

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Main report and annexes

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Map of the Project Area



The designations employed and the presentation of the material in this map do not imply the expression of any opinion whatsoever on the part of IFAD concerning the delimitation of the frontiers or boundaries, or the authorities thereof.

Map compiled by IFAD | 15-11-2023

Abbreviations and Acronyms

| | |
|-----------------|---|
| ADB | Asian Development Bank |
| ADBL | Agriculture Development Bank Limited |
| ASDP | Agriculture Sector Development Programme (GON-IFAD) |
| ASHA | Adaptation for Smallholders in Hilly Areas (GON-IFAD) |
| AUO | Office of Audit and Oversight |
| AWPB | Annual Work Plan and Budget |
| B2B | Business to Business |
| B2S | Business to Service |
| BALI | Business Action Learning for Innovation |
| BoQ | Bill of Quantities |
| CBO | Community-Based Organizations |
| CBPP | Community Based Participatory Planning |
| CCA | Climate Change Adaptation |
| CFM | Country Feedback Mechanism |
| CMT | Contract Monitoring Tool |
| COI | Core Outcome Indicators |
| COSOP | IFAD Country Strategic Opportunities Programme |
| COSTAB | Cost Tables |
| COVID-19 | Coronavirus disease 2019 (SARS-CoV-2 virus) |
| CQS | Selection Based on Consultants' Qualifications |
| CSA | Climate Smart Agriculture |
| CSO | Civil Society Organizations |
| DA | Designated Account |
| DC | Direct Contracting |
| DUDBC | Department of Urban Development and Building Construction |
| EFA | Economic and Financial Analysis |
| EG | Ethnic Group |
| ENR/CC | Environment and Natural Resources/Climate Change |
| EoI | Expression of Interest |
| ESCMF | Environmental, Social and Climate Management Framework |
| ESCMP | Environmental, Social and Climate Management Plan |
| EU | European Union |
| F2F | Farmer-to-Farmer Extension |
| FA | Financing Agreement |
| FAO | UN-Food and Agriculture Organization |
| FBS | Fixed Cost Selection |
| FEBL | Financial Education and Business Literacy |
| FM | Financial Management |
| FMFCH | Financial Management and Financial Control Handbook for Borrowers |
| FMFCL | Financial Management and Financial Control Arrangements Letter |
| FPIC | Free Prior Informed Consent |
| FSDPG | Food Security Development Partner Group |
| FSS | Food System Summit |
| GALS | Gender Action Learning System |
| GAP | Good Agricultural Practices |
| GBF | Global Biodiversity Framework |

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|--------------------|---|
| GBV | Gender Based Violence |
| GC | General Conditions |
| GCF | Green Climate Fund |
| GDI | Gender Development Index |
| GDP | Gross Domestic Product |
| Geo-MIS | Georeferenced Management Information System |
| GESI | Gender Equality and Social Inclusion |
| GEWE | Gender Equality and Women's Empowerment |
| GHI | Global Hunger Index |
| GII | Gender Inequality Index |
| GiZ | Deutsche Gesellschaft fuer Internationale Zusammenarbeit GMBH |
| GNI | Gross National Income |
| GoN | Government of Nepal |
| GRM | Grievance Redress Mechanism |
| HCI | Human Capital Index |
| HH | Household |
| HHM | Household Methodology |
| HVAP | High Value Agriculture Project (GON-IFAD) |
| ICB | International Competitive Bidding |
| ICP | IFAD Client Portal |
| ICP-CMY | IFAD Client Portal – Contract Monitoring Tool |
| ICS | Individual Consultant Section |
| ICT | Information and Communication Technologies |
| IEC | Information, Education, and Communication |
| IFAD | International Fund for Agricultural Development |
| IFPRI | International Food Policy Research Institute |
| IFR | Interim Financial Reporting |
| IMT | Irrigation Management Transfer |
| IP | Indigenous People (Ethnic Groups) |
| IPCC | Intergovernmental Panel on Climate Change |
| IPPF | Indigenous Peoples Planning Framework |
| IPRM | Integrated Project Risk Matrix |
| IS | International Shopping |
| ISFP / KUBK | Improved Seeds for Farmers Programme (GON-IFAD) |
| IVET | Integrated Vocational Education and Training |
| IWGIA | International Work Group for Indigenous Affairs |
| KAP | Knowledge, Attitudes and Practices |
| KM | Knowledge Management |
| LANN | Linking Agriculture, Natural resource management and Nutrition approach |
| LAPA | Local Adaptation Plans for Action |
| LCS | Least Cost Selection |
| LDC | Least Developed Country |
| LDH | IFAD's Loan Disbursement Handbook |
| LDN | Land Degradation Neutrality |
| LFLP | Leasehold Forestry and Livestock Programme (GON-IFAD) |
| LPA | Lead Partner Agency |
| LtB | Letter to the Borrower |

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|----------------|--|
| M&E | Monitoring and evaluation |
| MAPS | Methodology for Assessing Procurement Systems |
| MIS | Management Information System |
| MoALD | Ministry of Agriculture and Livestock Development (federal) |
| MoES | Ministry of Education and Sports |
| MoF | Ministry of Finance (federal) |
| MoFAGA | Ministry of Federal Affairs and General Administration (federal) |
| MoFE | Ministry of Forests and Environment (federal) |
| MOGAP | Market Operational Guideline and Action Plan |
| MoICS | Ministry of Industry, Commerce and Supplies (federal) |
| MoLMAC | Ministry of Land Management, Agriculture and Cooperatives (province) |
| MoUD | Ministry of Urban Development |
| MPI | Multi-dimensional Poverty Index |
| MSME | Micro, Small and Medium Enterprise |
| MSP | Multi-stakeholder platform |
| MTR | Midterm Review |
| NARC | Nepal Agriculture Research Council |
| NCB | National Competitive Bidding |
| NDC | Nationally Determined Contribution |
| NDVI | Normalized Difference Vegetation Index |
| NEET | Not Employed in Education or Training |
| NGO | Non-governmental organization |
| NOTUS | No Objection Tracking Utility System |
| NPSC | National Project Steering Committee |
| NPV | Net Present Value |
| NRM | Natural resource management |
| NS | National Shopping |
| NTFPs | Non-Timber Forest Products |
| NUS | Neglected and Under-utilized Species |
| O&M | Operations and Management |
| ODA | Official Development Assistance |
| ORMS | Organizational Results Management System |
| PA | Programme Account |
| PAP | Palika Agroecology Plans |
| PAR | Participatory Action Research |
| PBAS | IFAD Performance-Based Allocation System |
| PCO | Programme Coordination Office at federal level |
| PDO | Programme Development Objective |
| PDR | Programme Design Report |
| PDT | Programme Design Team |
| PIM | Programme Implementation Manual |
| PMO | Programme Management Unit (provincial level) |
| PO | Producers' organizations |
| PP | Procurement Plan |
| PPC | Provincial Planning Commission |
| PPMO | Provincial Programme Management Office |
| PPSC | Provincial Programme Steering Committee |
| PRM | Procurement Risk Matrix |

| | |
|---------------|---|
| PwD | Persons with Disabilities |
| QCBS | Quality and Cost-Based Selection |
| RAS | Rural Advisory Services |
| REoI | Request for Expression of Interest |
| RERP | Rural Enterprises and Remittances Project (GON-IFAD) |
| RET | Renewable Energy Technologies |
| RFQ | Request for Quotation |
| SDG | Sustainable Development Goal |
| SECAP | Social, Environmental and Climate Assessment Procedures (IFAD) |
| SIAP | Social Inclusion Action Plan |
| SLM | Sustainable Land Management |
| SNV | Netherlands Development Organization |
| SO | Strategic Objective |
| SOE | Statement of Expenditure thresholds |
| SSS | Single Source Selection |
| SSTC | South-South and Triangular Cooperation |
| TA | Technical Assistance/Assistant |
| TAA | Targeted Adaption Assessment |
| TEPC | Trade and Export Promotion Centre |
| TOR | Terms of Reference |
| ToT | Training of Trainers |
| UNCT | United Nations Country Team |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VITA | Value chains for Inclusive Transformation of Agriculture (GON-IFAD) |
| WA | Withdrawal Application |
| WUPAP | Western Uplands Poverty Alleviation Project (GON-IFAD) |

In line with IFAD mainstreaming commitments, the project has been validated as:

Be gender transformative Be youth sensitive Be nutrition sensitive Prioritize persons with disabilities Prioritize indigenous peoples Include climate finance Build adaptive capacity

Executive Summary

Background

Nepal maintained economic growth over the 2010-2020 decade and was able to reduce multidimensional poverty by half between 2006 and 2019. Nepal achieved lower middle-income status in 2020 and is on the path for graduation from Least Developed Country status by 2026. However, in recent years, economic growth has been affected by multiple shocks such as the Gorkha earthquake and fuel crisis in 2015, floods in 2017, and the COVID-19 pandemic from 2020 - 2022.

In 2020, with the onset of COVID-19, the economy contracted by 2.4%, resulting in substantial job and income loss. The recovery has been unequal and incomplete: GDP grew by an estimated 5.3% in FY 2022, but slowed down to an estimated 2.16% in FY 2023. Inflation reached almost 8% in the first 8 months of FY 2023, following a global trend related to the on-going Russia-Ukraine conflict, which is impacting prices of fuel, food, and agricultural inputs. Further, the rising prices of imported goods is compounded by the depreciation of the Nepali Rupee against the US Dollar (around 6% in FY 2022).

The contribution of the agriculture sector to the GDP has steadily decreased from 33% in 2010 to 25% in 2021. Exports of agri-food products have increased and are now the country's main export in value. However, the growing dependency on food imports poses major challenges to national food security and sovereignty, while also placing foreign exchange reserves under stress. As such, there is renewed urgency to increase domestic food production and distribution, and to generate foreign exchange from the agriculture sector to offset import expenditures.

Rationale

The agriculture sector remains critical to the national economy, as it still employs 55% of the work force. Most agriculture workers are self-employed in small-scale and primarily subsistence-oriented family farming. Farmers face multiple constraints including very small land holdings, labour shortages, underdeveloped infrastructure, and limited access to advisory services, finance and markets. Of the total cultivable land of 2.64 million hectares, about 58% are supported by some form of irrigation. The dependency on rainfall is therefore high, causing significant variation in agricultural production across the years. Shocks and risks affecting agricultural production are also exacerbated by the effects of climate change, that result in uneven rainfall patterns, extreme weather events, droughts, floods and landslides.

Rural women are particularly disadvantaged: While women are overrepresented in the agriculture sector due to the migration of men from rural areas, 76% of women engaged in agriculture are unpaid and only 10% of the farms are owned by women. Despite remarkable progress achieved with regard to protection and promotion of women's rights and gender equality, women still lack access to key productive assets and services. This coupled with deeply rooted sociocultural norms restricts effective participation in decision-making processes and impedes further progress in their social and economic empowerment.

Young rural people also face challenges related to access to education, civic engagement, political participation, unemployment and underemployment. Unemployed youth aged 15-24 account for 20.5 percent of the total labour force, with women unemployment being higher than men (22.5% and 19.2% respectively). More than a third of youth are without education, training or employment. Youth migration is a major challenge in rural areas that affect agricultural activities at large.

In this context, the agriculture sector needs to transition to a more resilient, self-reliant, and sustainable system that is able to generate significant revenues from both domestic and export markets. To achieve this, a systematic process to transition from a conventional production model to a market-oriented agroecological model over the medium-term is necessary. The agroecology transition is grounded in an approach that seeks to produce market-driven "safe food", while maintaining and increasing agricultural productivity for food and nutrition security through targeted pathways and practices. The multiple benefits of this transition will support increased production and revenues, import substitution, export, trade deficit reduction, improved environmental services, and resilience to climate and other shocks.

The Resilient High Value Agriculture Programme (R-HVAP)

The Government of Nepal and IFAD have designed the Resilient High Value Agriculture Programme (R-HVAP) with the objective of transforming smallholder agriculture into inclusive, agroecological and profitable agri-food systems.

R-HVAP will adopt a stratified approach to target poor smallholder farmers, producer organizations (POs), and micro, small, and medium enterprises (MSMEs), providing needs-based co-investment packages to facilitate a transition to diversified agroecological production systems linked to commercially oriented multi-product supply chains. Market demand will be the main driver and pull factor of the programme. In line with the 2022 IFAD stock-take report on agroecology, the market-orientation, economic viability and service linkages of agroecological production will be strengthened. Further, the agroecological approach will be adopted for enhancing product quality to meet domestic and international demands for safe, organic and sustainably produced products, and for generating foreign currency inflows.

The programme will cover a period of eight years from 2024 to 2031.

R-HVAP Goal and Development Objective.

Programme Goal. Reduced poverty and improved resilience of smallholder households.

Programme Development Objective. Transition smallholder farming towards sustainable food systems that are profitable, inclusive and agroecological.

The programme goal and development objectives contribute to the following Strategic Objectives (SO) of the COSOP: accelerated inclusive and sustainable rural economic growth and recovery through greater market participation, improved resilience of rural communities to the impacts of climate change and to economic and other shocks; and strengthened rural and community institutions to effectively meet development needs under the decentralized federal system.

The Programme fully aligns with the development objectives and strategies of Nepal's Fifteenth Plan (FY2019/20-2023/24) and directly contributes to the federal and provincial Agricultural Development Strategies, and provincial priorities such as the Karnali Organic Mission Plan 2079.

To specifically address constraints and challenges faced by rural women and youth, R-HVAP will contribute to two of IFAD's mainstreaming priorities: gender equality; and employment of rural youth.

Target areas. The programme will cover three provinces in Western Nepal: Lumbini, Karnali, and Sudurpashchim, and operate in approximately 80 Municipalities (Palikas). The provinces have been selected based on the highest incidence of multi-dimensional poverty, impacts of COVID-19 on rural livelihoods, location of the Semlar regional wholesale market for national and international distribution, and a landscape perspective to facilitate the building of an agroecological foodshed.

Palika selection. R-HVAP will adopt an agroecological cluster-based approach for geographic targeting.. A total of 80 target Palikas (Karnali 32, Lumbini 31, Sudurpashchim 17) have been prioritised through a Geographic Targeting Index that combines the following selection criteria: (i) presence of target groups (poor and vulnerable communities, women and youth); (ii) production potential; (iii) market accessibility; (iv) presence of ongoing or recently completed IFAD-financed projects (ASDP, ASHA, and KUBK), and (v) agroecology potential. The list of target Palikas will be validated at programme start-up in consultation with the respective provincial governments for implementation.

Programme participants and outreach. The total R-HVAP outreach is estimated at 60,000 households or 258,000 individuals. Of these, 45,000 households will benefit from market-oriented agroecological production packages, and an additional 15,000 households will benefit from capacity building and extension services (enhanced financial education and business literacy [FEBL], demo farms, market and service linkages (multi-stakeholder platforms [MSP], business to business [B2B], business to service [B2S]), and from public goods (irrigation, aggregation, storage and regional wholesale market infrastructure).

Target groups. The main target group consists of poor smallholder households engaged in mixed farming systems and deriving most of their income from agricultural production at different scales: subsistence, semi-commercial, and commercial. Women-headed households, women farmers, youth (including returnee migrants) and minority communities (dalits and janajatis/indigenous people) will be prioritized. Women will constitute at least 50% of the total programme participants and youth 40%.

In line with the new IFAD Targeting Policy (EB 2023/138/R.3), R-HVAP will provide needs-based services for: (i) poor (including both poor and medium poor); (ii) ultra-poor; and (iii) near-poor households. Poor and ultra-poor farmers will together constitute 80% of programme participants.

Description of the programme

Component 1: Enhanced capacities for transitioning to market oriented agroecological production systems.

Sub-Component 1.1 Decentralised agroecological planning and coordination: The programme will support the preparation of 5-Year Palika Agroecological Plans (PAP) through a local level planning process facilitated by decentralised Provincial Programme Management Offices (PPMOs) and Corridor Offices (COs). The PAPs will result in the identification of potential programme participants, high-value commodities that can be nested within agroecological farming systems, farm level agroecological best practices, market demands and compliance standards, agri-service and enterprise opportunities, and public goods and productive infrastructure needs. The PAP priorities eligible for R-HVAP financing will be consolidated and aligned with the annual local planning process for leveraging municipal co-financing and integration into the municipal annual development plans. PAPs will be formulated for the 80 programme Palikas.

Sub-Component 1.2 Knowledge and capacity for establishing agroecological farming: R-HVAP will build on the existing knowledge base of sustainable agriculture, agroecology and permaculture by upgrading the currently available knowledge products, and by disseminating good practices through a training-of-trainer (TOT) approach for Junior Technical Assistants (agriculture) and Community Mobilisers. Agroecological demonstration farms will be established in cooperation with around 80 lead farmers. This activity will be combined with in-depth training on the different technical aspects of agroecological farming, together with a Financial Education and Business Literacy (FEBL) trainings as well as a truncated version of the Gender Action Learning System (GALS lite). The FEBL-GALS-lite sessions will be used as an entry point to advance women's economic empowerment and enhance the financial and business knowledge and skills among the producers HHs. This sub-component also includes youth agroecology apprenticeships for about 60 young agricultural trainees, as well as Farmer-to-Farmer exchange that will contribute to building a large community-of-practice (COP). Participatory Research and Monitoring will involve the preparation of an analytical framework designed to study and monitor the ecological, economic and social outcomes and impacts of market-oriented agroecological farming systems.

Sub-Component 1.3 Market oriented agroecological production expanded: R-HVAP will provide support to at least 1,600 Producer Organisations (POs - approximately 45,000 farmers), including those assisted under the Agriculture Sector Development Programme

(ASDP) and Adaptation for Smallholders in Hilly Areas (ASHA). To enhance the capacity of these POs and facilitate the PO graduation process, a specialised service provider will be recruited.

Based on the lessons learned from the High Value Agriculture Project (HVAP), Multi-Stakeholder Platforms (MSPs) will be operationalised to link POs with MSMEs at the cluster and provincial levels. Business to Business (B2B) and Business to Service (B2S) linkages will be facilitated for building profitable trading relationships between POs and respectively, agribusiness/traders (B2B) and commercial service providers (B2S). Cluster MSPs and B2B/B2S will be high priority processes launched at programme start-up in order to create early linkages between POs and major MSMEs and buyers, and for leveraging the private sector's market intelligence for informing PAPs, PO and MSME investments, market compliance standards, and risk reduction.

Guided by the PAPs, R-HVAP will co-finance PO capacity building and farm-level investments in agroecological farming practices for two complementary high value commodities which have domestic and export market potential, comparative commercial advantage for smallholder producers, and agroecologically suitable production. Products that have been successfully promoted by previous projects such as HVAP, KUBK, RERP and ASDP will be prioritized, including crops, livestock, agroforestry systems, honey production, non-timber forest products (NTFPs) and medicinal and aromatic plants (MAPS). Participating smallholder farmers (around 40,000 households) will be eligible for two types of tailored production support packages. POs supported by ASDP and ASHA (around 5000 households) will be eligible for one production package that complements the value chain support they have already received under the previous project. About 3,000 ultra-poor households will be eligible to access the Inclusion Fund for additional subsidised support.

R-HVAP programme participants will be eligible to access financial products under IFAD's on-going Value Chains for Inclusive Transformation of Agriculture (VITA) project implemented by the Agriculture Development Band Ltd (ADBL).

Sub-Component 1.4: MSME ecosystem for agricultural service market strengthened. The programme will mobilise specialised expertise at PMO level to facilitate the development of an ecosystem of MSME services to meet upstream and downstream needs of agroecological multi-commodity value chains. Co-investment support will be provided to: (i) Decentralized MSME units for affordable and high-quality bio-input production; and (ii) MSME service market for post-harvest value addition. Supported MSMEs will be mandated to provide their services to R-HVAP target groups in proportion to the co-investment amount provided, and are expected to initially benefit 25,000 smallholder households. The MSME's business plans will be required to include a scaling-out strategy to service a larger group of households over the full project period. Support to youth includes a skills development programme for youth employment through Agricultural Technical and Vocational Education and Training (Agri-TVET, around 400 youth), and business incubation support for enterprise development (300 youth).

Component 2: Improved access to climate resilient productive infrastructure.

R-HVAP will fund infrastructure to complement production activities supported through co-investments under Sub-component 1.1. Under the PAP process, climate resilient infrastructure for smallholders and POs will be identified and selected. These will include: (i) water related systems such as small-scale irrigation schemes, water storage facilities, multi-use water systems (MUS) etc.; (ii) collection points and storage facilities for efficient commodity aggregation; and (iii) post-harvest primary processing facilities. All infrastructure interventions will be synergetic with other programme interventions and include O&M measures. Renewable Energy Technologies (RETs) will be supported for lift irrigation, primary processing and postharvest handling activities.

Component 3: Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets.

R-HVAP will support the first phase of the construction of the Semlar Agriculture Regional Wholesale Market in Butwal Sub-Metropolitan City, Lumbini province. The proposed market will facilitate the aggregation of commodities from a large catchment area, targeting R-HVAP-supported POs, for improving distribution of agroecological commodities to both domestic and export markets.

Component 4: Strengthened policies, regulations and institutions for smallholder agroecological production and trade.

R-HVAP will work to establish and strengthen enabling policies, regulations and other supporting frameworks for profitable smallholder agroecological production, facilitated by participating institutions and communities. In addition, to support export of agricultural produce, the programme will establish certification systems, enhance the capacity for compliance with sanitary and phytosanitary (SPS) measures, support trade facilitation and negotiations, and participate in international trade events, and ethical and bio-trade fairs.

Programme costs and financing. The total cost of the programme is estimated at US\$ 120.9 million. The financiers and contributions are the following: (i) IFAD loan US\$ 70.9 million (58.6%); (ii) Federal Government of Nepal US\$ 24.6 million (20.3%) comprising of, (a) US\$ 19.6 million (16.2%) covering duties, taxes, salary and operational cost of deputed staff, and (b) US\$ 5.0 million (4.1%) cash contribution for the Semlar wholesale market; (iii) provincial government US\$ 0.5 million (0.4%); (iv) local government / Palikas US\$ 1.52 million (1.3%); (v) Producer Organizations-Households US\$ 20.87 million (17.3%); and (vii) MSMEs US\$ 2.56 million (2.1%).

Summary of the economic and financial analysis. A financial analysis was conducted for nine different household-level farm models, five types of MSMEs, and for major community infrastructures. The financial analysis indicates all of these models present an Financial Internal Rate of Return (FIRR) of above 12.8%. The benefit-cost ratio (BCR) is above 1.01 and Net Present Value is above NPR. 50,600 (US\$ 389) with a 12% discount factor (DF). This indicates all these models will be financially attractive for investment by smallholder farm households.

Further, based on the financial models of farms/households, MSMEs, community infrastructure and the Semlar Wholesale Market, an economic analysis of the programme was conducted using economic prices. The cost-benefit analysis yields an overall Economic Internal Rate of Return (EIRR) of 18.1%. The estimated NPV for a 9% discount rate is NPR 21,267 million (USD 163.6 million) and

the BCR is 8.52. A positive NPV under the current Opportunity Cost of Capital of 9% indicated that the programme investments were sound, and worth investing in from a financial and economic perspectives.

Environmental, social and climate risks and mitigation measures

The environmental and social category for R-HVAP is determined as **substantial**, based on the screening tool of SECAP 2021. An international Environmental Impact Assessment (EIA) study team, commissioned by Invest International of The Netherlands, submitted a final draft of the EIA report to the Government of Nepal, which was approved on 29 September 2023. The EIA study was conducted in close coordination with IFAD, and it adheres to the SECAP 2021 standards, and was disclosed to the Executive Board on 14 August 2023. The EIA report encompasses a comprehensive analysis of the social and environmental impacts associated with the wholesale market and includes a list of proposed mitigation measures.

R-HVAP is a gender transformative and youth sensitive program that places a significant emphasis on social inclusion. To mitigate environment, social, and climate risks, a comprehensive Environmental, Social, and Climate Management Plan (ESCMP) was prepared.

The climate risk category of the program is determined as **substantial**. R-HVAP intervention areas are exposed to river flood, urban flood, landslides, water scarcity, extreme heat, and wildfires. Likewise, anticipated future climate scenarios predict changes in temperature, climate variability, and changes in intensity and frequency of extreme events.

Implementation arrangements

The Ministry of Agriculture and Livestock Development (MoALD) is the Lead Programme Agency (LPA), and will work in collaboration with the Ministry of Industry, Commerce and Supplies (MoICS), Department of Urban Development and Building Construction (DUDBC) of the Ministry of Urban Development (MOUD), and the respective Ministries of Agriculture, and Environment and Forests at provincial level, and other relevant agencies/stakeholders. The Ministry of Finance (MoF) will have overall oversight of programme implementation.

A Programme Steering Committee (PSC) at federal level will be chaired by the Secretary of MoALD with representatives from the concerned line ministries (MoF, MoICS, MOFE, DUDBC/MoUD). Three Provincial Programme Steering Committees (PPSC) will be established under the chairmanship of the Secretaries of provincial agriculture ministries (MoLMAC), with representatives from the relevant provincial ministries (MoITFE, etc.) of Lumbini, Karnali and Sudurpashchim.

Management structures will include: (i) a Programme Coordination Office (PCO) at federal level, hosted by MoALD; (ii) three Provincial Programme Management Offices (PPMO) in the respective provincial capitals of Lumbini, Karnali and Sudurpashchim; and (iii) three Corridor Offices (COs) in strategic locations. The PPMOs and COs will include technical, finance and procurement related expertise as required.

Government appointed staff will be deputed to the various levels. For specialised expertise and programme delivery functions, programme personnel will be recruited through Service Providers specialised in the three key areas of the programme: agroecology, PO professionalization, and MSME development.

Monitoring and Evaluation, Knowledge management

The M&E system developed and managed by the PCO will cover: (i) monitoring of implementation performance, execution of the Annual Work Plan and Budget (AWPB), outreach and effectiveness of the targeting strategy, and (ii) periodic measurement of programme results (outputs, outcomes and impact) in relation to agreed targets. All provinces will contribute to a single R-HVAP M&E System and have access to the data generated.

The programme will invest in good quality, evidence-based knowledge management to contribute to implementation and policy development processes. A KM Strategy and Policy Engagement Plan will be developed that considers and responds to the knowledge and communication needs of all key stakeholders, including programme participants (youth, POs, MSMEs), provincial and local governments, and the R-HVAP team as well.

1. Context

A. National context and rationale for IFAD involvement

a. National Context

Political, economic, and social context.

1. **Political context.** The 2015 Constitution established Nepal as a federal democratic republic with a three-tier government structure: one federal government, seven provincial governments, and 753 local level administrations (*Palika* or municipality). Recent general elections in 2017 and 2022 have resulted in coalition governments with relative political stability.
2. The on-going transition from unitary to a federal system faces challenges in terms of government capacity, lack of clarity and coherence between policies and devolved powers, and jurisdictional overlap among the three tiers of government (World Bank 2020).

3. The implications of the transition to federalism for the agriculture sector are multiple: a recent study found that functional overlap, duplication and lack of coordination between the three tiers of the government hinder the operationalisation of the devolution of institutional powers to the appropriate level. However, the advisory services delivered by communes to agricultural producers have improved (Bishwakarma, B. K. 2022).
4. **Economic context.** With growth averaging 4.5% per year over the last decade, Nepal achieved lower middle-income status in 2020 and it aims for graduation from Least Developed Country status by 2026. Economic growth has been affected by shocks; the Gorkha earthquake and fuel crisis in 2015, floods in 2017, the COVID-19 pandemic from 2020 - 2022, and increasing environmental hazards.
5. In 2020, with the onset of COVID-19 pandemic, the Nepalese economy contracted by 2.4%, resulting in substantial job and income loss. The recovery has been unequal and incomplete. By the end of 2021, close to a fifth of jobs lost have not been recovered, and women in agriculture and lower skill occupations were recovering slower.
6. The economy grew by an estimated 5.3% in fiscal year 2022, driven by hydroelectricity, manufacturing, construction, and a gradual return of tourism. Growth declined in FY2023 and estimated to be 2.16% – 2.73% in agriculture and 1.92% in non-agricultural sectors. Inflation increased from 3.6% in 2021 to 5.54% in 2022, and 7.93% in the first 8 months of FY 2023, following a global trend related to the on-going Russia-Ukraine conflict, that continues to impact prices of fuel, food, and agricultural inputs. The problem of rising prices of imported goods is compounded by the depreciation of the Nepali Rupee against the US Dollar (around 6% in FY 2022)^[1]. Prospects for continued growth in 2024 are positive but risks related to a global economic downturn might negatively impact revenues from tourism and remittances (Asian Development Outlook, April 2023).
7. The contribution of the agriculture sector to GDP has steadily decreased, falling from 33% in 2010 to 24.7% in 2021/2022 to 24.1% in 2022/23 (MoF, 2023). Manufacturing and services contributed 13.5% and 62.4% respectively in FY 2023. Over the same period, the agriculture sector grew at a slower pace of 3% per year, compared to the industry and service sectors (5% and 4.6% respectively), resulting in a large migration of labour from farming to non-farming occupations.
8. In 2018 agriculture employed 60.4% of the work force which decreased to 50.4% in 2021 (MoF 2023). This has caused increase in fallow lands in the hills and mountains. Of the total cultivable land of 2.64 million hectare, about 58% is supported by some form of irrigation. The dependency on rainfall is therefore high causing significant variation in agricultural production across the years.
9. Agriculture remains critical to the national economy. Exports of agri-food products have increased and are now the main export in value. The country exported agro products worth NPR 125.51 billion (USD 1.1 billion), representing 63% of its export earnings in 2021/2022. Meanwhile, imports of food products increased sharply in 2021/2022, reaching NPR 378.60 billion (USD 3.2 billion) or 19% of the total value of imports (WTO statistics and the Department of Customs).
10. The agricultural trade deficit and growing dependency on food imports pose major challenges to national food security and sovereignty, while also placing foreign exchange reserves under stress. Short term measures, such as import restrictions, have been applied in 2022 and 2023 but import substitution remains the priority.
11. The mid-hills have a comparative advantage in supplying domestic and export markets due its high agroecological diversity and relatively low use of agrochemicals. There are demonstrated profitable opportunities for off-season vegetables (OSVs), spices, coffee, tea, Non-Timber Forest Products (NTFPs), honey, and Neglected and Underutilised Species (NUS). However, supply chains are fragmented and poorly regulated, which constrains Micro, Small and Medium Enterprises (MSMEs) in the aggregation of quality products from smallholders. Support to MSMEs in aggregation of products, and access to finance and markets is needed both for import substitution and export driven production for generating foreign currency inflows. The latter includes compliance to international market requirements and certification.
12. **Social context.** Twenty-five percent of the population lives below the national poverty line of USD 0.50 per day (WFP, 2022) and 8.2 percent below the international poverty line of US\$2.15 (WB, 2010). Data shows that multidimensional poverty incidences are higher than their monetary counterpart, indicating that a larger portion of the population suffers deprivation in areas of health, education etc. The latest multidimensional poverty report by the National Planning Commission (NPC, 2021) indicated 17.4% or 4.98 million of the population were in multi-dimensional poverty; 4.9% being severe and 17.8% vulnerable to become multi-dimensionally poor. However, Nepal has more than halved its Multidimensional Poverty Index (MPI), which was 59.35%in 2006 and has fallen since to 17.4%in 2019. MPI is 28%in rural areas and 12.3%in urban areas (NPC, 2021).
13. The 2016 Nepal Demographic and Health Survey (NDHS) showed that only 48.2% of households at national level were food secure whereas in rural areas it was only about 38.8%. About 10% of households are severely food insecure. Geographically, the mountain regions suffer from more food insecurity where the percentage of food secure households is 38.4%compared to *Terai* (or plains) where it is about 51% (MoPH, 2017).

Alignment with Sustainable Development Goals (SDGs).

14. R-HVAP will directly contribute to achieving SDGs 1, 2, 5, 8, 12, 13 and 15. The programme specifically targets SDG 1 - no poverty, and SDG 2 - zero hunger, through the increase of agricultural productivity, availability of fresh food in local markets, value addition, and income generation for poor and ultra-poor households. The programme's participatory process to ensure women, youth and vulnerable groups are included in local institutions, economic dynamics, and employment opportunities, contributes to SDG 5 - gender equality and 8 - decent work. By establishing conditions and incentives for sustainable and profitable agroecological farming, the programme will contribute to SDG 12 - responsible consumption, 13 - climate change, and SDG – 15 life on land, by improving responsible patterns of production and consumption that are simultaneously resilient to economic and climate shocks, and promote ecological restoration.

Smallholder agricultural and rural development context.

15. Nepal is an agrarian country with a large rural population dependent on agriculture for food and income. The dominant practice of family farming involves around 50.4% of households. The predominance of smallholder farming that use integrated crop and livestock farming is a salient feature of Nepal. Land distribution is uneven and a majority of small farmers utilize about 18% of total agriculture land. Landholdings are significantly skewed against the poor with respectively 47.2% of farmers holding less than 0.5 hectares (ha), 27.2% between 0.5 and 1 ha (CBS, 2011), and 24.5% of farmers between 1-5 ha (ADS, 2015-2035). Migration is contributing to an increase in abandoned and fallow lands, however, without any increase in land holdings of those who remain.
16. While three cropping seasons are prevalent in the plains, the Hill Regions have a double season and the Mountain Regions only a single season. Farmers' access to inputs such as irrigation, fertilizer and seed are limited. This is attributed to poor road access to market centres and poor purchasing power when access is available. The Terai has relatively better access to inputs however, access to productive infrastructure, agri-advisory services, credit, and agriculture insurance are lacking in all regions. Land degradation, exposure to climate shocks and natural disasters further contributes to low agricultural productivity (MoFE, 2018)^[2].
17. The low productivity of small plots, inadequate infrastructure, and limited access to markets lead to low returns to farmers. This has led to large-scale migration, particularly by young men from rural areas seeking better prospects in urban areas or in other countries. This in turn is contributing to agricultural labour shortages, which further adversely affects agricultural yields and labour costs without a concurrent increase in farm-gate prices. This shortage of labour adds more burden onto women in households that take on additional labour for less returns. Land operated by women produce less value per hectare due to lower accessibility and use of technology (FAO 2019).
18. Low incomes derived from agriculture stem primarily from weak links to markets and low competitiveness of commodities produced. This is caused by constraints on both supply and demand sides that come together to form a vicious circle, which pose significant challenges. On the supply side, farm size, farming patterns, low capacity for innovation, and lack of post-harvest storage, handling, processing and packaging facilities are the main causes for limited marketing opportunities. This in turn is linked to demand side hurdles such as, the under-development of vertically and horizontally coordinated supply chains that could play a key role in driving demand for agricultural produce in line with market requirements.

National strategies, policies and/or programmes relevant for smallholder agriculture, rural poverty reduction and enhanced food security.

19. Nepal's Fifteenth Plan (FY2019/20-2023/24) calls for the following: sustainable and inclusive economic growth and poverty alleviation; modernization and commercialization of agriculture, with an emphasis on high value production and processing; and sustainable natural resource management for enhancing ecosystem services to the agriculture sector.
20. The 20-year Agriculture Development Strategy adopted in 2014 envisions "a self-reliant, sustainable, competitive, and inclusive agricultural sector that drives economic growth, and contributes to improved livelihoods and food and nutrition security leading to food sovereignty". A long-term target is to increase the agricultural land productivity (AGDP/ha) from \$1,804 to \$4,787. The sustainability vision aims to increase soil fertility, with a target to increase Soil Organic Content (SOC) from 1% (in 2010) to 4% in the long term. Some provinces have formulated and implemented strategic priorities for the agriculture sector such as the Organic Mission of Karnali Province.

Key actors and institutional arrangements.

21. Federal Ministry of Agriculture and Livestock Development (MoALD) is the key government institution for agriculture related policy formulation, implementation and monitoring, international cooperation in the agriculture sector, and administering federal projects, and providing normative guidance to institutions for achieving national objectives. MOALD, as Lead Programme Agency (LPA) will host the Programme Coordination Office (PCO) at the federal level.
22. The Department of Urban Development and Building Construction (DUDBC) of the Federal Ministry of Urban Development (MOUD) is responsible to promote safe and affordable housing, promote construction and development of safer, economical, and environmentally friendly buildings and promote rural urban linkage through development of modern physical facilities. DUDBC is an implementing partner of several development projects funded through the Asian Development Bank (ADB), World Bank (WB), Japan International Co-operation Agency (JICA), and others. DUDBC will lead the construction of Semlar regional agriculture wholesale market (Component 3) of R-HVAP.
23. Federal Ministry of Industry, Commerce and Supplies (MoICS) is responsible for the formulation and implementation of policies, acts, regulations and rules for the promotion of industries and business enterprises for employment generation and export promotion. MOICS is also responsible for cooperation and coordination with agencies involved in national, regional, and international trade and transit, and protection of consumer rights and welfare.
24. Trade and Export Promotion Centre (TEPC) functions under MoICS and works as a facilitator in identifying various markets for export, providing trade-related information on certification and export procedures. TEPC will work closely with RHVAP Programme Management for the implementation of activities under Component 4.
25. Provincial Ministries of Land Management, Agriculture, Livestock, and Cooperatives (MOLMAC) are the key institutions supporting the agriculture sector for improving production and productivity of agriculture, livestock, and fisheries through the adoption of modern technologies, and through promoting agricultural enterprises in the province. These Provincial Ministries will host a Provincial Programme Management Unit (PPMO) each at the provincial level.

26. Municipalities (Palikas) are one of the three tiers of government in Nepal, ensuring decentralized governance and local autonomy, placed at the frontline to manage substantial public resources and deliver critical services to citizens and tasked to coordinate, regulate, and evaluate all development activities within their jurisdiction. Municipalities will be involved in joint monitoring of Programme implementation and seek co-financing and potential collaborations for the implementation of the Palika Agroecology Plans (PAP) and overall engagement in agroecological approaches and priorities.
27. Nepal Agriculture Research Council (NARC) is responsible to conduct agricultural research in the country and plays an important role in qualitative studies and research, technology generation, dissemination and promoting the adoption of technology in agriculture and assisting in the formulation of agricultural policies and strategies. NARC will be an important partner for conducting participatory research and monitoring, and demonstration related to agroecological farming.
28. Civil society organizations (CSOs) are operating both at local and national levels. CSOs support governments in providing community-based services such as social mobilization, capacitation of producer organizations, agro-ecological farming, environmental education, and gender and youth empowerment etc.
29. Micro, Small and Medium Enterprises (MSMEs) provide market intelligence and access to producers for determining when and where to invest, and how to manage risk and protect their investments. Some MSMEs have developed strong ties with POs to set up their supply chains, while others provide support services for inputs, farm machinery, and post-harvest processing. MSMEs will play a significant role in the implementation of R-HVAP.
30. Community-based organizations (CBOs) such as producer organisations, farmers groups, cooperatives (savings and credit, commodity-based, multi- purpose), community forest user groups (CFUGs), livestock and crop groups, and women's development groups provide critical services to smallholder producers. Many CBOs have also developed links with extension service providers and other rural development players. Members of these CBOs have graduated to represent their constituencies at village level.

Multi-sectoral platforms.

31. IFAD is the Chair of the Food Security Development Partner Group (FSDPG). The FSDPG meets monthly and provides a platform for development partners to discuss policies, programmes, projects and thematic issues relevant to the agriculture sector. This allows for development partners to harmonize interventions and approaches, and for coordinating support to policy formulation and implementation of national strategies and priorities. As the Chair of the FSDPG, IFAD assumes the Co-Chair of the Agriculture Joint Sector Review (A-JSR) Chaired by the Minister of Agriculture. On 24 April 2023, under the A-JSR the Fourth Annual Agriculture Development Strategy review was undertaken.

b. Special aspects relating to IFAD's corporate mainstreaming priorities

32. **Gender.** Despite remarkable progress achieved with regard to protection and promotion of women's rights and gender equality, women in Nepal still lack access to key productive assets and services. This coupled with deeply rooted sociocultural norms restrict effective political^[3] and economic participation and impedes further progress in their social and economic empowerment.
33. The country stands at 133 of 162 countries in the Gender Inequality Index (GII - UNDP 2022). The global gender gap puts Nepal in 96th position of 146 countries, with an average score of 0.692, meaning disparity between men and women is more than 30% in terms of (i) economic participation and opportunity, (ii) educational attainment, (iii) health and survival, and (iv) political empowerment (World Economic Forum, 2022).
34. Nepal has one of the highest rates of women's participation in agriculture in the world, at over 70 percent of the workforce. The migration of men from rural areas is driving the feminization of agriculture, which results in shifts in the traditional division of labour leading to women taking additional responsibilities such as ploughing and marketing. Male migration has also led to an increase in women-headed households, which grew from 14.9 percent in 2001 to 31.3 percent in 2016 (World Bank, 2022a). Furthermore, 76.4 percent of women aged 15-49 years engaged in agriculture are unpaid, compared to 15.9 percent of women engaged in non-agricultural work.
35. Despite the new Constitution ensuring equal property rights without gender discrimination, ownership rights over land remain a major constraint for the majority of women with only 10% of farms being owned by women. Women-headed households hold on average only 0.50 ha of farmland, compared to 0.78 ha for male-headed households. This limits their access to credit, renting of tools and technologies, and purchasing of crucial inputs for agriculture production, which ultimately results in low production (FAO, 2019). Furthermore, women-headed households tend to plant fewer types of crops, making them more susceptible to climatic and other shocks (MoFE, 2022).
36. Rural women are constrained by their weak decision-making and bargaining power, triple-work burden (productive, reproductive and community work), limited knowledge about market demand and supply, as well as restricted opportunities for setting-up micro-enterprises and agriculture businesses. In addition, women have limited intra-household decision-making power, particularly regarding agricultural investments, household income expenditure and workload division. Women are also more adversely affected by climate change and have lower adaptive capacity. For instance, precipitation changes that harden soils or increases in weeds add to women's workloads. Activities that women engage in (collection of water, pest management, storage of grains, NTFP collection, etc.) are also the most affected by climate shocks (ICIMOD, UNEP and UN Women, 2021).
37. **Youth.** The Government of Nepal defines youth as people between 16-40 years, which accounts for 40.4 percent of the total population. Population aged 15-29, represent approximately 33 percent of the population with over 61 percent of them living in

rural areas (CBS, 2012).

38. Nepal has a young demography and the overall population is projected to increase. Youth continue to face challenges related to education, civic engagement, political participation, unemployment and underemployment. Unemployed youth aged 15-24 account for 20.5 percent of the total labour force, with women unemployment being higher than men (22.5% and 19.2% respectively). The number of youths without education, training or employment is 34.8% (WB, 2017).
39. Youth migration is a major challenge in rural areas that affect the agriculture sector. Limited access to land and economic opportunities in rural areas, low economic return of traditional agriculture, high concentration of economic activities in urban areas, wider availability of better paid low-skilled jobs in Middle Eastern Countries, and demographic changes are powerful push and pull factors affecting the movement of rural youth.
40. Youth are mainly employed in agriculture as unpaid family workers or as low paid wage employment. Self-employment for youth is constrained due to lack of knowledge and access to efficient production technology, lack of business skills and financial literacy, and inability to access credit. Changing the perception of farming is an important factor for attracting youth to agriculture. Evidence suggests that returnee youth labour migrants are more likely than youth non-migrants to engage in agriculture. Returnee youth labour migrants may be an important target group for the push to modernize agriculture for safe food production (WB 2018).
41. **Nutrition.** Nepal has made impressive strides in reducing the prevalence of under-5 stunting (low height-for-age) nationally, which fell from 57 percent in 1996 to 25 percent in 2022. During this same period, the prevalence of wasting (low weight-for-age) declined from 15 percent to 8 percent, and the prevalence of overweight was steady at 1 percent among children-under-5 (DHS, 2022).
42. Stunting prevalence for children under-5 years does vary by region; the highest is 55% in Karnali. Chronic undernutrition correlates with maternal education and wealth levels; 23% of children whose mothers have secondary education are stunted, while it rises to 46% when mothers had no formal education (USAID, 2021). Poor dietary diversity is a major factor for the high rates of child malnutrition and it impacts adolescent girls significantly contributing to a cycle of malnutrition and poverty.
43. **Climate change.** Nepal is the 51st most vulnerable country and 116th most "ready" country (to improve resilience) out of 182 countries based on the ND-GAIN Index (2020). Erratic and extreme rainfall (changes in monsoon onset, change in spatial patterns, increase in the number of consecutive dry days and decrease in consecutive wet days, increase in precipitation extremes, declines in winter or post-monsoonal precipitation) is evident in Nepal – resulting in increased frequency of floods, landslides, and droughts – with significant effects on agriculture. Climate change directly accounts for an equivalent of 10-30% of production loss in crops, livestock and fisheries sectors annually. Droughts accounted for 38.9% of all weather- and climate-related production losses between 1971 and 2007 whereas floods accounted for 23.2% (MoFE, 2021)^[4]. The potential for cropping system intensification is also limited by climate change and limited options for irrigation during the winter cropping season.
44. Climate change projections for Nepal indicate an increase in temperature and shifts in precipitation patterns. Models show that compared to 1981-2010, under RCP 4.5 (moderate emissions scenario), annual mean temperature is expected to increase by 0.78°C over 2011-2040 (a maximum of 1.21°C) and by 1.54°C over 2041-2070 (a maximum of 2.38°C)^[5]. The increase in daily maximum and minimum temperatures, and temperature increases during winter months is expected to be higher than the rise in average temperature. This has implications on rates of snowfall and water stress in the summer months. The projections for change in annual rainfall is less certain, with decreases at the lower end and increases at the upper end over 2011-2040 and 2041-2070 for both RCP 4.5 and RCP 8.5 (the latter is the high emissions scenario). Other models project an increase in rainfall in the central and western regions (CIAT; World Bank; CCAFS and LI-BIRD, 2017)^[6].
45. **Indigenous peoples.** Nepal is a multi-lingual, multi-religious, multi-ethnic and multi-cultural country inhabited by over 125 caste/ethnic groups, 123 languages and 10 religious groups. The National Census of 2011 determined that 35.8% of the population comprises of Indigenous Peoples (IPs - *Adivasi, Janajati*) and the country has legally recognized 59 indigenous nationalities and classified these groups into 5 different categories - endangered, highly marginalized, marginalized, disadvantaged, and advantaged (details in SECAP review note). Lumbini, Karnali and Sudurpashchim Provinces have 19.58%, 13.63% and 3.61% of IPs respectively (CBS, 2012).
46. There is extreme variation in the economic situation of indigenous people – from the *Rautes* who still make their livelihood through hunting and gathering, to the *Newars* and *Thakalis* who are well advanced in commercial and industrial activities (Bhattachan, 2012). Dalits and Indigenous Peoples still face discrimination and inter-generational exclusion. Dalits are probably the most marginalized and live in remote areas with a very low availability of employment options and opportunities for livelihood enhancement (CDA, 2020).
47. **Mainstreaming Themes Strategy.** While promoting positive shifts towards a food systems approach through policy instruments, capacity building and investments for inclusive, climate resilient, agroecological and profitable agri-food systems, R-HVAP presents a major opportunity to strengthen women's social and economic empowerment. The gender strategy of R-HVAP recognizes that rural women in Nepal play a key role in the transformation of the agricultural sector. This reflects the understanding that women's equal participation as agents of change in the programme needs to be facilitated through a set of specific enabling measures.
48. The R-HVAP gender, youth and social inclusion strategy will focus on responsive and equitable participation of disadvantaged groups in development planning and implementation. Women, youth and marginalised groups (i.e. Dalits, *janajatis* and IPs) will be consulted to ensure that programme activities take into consideration their specific needs when selecting subprojects and any strategic investments at community level. This will be done during the participatory planning process for Palika level

Agroecology Plan (PAPs) development. Similarly, ultra-poor and marginalized groups, including IPs will be consulted to define their needs and their participation in the programme.

49. To achieve this objective, the programme will: (i) conduct training and awareness raising in gender responsive participatory approaches for identification of development needs with a specific focus on inclusion of women and other vulnerable groups (i.e. women headed households, elders, youth and persons with disabilities, IPs and other marginalised groups); (ii) set quotas (30%) for inclusion of women and youth representatives in decision making in committees/boards responsible for planning processes at all levels (e.g. wards, municipality, province); (iii) ensure equitable participation (min 50%) of women and promote participation of youth (min 40%) in accessing programme services and training for improved agriculture practices, economic diversification, business advisory services, and job creation (employment creation and rural enterprise development); and (iv) nominate gender champions in PPMOs who can facilitate more regular interactions on social norms, attitudes, beliefs, practices and value systems that may impede inclusion. Women will also receive training in Financial Education and Business Literacy (FEBL). The programme will be **Gender Transformative** and **Youth sensitive**.
50. **Climate adaptive capacity.** Target provinces have an urgent need to identify and implement climate change adaptation (CCA) actions in the agricultural sector. The Local Adaptation Plans of Action (LAPA) approach has been implemented in Nepal since 2010, including in the IFAD-funded ASHA project. In this approach, different stakeholders (national, provincial, local government and Palikas) work together to identify climate risks for integrating climate adaptation priorities in their planning and budgeting processes to ensure climate finance reaches communities.
51. R-HVAP will not prepare new LAPAs but incorporate lessons from LAPA preparation and implementation into the programme's design, planning and implementation processes – specifically with regard to development of Palika Agroecological Plans (PAPs). This exchange of experience and lessons will be facilitated through a workshop with ASHA-supported local governments. The program will capacitate local governments to better integrate climate adaptation, resilience building and agroecology practices into their planning process.
52. R-HVAP's agroecological approach will directly influence resilience of agricultural production through the adoption of technologies and practices that have the potential to: (a) increase agrobiodiversity through the promotion of multi-commodity value chains; (b) reduce soil erosion and fertility loss (e.g. mulching, intercropping, agroforestry), thereby increasing soil organic carbon, moisture and fertility; (c) reduce the risk of crop diseases and pests (e.g. through IPM and use of bio-fertilizers and bio-pesticides); and (d) increase water use efficiency and conservation (e.g. drip irrigation, recharge ponds). In addition, stress-tolerant seeds, bio-inputs, crop diversification etc. will support the stabilization and increase of yields. Upgrading or development of new infrastructure will incorporate climate proofing for ensuring longevity.
53. During the start-up phase, R-HVAP will identify options to expand climate resilience of households and their production systems through: (a) provision of crop advisories through existing platforms that provide weather and climate information; (b) piloting revolving funds at the community level for post weather/climate shock recovery; and (c) linking with existing livestock insurance programs and associated subsidies to encourage uptake of insurance products to improve loss management.
54. Considering that Nepal is a LDC, reducing GHG emissions and emissions intensity of the agricultural sector is not a high priority in the Nationally Determined Contributions (NDC). Nevertheless, R-HVAP is expected to contribute to GHG emission reductions and carbon sequestration through the substitution of agrochemicals with bio-inputs, increasing soil carbon content, increasing woody vegetation, adoption of renewable energy technologies (RETs) for irrigation and post-harvest processing, and reduced food loss and waste.

c. Rationale for IFAD involvement

Development problem.

55. COVID-19, the Russia-Ukraine conflict, and increasing climate and other shocks have highlighted Nepal's heavy dependence on imports for food and nutrition security and exposed the vulnerability of Nepal's food systems. These vulnerabilities have been exacerbated by internal factors such as the political transition to a federal state and the macro-economic challenges such as very low contribution of manufacturing to GDP, high dependence on imports for government revenue, and gradual devaluation of the national currency. As such, there is renewed urgency to increase domestic food production and distribution, and to generate foreign exchange from the agriculture sector to offset import expenditures.
56. In this context, the agriculture sector needs to transition to a more resilient, self-reliant, and sustainable system that is able to generate significant revenues from both domestic and export markets. To achieve this, a systematic process is necessary to transition from a conventional production model to a market-oriented agroecological model over the medium-term. The agroecology transition targets demand-driven production of "safe food", while maintaining and increasing agricultural productivity for food and nutrition security through targeted pathways and practices. The multiple benefits of this transition will support increased production and revenues, import substitution, export, trade deficit reduction, improved environmental services, and resilience to climate and other shocks.

IFAD's comparative advantage.

57. IFAD's 40-year partnership with the GoN has helped build practical approaches to tackle challenges experienced in the agricultural and rural development sector, through the promotion of agroecological production and building climate resilience (ASHA), pro-poor leasehold forestry (HLFFDP, LFLP), inclusive high-value agriculture and value chain development (HVAP, ASDP); improved livestock breeds (ISFP-KUBK), and rural finance (VITA). IFAD has demonstrated its comparative advantage in providing integrated support to marginalised smallholder farmers and their organisations in Nepal, especially in areas with lower levels of socio-economic development.
58. Furthermore, IFAD has for decades supported farmers globally in adopting agroecological practices to improve the sustainability of their farming systems. Building on lessons learned from the 2021 Agroecology Stock-take of IFAD operations, IFAD is currently supporting several countries in implementing investment projects with an advanced agroecology approach to increase the resilience of smallholders and their contribution to sustainable food systems. These projects are delivering on food security, sovereignty, and nutrition benefits (e.g. Brazil, India, Bolivia, Argentina, Burkina Faso). R-HVAP will benefit from linking with these projects for joint learning from a growing portfolio of investment projects that strengthen smallholders and rural MSME's role in sustainable food systems.

B. Lessons learned

59. IFAD-financed projects have established a wealth of good practices over four decades of engagement in Nepal. Key lessons learned include:

Inclusive targeting.

60. Adapt ASHA's community-based participatory planning processes to ensure effective and transparent targeting of poor and vulnerable households. IFAD-financed projects in the last decade have implemented several effective models of participatory planning and targeting processes, including the Community Investment Plan in WUPAP and the Leasehold Forest User Group Plan in LFLP. The most recent and promising approach has been ASHA's rigorous local adaptation planning process, which includes community level sensitization and participatory household ranking for developing transparency, ownership, and consensus in the selection of beneficiary households, and preventing elite capture. R-HVAP will implement a community-led planning and targeting process, adapting ASHA's targeting approach to balance efficiency and effectiveness.
61. Provide needs-based multi-year co-investment packages, guided by business plans and affordable investment pathways to establish profitable agri-businesses. Co-investment packages with financial and technical support, sustained over a period of at least 3 years, have proven effective under HVAP, RERP and ASDP. Singular grant support under ASHA, however, have provided valuable lessons on the changing needs of producer groups when transitioning from subsistence to commercial farming. R-HVAP will provide co-investment packages with continued financial and technical support, to facilitate the transition towards market-oriented agroecological production, and to ensure sufficient graduation support for establishing profitable agri-businesses. Investment pathways will be developed to meet the specific needs of each producer group.

Market-oriented agroecological^[7] production and resilience.

62. Integrate agroecological practices into both subsistence and commercial production systems to revitalize farm ecological health, increase diversity and nutrition benefits, and build climate resilience. R-HVAP will build on positive experiences from ASHA, where a combination of integrated production systems, locally produced bio-inputs (e.g. bio-fertilizers, biochar) and sustainable land management practices (eg. mulching, hedgerows) were successfully applied to enhance soil quality and climate resilience to a significant degree^[8]. While nutrition is not a mainstreaming priority under R-HVAP, the promotion of diversified production systems under the programme will contribute to enhancing household nutrition.
63. Strengthen market-orientation, economic viability and service linkages of agroecological production. The Stock-take report on Agroecology in IFAD Operations (2021)^[9] found that project's need to rethink agroecological approaches to strengthen market access and promote direct connections between producers and consumers around the value of sustainably produced and safe food (e.g. through digital and physical market spaces, corporative organised collection and distribution, digital communication and traceability tools); support innovation and improve access to seeds, bio-inputs, digital and mechanical technologies relevant

for small-scale agroecological farming systems; and support systematic learning and evidence generation for policy engagement. R-HVAP will integrate these lessons into the PAPs and the investment plans of Producer Organisations (PO) and MSMEs, for ensuring market-orientation and economic viability of the agroecological approach. The agroecological approach will be specifically used for enhancing product quality to meet domestic and international demands for safe, organic and sustainably produced products, and for generating foreign currency inflows.

64. Integrated multi-product value chains for enhanced resilience to economic and climate shocks. The Organic Valley (TOV) is a private enterprise supported by HVAP engaged in the processing of several organic spices for export markets^[10]. Sourcing multiple commodities from a set of smallholder farmers, and using the same infrastructure for post-harvest processing, TOV builds on the relationship and trust among its stakeholders, while also maximizing outputs and reducing operation costs. Through careful selection of diverse and complementary high value commodities for agroecological production, R-HVAP will develop multi-product value chains with diversified production and processing systems, enhancing the economic and ecological resilience of both producer and processing enterprises.
65. Create incentives for use of bio-inputs, combined with sensitization on judicious use of agro-chemicals, guided by provincial strategies for safe food production. Inappropriate and excessive use of chemical inputs, largely in the Terai, have resulted in increased soil acidity and reduction in organic matter and beneficial microbes. It is estimated that 60% of soil in Nepal has low organic matter and 67% is acidic^[11], which has serious implications for water and nutrient retention capacity. Therefore, for sustainable and safe food production systems, the current use of chemical inputs must be gradually reduced and phased out, for which clear guidance and awareness raising on its judicious use is vital. Building on Karnali's Organic Mission Plan, R-HVAP will work with Lumbini and Sudurpashchim to develop a similar strategic action plan for reducing and phasing out agro-chemical use and for incentivizing decentralized production and use of high-quality bio-inputs. This will not only reduce the cost of production, and make farming more remunerative, but also improve the resilience of farm ecosystems.
66. Ensure sufficient funds for climate resilient infrastructure design, and O&M for long term sustainability. The ASHA Completion Mission (2022) observed several cases where small investments in green and grey infrastructure such as hedgerows, gabion walls and check dams helped protect many houses and community infrastructure from severe landslides during the heavy monsoons of 2022. R-HVAP will ensure the climate resilience of community infrastructure through such protective investments. In addition, R-HVAP will also ensure the organization of infrastructure user groups with sufficient funds for effective operation and management, and longevity.
67. Establish a network of agroecological lead farmers and demonstration farms for knowledge sharing, innovation and research. Agroecological farming is knowledge and skill intensive. As observed during the design field mission, adoption of agroecology practices requires a "learning-by-doing" approach supported by structured technical assistance over the medium-term. R-HVAP will build on the existing network of agroecological lead farmers and farmer field schools (FFS) established under ASHA for facilitating farmer-to-farmer exchange of experience and innovation within production clusters. The agroecological demo-farm networks will also form the basis for participatory research on enhancing productivity as well as troubleshooting on new and emerging environmental and climate risks.

Value chain development.

68. Support producer groups engage in export-oriented value chains and meet international standards for safe and organic foods. A wide diversity of organic high-value agricultural products from Nepal including, vegetables, spices (ginger, turmeric), native crops (millet, buck wheat, foxtail millet etc.), shade grown coffee, Himalayan honey, Medicinal and Aromatic Plants (MAPS), and Non-Timber Forest Products (NTFP), to name a few, have significant demand in international markets. As noted during the Organic Exporters Roundtable^[12], many private enterprises are already engaged in the international certification and export of several organic agricultural products in the programme area. However, while there are significant opportunities for growth, they highlighted inconsistent production quality and quantity to meet market demands as the major limiting factor. R-HVAP will support producer groups to enhance their export readiness by improving production and post-harvest handling practices as per international standards.
69. Provide capacity building support to producer organizations on financial literacy, business planning, and market and service linkages. As observed under ASDP and RERP, financial education and business literacy training for smallholders can encourage the use of financial services, enhance awareness of agri-business opportunities, and increase investments in agriculture. R-HVAP will utilize successful peer-to-peer models for providing PO professionalization services, including market-oriented social mobilizers for widespread training on financial education and business literacy (FEBL) training. Local resource persons capacitated under ASDP will be integrated into R-HVAP. In addition, the programme will implement proven field approaches for accelerated and inclusive growth of smallholder commercial agriculture, including multi-stakeholder platforms (MSP), and processes for business-to-business/service interaction.
70. Prioritize early establishment of MSME for decentralized production of affordable and high-quality bio-inputs to support agroecological farming. Consistent supply of quality bio-inputs is a major gap in Nepal. ASDP is currently partnering with a private organic vermicompost producer^[13] to establish community-based satellite production units to create a reliable source of nutrient-rich bio-inputs. As early as possible, R-HVAP will partner with MSMEs to establish bio-input production units across the programme area, and create early linkages and synergies between POs and MSMEs. Successful models of organic seed production and nurseries^[14] will be replicated, especially important for land poor smallholder farmers. This will also stimulate rural economies and employment opportunities through the creation of a diverse MSME service market for supporting profitable agroecological production, thereby, lowering agro-chemical use and the drain on foreign exchange. The creation of MSMEs will encourage youths to seek employment at home, which will eventually contribute to the development of the agriculture sector.
71. Establish satellite MSME post-harvest processing units close to production zones to minimise post-harvest loss and stimulate

value-addition. Post-harvest processing units close to production areas can increase smallholder income by reducing post-harvest loss and adding value. HVAP's partnership with The Organic Valley on ginger exports to Germany has demonstrated how linking smallholders to private agri-processing enterprises can drive rural agricultural development. MSMEs, especially when linked to international buyers, can bring in knowledge, innovations and technologies, while funnelling export earnings and foreign investments to smallholders. Satellite units enable immediate processing, reducing up to 22% of lost income in postharvest and transportation.

72. Establish clustered production zones for organic certification to target export markets. Credible organic certification is key to access international markets. The mountainous topography of Nepal necessitates a landscape approach to organic production whereby a cluster of upstream communities practice organic agriculture, preventing chemical runoff into farms downstream. Taking this into consideration, the Karnali Organic Mission Plan has mapped organic production zones at the ward level^[15]. Building on HVAP and ASDP value chain corridors, and in partnership with provincial and local institutions, R-HVAP will create similar clusters of upstream organic zones for certification across the programme area. In addition, taking lessons from organic agri-enterprises, R-HVAP will operationalise a digital chain-of-custody monitoring system throughout the supply chain. The use of an "organic" label will be encouraged to develop trust and transparency.

Programme Management.

73. Establish Corridor Implementation Units as cost centres with suitable budget ceilings. The centralized decision-making structure in ASDP, and the absence of cost centres closer to implementation areas, has lengthened bureaucratic hurdles to a great extent, creating implementation challenges, and affecting the performance of the entire programme. Therefore, R-HVAP will establish cost centres closer to implementation areas, with an appropriate budget ceiling, to facilitate swift disbursement processes.
74. Use georeferencing, and unique household and beneficiary ID integration developed by ASDP and ASHA, and establish a MIS before start-up. A unique identification (ID) will be provided to each programme participant and household to enhance transparency of investments and to track change over time. Georeferencing of productive infrastructure will contribute to enhancing transparency by enabling remote monitoring of infrastructure locations using freely available satellite imagery. Delayed MIS development in ASHA and ASDP resulted in significant challenges in data input and integrity, causing loss of evidence that negatively impacted progress reporting and perceptions. In cooperation with ASDP, a MIS will be developed for R-HVAP before start-up to ensure data capture from day one. Post start-up, this system will be enhanced to integrate the programme's more complex monitoring, evaluation and reporting needs.
75. Replicate farm business diaries for household level data collection and outcome monitoring. Farm diaries form the foundation for household level data collection in the ASDP and RERP M&E systems, whereby households self-report key data on seasonal production and sales, which is fed into the MIS by field staff on a rolling basis. The same process has also been highly useful in the collection of household data for other outcome indicators such as MDD-W, and can also be expanded to other IFAD CI indicators. This system has been extremely valuable for monitoring and analyzing outcome level results such as increase in production and sales, disaggregated by value chain, Palika, PO, household, and more.
76. Support the federal structure and decentralised implementation to provincial and municipal levels The Nepal Country Strategy and Programme Evaluation (CSPE) recommended supporting local governments in promoting rural development, including infrastructure, advisory services, and economic opportunities. R-HVAP will actively support provincial and municipal governments, building on positive experiences of ASHA, ASDP and RERP. Specifically building on ASDP's current approach, R-HVAP will engage local governments in various value chain development activities, such as: identification of priority commodities, participation in relevant MSPs, co-investment in productive community infrastructure, and joint planning, monitoring and supervision missions.
77. Recruit strategic service providers to offset limited technical capacities within local governments. IFAD projects that included strategic technical assistance to promote innovation were able to achieve success (HVAP and SNV, KUBK and Heifer International, RERP and Helvetas etc.). Considering the capacity gaps at local level it is essential for integrating technical assistance to facilitate the roll-out of more complex programme interventions. In this regard, technically sound partners and service providers will be required for advancing market-oriented agroecological farming, PO graduation, certification, and export market linkages.

2. Project Description

C. Project objectives, geographic area of intervention and target groups

Goal and Objectives.

78. **Programme Goal.** Reduced poverty and improved resilience of smallholder households.
79. **Programme Development Objective.** Transition smallholder agriculture towards sustainable food systems that are profitable, inclusive and agroecological.

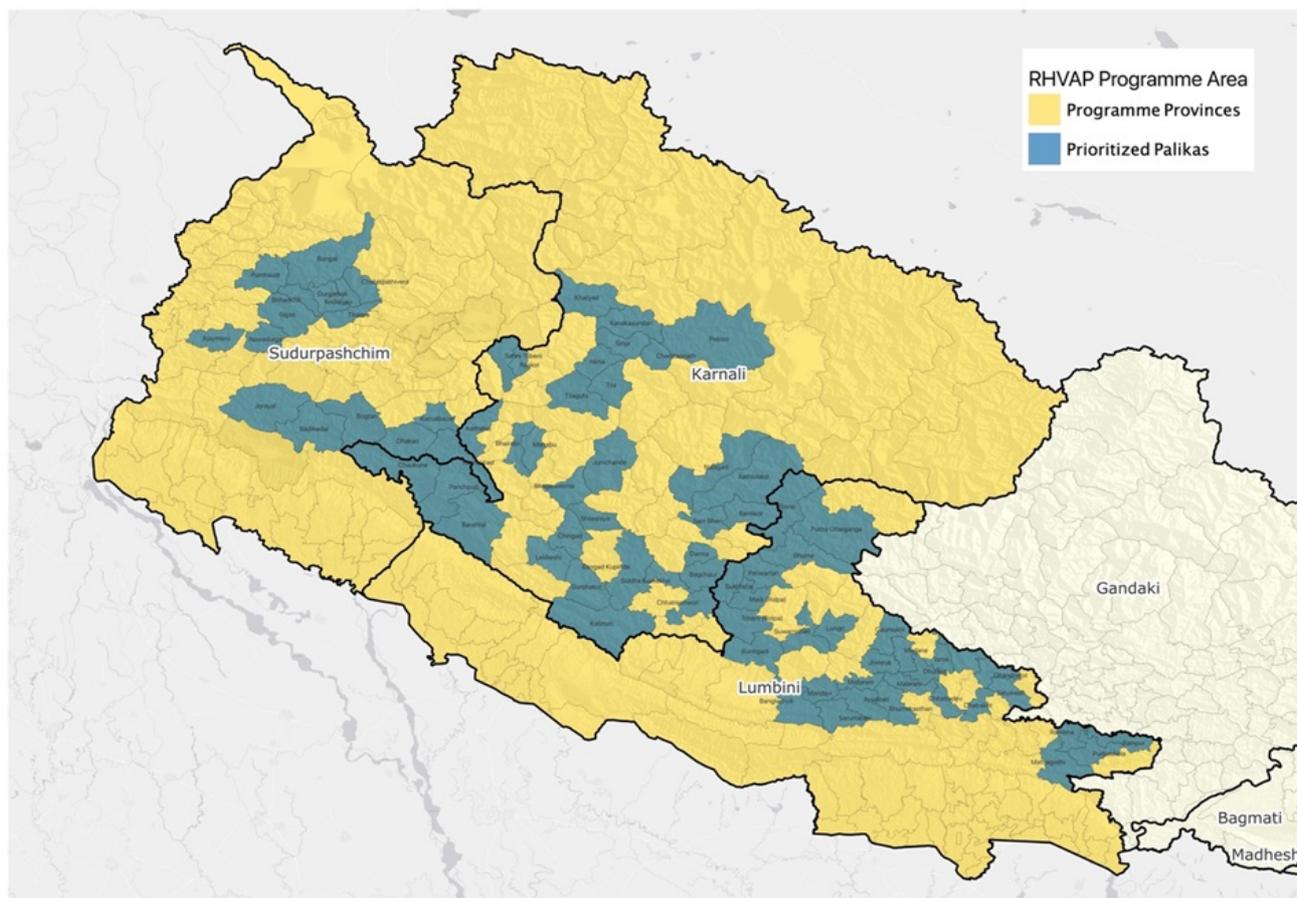
Programme Duration and Geographic Area.

80. **Duration of the programme.** R-HVAP is designed as a foundation building initiative that establishes the necessary capacity, service provision, infrastructure, and enabling policy and regulatory frameworks for initiating the transition towards self-reliant agroecological farming systems that produce a range of commodities for domestic and export markets. The first phase is

designed for eight years from 2024 to 2031. A second phase is envisaged for further scaling up the agroecology approaches and successful outcomes of the first phase.

81. **Target areas.** The programme will cover three provinces in Western Nepal: Lumbini, Karnali, and Sudurpashchim and operate in approximately 80 Municipalities (Palikas). The provinces have been selected based on the highest incidence of multi-dimensional poverty^[16], impacts of COVID-19 on rural livelihoods^[17], location of the Semlar regional wholesale market for national and international distribution, and a landscape perspective to facilitate the building of an agroecological foodshed.
82. **Geographic targeting.** R-HVAP will adopt an agroecological cluster-based approach for geographic targeting. A Geographic Targeting Index was developed for the selection of Palikas that combines the following selection criteria: (i) presence of target groups (poor and vulnerable communities, women and youth); (ii) production potential; (iii) market accessibility; (iv) presence of ongoing or recently completed IFAD-financed projects (ASDP, ASHA, and KUBK) and (v) agroecology potential. Palikas with the highest scores were identified based on the Geographic Targeting Index. Palikas with lesser scores but adjacent to Palikas with high index scores were also prioritized as a means to create a contiguous agroecological cluster. A total of 80 Palikas (Karnali 32, Lumbini 31, and Sudurpashchim 17) have been prioritized for implementation to be validated at programme start-up in consultation with the respective provincial governments for implementation. Please see the PIM in Annex 8 for the detailed list of Palikas (Appendix 2 of the PIM).
83. Within the prioritized Palikas, an exercise will be carried out to demarcate and analyse agroecological production clusters for priority commodities that have proven domestic and export market demand. The prioritisation and selection of clusters within the palikas will be done using the following criteria: (i) poverty incidence; (ii) presence and maturity of Producers Organisations (POs); (iii) proximity to road corridors; and (iv) credible market opportunities where smallholders can profitably compete. More remote clusters will be brought into operation once the supply chains adjacent to road corridors are operational. Operations will commence immediately in Karnali province given the advanced level of POs supported by previous and on-going IFAD projects.

Figure 1: Palikas prioritized for implementation.



84. **Value chains.** The programme will support the development of multi-commodity supply chains for farming systems diversification, while promoting co-investments in commercial production, value addition and market linkages. Smallholders will be supported in the integrated production of two complementary high value commodities which have domestic and export market potential, comparative commercial advantage for smallholder producers, and agroecologically suitable production. Products that have been successfully promoted by previous projects such as HVAP, KUBK, RERP and ASDP will be prioritized, including off-season vegetables, livestock, NUS, MAPS, NTFPs, and others. Linked to these products, MSMEs will be developed to provide production-related services to smallholders, and for post-harvest value addition and processing. **Target groups.**
85. **Programme participants and outreach.** The total R-HVAP outreach is estimated at 60,000 households or 258,000

individuals^[18]. Of these, 45,000 households will benefit from market-oriented agroecological production packages, while an additional 15,000 households will benefit from capacity building and extension services (enhanced FEBL, demo farms, community mobilizers), market and service linkages (MSP, B2B, B2S), and from public goods (irrigation, aggregation, storage and regional wholesale market infrastructure).

86. **Target groups.** The main target group consists of poor smallholder^[19] households engaged in mixed farming systems and deriving most of their income from agricultural production at different scales: subsistence, semi-commercial, and commercial. Women-headed households, women farmers, youth (including returnee migrants) and minority communities (dalits and janajatis/indigenous people) will be prioritized. Women will constitute at least 50% of the total programme participants and youth^[20] 40%.
87. In line with the new IFAD Targeting Policy (EB 2023/138/R.3), R-HVAP will provide needs-based services for: (i) ultra-poor; (ii) poor (including both poor and medium poor); and (iii) near-poor households.
88. Ultra-poor and poor farmers will together constitute 80% of programme participants^[21]. Near-poor households will represent approximately 20%^[22] of participants.
89. **Ultra-poor** have less than 3 months of food sufficiency from their own farm production and other regular sources of income. These are disadvantaged HHs due to their socio-economic condition and social exclusion, which include landless, persons with disabilities (PWD), women headed HHs, marginalized communities such as Dalits and Janajatis. Their source of income is primarily from agricultural labour, limited and irregular farm income, and may receive government support. Most of them are not actively engaging in agriculture production because of fragmented, marginal (often unproductive) and small pieces of land, and lack of access to inputs, motivation and business environment. They produce traditional crops that partly meet their subsistence needs. They have the potential to participate in agriculture production through improved access to water and inputs, enhanced capacity, and additional financial support. They are 5-10% of the targeted households (total 3,000 HHs and approximately 2,100 women-headed households from more disadvantaged categories).
90. **Poor rural households** have 3-12 months of food sufficiency from their own farm production and other regular sources of income^[23]. These poorer households derive their income from agriculture and forest foraging coupled with other incomes derived from off-farm activities, combined with irregular remittances from seasonal migration. These include poor men and women farming small areas of land of up to 0.7 ha, growing vegetables, rearing livestock (approximately 1-3 buffalos, up to 10-20 goats) and having access to rangelands for animal feed. They often have irregular access to productive water sources and irrigation, limiting their productivity and levels of volumes produced. Households in this category constitute 70-75% of the targeted households.
91. **Near-poor households** have more than 12 months of food sufficiency from their own farm production and other regular sources of income. These are men and women smallholders who typically own 1 ha of farmland and above. However, they are only marginally above the poverty line, and lack affordable inputs, finance, connectivity to networks and markets, technical capacity and scale. They are full time involved in agriculture production and have the potential to provide consistent increased volumes and quality of their output to meet safety compliance standards and market requirements. They represent 20% of the targeted households.
92. **Transformation Drivers.** Another group consists of transformation drivers such as lead farmers and agri-entrepreneurs who can serve as champions to demonstrate the viability of agroecological approaches to increase rural resilience and provide potential development pathways for the poor. Furthermore, in the commercially oriented cluster-based approach, the private sector will play a crucial role in driving market-led enterprise growth for smallholders. Micro, small and medium enterprises (MSME) will be provided co-investment support to establish rural agri-services for affordable bio-inputs, and post-harvest processing and value addition, with in-built agri-extension services. Supported MSMEs will be mandated to provide their services to R-HVAP target groups in proportion to the co-investment amount provided, and are expected to benefit up to 25,000 smallholder HHs.

Figure 2: Programme outreach and target groups.

| Component | Number of PO/ MSME | Est. HH Outreach | Total Outreach |
|---|--------------------|------------------|-------------------|
| 1. Enhanced capacities for transitioning to market oriented agro-ecological production systems | | | |
| SC 1.1 / 1.3 AE planning, market linkage and cluster coordination | 2200 | 60,000 | 60,000 households |
| SC 1.2 Knowledge and capacity for AE farming | | | |
| SC 1.3 PO co-investment for market-oriented AE production | 1600 | 45,000 | |
| SC 1.4 MSME co-investment for agri-services | 240 | 15,000 - 25,000 | |
| 2. Improved access to climate resilient productive infrastructure | | | |
| Water-related infrastructure (small-scale irrigation) | 485 | 20,000 | |
| Market-led productive infrastructure | 595 | | |
| Productive RET at PO level | 162 | | |

| Target Group | Target % | Number of HHs / individuals |
|-------------------|----------|-----------------------------|
| Ultra-poor HH | 80% | 48000 |
| Poor HH | | |
| Near-poor HH | 20% | 12000 |
| Women-headed HH | 15% | 9000 |
| Women | 50% | 30000 |
| Youth | 40% | 24000 |
| Indigenous people | 20% | 12000 |

93. **PO graduation approach.** To maximize the inclusion of disadvantaged individuals and households, building on the experience from HVAP, the programme will adopt a “graduation” approach among supported small-scale producers and groups. In the context of R-HVAP, producer organizations will be mobilized on an inclusive basis, i.e. with the participation of like-minded small-scale producers in a community but with varying levels of individual resources and starting incomes. More able and less risk averse small-scale producers from the community may be the first to mobilize themselves into producer groups to interact jointly with the market. As initial linkages with buyers and service providers become more established, other interested but poorer or risk averse individuals will then be supported by the programme and existing group members to join these producer groups. This “graduation-based” growth of producer groups allows the groups to achieve scale and also attract more buyers and services providers, for delivering benefits to all the members, as was seen in HVAP.

94. **Targeting strategy.** The programme will apply a combination of self-targeting and direct targeting methods. R-HVAP will promote relevant services in line with the needs of all target groups. Some activities will be of interest for the community as a whole, such as community irrigation, small-scale cold storage, and market infrastructure. The PAP consultation process will engage a broad range of stakeholders mobilized through existing or newly established rural institutions, community-based organizations (CBOs), POs, and platforms (e.g. Multi Stakeholder Platforms). Furthermore, targeted activities are directed to specific disadvantaged categories (ultra-poor, women, youth, indigenous people, and marginalized groups). The robustness of the targeting strategy relies on a strong mobilisation and consultation process to be conducted at the beginning of operations.

95. **Self-targeting.** The programme will mainly work with POs (approximately 2,200 POs) and cooperative networks composed of members with diverse socio-economic backgrounds (ultra-poor, poor, and near-poor), gender and age groups. POs composition will be driven by self-targeting principles. POs will conduct participatory wellbeing ranking of their member households for poverty classification (ultra-poor, poor, and near-poor). POs already supported by other programmes (e.g. ASDP, ASHA, HVAP) will be eligible for partial R-HVAP support.

96. **Women’s participation.** Women represent at least 50% of the programme participants (or about 30,000, out of which 9,000 are women-headed HHs). Under Component 1, they will be mobilised and organised in producer groups (mixed or women-led) to receive specific trainings on the basis of their interests and activities along existing or new opportunities resulting from the cluster development. Trainings will focus on (but not limited to) improved production and productivity (through demo-farms), enhanced Financial Education and Business Literacy (FEBL) combined with agroecology and Gender Action Learning System (GALS lite, where necessary), as well as leadership. The last is particularly important to encourage women to actively participate in the various Multi Stakeholders Platforms (MSP) and cluster coordination, to ensure that women’s views and interests are captured at all levels.

D. Components/outcomes and activities

97. **Youth participation.** Youth will be organized in groups (young men and young women) on the basis of their interest and different degrees of participation in the programme and will receive targeted interventions and trainings; i.e. as existing farmers’
100. **Producer group training.** The programme will provide training to support the transition of smallholder farmers to agroecological farming systems that generate economic benefits for smallholder farmers while providing environmental and social benefits. The programme services in market-oriented agroecological production in crop-livestock, aquaculture and poultry systems for 3000 smallholder farmers. This includes 3000 from business incubation support, and 60 youth will benefit from agroecology apprenticeships with lead farmers.
101. **Market demand is the main driver and pull factor of the programme as a whole.** The agroecological approach will directly
98. **Orientation and outreach.** The quality and the reach of the outreach will allow producers to access better remunerative markets, both domestic and international. By the beginning of the production programme, it is expected that the programme will include the expansion of rural extension and education that can increase community awareness and help them to access group markets and generate, for target groups, indigenous peoples, Dalits and other marginalised communities.
99. **Profitability and viability.** From agroecological production systems have been confirmed by the Economic and Financial analysis that showed that (all) 24 participatory stakeholders farming and using agroecological models are financially attractive. Producers are for the agroecological approach and in the medium to long term, they will be able to capture a positive Net Present Value.

103. Economic cost-benefit analysis of total programme investment yields an overall EIRR of 18.1%. The estimated NPV for a 9% discount rate is NPR 21,267.60 million (USD 163.59 million) and the BCR of 8.52. A positive NPV under the current Opportunity Cost of Capital (OCC) of 9% indicated that the project investments were sound, robust and quite rewarding from economic perspectives.
104. As highlighted in the stock-take report on agroecology in IFAD operations^[24], agroecology will be promoted at four levels: (i) farm level agroecological practices; (ii) landscape level natural resource governance, community joint learning and adoption of sustainable natural resources management and nature-based solutions to enhance ecosystem services; (iii) market level support for value addition and innovations in connecting smallholder producers and consumers around shared values of sustainable and healthy food; and (iv) policy level instruments and services enabling agroecology and sustainable food systems.
105. The overall framework for the programme interventions will draw on an agroecology approach (box 1) defined by the ten elements of agroecology approved by the FAO council in 2019^[25].

Box 1.

Agroecology (AE) appeared in the 1920s when scientists used the term to refer to the application of ecological principles to agriculture, where diversity, recycling (energy, nutrients, water and biomass) and effective use of resources in the farming systems are essential. It is an innovative approach that over time has become a holistic approach defined by Gliessman (2018) as the integration of ecology, economy and society in food systems. The Gliessman establishes five levels that characterize a gradual agroecological transition: in the first two levels, the increase in efficiency and recycling in the use of resources allows for a substitution and reduction in synthetic chemical inputs; at the third level agro-ecosystems are redesigned according to ecological processes, while the last two levels look at direct commercialization and transformation to local and regional food systems. In December 2019, the member countries of the FAO Council adopted the framework of the ten elements of EA.

The five levels defined by Gliessman are not meant to be sequentially implemented. Innovative market access approaches should be integrated from the beginning of an AE transition process. Through low-cost participatory guaranty systems (PGS), digital platforms and tools for traceability it is important to create more direct connections between producers and consumers around the value of sustainably produced, safe and healthy food and ensure more value is allocated to the small-scale producers in the agri-food chain.

EA can increase the resilience capacities of family farmers, reduce their costs and dependence on external inputs, and improve access to nutritious and safe food. EA practices maintain a high diversity and integration of crops and animals in farming systems complemented by practices that conserves soil and water resources. As such, these practices build resilience by spreading risks and improving the nutrient and water buffer capacity of the system. The EA emphasizes the importance of farmer empowerment, joint experimentation and sharing of knowledge. AE also emphasises the inclusion of women and youth. As such, it can be a successful approach to achieving IFAD's four main priorities: climate change, gender, nutrition and youth, and is also a relevant option for indigenous peoples.

106. **Programme components:** RHVAP features four complementary and interlinked components: (1) Enhanced capacities for transitioning to market oriented agroecological production systems; (2) Improved access to climate resilient productive infrastructure; (3) Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets; and (4) Strengthened policies, regulations and institutions for smallholder agroecological production and trade.
107. **Component 1: Enhanced capacities for transitioning to market oriented agroecological production systems.**
108. **Sub-Component 1.1: Decentralised agroecological planning and coordination.**
109. To mainstream the agroecology practices and principles across programme interventions, a 5-Year Palika Agroecological Plan (PAP) will be developed through a local level territorial planning process. The key objective of the PAP will be to boost production of subsistence crops, identifying high-value commodities that can be nested within agroecological farming systems and establishing relationships between POs, vendors and financiers. The territorial planning process will identify opportunities for creating synergies and collaboration between municipalities, networks of agroecology POs and other VC actors around investing in and governance of shared resources and assets. The PAP will also address social economic inclusion, climate change vulnerabilities and circular economy opportunities. As such the PAP planning process will identify investment opportunities for building sustainable agri-food systems and for developing synergies and inter-dependencies between different stakeholders within the Palikas.
110. Currently, agriculture sector planning at the municipal level is done on an annual basis and lacks a medium to long term framework that facilitates iterative and incremental agriculture sector development. The PAP will be a strategic costed 5-year framework that will inform the respective municipalities' Agriculture Sector Development Plans (that have yet to be developed) and integrated into the municipal Medium-Term Expenditure Framework (MTEF). The PAP development process will incorporate proven tools, methods, and best practice for community-based planning from previous projects, such as HVAP and ASDP's multi-stakeholder platforms (MSPs), and LAPA planning under ASHA. The PAP process will be informed by the following: (i) Agroecological Cluster Delineation and Analysis, and (ii) Development of the PAP Manual.
111. **Agroecological Cluster Delineation and Analysis:** A participatory exercise will be carried out to demarcate agroecological production clusters for priority commodities that have proven domestic and export market demand. Existing provincial zoning, such as under the Karnali Organic Mission, will form the basis. An agroecological cluster is a geographic unit with common agroecological features within the municipalities and has potential for the production of a diversity of commodities, including high value commodities with proven market demand. The cluster delineation will be a landscape level analysis of the programme area based on the following:
- Agroecological conditions, current production levels, farming practices, food and nutrition security needs, climate risks,

- infrastructure, market access (road corridors), market and value chain analysis.
 - Potential programme participants, including poor, women, youth, marginal groups (IP and Dalits) and POs, expressing interest and specific needs with regard to transitioning to commercially oriented agroecological production systems.
 - Opportunities, capacity and knowledge gaps and needs within each cluster (among both smallholder communities and government representatives) for facilitating the transition to commercially oriented agroecological farming, such as agroecology advisory services, bio-input production, community infrastructure, partnerships between POs and MSMEs, agroecological action research, aggregation and processing needs, geographical identification and branding, traceability, PGS certification, and marketing and e-commerce.
 - Most suitable high value commodities, and agroecological best practices at the farm and landscape level.
112. This exercise will be conducted within the first 6 months of programme start-up in order to inform other activities in a timely manner. The findings of this exercise will be validated and used during the Start-up Workshop for the prioritization of Palikas and clusters for implementation. Further, the findings of the exercise on the knowledge and capacity gaps within identified clusters for transitioning to agroecological production systems will guide the implementation of Sub-component 1.2 Knowledge and capacity for establishing agroecological farming, and in particular, to the development of the R-HVAP Knowledge Management Strategy and Policy Engagement Plan.
113. **PAP Manual.** The PAP Manual will be developed prior to the launch of the PAP formulation process for guiding the planning process, including a 5-year planning template and community-based monitoring mechanisms (in line with PGS). Each PAP will assess potential production clusters for the challenges, opportunities and gaps in AE production and services, and will include a detailed 5-year action plan, with annually prioritized and budgeted investment activities, identifying the following:
- High-value commodities that can be nested within agroecological farming systems;
 - Farm level agroecological best practices suited to local socio-economic and ecological contexts, and aligned to the compliance standards of domestic and export markets;
 - Market demands and compliance standards for both domestic and export markets;
 - Agri-services and enterprise opportunities;
 - Public goods and productive infrastructure needs;
 - Potential programme participants for channelling direct support for agroecological production and MSME development; and
 - Community-based monitoring mechanisms.
114. The PAP Manual will be informed by the findings of the Agroecological Cluster Delineation and Analysis, and will be developed by the same service provider. Following the PAP Manual development, facilitators will be trained for guiding the PAP process, including 40 Junior Technical Assistant (JTAs) and 80 Community Mobilisers (CM).
115. **5-year Palika Agroecological Planning.** The agroecological clusters identified within the programme area through the Cluster Delineation and Analysis will form the geographic units for the formulation of 5-year Palika Agroecology Plans (PAPs). PAPs will be formulated through a community level participatory process. Within each Palika, multi-stakeholder platforms (MSP) will be created comprising of key stakeholders including representatives of each beneficiary group, including marginalised communities, POs, cooperatives, MFIs, MSMEs, traders, service providers, and Ward and Palika governments, who will engage in the development of their respective PAPs.
116. A draft PAP will first be formulated by programme staff using the findings of the Cluster Delineation and Analysis as the evidence base, and through community level consultations and key informant interviews involving community, ward/Palika representatives. Following the formulation of the draft PAP, a Palika level MSP workshop will be organized to review, validate and finalize the PAP. In particular, for ensuring sufficient market-orientation, the identification of major traders and enterprises will be a continuous process under Sub-component 1.3, and when possible, they will be encouraged to participate in MSP processes during the Draft PAP formulation and finalization.
117. PAPs will be considered “living plans” and will be reviewed and revised by respective MSPs annually or as needed. Consequently, the PAPs will guide the formulation of individual POs and MSME business plans that respond to the clear identification of opportunities and gaps in production, services, and potential partnerships within each cluster.
118. **PAP Committee.** During the MSP workshop for PAP finalization, a PAP Committee will be formed to facilitate the implementation, monitoring and progress review processes. The Committee will be led by a Palika representative, and will include 5-7 members from POs, MSMEs, and other key stakeholders, and will support the Palika endorsement and integration of PAP activities into Palika plans. The Committee will also participate in corridor level coordination, networking and review events. In addition, they will facilitate the identification and selection of community resource persons such as community mobilizers and lead farmers.
119. The PAP formulation process will be facilitated by R-HVAP Corridor Offices, in coordination with and participation of local government representatives. Under the oversight of the Corridor Offices, the development of the PAPs will be led by a service provider that has the appropriate skills and knowledge to mainstream agroecological approaches and practices and supported by JTAs and CMs. A PAP Manual will be developed prior to the launch of the PAP formulation process for guiding the planning process, including a 5-year planning template and a community-based monitoring mechanisms (in line with PGS).
120. **Palika Plan Integration.** The PAP activities eligible for R-HVAP financing will be consolidated. Following the Local Government Operation Act 2074 (LGOA 2017), and with the support of the PAP Committee, the programme will participate and present the PAP in respective Palika planning processes for endorsement. The PAP development process will be aligned with select entry points of the annual local planning process for identification of municipal co-financing and integration into the municipal annual development plans. The PAP will be the basis for developing the R-HVAP AWPBs through the aggregation at municipal, Provincial and Federal levels. In addition, the PAPs will also be used as a multi-year agroecology strategy to inform the respective municipalities’ Agriculture Sector Development Plans (that have yet to be developed in most municipalities) and

integrated into the municipal Medium-Term Expenditure Framework (MTEF). Around 80 PAPs will be formulated, one for each of the 80 programme municipalities.

121. Sub-component.1.2 Knowledge and capacity for establishing agroecological farming.

122. Agroecological farming is knowledge and skill intensive and needs structured technical support over the medium-term. As observed during field visits, adoption of effective agroecology practices cannot be achieved through a single and stand-alone training but requires a "learning-by-doing" approach over the course of 2 – 3 years. This needs to be supplemented by the creation of a network for exchange of experience and innovation. As such, the engagement of a service provider with technical and practical experience in agroecology is needed. In this regard, supported by the technical service provider, the existing knowledge base requires a number of enhancements as detailed below.

Knowledge products.

123. **KM Strategy and Policy Engagement Plan.** The Programme will invest in good quality, evidence-based knowledge management to contribute to implementation and policy development processes. A KM Strategy and Policy Engagement Plan will be developed that considers and responds to the knowledge and communication needs of all key stakeholders, including programme participants (women, youth, POs, MSMEs), provincial and local governments, and the R-HVAP team as well. The strategy will respond directly to the findings of the Agroecological Cluster Delineation and Analysis, which will identify the knowledge and capacity gaps and needs of both smallholder communities (production) and of government representatives (policy) for transitioning to market-oriented agroecological production systems. The strategy will also take into consideration the need for both horizontal (peer-to-peer) and vertical (multi-stakeholder) knowledge and communication pathways in order to address issues of risk perception and trust.

124. Along with the KM Strategy, a Policy Engagement Plan will be developed directly addressing the priority policy research areas and evidence needs of policy-makers identified by the Agroecological Cluster Delineation and Analysis. This will then be used to ensure the Programme is collecting sufficiently robust data on these issues through M&E systems and thematic studies to provide evidence-based policy inputs, particularly through activities under Participatory Research and Monitoring. This Policy Engagement Plan is in addition to the key policy areas that are being addressed under Component 4.

125. **Agroecology Curriculum and Handbook.** R-HVAP will build on the existing knowledge base of sustainable agriculture, agroecology and permaculture^[26] practiced in the country for over 30 years, and improve on it by adding aspects of market orientation for economic viability. Agroecological systems leverage ecological processes to improve soil fertility, water conservation, and integrated pest management, among others, for creating a self-sustaining farming system that is seldomly reliant on external inputs.

126. There is a nascent permaculture movement replete with training centres and a trained cadre of about 1500 permaculture consultants in Nepal. The ASHA project drew on these centres and consultants to pilot permaculture and achieved successes at farm level. While permaculture is able to create resilient multi-commodity production systems it needs further improvement for making these systems financially attractive to the farmers. In this regard, the existing permaculture curriculum and handbook will be upgraded through the inclusion of market orientation and financial education and business literacy (FEBL) for training smallholder farmers. This will be used as a resource material for enhanced FEBL courses and technical trainings on demonstration farms aimed at enhancing smallholder capacities.

127. **Extension through videos and social media.** R-HVAP will produce instructional videos (in vernacular) on agroecology approaches and technologies for facilitating wider up-take among farmers. Furthermore, social media platforms will be used as a knowledge repository and medium for dissemination.

128. **Manuals and Guidelines.** A critical number of manuals and guidelines will be developed to support the Programme's knowledge and capacity building activities, including the Enhanced FEBL Manual, and a guideline for demonstration farm establishment. For FEBL, the Programme will take existing resources from ongoing IFAD-financed projects (ASDP-FEBL, RERP-FEEK/GALS), and enhance the modules by integrating agroecology and GALS.

Market oriented agroecology extension service providers.

129. **Market-oriented AE extension agents.** A cadre of 40 Junior Technical Assistants (JTAs) and 80 Community Mobilisers (CMs) will be trained, both in-class and on-farm, on commercially oriented agroecological farming, PAP preparation and cluster coordination (MSP, B2B, B2S). This cadre will undertake outreach, agroecological extension, household level investment plan development, and M&E. R-HVAP will work with certified permaculture trainers to undertake TOT based on the agroecology curriculum. Among other tasks, the trainees will be required to organise and assist the certified permaculture trainer with PO trainings described under Activity 1.2.3 Capacity building for agro-ecological approaches. This will provide further exposure for the trainees on how to conduct trainings and it is expected that after 5 – 6 PO trainings the JTAs/CMs will be able to provide trainings independently.

130. **Enhanced FEBL facilitators.** The programme will train around 700 FEBL facilitators, who will be responsible for conducting FEBL courses for approximately 3 POs per facilitator. FEBL and GALS lite will be delivered by FEBL Facilitators (FEBLF). The FEBLFs will be trained by the programme in both financial and women's empowerment aspects, as successfully demonstrated in IFAD's ASDP and RERP projects. The Programme will also consider FEBL Facilitator's role in farm diary entry, especially in regularly capturing data on the sales and financial performance of the producers and producer groups in clusters. The Facilitators will be paid a stipend for delivering the training course and providing support to the producer organization on data collection from Farm Business Diaries.

131. FEBL facilitators will be selected from within the POs and communities supported. The following are the proposed selection

criteria:

- At least 10+2 or intermediate equivalent education.
- Priority given to Candidates having prior experience on adult literacy classes.
- Female candidates will be prioritized.
- Good understanding on local and Nepali language
- Good communication and motivation skills
- Age 16 to 40 years

Capacity building for agro-ecological approaches.

132. **Agroecological demonstration farms:** For effective programme implementation it is estimated that 80 agroecological demonstration farms need to be established - one in each Palika. During the PAP development process, interested lead farmers will be identified for establishing strategically located demonstration farms. The lead farmer will be trained in agroecology for converting their existing farm into fully functional agroecological farms. The cost of establishing a demonstration farm will be borne by the programme, with in kind contribution from the lead farmers. The lead farmer will also be eligible for accessing the MSME financing window if he/she wishes to establish an enterprise.
133. The demonstration farms will serve three purposes: i) function as an on-farm training and demonstration centre for capacitating the different categories of beneficiaries and POs with the knowledge necessary to transit to commercially oriented agroecological farming; ii) provide youth apprenticeships for on-farm training; and iii) conduct participatory action research (on 10 farms).
134. **2-day market oriented agroecology orientation and investment planning.** After the selection of interested POs for production support (SC 1.3), a 2-day orientation training will be held for each PO on commercially viable and gender empowered agroecological farming, followed by the preparation of investment plans informed by respective PAPs. Where possible, these orientations will be held on demonstration farms.
135. **Enhanced FEBL for POs.** The 2-day orientation will be followed by Enhanced Financial Education and Business Literacy (FEBL) for all members of POs, particularly women. The programme will provide essential financial and business skills so they can transform their farming into a business.
136. The classes will be conducted 1-2 sessions per week, delivered on a peer-to-peer basis by FEBL Facilitators. Each FEBLF will conduct courses for 3 POs on average. The course will span around 60-70 hours spread over 32 sessions, and will cover the different technical aspects of agroecological farming, a truncated version of the Gender Action Learning System (GALS lite), combined with FEBL courses on financial literacy and household finances, managing a farm as a business, and managing a group enterprise.
137. As part of the technical sessions on agroecology, lead farmers will be required to provide 6 technical sessions (2 -3 hours per session) on more in-depth training on specific aspects of agroecology (beneficial soil micro-organisms, plant guilds and IPM etc.). The sessions will focus on agroecological farming approaches and be delivered on-farm by a Lead Farmer, or trained JTA.
138. The Community mobiliser associated with the service provider will provide regular backstopping and supervision of the FEBLFs and facilitate the participation of suitable resource persons from relevant institutions to attend selected sessions of the FEBL training course.
139. The FEBL-GALS-lite sessions will be used as an entry point to advance women's economic empowerment. These sessions will address the structural socio-cultural and economic barriers that women experience and identify action points for addressing them. The GALS visioning tool, for example, will be introduced so that women may map out their challenges, opportunities, milestones, and support needs. These visioning roadmaps will be monitored by FEBLFs and community mobilisers to assess progress and to identify additional supports for reaching the next milestone. Once group members have mastered the methodology, they will be encouraged to replicate the visioning exercise at the household level. FEBLFs and CMs will provide peer support to individual members to address challenges raised at the household level. The sessions will include discussions on family support for achieving roadmap milestones and elimination of gender-based violence.
140. **Youth agroecology apprenticeships at demo farms.** Initially, 60 youth agricultural trainees will apprentice under lead farmers over a 6-month period of two cropping cycles. The lead farmer will provide knowledge in exchange for cost-free labour. The trainees will be provided with USD165 per month (NPR 21,500) to cover the costs of board and lodging, and a stipend as an incentive. Where possible the trainees will reside with the lead farmer or alternatively in nearby home stays. Drawing on the initial lessons from this initiative, the number of youth trainees will be scaled up.
141. **Knowledge events for agroecological approaches.** The programme will facilitate peer-to-peer exchanges among POs and MSMEs for cross fertilisation of knowledge and for building a large community-of-practice (COP). These exchanges will be calibrated to exchange knowledge between those at a more advanced stage with those seeking to reach the same level, within and across provinces.
142. **Participatory Research and Monitoring.** An analytical framework will be developed in partnership with the National Agricultural Research Council (NARC) to study and monitor the ecological, economic and social outcomes and impacts of agroecological farming and marketing systems. The analytical framework will be guided by the KM Strategy and Policy Engagement Plan, and will draw on existing frameworks such as, IFAD's Resilience Design and Monitoring Tool (RDMT) and the FAO's Tool for Agroecology Performance Evaluation (TAPE) among others, to delineate a set of research activities and methods for implementation at demonstration farm level. Topics for thematic research and monitoring will include key intended outcomes and

impacts of Programme activities, and the enabling factors and constraints faced, for example, profitability and return on labour of agroecological production systems, impact on ecological health and biodiversity, resilience and loss and damages during extreme events, foreign exchange generated or saved through exports and import substitution, and other relevant aspects. This will not only support monitoring progress of interventions and making course corrections, but also, support evidence-based knowledge generation, knowledge products, and policy briefs.

143. **PAR.** The programme will support joint experimental learning and participatory action research at 10 demonstration farms in collaboration with researchers focusing on optimizing agroecology practices and technologies for generating multiple benefits. To support the systematic monitoring and learning for scaling up and course corrections, the programme will work in partnership with NARC, 4 PhD degree students and an agriculture policy-oriented institute. A lumpsum budget has been allocated for this intervention, and details will be jointly worked out during the start-up phase of the programme.
144. **Farm Business Diaries.** In addition to the research at demonstration farms, the Programme will also make use of simplified farm business diaries, with lessons from other IFAD-financed projects in Nepal. The diaries will be used by all supported POs, allowing the Programme to monitor and study the economic outcomes of agroecological farming and marketing systems. To the extent possible, tablets and mobile phones will be used for data entry of farm diary accounts into the MIS, enabling immediate outcome level analysis.
145. **Sub-Component 1.3: Market oriented agroecological production expanded.**
146. The design team took stock of the recent evaluation of IFAD's Engagement in Pro-Poor Value Chain Development^[27] specifically with regard to Multi-Stakeholder Platforms (MSPs). With experiences and lessons on MSPs from HVAP and ASDP, it is clear that MSPs provide an advanced form of governance, and cluster planning and coordination. In addition, the evaluation report highlighted the importance of providing support to POs for two (or more) project cycles (i.e. a time horizon of 10-15 years). POs that received such support showed significantly better capacity to run their businesses. In this regard, the programme will provide technical support over a period of 4 years, ensuring sufficient graduation support to establish profitable agri-businesses.
147. **Producer Organisation (PO) graduation.** In line with these lessons, R-HVAP will continue to support POs that have been established and strengthened by previous projects, (including several POs from ASHA, HVAP and ASDP with high potential). These POs have gained experience working in groups and have been exposed to markets for commercialisation of production surpluses. However, market linkages have proven to be tenuous, and many of these POs have had limited exposure to export markets. There are a few notable exceptions however, such as, "The Organic Valley" company in Karnali, supported by the HVAP project. The company has a network of about 1500 smallholders producing certified organic ginger and turmeric for export to European countries. After about 8-years of operation, it is currently managing a million-dollar annual turnover. Furthermore, based on feedback received from the organic exporters' roundtable discussion organised for informing the R-HVAP design, there is significant unmet demand for a variety of commodities that are currently being exported (vegetables, fruit, honey, PAPs, frozen meat, etc.). Increasing production of these commodities thus has good potential for meeting export market demands (see Component 3 for policy and regulatory interventions for supporting exports).
148. Guided by the PAPs, R-HVAP will provide co-financing support to at least 1,600 POs (approximately 45,000 farmers), over a period of 4 - 5 years. The programme will improve networking and collaboration between neighbouring small-scale POs as well as large cooperatives to strengthen their market access and positioning. To enhance the capacity of these POs and facilitate the PO graduation process, a specialised service provider will be recruited.
149. The service provider will mobilise specialists in PO professionalization to provide on-the-job coaching to PO committees on leadership, governance, administration, accounting and financial management, business planning and development, establishment of PGS, and connecting to consumers via e-commerce and other platforms. The Service provider will monitor and support the PO graduation process where POs progress from "initiation" to "advanced" and "mature/commercial" levels. Mentoring and coaching will be provided to the PO over 3 - 4 years and its performance will be measured using a set of graduation criteria such as the following: production, yield and income increases; leadership, governance, administration and management functions; financial viability, business planning and management capacity; climate, market and environmental risk management; and inclusion of women, youth and poor people.
- Operationalising Multi-Stakeholder Platforms (MSPs).** Multi-commodity MSPs will be convened periodically at the cluster level bringing together producers, buyers, service providers (technical, financial or inputs), government agencies and other supporters including research institutions and insurance companies, for action-oriented brokering, dialogue, and investment facilitation. The key actors in each cluster will jointly identify bottlenecks and practical modalities for developing multi-commodity value chains to increase trading and profits. The MSP meetings will help foster trust among the different players, and establish informal or formal contracting arrangements, which is vital for sustaining longer-term commercial relationships. As a follow up to MSPs, Business to Business (B2B) and Business to Service (B2S) linkages will be facilitated for building profitable trading relationships between POs and respectively agribusiness/traders (B2B) and commercial service providers (B2S).
150. MSPs and B2B/B2S will be high priority ongoing processes from programme start-up in order to create early linkages between POs and major MSMEs and buyers, and leverage the private sector's market intelligence for informing PAPs, PO and MSME investments, market compliance standards, and risk reduction. MSPs will be facilitated by the Provincial Programme Management Unit (PPMO) and Corridor Office staff working together with the service provider. It is envisaged that once the MSPs and B2B/B2S mature, the producers and businesses themselves will carry it forward.

Smallholder co-investments and access to rural finance. Based on the PAP, R-HVAP will co-finance PO capacity building and farm-level investments in agroecological farming practices for two complementary high value commodities that have domestic and export market potential, comparative commercial advantage for smallholder producers, and agroecologically suitable production. Commodities that have been successfully promoted by previous projects such as HVAP, KUBK, RERP and ASDP will be prioritized,

including crops (year-round vegetable production, spices, native crops / NUS, fruits, etc.), livestock (native chicken, goat, dairy, including shed improvement for manure management, and forage/ fodder production), agroforestry systems, honey production (both for pollination and commercial purposes), NTFPs and MAPS. Participating smallholder farmers (around 40,000 households) will be eligible for support on two types of tailored production support packages as presented below in Table 2, to promote farm diversification, resources use efficiency and recycling. There will be differentiated production packages depending on the level of PO maturity that will be determined during the planning process and there is flexibility for HHs to combine different elements of the indicative list provided in Table 2. Commodity combinations with varied gestation periods will be considered to create production packages that provide a steady stream of income in the short and medium term. Where relevant, perennials with low labour requirements will be considered, especially for women-headed households and persons with disabilities.

151. POs supported by ASDP, ASHA (around 5000 households) will be eligible for one production package that complements the value chain support they have already received under the previous project.

152. The programme will cover up to 50% of the cost of each production package, and the programme participants will contribute in-kind (labour, local materials) and nominal cash contributions. Programme participants will receive 50% co-financing support of up to USD 300 for a single production package, and up to USD 500 for two production packages. The programme will provide grants to POs or through direct payment to inputs and equipment suppliers.

Table 2: Indicative diversified agroecological production packages

| Production packages | Purpose |
|--|---|
| Year-round vegetable production: polytunnels, water-efficient systems, seeds, bio-fertilisers and IPM practices | Self-consumption, commercialisation of surplus for local and regional markets (import substitution) |
| Goat and dairy combined with improved sheds for manure management (compost) and forage/fodder production and breed improvement. Native chicken, semi scavenging, possibly linked with vegetable production. | Main source of income. Commercialisation for local and regional markets (import substitution) |
| Native crops and NUS such as, millet, buckwheat, barley, Karnali beans | Important staple food source. Commercial potential for domestic and export markets |
| Apiculture for commercial honey production with butter trees (<i>Chiuri - Diploknema butyracea</i>) (20 hives model), pollination and nutrition (2 hives model) | Multiple benefits: nutrition, income generation, pollination, potential for export |
| MAPS and NTFPs, such as Indian prickly ash or Timur, soap nuts | Commercialisation for domestic and export markets |
| Spices (ginger, turmeric, cardamom) | Under-supplied export markets. Shade tolerant species |
| Shade grown coffee and cover crops | Production of quality certified coffee in Lumbini and Karnali provinces for export markets |
| Agroforestry systems (apple / walnut / citrus / fodder trees with cover crops) | In conjunction with existing and upcoming orchards (NAFHA project) |
| Seed potato production | Local inputs supply chain supported. Commercialisation for local and regional markets (import substitution) |

153. To co-invest in these production packages, members of POs, Cooperatives, and large Multi-Purpose Cooperatives can access finance from Saving and Loans schemes. The R-HVAP programme participants will be eligible to access financial products supported by the USD 83 million Line of Credit under IFAD's on-going Value Chains for Inclusive Transformation of Agriculture (VITA) project implemented by the Agriculture Development Band Ltd (ADBL). The PPMOs and Corridor Offices will facilitate the collection of PO business proposals for submission to ADBL branch outlets.

154. The saving and credit multipurpose cooperatives, however, are not eligible for receiving subsidised interest from the Government. Other sources of financing include: MFIs, remittances, and pre-financing by buyers. Options to access rural finance will be addressed at the PAP planning stage. A dedicated rural finance officer will be placed in each PPMO and Cluster

Office to facilitate the linkage of POs and MSCs with agriculture banks, MFIs and other financiers. Smallholders will be actively supported to access agri-insurance services.

155. **Inclusion Fund:** About 3,000 ultra-poor households including those from marginalized groups (Janajatis, Dalits and IPs) will be eligible to access the Inclusion Fund for additional subsidised support of 30%. In this regard, the co-financing packages will be 80% grant and 20% in-kind for these groups. This will enable them to join POs and gradually increase their income for transitioning from subsistence-based agriculture to more commercially oriented agroecological farming. The Programme field staff will facilitate the identification of ultra-poor members by applying Participatory Wellbeing Ranking methods as practiced by HVAP and ASDP.

156. **Sub-Component 1.4: MSME ecosystem for agricultural service market strengthened.**

157. Operationalising a commercially viable agroecological farming system requires a different configuration of input supply, collection, aggregation, post-harvest processing and transport, considering that a larger diversity of commodities are produced from a parcel of land albeit in smaller volumes. This requires the establishment of an ecosystem of MSMEs within the clusters to provide services to smallholders transitioning to agroecology. While some of the MSMEs will be wholly new operations, others could be satellite operations of existing MSMEs located elsewhere in the country. The latter will be given initial priority as it will help reduce the start-up challenges usually associated with MSME establishment. Creating a dynamic and lucrative local agricultural sector will facilitate increased returns and employment for rural youth.

158. To facilitate the development of a vibrant ecosystem of MSME services to meet upstream and downstream needs of the agroecological multi-commodity value chains, the programme will mobilise specialised expertise at PPMO level. The PPMO will deploy the specialised expertise to assist existing MSMEs and start-ups to prepare technical feasibility studies for bio-input production, logistics and post-harvest processing, to name a few. The PPMOs, with support from the service provider will launch calls for interest, screen proposals and support MSMEs in their planning, establishment, and operational stages. The service provider will mobilise short term expertise for specific technical areas and technology selection. To meet the co-financing contribution from MSMEs, they will be linked with the VITA project for accessing credit to cover the additional financing needs.

159. Each supported MSME will be required to transfer benefits and services to R-HVAP target groups (smallholder POs, prioritising women, youth, indigenous and Dalit communities), which is governed by a Memorandum of Understanding (MoU). The minimum number of HHs to be serviced will be proportionate to the co-investment support provided - for every USD 1000 of Programme co-investment, the MSME will be mandated to provide services to at least 4 smallholder HHs. The assumption is that each HH will receive direct services equivalent to an average of USD 250 from the supported MSME over the Programme period. For example, if an MSME receives USD 20,000 as co-investment support, it will be required to provide direct services to at least 80 HHs.

160. Informed by activities under Component 4, MSMEs that have adopted “ethical trade” approaches, support agroecologically produced commodities, and promote quality certification schemes (organic, fair trade, forest alliance, forest stewardship council, etc.) will be given priority to engage with the POs supported by R-HVAP.

161. **Decentralized MSME units for affordable and high-quality bio-input production.** While smallholders will be supported with improving on-farm production of bio-inputs through farmyard waste management, vermicompost and bio-pesticide production, it is evident that the volume required cannot solely be met from farm level. As such, decentralized MSME production and distribution of bio-inputs will be supported for meeting the significant unmet demand. The rationale is to expand the use of organic inputs by establishing commercially viable small-businesses specialised in production of bio-inputs and supporting them to market these products to POs and other agriculture production operations. This ecosystem of bio-input producers will not only create an affordable source of bio-inputs locally or within short distance for enhancing productivity and reducing production costs, but also, offset the significant USD cost of importing agro-chemicals borne by GON. This will also help Nepal to save foreign exchange and thereby lessen dependence on remittances.

162. Market analysis and technical feasibility studies will be conducted for supporting the production of high-quality bio-inputs. New and existing MSMEs will be supported with production and dependable supply of nutrient-rich bio-fertilizers, bio-pesticides, bio-fungicides, including vermicompost, liquid fertilizer, biochar, effective microorganisms (EM), and Integrated Pest Management (IPM) technologies. A targeted strategy will be pursued for engaging young women and men entrepreneurs in these ventures.

163. Localised distribution of production and primary processing tools and technologies for drudgery reduction and efficient resource use will also be supported. MSMEs will also be supported in the production of a diversity of high value, high quality, and stress-tolerant seed, seedlings and saplings, and livestock and poultry breeds necessary for agroecological production systems. For MSMEs engaged in seed production, knowledge from IFAD’s pilot initiative on “Evolutionary Plant Breeding^[28]” undertaken in partnership with NARC will be shared for replication. Seed quality assurance and seed certification will be implemented in partnership with the Seed Quality Control Center (SQCC) of MoALD. Through the Multi-Stakeholder Platforms (MSP) under Component 1, special attention will be given to the selection of high value and market-relevant varieties and breeds of crop and livestock.

164. A workshop was held with 22 major bio-input producers to inform the R-HVAP design. Several of them expressed interest to support establishment of satellite production units in the R-HVAP agroecological clusters. The key challenges they highlighted were the lack of standards, certification and safeguards; lack of incentives for increasing production and marketing; uncompetitive pricing due to bio-inputs being ineligible for subsidies that agrochemicals receive; and lack of monitoring and evaluation. In this regard, under Component 4, policy-oriented work will be undertaken to address these challenges.

165. Bio-input MSMEs will be identified through competitive calls for proposals. A total of 28 bio-input MSMEs will receive capacity building and financial support from the programme: (i) 14 MSMEs producing bio-fertilisers and biopesticides etc., requiring an

investment of up to USD 46,500 per unit; (ii) 7 private nurseries producing seeds and saplings requiring an investment of up to USD 13,950 per unit; and (iii) 7 livestock breeding units (resource centres), requiring an investment of up to USD 74,400 per unit^[29]. In addition, an investment of USD 5000 per unit will be provided to establish 95 agro-vet operations that provide agroecology services and drudgery reduction tools.

166. For each of the selected MSMEs detailed feasibility studies and business plans will define the co-investment arrangements and funding sources. The programme will co-finance capital investments such as civil works, equipment, transportation, and marketing. A portion of funding will also be allocated for recruiting legal, technical, marketing, standards, etc. services. The programme will co-finance only up to half the total investment cost of each proposal but not exceeding the overall thresholds detailed above.
167. The business proposals will clearly identify the market for the bio-inputs, and in particular, how the participating POs in the programme will benefit from this investment. In line with SECAP requirements, risk screening and mitigation measures will examine key aspects of the business, and in particular sourcing of raw materials (for compost production units for example), waste management and other social and environmental impacts.
168. **MSME service market for post-harvest value addition strengthened.** Currently, post-harvest processing centres are located a considerable distance from production zones. This leads to significant commodity loss and waste caused by long transport distances on poor road networks, leading to reduced income for farmers and traders. By locating MSMEs within agroecology clusters, not only can these losses be minimized but also, mutually beneficial relationships can be established to stimulate the local economy. Existing MSMEs located in other parts of the country will be given initial priority for establishing satellite operations for speeding up the process of MSME establishment.
169. **Post-harvest MSMEs:** The key interventions under this sub-component will include aggregation and processing centres, small-scale cold storage, and other value addition operations. With regard to value addition operations, viable business plans that engage in primary and secondary processing will be supported. Agri-commodity processing centres will include necessary grading, washing, drying, and packaging facilities. For the dairy value chain, support will be provided for processing curd/yoghurt, cheese and milk-based sweets etc. Similarly, support will be provided for processing MAPs, NUS and apiculture products. In addition, PO marketing functions will be supported through capacity building of farmers and POs in meeting the end-market demand and quality standards. Certification schemes will also be promoted in compliance with international requirements. These interventions will support market oriented commercial farmers to scale up agriculture/dairy operations for vertical integration along the value chain. Establishment of MSMEs for post-harvest operations will need to meet a number of criteria that align with agroecological farming and PO mobilisation. MSMEs will be co-financed 50% from R-HVAP and 50% from the private sector. As with the MSMEs for bio-input production, linkages with VITA will be established for accessing concessionary lending by ADBL.
170. The Programme co-financing for each business proposal will be a maximum of USD 50,000. In exceptional cases where there is high export potential, substantial social impact of the proposed business, and investment is pivotal for developing the respective commodity, the co-financing could be increased up to USD 150,000. As mentioned above, MoUs with HHs and/or POs based will be required for accessing these co-financing resources.
171. Following the successful business matching approach developed and scaled up under HVAP and ASDP, MSMEs will be connected to POs through MSPs as well as B2B/B2S relationships. MSMEs will be supported by the programme for business development over the medium-term, branding and marketing, as well as, for PGS, traceability and certification systems, and ICT4D services.
172. Support to youth under this sub-component includes a skills development programme for youth employment through Agricultural Technical Education and Vocational Training (Agri-TVET) on activities such as commercial crop production, livestock rearing including poly-tunnel construction, Goat/cow shed construction, irrigation channel construction etc. (around 400 youth), and business incubation support for enterprise development (300 youth). Well performing and motivated youth will be encouraged to establish agri-enterprises through support under Sub-component 1.4. MSME ecosystem for agricultural service market strengthened.
173. **Component 2: Improved access to climate resilient productive infrastructure.**
174. R-HVAP will meet infrastructure needs to complement production activities supported through co-investments under sub-component 1.1. Under the PAP process, climate resilient infrastructure for smallholders and POs will be identified and selected. These will include: (i) water related systems such as small-scale irrigation schemes, water storage facilities, Multi-Use water systems (MUS) etc.; (ii) collection points and storage facilities for efficient commodity aggregation; and (iii) post-harvest primary processing facilities. All infrastructure interventions will be synergetic with other project interventions.
175. **Sub-component 2.1: Water-related infrastructure.**
176. The dependence of Nepali farmers on monsoon rains makes their productivity uncertain, and multiple crop cycles are not always possible. In context of climate change and anticipated drier conditions, the provision of reliable, sustained, and timely supply of water is critical. The programme will support the rehabilitation and upgrading of existing water systems and construction of new ones.
177. Eligible water-related infrastructure are small-scale crop irrigation systems (both open channels and piped networks combined with drip and sprinkler irrigation), Multi Use water Systems (MUS) that can serve crop and livestock production and domestic water needs, and water storage facilities such as lined ponds and reinforced concrete tanks. Such models have been piloted and scaled up under ASHA and ASDP.
178. Farmer managed irrigation systems (FMIS) are generally surface water irrigation systems developed and managed by the

beneficiary farming community and comprise the largest part (80-90%) of total irrigation systems. These are simple (in terms of technology and operation); and small-scale in terms of command area (1-10 hectare). The programme will support existing and new FMISs.

179. A total of 485 water related subprojects will be co-financed by the programme for up to 85% of the investment cost and the communities will contribute at least 15% of the investment in-kind (labour, local material). Water related subprojects will be identified during the PAP process and selected by applying criteria to ensure inclusiveness and sustainability of the investment. In particular, the ecological context will be considered when determining the type and design of irrigation subprojects, as well as needs for conservation of the catchment and water sources. Climate proofing measures will be integrated in the design, based on a cost-benefit analysis and site-specific vulnerability assessments. This will be supported by the civil engineering teams mobilised at PPMO and Corridor Offices. The programme will follow IFAD Social, Environmental and Climate Assessment Procedure (SECAP) guidelines and requirements to ensure sustainability of the infrastructure.

180. Sub-component 2.2: Market-led productive infrastructure.

181. Drawing on the experience of ASDP and ASHA, community-based small-scale infrastructure and facilities for post-harvest primary processing, aggregation and storage, and packaging will be supported. Depending on the commodities produced and in coordination with the specific market demand requirements, these operations may include aggregation facilities (collection points, loading docks) and other value adding operations, drying (drying floor, solar dryers, etc.), sorting, shelling, pressing, primary extraction (for honey, MAPs), packaging, and storage (including warehouses, small-scale cold storage). Eligible investments will be identified and selected at planning stage in the PAP process. This infrastructure will be complementary to the larger operations being established by MSMEs.

182. **Renewable Energy Technologies (RETs):** Where appropriate, renewable energy technologies (RET) will be introduced and scaled up. Cooperative-level solar powered dryers and mini-cold storage units will be supported. The majority of farmers in Nepal practice open sun drying, which has several limitations, including slow drying rates, contamination risks, insufficient drying, and weather conditions. In addition, inadequate and inefficient cold storage systems often result in limited market opportunities and economic losses.

183. As part of this intervention, the first step will be to identify areas where high-value crops are most likely to suffer postharvest losses with poor electricity grid connectivity. Investments in cooperative-scale solar dryers and solar-powered cold storage will be strategically located near collection centres and market outlets. There will also be a need for adequate volumes, so ideally areas will be selected where two to three POs can aggregate their produce. There are several value chains that can greatly benefit from the adoption of solar dryers and mini-cold storage units. Through the implementation of this activity, perishables will be able to have a longer shelf life, which in turn will increase farmer income by reducing spoilage, enabling aggregation, reducing transportation bottlenecks during peak operations, and providing the opportunity to sell during the off-season at higher prices.

184. These investments, identified in the PAP, will involve POs, MSMEs (buyers, processors, exporters, service providers, etc.), Wards and Palika and facilitated by programme teams mobilised at PPMO and Corridor Offices. The profitability and sustainability of the investments will be assessed through business plans that will include a risk screening and mitigation measures in line with IFAD SECAP guidelines.

185. A total of 85 market led productive infrastructure subprojects and 162 PO-level RET sub-projects will be co-financed by the programme for up to 85% of the investment cost and the communities will contribute at least 15% of the investment in-kind (labour, local material). Selected subprojects will be implemented and managed by the community-based organizations and POs with support from the PPMO and Corridor Offices. To ensure the quality and sustainability of proposed infrastructure, the design and supervision will be overseen by PPMO and Corridor Office engineers and sub-engineers. POs will take responsibility for O&M and financing arrangements of the productive infrastructure. These arrangements will be defined and formalised at planning stage.

186. **Operation and Maintenance (O&M).** To enhance the likelihood of sustainability, and building on the lessons learned from previous projects, R-HVAP will support the formation and capacity building of O&M committees/water user associations responsible for O&M, at the early stage of the process. These committees will be involved in coordinating the construction, and in managing operation and maintenance of related infrastructure. They will collect O&M user-fees to cover operation and routine maintenance costs. For major maintenance and repairs, the respective Palikas who will participate in the identification and approval of the schemes and may even supplement to the equity (beneficiary) contribution, will be responsible as per their mandate. The corresponding costs are accounted for as contributions from municipalities.

187. Component 3: Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets.

188. R-HVAP will support the first phase of construction of the Semlar Agriculture Regional Wholesale Market in Butwal Sub-Metropolitan City, Rupandehi District, Lumbini province. The component budget is estimated at US\$ 31.25 million, including US\$ 22 million from IFAD and US\$ 9.25 million GoN contributions (US\$ 5 million in cash contributions, and US\$ 4.25 million covering duties, taxes, salary, and operational cost of deputed staff). The proposed market will facilitate the aggregation of commodities from a large catchment area, specifically from agriculture clusters where R-HVAP is supporting POs. The Semlar market will be constructed as a state-of-the-art market replete with wholesale shutters for fruit, vegetables, cereals, and other priority commodities and will engage in collection, processing, and branding of agricultural products. The market is strategically located within a 20-minute drive to the Gautam Buddha International Airport and about 40 km from the Indian border. The market will support smallholders' commodities to reach both domestic and export markets efficiently and at competitive prices.

189. Establishing wholesale markets at strategic locations is one of the key development priorities of GoN. The programme's support

in establishing and developing an “Export Oriented Agricultural Wholesale Market in Butwal” would not only carry forward the GoN’s development agenda, but also would effectively contribute in meeting the country’s agriculture strategies and sector specific programs, explicitly aiming at development of wholesale markets in the south-western part of Nepal.

190. **Current Situation and Key Challenges:** The marketing opportunities for agricultural products in the south-western part of Nepal are comparatively less than in the eastern side of the country. The existing wholesale market in Butwal was established in 2010 and is unable to cope with the current market demand. Also, expansion of the existing market is not possible due to the unavailability of land as it is located in the centre of Butwal city. Given the situation, the region will continue to experience insufficient trade and storage facilities for surpluses produced in the region. Efforts were made to address the situation by developing a new wholesale market in Hetauda, in Bagmati Province (not among the Programme provinces). However, such efforts remain insufficient to fill the gap and to exploit the full potential of the region. It is anticipated that in the absence of a larger wholesale market increased production will lead to food loss and waste. Currently, increasing local demand for agriculture produce is being met from imports. This is contributing to the trade deficit, especially with India, and a drain on hard currency in the country.
191. The design mission’s discussions with the wholesale traders revealed that the agriculture produce that could not be traded in a timely manner led to significant loss and waste amounting to about 25% of the total harvested volume. This is causing huge income losses and adding to the hardship of smallholder farmers. Furthermore, the lack of backward and forward linkages in commodity markets are significantly impacting the capacity of farmers and retailers to competitively engage in market demand and supply.
192. **Outcomes and anticipated positive impacts:** A Technical and Financial Feasibility Study^[30] and an Environmental Impact Assessment (EIA)^[31] for the market was commissioned by Invest International and endorsed by GoN on 29 September 2023^[32]. The Feasibility Study concluded that there is an opportunity to capture substantial volumes of fruits, vegetables and other commodities produced in the programme catchment area. The market will serve as a nodal point to facilitate the movement of agriculture commodities across various markets and facilitate export of a number of commodities. The market will also stimulate socio-economic development of the programme target area and provide direct employment opportunities to especially women and youth from the area.
193. The Semlar market will also help address the infrastructure and environmental issues associated with the wholesale market in Butwal, by providing infrastructure facilities for meeting the current demand, avoiding traffic congestion, while efficiently laying out facilities for logistics, people and product flows. Furthermore, the Semlar market would be properly equipped to prevent environmental pollution that is currently experienced in Butwal.

Market Design.

194. Based on the Feasibility Study and EIA, a preliminary design of the market has been developed. Guided by this, a detailed engineering design of the market infrastructure will be prepared soon after programme initiation. In consultation with MoALD and IFAD, the construction of the market will be staggered into multiple phases. The main units of the market will be constructed during Phase I under R-HVAP for establishing a functioning wholesale market. Expansion of the market will be based on market functionality, projected surplus production, and availability of supplementary financing. This staggered approach will enable continued efforts by GoN to mobilize supplementary grant financing for market expansion and upgrades, as well as, for construction of a satellite market in the far West for improved channelling of agricultural products to the Semlar Market.
195. The main elements of the Semlar market, implementation and management modalities will include the following:
- **Wholesale Shutters:** Around 120 wholesale shutters with adequate capacity^[33] are planned to be available for the traders. In order to facilitate loading/unloading of commodities, a wide canopy (6m) will be provided in front of the shutters. This space will also serve as temporary storage for commodities before being taken inside the shutters. Based on the successful operational experience of existing market(s), some of the shutters will have flexibility for conversion to cold storage for improving shelf-life of agricultural commodities.
 - **Processing Facilities:** The market will have cleaning, washing, sorting, grading and packing facilities housed in a separate block. Cold storage facilities for key commodities will be available.
 - **Support Facilities:** A water supply system including, overhead and underground tanks will be constructed. While the main source of electricity will be supplied from the grid, renewable energy alternatives (solar, biogas) will be supplementary. Furthermore, firefighting arrangements, sanitary facilities, conference and meeting rooms, and parking spaces will be developed. An auction block will be established to facilitate trading of commodities.
 - **Pesticides Residues Lab:** A “Rapid Bioassay Pesticide Residue Lab (RBPR)” is one of the key facilities at the market. Among other contaminants, Carbamate and Organophosphate present in the commodities collected from different production pockets will be tested for. The laboratory will also be equipped to undertake testing of the effluent from the onsite wastewater treatment plant.
 - **Waste management facilities:** The market will have an integrated waste management system. The management of biodegradable solid waste will be outsourced to an approved waste management operator for conversion into compost. Non-biodegradable waste will be disposed in a landfill site by the municipality, while ensuring the treatment and disposal takes place in a sustainable manner with minimal impact on the environment and surrounding communities.
 - **Wastewater Treatment Plant:** Wastewater generated from washing undercarriages of trucks and produce, other processing, grey water, and toilets will be treated in a wastewater treatment plant (WWTP). The final discharge will meet the GON and IFC environmental protection criteria.
 - **Administration Block:** The market will have an administration block to house the programme management and administrative staff. The block will be fully equipped with IT and telecommunication facilities for both staff and visitors. This block will also have a conference room for conducting meetings and other events.

196. Quality Standards and Design Norms^[34]: Building planning and construction in Nepal is regulated at two levels: (i) federal; and (ii) local government. The construction of the wholesale market in Semlar will comply with all relevant and applicable federal and local policies, acts and regulations. Some of these include: Land Use Policy, 2072^[35] (2015); Nepal Land Act, 202131 (1964); Building Act, 205531 (1998); Fundamental Construction Standards for Settlement Development, Town Planning and Building; and Building Construction and Planning Standards, Butwal Sub Municipal City, 207231 (2015).
197. All applicable building codes at the Federal and local levels will be adhered to. Some of these include, the Nepal National Building Code, NBC 206(2015): Architectural Design Requirements; Nepal National Building Code, NBC 105 (2020): Seismic Design of Building of Nepal; and Nepal National Building Code, NBC 202 (2015): and Load Bearing Masonry.

Implementation.

198. All regional markets come under the purview of MoALD, and as such, MoALD will have overall oversight over the market construction and operation. DUDBC will lead the construction of the Semlar market. Given the scale and complexity of the intervention, a dedicated Sub-Project Implementation Unit (SPIU) with government deputed staff, recruited professional and general service staff will be established for day-to-day supervision of the construction. The implementation unit will either be hosted by the Butwal municipality or housed in a rented space in Butwal.
199. The proposed composition of the SPIU is as follows:
- Government deputed staff: An Undersecretary from DUDBC will function as the Sub-Project Coordinator. In addition, two engineers, two assistant engineers, one account officer, and two Junior Officers will be deputed from DUDBC. At least one officer-level staff will be deputed from CAIDMP, MoLMAC Lumbini, and Butwal Sub-metropolitan City to support the SPIU.
 - Recruited staff: FIDIC certified engineer for quality control of detailed project design, drawings, estimation and implementation modalities; FIDIC certified procurement expert for preparation of bid documents, bid evaluation, and contract awarding; Legal services for contract negotiation, follow up, and management of grievance mechanism; Financial Management Expert to support government accountants in preparing Withdrawal Applications, Interim Financial Reports, and payments to contractor; Community, Farmer, and Trader Liaison Officer; and 2 Office Assistants. The R-HVAP PCO will also have dedicated staff for monitoring implementation.
 - Sub-Project Construction Management, Supervision and Quality control of the Semlar wholesale market implementation will be done by a Consulting Firm procured through competitive Quality Cost Based Selection (QCBS) method. The Feasibility Study provides the following three procurement options^[36] describing the pros and cons for each and recommending the most feasible option: (i) EPC (Engineering, Procurement and Construction) Lump-sum/turnkey); (ii) Packages approach; and (iii) EPC management approach (EPCm). The option recommended by the Feasibility Study is a combination of the EPCm approach and packages approach. MoALD in consultation with MoLMAC, DUDBC and IFAD will make the appropriate decision taking into consideration the specificities of the Nepali context.
200. Pre-implementation preparatory tasks: The bulk of preparatory works required for establishing the wholesale market have been concluded. These include the Feasibility Study and EIA, concluding the final site selection process, community consultations, and preliminary market design. For project execution, the Feasibility Study provides the guiding structural plan which includes a: (i) procurement plan; (ii) implementation plan; (iii) governance, management and operation plan; and (iv) monitoring and evaluation plan.
201. Given the scale and complexity of the Semlar market and the capacity constraints at the different levels of implementation, several capacity enhancement measures will be provisioned, including: (i) FIDIC certified engineer and procurement experts to be housed in the SPIU; (ii) dedicated staff for sub-project coordination, financial management, legal services and community liaison; (iii) studies for developing the market business plan, market management policies and procedures, disaster risk and recovery response etc.; (iv) trainings for relevant stakeholders, DUDBC, CAIDMP, MOLMAC and PPMO; and (v) stakeholder workshops for consultation and status updates. Similarly, IFAD country office will need to strengthen its in-house capacity to oversee the procurement and construction processes by recruiting a dedicated engineer and a procurement expert.
202. Governance, Management and Operations: Governance and management is a critical aspect for successful operation of the Semlar market for ensuring the sustainability of the investment. The design mission interacted with several wholesale markets and had discussions with their respective management committees. Only a few (6-8) of around 30 wholesale markets in Nepal are functioning successfully in at least meeting their operational expenditures. The key to success is a dedicated management committee. The well-functioning wholesale markets are being run by management committees that are well-represented by key stakeholders (farmers, POs, wholesale traders, and government authorities), and sufficiently autonomous to take timely decisions in a transparent manner.
203. Based on feedback received during stakeholder consultations and the RHDHV's feasibility study, the Semlar market will be set up and operated under the Development Board Act, 2013 BS. The market will be governed and managed by a Market Management Committee (MMC). The proposed composition of the MMC is the following: Joint Secretary of the GoN (Chair); representative of the Center for Agricultural Infrastructure Development and Mechanization Promotion (CAIDMP); Planning Division Chief of MoLMAC Lumbini; representative of Federation of Nepalese Chambers of Commerce and Industry (FNCCI); Chief Administration Officer of the Butwal Sub-metropolitan City; Chairperson of Ward 15 of Butwal Sub-metropolitan City and an alternative representative; a male and female representative from POs and cooperatives located in R-HVAP clusters supplying products to the wholesale market (two persons); a male and female representative of vendors/traders of the wholesale market (two persons); a representative of agriculture exporters; a representative of FNCCI's local unit representing the transport sector; and the Managing Director of the Semlar Market (Secretary of the MMC).
204. The MMC will function as a governing body and provide strategic guidance and approvals with regard to development of policies and procedures relating to all aspects of running the market in a professional, efficient and sustainable manner. The MMC will

hire a full time Managing Director (MD) and support staff to run the day-to-day operations of the market. The MD will be an experienced market management professional either deputed from MoALD or recruited from the open market through a competitive process. Similarly, all professional, technical and support staff for market operation will be recruited through a competitive process. The MD reports to the Chair of the MMC, while a hierarchical reporting structure for the sub-teams dealing with various aspects of market management will culminate with the MD.

205. A Market Operational Guideline and Action Plan (MOGAP) will be developed together with the MMC, vendors, farmers and other key stakeholders, with the support of the SPIU. A draft table of contents for the Semlar Market Operational Guideline and Action Plan is included in the PIM. The MOGAP will include policies and guarantees for ensuring the long-term access of R-HVAP and other smallholder farmers to the Semlar market. R-HVAP will be monitoring the engagement of smallholders in the Semlar market (M&E indicator – “Number of R-HVAP POs/HHs reporting access to Semlar market services”).

206. Lessons will be leveraged from the Kalimati Market in Kathmandu, and other wholesale markets in Nepal and internationally to inform the MOGAP. IFAD-funded projects such as the Market Infrastructure Development Project in Charland Regions (MIDPCR)[37] project, among other projects in Bangladesh, have gained a wealth of experience on facilitating the establishment of MMCs and building their capacity for sustainable and sound market management arrangements. Such approaches and lessons learned will be made available to the SPIU for informing the MMC when developing the MOGAP.

207. To ensure sustainability and successful operation of the market, an Operational and Reserve Fund will be established to support the day-to-day running of the market and for long term market development. The RHDHV Feasibility Study further recommends that the operations of the wholesale market should be contracted to professionally capable and experienced entities that can manage relevant technical aspects of market operations, such as, lab testing, machine maintenance, transportation, utilities, waste management, management information system (MIS) etc.

208. While endorsing the proposed market governance and management structure, the design mission recommends revisiting and revalidating the overall management structure prior to operations. This will allow any adjustments needed post-construction work and equipment installation.

209. Implementation Schedule and Timeline: It is estimated that about 3 and a half years would be required for construction. The Semlar market is scheduled for implementation and operationalization in three phases[38]: (a) Pre-construction; (b) Construction; and (c) Operational phase. The key activities envisaged under each phase is listed in the table below:

Table 3: Semlar Agriculture Regional Wholesale Market: Key Activities by phases.

| Pre-Construction Phase | Construction Phase | Operation Phase |
|---|---|--|
| Acquisition of permission for construction of buildings at site as per final design | Site clearance | Operation of the market (wholesale and retail) Operation of the processing and storage facilities Transportation of produce. |
| Land transfer of the project site from MOFE to MOALD | Earthwork and site preparation | |
| Forest clearance approval from the Ministry of Forests and Environment | Hauling of construction materials and equipment | |
| Marking and counting of the trees to be felled | Construction of the project structures and facilities | |
| Establishment of construction camp | Installation of equipment | |
| | Landscaping and rehabilitation of the site | |

210. Component 4: Strengthened policies, regulations and institutions for smallholder agroecological production and trade.

211. This component aims at establishing and strengthening enabling policies, regulations and other supporting frameworks for profitable smallholder agroecological production, facilitated by participating institutions and communities. Furthermore, to address recurrent trade barriers (Sanitary and Phyto-Sanitary requirements, certificates of origin, logistics, legal agreements, customs clearance), this component will be implemented in coordination with MoCS, Department of Customs, the provincial line Ministries, and the Trade and Export Promotion Centre (TEPC). The Federation of Nepalese Chambers of Commerce & Industry (FNCCI), responsible for issuing Certificates of Origin that are required by importing countries, will also be involved in support of export-oriented trade.

Policies and regulations.

212. The project will facilitate the participation of small-scale producers as well as other key actors in the safe, organic or agroecology value chains in policy dialogues for identifying systemic barriers to be addressed by policies and regulations at Palika, Province or the Federal level. This participation will be ensured through the participatory agroecology cluster planning processes. Policies and regulation barriers, opportunities and proposed actions that can be implemented at the Palika or Provincial level will be included in the PAPs.

213. At design stage, the following policy and regulation gap areas have been identified in consultation with producers, institutional and private stakeholders: (i) Out of the R-HVAP target provinces, currently only Karnali province has developed a Karnali Organic Mission Plan 2079 (2022) with the support of FAO; (ii) There are no quality assurance, certification and subsidised

pricing regimes for bio-inputs differentiating between farm, community, factory or industry produced bio-inputs; iii) Registration of landraces/local varieties, seed mixtures and evolutionary populations relevant for agroecology farming conditions are limited by the requirement of uniformity in seeds regulations (the inherent resilience benefits of these varieties, mixtures and populations are linked to their polymorphic nature and do not meet the variety registration standards of uniformity); (iv) Lack of policies that can facilitate the long-term lease of idle/abandoned land to young farmers, women or land-poor households; and (v) There are various structural and systemic barriers for export i.e. no credible national organic certification scheme acceptable to export markets, and only a limited number of commodities are eligible for trade incentives.

214. To respond to the above challenges, R-HVAP will support the development of organic policies for Lumbini and Sudurpashchim, similar to the Karnali Organic Mission. Discussions have been held with FAO regarding raising a Technical Cooperation Programme (TCP) for supporting Lumbini and Sudurpashchim provinces in this regard. The programme will provide technical assistance and work with the relevant divisions in MoALD to develop the protocols and regulations for: quality assurance, certification and pricing of bio-inputs with differentiated requirements for farm, community/micro enterprise factory and industry produced bio-inputs; and registration of landraces/local varieties, seed mixtures and populations. Likewise, the program will support the Ministry of Industry, Commerce and Supplies (MoICS) with technical assistance to address structural and systemic export barriers, export procedures, and trade facilitation and negotiation for organic and/or agroecology products.

215. In addition, a trade promotion policy is currently being prepared by MoICS to tackle these constraints, aiming at reducing the current trade deficit. Feedback from the Organic Exporters Roundtable indicated that exports to European and Middle Eastern markets face constraints in logistics and compliance with national and international regulations. MoICS will engage relevant institutions to conduct specific policy studies for developing or updating policy frameworks, regulations and protocols. Over the first 4 years of programme implementation, identification of incoherence in policy and regulatory frameworks will be conducted to define enabling policy responses.

216. Policy development initiatives will include the development of related action plans and a M&E framework. Where relevant, policy monitoring indicators will be linked with indicators related to reporting commitments towards international conventions such as Land Degradation Neutrality targets, Nepal's National Determined Contributions, and the Convention on Biological Diversity.

217. Furthermore, MoALD will work with Palikas and undertake specific studies to develop a legal framework for long-term leasing of fallow and abandoned lands by municipalities for provision to agroecology producers with less than 1 ha, youth and landless.

Trade facilitation and negotiations.

218. **Capacity building for sanitary and phytosanitary (SPS) measures:** One of the critical criteria for ensuring access to export markets is the adherence to stringent Sanitary and Phyto Sanitary (SPS) standards. In this regard, the programme will enhance the capacity of public agencies in conducting pesticide residue analysis to comply with SPS regulations of export markets. Further, given the high volume of cross-border trade with India the programme will provide capacity building support to laboratories at border checkpoints to operate and maintain the facilities and equipment, and for accreditation of the laboratories in the medium term. This will increase competitiveness and facilitate export trade to neighbouring countries and beyond. R-HVAP will also support upgrading of the biotechnology lab in Surkhet and provide capacity support to the laboratory staff. This facility will be involved in conducting quality analysis for both bio-inputs and agricultural products.

219. **Business matching and trade events.** The programme will establish a roster of processing and exporting companies established in Nepal, as well as, international processing and importing companies in third countries. The roster will focus on identifying partner companies that have adopted "ethical trade" approaches and have a long-term vision to sourcing commodities produced by POs in a sustainable manner. Companies that support agroecologically produced commodities and promote quality certification schemes (organic, fair trade, forest alliance, forest stewardship council, etc.) will be given priority to engage with the POs supported by R-HVAP.

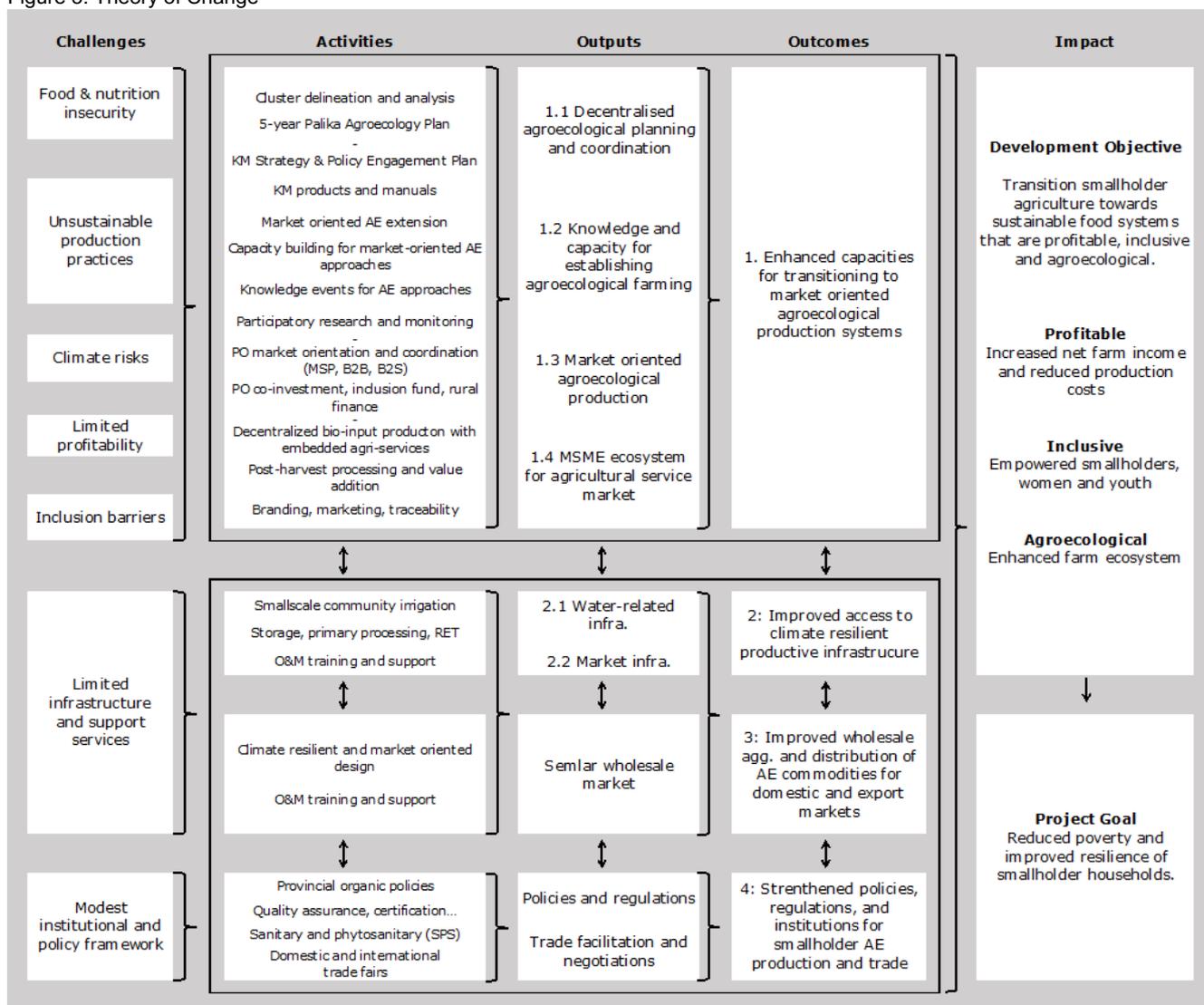
220. This B2B linkage process between graduated POs, MSMEs and international ethical companies will be facilitated by programme staff based at PPMO level. Business matching and trade facilitation will be conducted in partnership with provincial and federal line agencies (MoALD, MoICS, TEPC, MoITFE, FNCCI, etc.). Provincial level MSPs will provide the arena for business matching between PO and MSMEs, some of which have access to export markets. Furthermore, participation in international trade events and international ethnical and bio trade fairs will provide the opportunity to identify international buyers and enter into trade partnerships with POs.

E. Theory of Change

221. **Problem statement:** The agricultural sector of Nepal consists mostly of traditional and subsistence farming and suffers from a limited asset base, weak capacity of farmers and their groups, climate vulnerability, limited water availability, low soil fertility, wildlife-crop depredation, limited access to credit, gender inequality, and labour shortages compounded by limited interest among youth to engage in the sector. Furthermore, high post-harvest losses, limited storage and processing facilities, and inefficient domestic and export market linkages due to unsupportive policy and regulatory regimes are disincentivizing private sector and entrepreneurial investments, and holding back increased market-based production and the commercialisation of the sector.
222. It is estimated that Nepal imports over 50% of its food. The COVID-19 crisis brought into sharp focus the dependency of Nepal on food imports to meet its food and nutrition security. It also exposed the vulnerability of the agriculture sector's dependency on importing most of the essential agri-inputs. The Ukraine-Russia crisis has further exacerbated the problem with accessing agri-inputs, namely chemical fertilisers. The promotion of conventional high input agriculture over the last several decades has seen a ratcheting up of expenditures related to the import of agrochemicals, seed, farm machinery and post-harvest technologies. This heavy dependency on imports for supporting the agriculture sector has been a significant drain on the public treasury and continues to contribute to the trade deficit.
223. **Vision of R-HVAP:** In light of the above, R-HVAP seeks to systematically transition the smallholder agriculture sector towards commercially oriented agroecological farming. The objective is to transition to an inclusive, self-reliant, resilient, and profitable smallholder agriculture sector that increases its contribution to national food and nutrition security as well as foreign exchange reserves.
224. A commercially oriented agroecological farming approach promotes the diversification of a farm to include a number of commodities that meet both domestic and export demand. In this regard, the farm is designed to include crops, livestock, poultry, together with high-value commodities (spices, honey, NUS, PAPs etc.) nested within the farming system. In line with the IFAD stock-take report on agroecology, the market-orientation, economic viability and service linkages of agroecological production will be strengthened. Further, the agroecological approach will be specifically used to enhance product quality to meet domestic and international demands for safe, organic and sustainably produced products, and generate foreign currency inflows.
225. The programme's theory of change assumes that addressing the complex challenge of transitioning to commercially oriented agroecological farming requires coordinated and complementary actions in several key thematic areas, at multiple geographic levels, and systematically over time. In addition, it is estimated that it will take about 20 years for the complete transition, and in this regard, the first phase of R-HVAP seeks to establish the foundations for this transition.
226. **Main lines of action:** R-HVAP adopts a spatial approach for initially establishing a critical mass of agroecology farms along the main arteries as there are already advanced producer organisations (POs) located in proximity to road corridors. Once these POs have established business relations with agri-service providers and traders for servicing multi-commodity value chains, the programme will then broaden its outreach to more distant areas to link up with these functioning supply chains. The agroecological cluster approach supports the creation of contiguous zones of agroecological production, which not only supports the ease of aggregation and transport but also, positively contributes to the enhancement of ecological services such as improved hydrogeologic functioning, soil fertility recycling, pollination, biodiversity conservation and a host of other benefits.
227. The participatory development of Palika Agroecology Plans (PAP) under Sub-Component 1.1 (SC1.1) enables the engagement of multiple stakeholders involved in the agriculture sector. The PAP provides a vehicle for developing a rational and coordinated set of actions including, capacity building, infrastructure, market-based production, agri-services, and financing, to be detailed and implemented over a 5-year period. Existing PAPs will be reviewed annually, and updated as required.
228. The transition to agroecological farming is knowledge intensive as it requires a good understanding of leveraging ecological processes for improving soil fertility, water conservation and integrated pest management through adoption of a circular systems approach. Over the last several decades a significant amount of scientifically proven approaches and technologies have been developed by permaculture and organic practitioners, and the World Overview on Conservation Approaches and Technologies (WOCAT). Furthermore, with the increased global uptake of agroecological farming, new innovations are further refining this approach.
229. Nepali smallholders have historically practiced various elements of agroecological farming. In this regard, the R-HVAP will draw on existing in-country knowledge and certified permaculture trainers to deliver a structured learning programme for building the capacities of smallholder farmers. This will enable them to master agroecological methods over a 2 - 3 year period together with the establishment of a "community of practice" to facilitate cross-learning among agroecological farmers and trainers post the training period. To support this learning process the following will be pursued: establishment of demonstration farms, production of instructional videos, farmer-to-farmer (F2F) exchanges, and an analytical framework for participatory research and monitoring of the economic, social and ecological outcomes of market-oriented agroecological production. Enhanced financial education and business literacy (FEBL) courses that integrate agroecology and gender action learning (GALS), agri-related vocational trainings, and apprenticeships will provide targeted support to female and youth participants. Sub-component 1.2 articulates the capacity building and knowledge aspects of the programme.
230. While smallholders will be capacitated to increase production to meet household food and nutrition security, they will also be assisted with co-investment packages for the agroecological production of diverse high-value commodities linked to market demand for ensuring increased and consistent income. Through effective professionalization support and market linkage mechanisms (e.g. MSPs, B2Bs), producer organisations (POs) will be strengthened to engage in production of higher value commodities. These high value commodities will target domestic and international demand for safe and organic agricultural

products resulting in premium prices and export earnings. MSPs and B2B/B2S will be high priority ongoing processes from programme start-up in order to create early linkages and synergies between POs and MSMEs, and leverage the private sector's market intelligence for informing PAPs, PO and MSME investments, market compliance standards, and reduce risks. The strong market linkage and demand driven production will also ensure a degree of consistency in sales and income.

Figure 3: Theory of Change



231. Currently, GON spends about \$230 million annually on importing chemical fertilisers, which is provided to farmers either free or at highly subsidised rates. This cost is a net drain on the public treasury. In this regard, R-HVAP seeks to build a local agri-input supply chain through the establishment of an ecosystem of MSMEs that produce bio-fertilisers, bio-pesticides, soil amendments, and seed and vegetative material. Bio-inputs produced within agroecological clusters will facilitate competitive pricing, ease of distribution, and real-time feedback on efficacy. With regard to post-harvest processing, R-HVAP will support the establishment of MSMEs that can engage in primary and secondary processing within agroecological clusters. This will allow for ease of aggregation, reduce food loss and waste, and value-addition. Overall, it is anticipated that the creation of MSMEs within the agroecological clusters will help reinvigorate the local economies and also, create more incentives for engaging youth in the agriculture sector. Supported MSMEs will be mandated to provide their services to R-HVAP target groups in proportion to the co-investment amount provided, and are expected to initially benefit up to 25,000 smallholder HHs. MSMEs that support agroecologically produced commodities, and promote quality certification schemes (organic, fair trade, forest alliance, forest stewardship council, etc.) will be given priority to engage with the POs supported by R-HVAP. Sub-component 1.4 provides details on the establishment of an ecosystem of agri-service providers.

232. To address structural constraints that limit production increases, R-HVAP will support the construction of critical infrastructure. To improve farm level production, sustainable land management (SLM), spring protection and irrigation will be supported (SC2.1). In addition, establishing MSMEs for provision of agri-services will require the construction of various production plants and service centres (SC1.4). A large state-of-the-art regional wholesale market will be constructed in Semlar, Butwal Sub-Metropolitan City of Lumbini Province under Component 3 (C3). The programme will also upgrade existing local markets and build new ones in strategic locations for creating a network of satellite markets to feed the Semlar wholesale market (SC2.2). The proximity of the Semlar wholesale market to the Gautam Buddha International Airport and the Indian border is expected to improve wholesale aggregation and distribution of agroecological commodities to both domestic and export markets.

233. The temporal aspect of the agroecological transition is important at many levels. Behavioural change of farmers requires time for absorption and testing of new ideas, and for experiencing the benefits of a shift to a systems approach to farming. In this regard, the capacity building supported under SC1.2 and the PO graduation process under SC1.3 enables a systematic transition towards market-oriented agroecological farming. In addition, the establishment of an ecosystem of micro, small, and medium enterprises (MSMEs) under SC1.4 for provision of bio-inputs and post-harvest services will take time to mature into a dynamic sub-sector. Similarly, the Semlar wholesale market (C3) and other supporting infrastructure (SC1.4 and SC 2.1) will take some time for benefits to manifest. Most importantly, it is key that the feedback loop from the analytical framework developed under SC1.2 guides implementation and enables course corrections over the programme period. The analytical framework will also generate evidence for informing the regulatory and policy formulation process under Component 4 (C4).
234. Other key thematic aspects that R-HVAP focuses on are policies, regulations, and systems for safeguarding agroecological value chains from contamination. A number of policy and regulatory frameworks need to be enhanced to facilitate the increased uptake of bio-inputs, stimulate private investments in agri-service provision, and establishing trade linkages for increasing exports. Furthermore, the programme will establish sanitary and phytosanitary (SPS) measures at border crossings and laboratory facilities in both the Semlar wholesale market and in Surkhet, Karnali. Participatory Guarantee Systems (PGS) and third party certification will also be pursued for accessing export markets.
235. The linkages between inclusive and resilient agroecological multi-commodity value chain development and market-oriented safe food production will act as a catalyst in boosting Nepal's aspirations to transition from Least-Developed Country (LDC) to Middle-Income Country (MIC) status by 2026. The focus on empowering women and youth employment and income opportunities aligns with several of GON's social and economic policies and addresses the need to generate an employment base and opportunity for future generations to participate in a productive and sustainable society. The combined outcomes of R-HVAP will contribute to empowered poor and vulnerable communities, enhanced farm ecologies, and increased net farm incomes, ultimately resulting in rural poverty reduction and improved smallholder livelihoods.
236. The Theory of Change (ToC) is presented as a graph in Annex 2.

F. Alignment, ownership and partnerships

Alignment with SDGs.

237. The Programme Goal aligns with SDG-1 (no poverty) by enabling smallholder farmers to generate additional on-farm income from commercialisation of quality products and access employment, in particular for rural youth. R-HVAP also contributes to SDG-2 (zero hunger), specifically SDG-2.3 (double the agriculture productivity and incomes of small-scale food producers).
238. R-HVAP mainstream gender equality (SDG 5) and will contribute to SDG 8 (inclusive and sustainable economic growth, employment, and decent work for all). The programme also aligns with SDG 12-responsible consumption and production and contributes to climate action (SDG-13) by strengthening resilience and adaptive capacity to climate related disaster (SDG 13.1).

Alignment with national priorities.

239. The Programme fully aligns with the development objectives and strategies of Nepal's Fifteenth Plan (FY2019/20-2023/24) which calls for sustainable and inclusive economic growth and poverty alleviation; self-reliant modernization and commercialization of agriculture, with an emphasis on high value organic production and processing; and sustainable natural resource management for enhancing ecosystem services to the agriculture, industry and service sectors. In addition, the Programme will strongly align with federal and provincial Agricultural Development Strategies, and provincial priorities such as the Karnali Organic Mission Plan 2079.
240. R-HVAP aligns with the Agricultural Development Strategy (ADS) vision of a self-reliant agricultural sector, contributing to its expected impact of agricultural surplus and import substitution through the development of commodities. The MSP and participatory processes will promote coordination between the different tiers of government and contribute to the GESI strategy outlined in the ADS and Food and Nutrition Security Action Plan (FNSP); the latter via the livelihood packages targeting the ultra-poor. The program's strengthening of PO's through graduation and connection to MSMEs, aligns with the strategic framework of the ADS on connectivity-based growth, competitiveness, and equitable income for households. Research generated by R-HVAP will be beneficial to the GoN in their formulation of policies and regulations at different tiers of government, as specified under the legal provisions of the National Policy on Climate Change. IFAD's utilization of previous approaches from projects builds on the 6 strategic thrusts in the ADS for achieving the objectives of the Agriculture Perspective Plan (APP), building on past investments and a package-based approach to different agroecological zones. The agroecological cluster approach and improvement of access to bio-inputs will improve soil fertility over the long-term, thus contributing to the NDC targets to increase organic soil fertility to 3.95% from 2% in 2020.
241. In September 2021, the national planning commission published a report^[39] on Nepal's food systems transformation, outlining the outcomes of the National and Provincial Food Systems Dialogues as a part of the UN Food Systems Summit of 2021. As a key proposition, the report highlights the need to increase agriculture productivity and to develop a sustainable food chain for affordable, safe, healthy, and nutritious diets, and zero hunger. GoN has identified a set of five strategic action areas contributing to the transition towards equitable, resilient and sustainable food systems: (i) ensure access to safe and nutritious food for all, (ii) shift to sustainable consumption patterns, (iii) boost nature-positive production at scale, (iv) advance equitable livelihoods, (v) build resilience to vulnerabilities, shocks and stresses and (vi) a legal framework for sustainable food systems. R-HVAP design is fully aligned with these priorities.

Alignment with IFAD policies and corporate priorities.

242. As described in Section C above, R-HVAP is fully aligned with IFAD policies and corporate priorities. R-HVAP contributes to the Strategic Objectives (SO) of the COSOP, namely accelerated inclusive and sustainable rural economic growth and recovery through greater market participation, improved resilience of rural communities to the impacts of climate change and to economic and other shocks; and strengthened rural and community institutions to effectively meet development needs under the decentralized federal system. R-HVAP addresses two of IFAD's mainstreaming priorities: gender equality; and employment of rural youth.

Country ownership.

243. The design of R-HVAP was initiated based on a request from GoN following the observed success of past country portfolio projects, most particularly HVAP, - ASHA and ASDP. Component 1 directly responds to the national need and priorities defined in the UN Food System Summit (UNFSS) report as described above. The Ministry of Finance and MoALD requested for a transformative agricultural programme that facilitates import substitution and increases export earnings for meeting national food and nutrition security and for generating foreign exchange and reducing the trade deficit.

244. GoN investment priorities in sustainable productive infrastructure for production, post-harvest processing and packaging have also been integrated in the design. The wholesale market in Lumbini province also addresses federal and provincial strategic priorities.

245. During the design mission in March 2023, about 600 individuals and groups representing various interests along the agriculture value chains were consulted. The field consultations culminated in a workshop held in Surkhet, Karnali, where the initial programme concept was presented to key stakeholders from the 3 target provinces. The feedback from the workshop was taken into account in the design of R-HVAP, namely: (i) the preferred modalities to strengthen POs capacity to deliver services to their members through diverse financing mechanisms; (ii) improvement of market linkages through business partnerships between POs and private entities, focusing on producing and processing safe and certified quality products for the domestic and export markets; and (iii) programme implementation arrangements in the context of the federal administrative structure, taking into account the lessons learned from previous and on-going IFAD and other donor funded projects in Nepal.

246. The private sector is a key stakeholder in the GoN strategy for the agriculture sector. Several exporters of agricultural products and a representative from the Trade and Export Promotion Centre (TEPC), were involved in the design to identify current export market potential (especially for organic certified products) and the constraints faced by Nepalese companies involved in sourcing, processing, and exporting agricultural products.

247. MoALD, as the Lead Programme Agency (LPA), in coordination with the Ministry of Finance (MoF), and the Ministry of Industry, Commerce and Supplies (MoICS), the respective Ministries of Agriculture, and Environment and Forests at provincial level, municipal authorities, and other relevant agencies/stakeholders have actively contributed to the design process, ensuring a strong country ownership of the programme. Of importance, is the leadership and commitment expressed by municipal governments to deliver the programme.

Harmonization and partnerships.

248. The programme, as an integral part of the IFAD country portfolio, is designed in complementarity to other IFAD funded projects, namely ASHA (recently closed) and the on-going RERP, ASDP and VITA projects. It is expected that VITA financing instruments will directly benefit R-HVAP beneficiaries.

249. R-HVAP will harmonize its interventions with on-going and pipeline projects supported by other development partners, specifically: (i) the Nuts and Fruits in Hilly Areas Project ([NAFHA](#), MoALD, ADB) implemented in Koshi, Bagmati, Gandaki, Karnali and Sudurpashchim from 2022 to 2030; (ii) the Rural Enterprise and Economic Development ([REED](#), MoALD, World Bank), implemented in Koshi, Madesh, Bagmati, Gandaki, Lumbini and Sudurpashchim from 2020 to 2025.

250. Partnerships will be developed with service providers for provision of technical assistance. During the design several entities have been involved in consultations and identified as potential partners to provide services to support the agroecological transition and the professionalization of PO through a structured graduation process. Recruitment and mobilisation of service providers require lengthy procurement process that have generated start-up delays in previous projects. Given the innovative and specific nature of the technical assistance required, it is recommended that direct procurement of service providers be undertaken to not only avoid delays in procurement but also, for ensuring that expert institutions that have the requisite know-how and experience are selected.

251. The programme will also engage research organisations, including NARC, focusing on developing an agroecology strategy and an analytical framework for the programme to measure impacts of the agroecology practices and approaches, and for informing the scaling up strategy.

G. Costs, benefits and financing

a. Project costs

252. Total cost of the Programme: The total cost of the programme is estimated at US\$ 120.9 million. The financiers and contributions are the following: (i) IFAD loan US\$ 70.9 million (58.6%); (ii) Federal Government of Nepal US\$ 24.6 million (20.3%) comprising of, (a) US\$ 19.6 million (16.2%) covering duties, taxes, salary and operational cost of deputed staff, and (b) US\$ 5.0 million (4.1%) cash contribution for the Semlar wholesale market; (iii) provincial government US\$ 0.5 million (0.4%); (iv) local government / Palikas US\$ 1.52 million (1.3%), (v) Producers Organizations-Households US\$ 20.87 million (17.3%), and (vii) MSMEs US\$ 2.56 million (2.1%).

253. Programme cost by components and financiers: The programme is composed of four components, while the 5th component covers Programme management. Of the total programme cost, US\$ 66.05 million (54.6%) will be used for Component 1, US\$ 10.08 million (8.3%) for Component 2, US\$ 31.25 million (25.8%) for Component 3, US\$ 1.37 million (1.1%) for Component 4, and US\$ 12.22 million (10.1%) for Programme management under Component 5. Table 4 provides programme cost by component and financier.

Table 4: Programme costs by component (and subcomponents) and financier

| NEPAL Resilient High Value Agriculture Programme (R-HVAP) Components by Financiers (US\$ '000) | GON (Federal) - | | Local Government | | IFAD Loan | | Producers' Organizations and Households | | MSME | | Total | | | | | |
|---|-------------------|-------------|------------------|------------|--------------|------------|---|------------|-----------------|-------------|-----------------|-------------|----------------|------------|------------------|--------------|
| | Cash Contribution | | (Palika) | | | | | | | | | | | | | |
| | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | | | | |
| 1. Enhanced capacities for transitioning to market oriented agro-ecological production systems | 9,714.8 | 14.7 | - | - | - | - | 34,324.2 | 52.0 | 19,499.9 | 29.5 | 2,511.5 | 3.8 | 66,050.4 | 54.6 | | |
| 2. Improved access to climate resilient productive infrastructure | 1,512.0 | 15.0 | - | - | 1,518.0 | 15.1 | 5,681.6 | 56.4 | 1,368.3 | 13.6 | - | - | 10,079.9 | 8.3 | | |
| 3. Improved wholesale aggregation and distribution of agro-ecological commodities for domestic and export markets | 4,254.7 | 13.6 | 5,000.0 | 16.0 | - | - | 22,000.0 | 70.4 | - | - | - | - | 31,254.6 | 25.8 | | |
| 4. Strengthened policies, regulations and institutions for smallholder agro-ecological production and trade | 205.2 | 15.0 | - | - | 33.8 | 2.5 | - | - | 1,082.6 | 79.1 | - | - | 46.5 | 3.4 | 1,368.1 | 1.1 |
| 5. Programme management, monitoring and evaluation, knowledge management and learning | 3,907.1 | 32.0 | - | - | 463.3 | 3.8 | - | - | 7,846.6 | 64.2 | - | - | - | - | 12,217.0 | 10.1 |
| Total Programme Costs | 19,593.8 | 16.2 | 5,000.0 | 4.1 | 497.1 | 0.4 | 1,518.0 | 1.3 | 70,935.0 | 58.6 | 20,868.2 | 17.3 | 2,557.9 | 2.1 | 120,970.0 | 100.0 |

254. Programme costs by expenditure categories and financiers: The programme cost has been budgeted under four expenditure categories: (i) works; (ii) goods, services and inputs; (iii) training; and (iv) operating costs. Of the total programme cost, 35.3% will be for works, 54.0% will be for goods, services and inputs, 2.7% will be for training, and 8.0% will make up the operating costs. Table 5 provides definitions of programme expenditure categories and the associated costs by financiers.

Table 5: Programme expenditure categories and associated costs by financier

| NEPAL Resilient High Value Agriculture Program Disbursement Accounts by Financiers (US\$ '000) | GON (Federal) - | | Local Government | | IFAD Loan | | Producers' Organizations and Households | | MSME | | Total | | | | | |
|---|-------------------|-------------|------------------|------------|--------------|------------|---|------------|-----------------|-------------|-----------------|-------------|----------------|------------|------------------|--------------|
| | Cash Contribution | | (Palika) | | | | | | | | | | | | | |
| | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | | | | |
| Works | 5,839.1 | 13.7 | 4,624.6 | 10.8 | 33.8 | 0.1 | 1,462.2 | 3.4 | 27,390.7 | 64.1 | 1,349.7 | 3.2 | 2,054.5 | 4.8 | 42,754.5 | 35.3 |
| Goods, services and inputs | 9,711.3 | 14.9 | 342.9 | 0.5 | - | - | 55.8 | 0.1 | 35,236.9 | 53.9 | 19,518.5 | 29.9 | 457.0 | 0.7 | 65,322.4 | 54.0 |
| Training | 462.6 | 14.3 | 32.5 | 1.0 | - | - | - | - | 2,702.9 | 83.3 | - | - | 46.5 | 1.4 | 3,244.6 | 2.7 |
| Operating costs | 3,580.8 | 37.1 | - | - | 463.3 | 4.8 | - | - | 5,604.5 | 58.1 | - | - | - | - | 9,648.6 | 8.0 |
| Total Programme Costs | 19,593.8 | 16.2 | 5,000.0 | 4.1 | 497.1 | 0.4 | 1,518.0 | 1.3 | 70,935.0 | 58.6 | 20,868.2 | 17.3 | 2,557.9 | 2.1 | 120,970.0 | 100.0 |

| Categories | Description |
|---------------------------------|--|
| (i) Works | Project works and for Project equipment and materials, including eligible costs for Project vehicles and standard office equipment |
| (ii) Goods, Services and Inputs | Project goods and services, including consultancy services, and other direct inputs |
| (iii) Training | Project training activities and workshops, e.g. costs of venue, participant travel, food and beverages and publication materials. |
| (iv) Operating costs | Project for operating costs and eligible expenditures incurred under all components of the Project for salaries and allowances of Project staff directly and fully assigned to the Project. Salaries of staff assigned to the Project on a part time basis should be costed pro rata |

255. Programme costs by component and year: Programme costs will be incurred over the period of 8 years. About 8% of the cost will be incurred in 1st year. The programme cost will be 23%, 32%, 26%, 4%, 3%, 3% and 1% in the 2nd, 3rd, 4th, 5th, 6th, 7th and 8th year respectively. Table 6 provides programme cost by component and year.

Table 6: Programme costs by component and year

| NEPAL Resilient High Value Agriculture Programme (R-HVAP) Project Components by Year -- Totals Including Contingencies (US\$ '000) | Totals Including Contingencies | | | | | | | | |
|---|--------------------------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|------------------|
| | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total |
| 1. Enhanced capacities for transitioning to market oriented agro-ecological production systems | 3,324.8 | 14,997.1 | 25,273.5 | 18,239.4 | 1,845.6 | 1,216.1 | 1,148.4 | 5.6 | 66,050.4 |
| 2. Improved access to climate resilient productive infrastructure | 847.0 | 1,838.6 | 2,885.0 | 2,261.5 | 1,000.5 | 448.0 | 452.4 | 347.1 | 10,079.9 |
| 3. Improved wholesale aggregation and distribution of agro-ecological commodities for domestic and export markets | 3,288.9 | 9,280.1 | 9,237.0 | 9,448.6 | - | - | - | - | 31,254.6 |
| 4. Strengthened policies, regulations and institutions for smallholder agro-ecological production and trade | 36.0 | 324.9 | 304.2 | 173.3 | 121.0 | 207.5 | 125.2 | 75.9 | 1,368.1 |
| 5. Programme management, monitoring and evaluation, knowledge management and learning | 2,363.2 | 1,387.5 | 1,335.6 | 1,471.4 | 1,451.4 | 1,468.0 | 1,496.1 | 1,243.8 | 12,217.0 |
| Total Programme Costs | 9,859.8 | 27,828.2 | 39,035.3 | 31,594.1 | 4,418.5 | 3,339.6 | 3,222.1 | 1,672.4 | 120,970.0 |

b. Project financing/co-financing strategy and plan

256. The total budget for R-HVAP is estimated at US\$ 120.97 million over a period of 8 years. The budget includes IFAD loan financing of US\$ 70.9 million (58.6%) - US\$ 38.5 million PBAS, and US\$ 15.4 million and US\$ 17.00 million reallocated from ASDP and VITA respectively. Federal Government of Nepal contributions are estimated at US\$ 24.6 million (20.3%), comprising of US\$ 19.6 million (16.2%) covering duties, taxes, salary and operational cost of deputed staff, and US\$ 5.0 million (4.1%) cash contribution for the Semlar wholesale market. Provincial and local governments' contributions amount to US\$ 0.5 million (0.4%) and US\$ 1.52 million (1.3%) respectively. In addition, producer organization-household and MSME contributions are estimated at US\$ 20.87 million (17.3%, mostly in-kind), and US\$ 2.56 million (2.1%).

257. The Financing Agreement (FA) will include a start-up financing provision of US\$ 1 million to finance the establishment of coordination and implementation offices/units, launching of initial procurements, recruitment of staff, and undertaking preparatory studies such as the baseline survey. Conditions prior to disbursement do not apply to start-up finance and GoN may request up to US\$ 1 million upon the FA entering into force. PCO will prepare AWPB and other procurement documents for the initial year of programme activities. In addition, the PCO will be responsible for other arrangements necessary to start programme activities shortly after entry into force of the programme.

c. Disbursement

1. Government of Nepal will pre-finance programme expenditures. The programme will on a quarterly basis reimburse Central Treasury actual expenditures pre-financed by the government. IFAD funds will be disbursed to a Designated Account (DA) to be opened in the Nepal Rastra Bank. PCO will transfer funds from DA to Central Treasury to reimburse IFAD's share of project expenditures after IFAD clears quarterly IFRs. Project cost tables will serve as reference documents to check the eligibility of project expenditures for IFAD financing.
2. Cost categories. The programme will have four cost categories: (i) Works, (ii) Goods, Services and Inputs, (iii) Training and (iv) Operating costs. The ratio of recurrent expenditures under IFAD loan (amounting to (US\$ 5.6 million) to total programme financing is 8.8%, which is within the 15% limit.
3. Interim Financial Reporting (IFR). Report-based disbursement modality will be applied to request funds from IFAD. The PCO will submit consolidated quarterly IFRs within 45 days from the end of the relevant quarter. Two WAs, one for justification for actual spent amount and the second for advance, will be submitted each quarter.
4. Expenditure thresholds and supporting documentation. The most recent IFRs will be attached to each WA. IFAD may ask for additional supporting documents as deemed necessary.

d. Summary of benefits and economic analysis

258. The detailed Economic and Financial Analysis (EFA) is in Annex 4 of the PDR.

259. **Programme benefits.** The programme will benefit 60,000 smallholder farm households^[40]. Programme participants will receive co-investment support and access to rural finance to start climate resilient agricultural enterprises, among others.^[41] Smallholders will gain increased production of various agricultural commodities through the adoption of agroecological farming systems, improved technology, management practices, and enhanced access to other complementary services.

260. The programme will assist with construction of: (i) 485 small-scale community irrigation systems ; and (ii) 85 market-led infrastructure (new/upgrading); and (iii) installation of 162 solar dryers / incubators at PO level. The programme will promote decentralized MSMEs: (i) 14 bio-fertilizer and bio-pesticide production units; (ii) establish 7 seedlings / saplings nurseries, and 7 breeding units/resource centers for goats and other animal breeds; and (iii) strengthen 95 agro-vets and tools suppliers. The programme will support establishment of 25 cold storage facilities (50 MT capacity) and 25 small scale processing units for storage, sorting, grading, drying, packaging and value addition. In addition, R-HVAP will support the first phase of construction of the Semlar Agriculture Regional Wholesale Market in Butwal Sub-Metropolitan City, Lumbini province.

261. The programme will bring approximately 2,425 hectares of land under year round irrigation. Through MSMEs, the programme will facilitate the annual production and distribution of about 4,500 MT of organic fertilizers/pesticides, 140,000 high quality seedlings/saplings, 3,500 improved goat breeds, over 80,000 chicks/birds, and inputs to approximately 45,000 programme participants. Eventual programme benefits will manifest in changing cropping patterns, increase in average cropping intensity by 29.78%, crop productivity by 20% to 30% in different agro-ecological settings, and improvements in agri-biodiversity.

262. **Programme costs.** Total cost of the programme is estimated at USD 120.97 million: 92.02% of the total programme cost is investment cost and 7.98% is the operating cost. The programme cost per year provided in following table.

Table 7: Programme Cost by Year and Type

| Programme year | Programme Cost (USD '000) | | |
|-------------------------------|---------------------------|-----------------|-------------------|
| | Investment cost | Recurrent cost | Total |
| PY-1 | 8,636.0 | 1,223.7 | 9,859.68 |
| PY-2 | 26,694.3 | 1,133.8 | 27,828.06 |
| PY-3 | 37,851.2 | 1,184.1 | 39,035.34 |
| PY-4 | 30,307.6 | 1,286.9 | 31,594.48 |
| PY-5 | 3,212.5 | 1,206.1 | 4,418.51 |
| PY-6 | 2,121.3 | 1,218.2 | 3,339.58 |
| PY-7 | 1,980.2 | 1,241.9 | 3,222.09 |
| PY-8 | 518.6 | 1,153.8 | 1,672.40 |
| Total | 111,321.50 | 9,648.63 | 120,970.13 |
| | 92.02 | 7.98 | 100.00 |
| Note: 1 USD = NRs. 130 | | | |

Financial analysis

263. **Crop/Livestock/Agroforestry/Apiculture production Models:** A total of 24 enterprise models were prepared to represent the “with and without” project interventions situation; the results are summarized in Table 8. Financial analysis results indicated all these models are financially attractive for investment to programme participants with FIRR above 12.4%, BCR more than 1.01 and positive NPV.

Table 8: Financial Analysis Results of Crop / Livestock / Agroforestry / Apiculture Model

| S.N. | Type of Crop | Unit | Model Size | Financial Indicators | | |
|------|--------------------|-------|------------|----------------------|-------------------|--------------|
| | | | | IRR (%) | NPV @ 12% DF (Rs) | BCR (12% DF) |
| 1 | Paddy | Ha. | 1.0 | 20.9% | 18 | 1.12 |
| 2 | Wheat | Ha. | 1.0 | 19.9% | 9 | 1.06 |
| 3 | Maize | Ha. | 1.0 | 25.6% | 13 | 1.14 |
| 4 | Millet | Ha. | 1.0 | 27.3% | 4 | 1.05 |
| 5 | Tomato | Ha. | 1.0 | 14.2% | 47 | 1.05 |
| 6 | Cucumber | Ha. | 1.0 | 17.6% | 94 | 1.09 |
| 7 | Cole vegetables | Ha. | 1.0 | 18.4% | 138 | 1.21 |
| 8 | Cattle | No | 5.0 | 20.0% | 305 | 1.26 |
| 9 | Goat | No | 10.0 | 30.3% | 450 | 1.42 |
| 10 | Ginger | Ha. | 1.0 | 13.1% | 1,026 | 1.02 |
| 11 | Turmeric | Ha. | 1.0 | 17.2% | 97 | 1.14 |
| 12 | Potato | Ha. | 1.0 | 18.8% | 116 | 1.08 |
| 13 | Snow pea | Ha. | 1.0 | 32.2% | 22 | 1.06 |
| 14 | Kidney bean | Ha. | 1.0 | 17.5% | 3 | 1.01 |
| 15 | Coffee | Ha. | 1.0 | 16.2% | 153 | 1.14 |
| 16 | Walnut | Ha. | 1.0 | 16.3% | 332 | 1.28 |
| 17 | Apple | Ha. | 1.0 | 13.9% | 101 | 1.06 |
| 18 | Orange | Ha. | 1.0 | 12.4% | 17 | 1.01 |
| 19 | Lime | Ha. | 1.0 | 18.1% | 132 | 1.07 |
| 20 | Timur - existing | Ha. | 1.0 | 17.2% | 26 | 1.12 |
| 21 | Timur - New | Ha. | 1.0 | 13.6% | 23 | 1.03 |
| 22 | Honey - polination | Hives | 2.0 | 18.4% | 10 | 1.08 |
| 23 | Honey - commercial | Hives | 20.0 | 18.8% | 118 | 1.06 |
| 24 | Back yard poultry | No | 100.0 | 32.1% | 116 | 1.09 |

264. **MSME, community infrastructure and Semlar market model:** Representative MSME’s investment models were prepared for five types of MSMEs. Similarly, the financial benefit cost analysis was done for representative small community irrigation systems. These results are summarized in Table 9.

265. Financial analysis results indicated all the MSMEs are very attractive for investment by private sector entrepreneurs with FIRR above 13.1%, BCR more than 1 and positive NPV. The sensitivity analysis revealed these MSMEs are very sensitive on their

level of capacity utilization. Investment in these MSMEs will not be financially attractive to investors if their capacity utilization / operation are below 60% of their potential. For annual break even, these MSMEs must operate above 60% capacity. Likewise, average small community irrigation systems have an estimated IRR of 27.6%, BCR of 1.27 %, and NPV of NPR 1.277 million. Return on community irrigation systems primarily depends on their proper O&M, highlighting the need for the programme to provide extra focus on proper O&M for sustaining larger benefits.

Table 9: Financial Analysis Results of Representative MSMEs and Community Irrigation System

| Representative MSME / Community Infrastructure Model Type | Unit | Quantity | Financial Indicators | | |
|---|--------|----------|----------------------|-------------------------|--------------|
| | | | IRR (%) | NPV @ 12% DF (Rs. '000) | BCR (12% DF) |
| Bio-fertilizer / pesticide | Number | 14 | 13.1% | 268 | 1.00 |
| Seedings / Saplings | Number | 7 | 15.1% | 673 | 1.05 |
| Breeding units (resource centers) | Number | 7 | 13.5% | 853 | 1.02 |
| Cold storage (50 MT) | Number | 25 | 13.3% | 697 | 1.00 |
| Dairy processing - Chilling Vat | Number | 5 | 14.3% | 986 | 1.00 |
| Dairy collection centre (600 Litre) | Number | 5 | 14.0% | 321 | 1.00 |
| Small Irrigation System | Number | 485 | 27.6% | 1,277 | 1.27 |

266. In the case of the Semlar Wholesale Market, it is anticipated that the annual revenue stream from the market facilities and services will be sufficient to meet the annual operating costs. Considering the public-goods nature of the Semlar Market with high upfront investments, the revenue from the market will be insufficient to recover the investment costs. This is consistent with other wholesale markets in Nepal and neighboring countries. and as with all public investments, the costs will be recovered through benefits to the larger agriculture sector through assured market facilities and reduced post-harvest loss and price instability.

267. **Farm/Households Models:** Nine different household farm models were prepared that integrate at least one and/or combination of 24 crop models discussed above. [42] Financial benefit cost analysis was done for all 9 farm/household models and the results are presented in Table 10.

Table 10: Financial Analysis Results of Representative Farms/Households Model

| Farm / Houeholds Model | Model Size (ha) | Cropping Intensity | | | Financial Indicators | | |
|------------------------|-----------------|--------------------|--------|--------|----------------------|--------------|--------------|
| | | Without project | With | Change | IRR (%) | NPV @ 12% DF | BCR (12% DF) |
| Model 1 | 0.50 | 210.00 | 260.00 | 50.00 | 13.0% | 22.22 | 1.01 |
| Model 2 | 0.50 | 210.00 | 226.00 | 16.00 | 16.6% | 230.49 | 1.09 |
| Model 3 | 0.50 | 210.00 | 226.00 | 16.00 | 22.2% | 488.95 | 1.14 |
| Model 4 | 0.50 | 200.00 | 236.00 | 36.00 | 15.8% | 187.22 | 1.06 |
| Model 5 | 0.50 | 210.00 | 218.00 | 8.00 | 15.0% | 50.60 | 1.01 |
| Model 6 | 0.50 | 210.00 | 238.00 | 28.00 | 12.8% | 135.63 | 1.00 |
| Model 7 | 0.50 | 210.00 | 248.00 | 38.00 | 16.1% | 135.63 | 1.04 |
| Model 8 | 0.50 | 210.00 | 258.00 | 48.00 | 13.6% | 48.35 | 1.02 |
| Model 9 | 0.50 | 210.00 | 238.00 | 28.00 | 22.6% | 266.82 | 1.12 |
| Average | 0.50 | 208.89 | 238.67 | 29.78 | | | |

268. Financial indicators of all the farm/household models are IRR > 12.8%, BCR > 1.01 and NPV @ 12% DF above NPR. 50,600. This indicates that all these models are financially attractive for investment by smallholder farm households.

Economic analysis.

269. **Economic analysis results.** Based on the financial models of farms/households, MSMEs, community infrastructure and the Semlar Wholesale Market, an economic analysis of the programme was conducted using economic prices. Cost-benefit analysis yields an overall EIRR of 18.1%. The estimated NPV for a 9% discount rate is NPR 21,267.60 million (USD 163.60 million) and the BCR of 8.52. This economic analysis results reveals that the project is worth investing from social and economic perspectives.

270. **Sensitivity Analysis.** A sensitivity analysis was conducted on various scenarios to assess the effect of variations in (i) 10% and 20% decrease in benefits; (ii) 10% and 20% increase in costs, (iii) one year and two-year delay on incremental income accrual, and (iv) 10% and 20% decrease in adoption rate. EIRR was at least 17% or more for all the scenarios tested, presented in Table 11. In particular, results of the sensitivity analysis revealed that the programme is most sensitive to programme benefits being delayed by two years.

271. Table 11: Results of the Sensitivity Analysis

| Analysis scenario | Δ% | Link with the risk matrix | IRR | NPV (USD M) |
|----------------------------|--------|--|-------|-------------|
| Base scenario | | | 18.1% | 163.60 |
| Programme benefits | -10% | Combination of risks affecting output prices, yields and adoption rates | 17.9% | 145.06 |
| Programme benefits | -20% | | 17.6% | 126.53 |
| Programme costs | 10% | Combination of risk associated to inflation of project related materials | 17.9% | 161.42 |
| Programme costs | 20% | | 17.7% | 159.24 |
| Programme benefits delayed | 1 year | Low readiness on project implementation | 17.6% | 157.22 |
| Programme benefits delayed | 2 year | | 17.0% | 132.78 |
| Adoption rate | -10% | Combination of risks affecting output prices, yields and adoption rates | 18.0% | 151.08 |
| Adoption rate | -20% | | 17.8% | 138.57 |

272. **Switching Values.** The switching value for the total project benefits is about – 751.73% while for the project costs it is approximately 88.26%.

Table 12: Results of Switching Value Analysis

| Particulars | NPV (NRs. '000) | Switching value (%) |
|----------------------------|-----------------|---------------------|
| NPV of incremental benefit | 24,096,758.24 | (751.73) |
| NPV of incremental cost | 2,829,164.54 | 88.26 |

273. **Programme cost by beneficiary:** With the total programme cost of USD 120.97 million, programme cost per beneficiary household amounts to US\$ 2,016 and that of cost per person is US\$ 469.

e. Exit Strategy and Sustainability

274. R-HVAP is designed as a medium-term initiative, with the first phase from 2024-2031, and the next phase starting in 2031.

Therefore, the programme is designed based on a scaling up strategy and takes into account the sustained support that is a key condition for sustainability of POs and related investments. R-HVAP graduation approach is to provide support to existing POs who have already been established, organised, trained, and coached for taking them to the next level. Support will be tailored to existing capacities by adopting dedicated maturity score cards to regularly track progress made by CBOs. This approach is expected to be more efficient by saving on mobilisation costs and time, and is also expected to generate quicker and more sustainable results during the 8-year programme lifetime.

275. In consistency with the programme TOC, this requires that key interventions and activities continue or are scaled up by rural institutions/groups, government authorities, donor organizations, the private sector and other agencies:

276. Institutions established and / or supported by the programme have the capacity to maintain and further develop their structures, functions, roles and responsibilities in respect of good governance, gender equality and social inclusion and provide services and inputs for beneficiaries to continue the activities invested in profitably.

277. Physical infrastructure supported by the programme are owned and managed by the adequate governance and O&M institutions in line with their institutional mandate, with adequate organizational structures, technical capacities, and financial means to ensure long term operation, maintenance, and further development where relevant. This may entail specific linkages with government institutions and organizations to ensure minimal backstopping and support more complex repairs. Such roles and expectations are included in the specific MoUs with local government institutions for elements that are beyond the communities' capacities and means.

278. Private sector entities (MSME) become financially independent and can maintain and develop their business activities and partnerships with farmer groups beyond programme complementation and continue to deliver services to POs.

279. Producers Organisations are linked to relevant public-private institutions to continue accessing services and inputs to continue engaging in viable activities (i.e. market partnership but also linkage with extension systems, lead farmers/entrepreneurs to facilitate access to inputs, seeds and services, access to credit etc.).

280. Main investment activities (including agroecology farming practices, infrastructure investments, post-harvest activities etc.) are economically and environmentally viable after programme completion; this will be ensured through community driven processes and screening of economic, social and environmental viability of promoted activities.

281. Knowledge management processes ensure that quality replication guidelines and videos are produced to facilitate continuity and scaling of relevant training and approaches.

282. The exit strategy will be further developed by PCO and implementing agencies from the start of the programme to ensure it is owned and adapted to programme development.

3. Risks

H. Project risks and mitigation measures

283. Annex 9 presents the Integrated Programme Risk Matrix (IPRM) with fiduciary risks reviewed in detail.

284. **Country context risks are generally low.** Nepal is at an advanced stage of transitioning from a unitary to a three-tier federal governance system. The inherent level of risk is low due to both elections having been completed without major incident. Rural and agriculture development remains priorities for all major parties. However, smooth implementation due to constitutional arrangements, including the newly introduced system of federalism, is to be tested over time and required adjustments made. Overall, local government (municipalities) have started playing a more pro-active role in local development, including agricultural development. These risks will be mitigated by involving all levels of government and programme execution will be mainstreamed by government ministries, namely MoALD as the LPA and MoICS in close collaboration with Provincial ministries.

285. Implementation risks will be mitigated by service providers mobilised in support of PPMOs, Corridor Offices, public agencies, local authorities at Palika level and POs. The IFAD Country Office will closely monitor the implementation progress and mitigate delays and issues. The programme has been designed taking institutional risks into consideration, especially in the context of the slow transition to Federalism. The programme implementation structure shifts the implementation focus to the Provincial and Palika levels with only a nominal role assigned to the Federal level entities. However, there are challenges at Provincial and Municipal levels as well, but increased demands by local communities for accountability is pressuring these institutions to perform more effectively. The local elections conducted in 2022 brought in many young and dynamic actors into the municipalities, which bodes well for the implementation of R-HVAP.

286. **Procurement risk assessment** was conducted using the Methodology for Assessing Procurement Systems (MAPS). The Procurement Risk Matrix is Annex 9a of the PDR.

287. (i) Risks associated with multiple PPMOs at provincial levels and Central PCO. Each PPMO and the PCO will require separate government-deputed Accounts Officers. PIM and FMM will have detailed roles and responsibilities. The PCO will have the necessary technical experts and be vital in coordinating all PPMOs, consolidating IFRs, and allocating timely budgets. In addition, the PCO will ensure all PPMOs and Corridor Offices have government-deputed Accounts Officers / accountants. The Part-time Accounts Officer option will be explored where the government does not have full time staff for R-HVAP; (ii) The risk that the government will delay the implementation of programme activities after entry into force. The programme legal documents will include retroactive financing provisions to finance consultancy contracts from PDR approval until entry into force. PCO level consultants will prepare AWPB and other procurement documents for the initial year of programme activities. In addition, consultants will be responsible for other arrangements necessary to start programme activities immediately after entry into force of the programme; and (iii) The risk that the Office of the Auditor General will delay the submission of annual audit reports. It is proposed that a combination of private and SAI for the project audit is considered within the current legislature to address audit submission delays.

I. Environment and Social category

288. The environmental and social category for R-HVAP is determined as **substantial**, based on the screening tool of SECAP 2021. An Environmental Impact Assessment (EIA) commissioned by Invest International was approved by the Government of Nepal on 29 September 2023. The EIA study was conducted in close coordination with IFAD and adheres to the SECAP 2021 standards. The EIA report encompasses a comprehensive analysis of the social and environmental impacts associated with the wholesale market and includes a list of proposed mitigation measures. The detailed EIA report, accompanied by a dedicated environmental and social management plan (ESMP), is available with the SECAP disclosure documents^[43].

289. R-HVAP aims to generate positive environmental and social benefits in a comprehensive manner. The program focuses on promoting agroecological farming systems, which will contribute to revitalizing the ecological health of farms, increasing biodiversity, and building climate resilience. R-HVAP will contribute to the following: a) encourage gradual phasing out of chemical inputs, while simultaneously providing support for homemade and commercial bio-inputs; b) promote integrated farming, mulching, inter/mix cropping, biochar, and integrated pest management to maintain soil health for minimizing pest and disease outbreaks; c) promote renewable energy technology as part of the value chain and support market development activities; d) support water source protection, storage and water recharge ponds, ground water recharge structures MUS, small irrigation schemes, and efficient water use technologies to reduce water stress; e) minimize waste from agriculture, poultry, processing and market centers, and create circular systems for compost production; f) promote agroforestry, fodder plantations, and stall feeding to alleviate pressure on forests; and g) anti-erosion measures for soil and water conservation.

290. R-HVAP is a gender transformative and youth sensitive program that places a significant emphasis on social inclusion. It adopts proactive measures to specifically target women, youth, and marginalized communities. The program will enhance women's access to viable economic opportunities, generate economic and professional opportunities for youth, and ensure their active engagement in decision making processes.

J. Climate Risk classification

291. As per the SECAP screening tool, the climate risk category of the program is determined as **substantial**. Following are the key themes and steps followed to assess climate risks:
292. (i) Hazard identification - As per the ThinkHazard tool, Vulnerability and Risk Assessment (VRA) report by MoFE (2021), and design field visit - R-HVAP intervention areas are likely to experience river flood, urban flood, landslides, water scarcity, extreme heat, and wildfires. Likewise, foreseen future climate scenario predicts changes in temperature, climate variability and alterations in intensity and frequency of extreme events;
293. (ii) Exposure Assessment - The program targets agricultural systems or livelihoods and infrastructure, especially the wholesale market, that are exposed to weather-related hazards. Crop and livestock production are frequently affected by rainfall variability, prolonged droughts, changes in temperature, and pests and diseases;
294. (iii) Sensitivity - Major income of the target population comes from agriculture and livestock. The population's vulnerability is also increasing by diseases such as COVID-19;
295. (iv) Adaptation capacity and climate resilience - Nepal still lacks disaster coping capacity (DDR score of 5.5 as per the INFORM) and climate and weather information services are not effectively being delivered to farmers, rural dwellers, and end users. Basic infrastructure and technical facilities are still poor in program targeted areas. Farmers still face difficulties in accessing adequate financial credit and loans that are tailored to their needs.
296. The program will promote agroecology, integrated farming, and climate smart agricultural practices. Of the total IFAD financing of US\$ 70.9 million, US\$ 19.947 million accounts for climate adaptation financing. Participatory planning process will be adopted to avoid climate hazard hotspots and for integrating appropriate adaptation measures. SECAP related responsibilities will be included in the terms of references of thematic specialists in PCO, PPMOs, and Corridor Offices. Climate risk including in-depth flood risk assessment has been planned for the wholesale market, and recommended measures will be incorporated into the EIA ESCMP.

4. Implementation

K. Organizational Framework

a. Project management and coordination

Programme management and coordination.

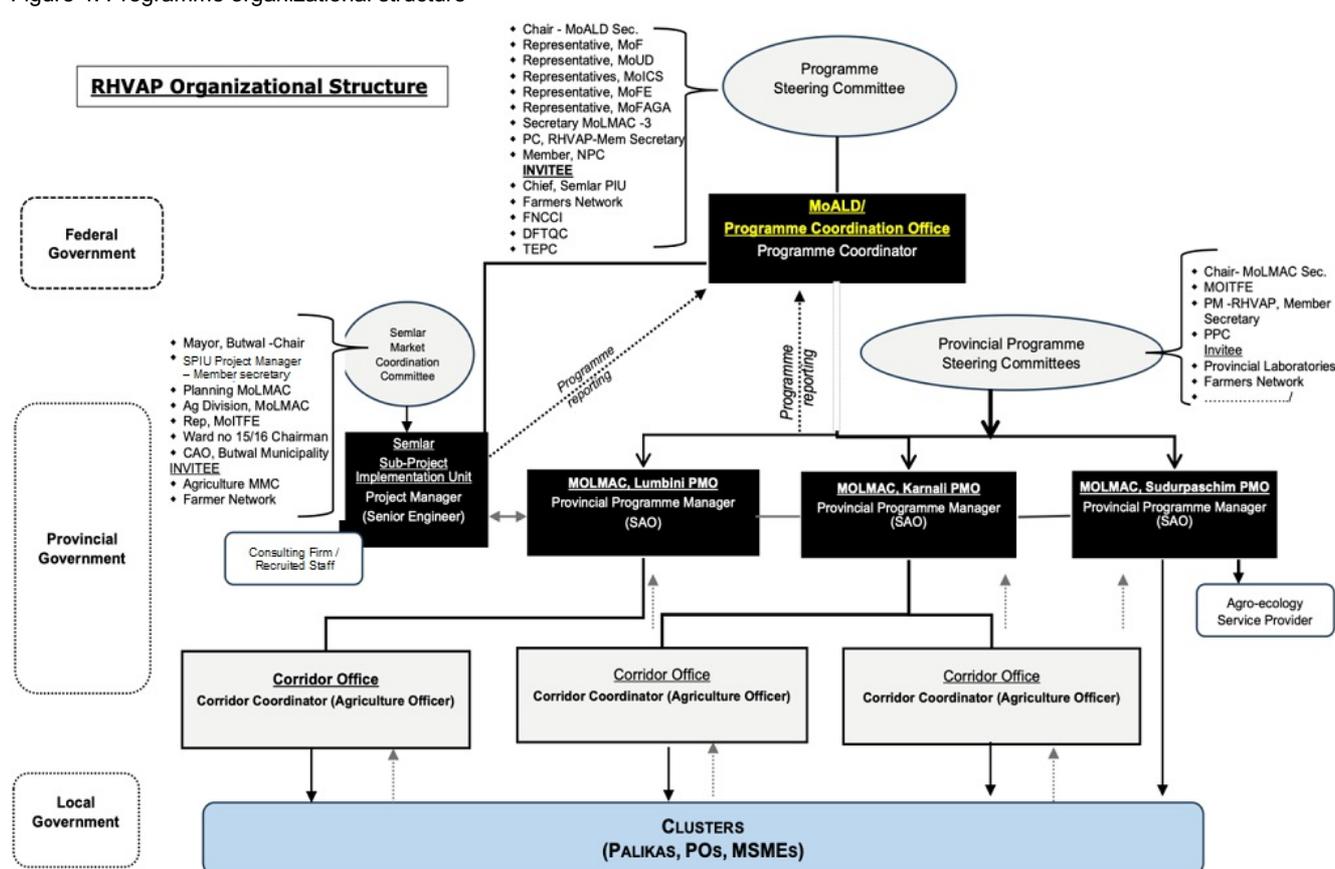
297. The Ministry of Agriculture and Livestock Development (MoALD) is the Lead Programme Agency (LPA) and will work in coordination with the Ministry of Finance (MoF), and the Ministry of Urban Development (MoUD), Ministry of Industry, Commerce and Supplies (MoICS), the respective Ministries of Agriculture, and Environment and Forests at provincial level, and other relevant agencies/stakeholders. A forestry technician will be appointed by the provincial ministry in charge of Forest and Environment (MoITFE or equivalent), to ensure coordination for interventions related to soil and water protection measures in the agroecological clusters.
298. A Programme Steering Committee (PSC) at federal level will be chaired by the Secretary of MoALD with representatives from the concerned line ministries (MoF, MoICS, MoFE). Three Provincial Programme Steering Committees (PPSC) will be established under the chairmanship of the Secretary MoLMAC, with representatives from the relevant provincial ministries (MoITFE, etc.) of Lumbini, Karnali and Sudurpashchim.
299. Management structures will include: (i) a Programme Coordination Office (PCO), hosted by MoALD, will be located in one of the provinces based on strategic and capacity considerations; (ii) three Programme Management offices (PPMO) in the provincial capitals of Lumbini, Karnali and Sudurpashchim; PPMO(iii) three Corridor Offices will be established in strategic locations and will host the technical staff in the various fields of expertise required (agroecology, agronomy and livestock, engineering, social inclusion, business development [MSP, B2B, B2S]); and iv) Semlar market SPIU.
300. The PCO at federal level will be responsible for the overall programme planning, implementation and monitoring and evaluation. The PCO will coordinate the operations of the PPMOs for harmonization of planning, activities implementation, monitoring and reporting. The PCO will also be in charge of establishing and managing partnerships with service providers, research institutions, as well as collaborating with other projects and development initiatives. The PCO will be located in a strategic location in one of the programme provinces.
301. The provincial PMOs will be responsible for delivering the programme services and interventions in the three respective target provinces of Lumbini, Karnali and Sudurpashchim.
302. The PPMOs and three decentralized Corridor Offices will be in charge of facilitating the PAP and MSP as well as providing technical guidance to POs and MSMEs receiving programme support.
303. Government appointed staff will be deputed to the various levels. For specialised expertise and programme management functions, a Service Provider will be recruited specialised in the three key areas of the programme: capacity building in

agroecology; PO professionalization; and MSME development. A research consortium led by NARC will also be involved in the programme implementation structure for the design, promotion and monitoring of the agroecology approach.

304. Service providers will be selected through a competitive bidding process or through direct selection. Lengthy competitive bidding processes have proven to significantly delay the start-up phase of previous projects and these delays have had a negative impact on the overall projects' performance. To mitigate these constraints, it is recommended that IFAD be requested by GON to recruit service providers and facilitate direct payment.

305. Staff and any service providers hired under the programme will be sensitised on the importance of youth and gender mainstreaming. A gender empowerment, youth and social inclusion expert (GESI) stationed in one of the provincial PMO will be responsible for implementation of gender and youth action plan as well as oversight the mobilisation strategy; selection of programme participants through an inclusive and transparent process. The gender, youth and social development specialist will also oversee the adoption of GALS-lite mainstreaming activities. At cluster level GESI focal points will be appointed among the social mobilisers (ToRs are available in the PIM).

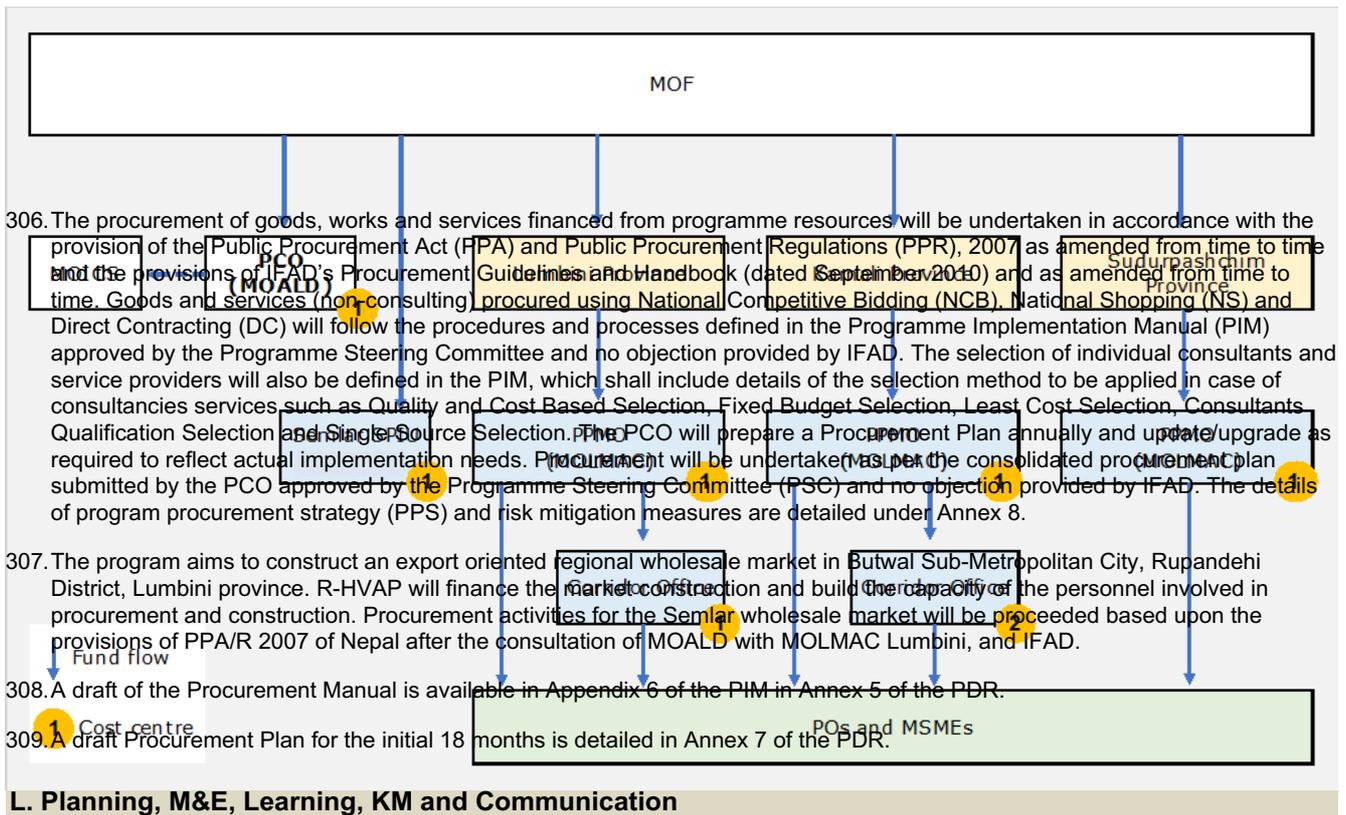
Figure 4: Programme organizational structure



b. Financial Management, Procurement and Governance

- Disbursement.** The Government of Nepal will pre-finance programme expenditures. The programme will reimburse Central Treasury actual expenditures pre-financed by the government. Report-based disbursement modality will be applied to request funds from IFAD. The PCO will submit consolidated quarterly IFRs within 45 days from the end of the relevant quarter. Two WAs, one for justification for actual spent amount and the second for advance, will be submitted each quarter. The PCO will maintain the DA at Nepal Rastra Bank.
- Planning and Budgeting.** Annual programme budgets will be prepared within the overall government budgeting process. The PCO will coordinate preparing and submitting accurate and realistic budgets from provincial PPMOs. Each province will prepare a provincial AWPB against which to manage activities, informed by the Palika Agroecological Plans (PAP). A dedicated AWPB will be formulated for the Semlar Wholesale Market. Upon endorsement of the AWPBs by the respective provincial PSCs, an overall programme AWPB will be consolidated along with activities at the federal level for IFAD "No-Objection" and federal PSC endorsement. The PCO will be responsible for ensuring overall coherence of AWPB with programme design and objectives, and will coordinate with MoF for performance based fund allocation to respective

1. AWPBs will be prepared using the official IFAD template designed for results-based management provided in the Programme Implementation Manual (PIM). In preparing the AWPB, the narrative presentation should be concise and precise, and spreadsheet tables and schemas should be used to illustrate targets, achievements, costs and financing. The AWPBs will clearly identify all implementing agencies, service providers and partners, and outline the detailed activities and estimated budget, including internal resources mobilized by each partner or agency. In addition, the AWPB will also estimate VITA or other loan resources required to support POs and MSMEs supported by the Programme
2. The draft AWPB, split by components, categories, and sources of funds, will be sent to IFAD 60 days before the start of the relevant financial year. The LPA will be responsible for submitting and obtaining approval of the AWPB from the MOF and IFAD. Post approval, changes to the AWPB will require endorsement by the PSC and "No-Objection" from IFAD.
3. Upon approval of the programme-wide AWPB, the PCO will enter AWPB activities of PCO and Semlar SPIU into the Line Ministry Budget Information System (LMBIS) hosted by the Ministry of Finance. These annual programme activities will be published in the Red Book upon approval of the budget by the Parliament. For provincial PPMOs, PCO will provide an Excel sheet of costed programme activities per province to the Ministry of Finance. The Ministry of Finance will transfer conditional grants based on the Excel sheet to the respective provincial governments. Upon receiving the notification of conditional grant for R-HVAP activities, respective PPMOs will enter AWPB activities of PPMO and Corridor Offices into the Provincial LMBIS. These annual programme activities will appear in the provincial Red Books upon approval by the provincial Parliament.
4. After approval of the budget published in the Red Books (both Federal and Provincial) and budget allocation to the PCO, SPIU, PPMOs and Corridor Offices cost centres, the R-HVAP approved budget will be inserted into respectively the Office of the Financial Comptroller General's (FCGO), Financial Management Information System (FMIS) at the Federal level and provincial treasury offices' FMIS. Budget allocations will be available at the District Treasury Controller Offices (DTCO) for R-HVAP use. The Red Books would specify the budget codes and funding source.
5. *Internal control.* The programme will follow Government regulations in payments, funds flow, and treasury operations. However, PIM and FMM will be developed to include detailed roles and responsibilities for all programme staff. In addition, the FMM will include specific procedures for the segregation of duties among FM staff.
6. *Accounting systems, policies, procedures, and financial reporting.* R-HVAP will adhere to the GoN budgeting/accounting rules as well as the percentage of financing of activities from the various financiers. Centralized Government Accounting Software (CGAS) will be used for accounting record-keeping and financial reporting. However, CGAS does not generate IFAD-required IFRs and can't consolidate financial reports for all provincial PPMOs and the central PCO. Therefore, Programme will work with the FCGO (MOF) to customize CGAS to generate IFRs and automatically consolidate IFRs at the PCO level.
7. *Audits.* In line with local regulations, the Office of the Auditor General (OAG) audits donor-funded projects in Nepal. However, OAG has not been able to complete audits in a timely manner for several years. It is proposed that a combination of private and SAI for the project audit is considered within the current legislature to address audit submission delays.
8. *Country systems.* Government staffing, budgeting, single treasury, funds flow, financial reporting, accounting and audit standards, and SAI will be used to implement R-HVAP. The most recent PEFA, dated 2015, assessed Budgeting (A), treasury system (C+), quality and timeliness of annual financial statements (C+), Scope, Nature, and Follow-up of Audit (C+) to be effective.
9. *Lessons learned.* ASDP could not timely disburse to project beneficiaries and suppliers due to the long distance to PMO. Therefore, R-HVAP will have a critical mass of PMOs close to suppliers and beneficiaries. In addition, all projects in Nepal had issues with the timely start of project activities after entry into force. Therefore, R-HVAP has included a retroactive financing option. Lastly, It is proposed that a combination of private and SAI for the project audit is considered within the current legislature to address audit submission delays.
10. Figure 5: Programme planning and fund flow.



L. Planning, M&E, Learning, KM and Communication

a. Planning, M&E, Learning, Knowledge Management and Communication

Planning.

- 310. R-HVAP will follow the GoN and IFAD AWPB planning processes. The participatory preparation of 5-year PAP action plans will be the principal planning process for mainstreaming market-oriented agroecology practices and principles into smallholder production systems. In addition, the PAPs will be the key instrument for orienting the bulk of the R-HVAP financing for alignment with respective ward and municipal development plans and formulating provincial Annual Workplans and Budget (AWPBs) and Procurement Plans (PPs). Consistent with the local planning processes, the PAPs will be endorsed by respective Palikas, and accounted into the Ward and Palika plans.
- 311. The PAP activities eligible for R-HVAP financing will be consolidated at the ward and municipal level. Following the Local Government Operation Act 2074 (LGOA 2017), the programme will participate and present the PAPs in respective ward and municipal planning processes for endorsement. The PAP development process will be aligned with select entry points of the annual local planning process for identification of municipal co-financing and integration into the municipal annual development plans.
- 312. Each province will have a provincial AWPB against which to manage activities. Palika Agroecological Plans (PAP) will be consolidated at the ward and palika level, and will be aggregated to form the provincial AWPBs. A dedicated AWPB will be formulated for the Semlar Wholesale Market. The provincial and Semlar Wholesale Market AWPBs will be consolidated into an overall AWPB along with activities at the federal level.

Monitoring and Evaluation.

- 313. The M&E system developed and managed by the PCO will cover: (i) monitoring of implementation performance, execution of the AWPB, outreach and effectiveness of the targeting strategy, and (ii) periodic measurement of programme results (outputs, outcomes and impact) in relation to agreed targets. All provinces will contribute to a single R-HVAP M&E System and have access to the data generated.
- 314. **Outreach monitoring.** For each key output, as and when they will be delivered, the M&E system shall track the number of direct programme participants. In so doing, the M&E system will help monitor the extent to which intended programme participants, in particular young smallholder farmers, poor women and marginalized groups, are actually being reached, helping thus track targeting performance. This means that, each time a specific programme output is delivered, the specific implementer shall collect information on the number of programme participants, their gender, age (both GoN 16-40 and IFAD 15-24), gender of household head, and if they belong to the janajati (IP) or dalit community. In addition, the programme will also track migrant families and returning migrants.
- 315. **Georeferenced Management Information System (MIS):** A key focus for the R-HVAP M&E System will be to operate a highly effective Geo-MIS (online and offline, internet and mobile devices) that provides programme managers and teams with timely

and reliable information to support adaptive programme management. A foundation MIS will be developed for R-HVAP in cooperation with ASDP prior to start-up. The Programme will adapt and improve on this foundation MIS using lessons from ASDP, ASHA and RERP. Unique ID will be provided to each programme participant and household, similar to the ASDP and ASHA MIS, to enhance transparency of investments, prevent duplication, and track change over time. Georeferencing of productive infrastructure will also contribute to enhancing transparency by enabling remote monitoring of infrastructure locations using freely available satellite imagery. Outcome level indicators will also be integrated into the MIS, such as increase in net income, employment status, PO and MSP activity status, and others. Further, the ESCMP indicators (overall Programme and Semlar) will be integrated into the M&E System and MIS to enable remote monitoring by international stakeholders (please see the ESCMP Matrix included in the PDR). To the extent feasible, the R-HVAP MIS will align with the VITA MIS for tracking lending activities to Programme beneficiaries.

316. The MIS user-interface will be improved for simplicity and results visualization, in order to make it more accessible for all users, especially for decision and policy makers. While the current RERP and ASDP MIS have informative MIS dashboards with results and progress diagrams, they focus on total and average numbers that provide a static snapshot of progress. To better inform the management and monitoring team, data analysis and evaluations will be improved by adding spatially and temporally dynamic diagrams and figures such as annual trendline figures on outreach, physical and financial progress, and relevant outcome indicators such as net income, production and sales volumes, and others. All PO output and outcome data will be disaggregated by annual batches to assess batch-specific trend analysis and year-over-year change in key value chain outcomes such as production volume, sales volume and value, and others.
317. MIS data-entry will be made mandatory for the disbursement of co-investment packages and funds.
318. **Data collection:** In each province, a baseline survey will be conducted among a representative sample of initial programme participants in order to collect quantitative and qualitative information on the socio-economic conditions of these households prior to programme interventions. The same exercise will be repeated at mid-term and completion (in time to inform the MTR and PCR preparation processes), in order to measure and appreciate changes since baseline. Attention will be given to consistently collect baseline, mid-term and end line data on all performance indicators as noted in the Logical Framework, including IFAD's core output and outcome indicators as described by IFAD's Core Indicators (CI) Framework. A resilience matrix and scorecard will be developed to measure household resilience, based on the IFAD Resilience Design and Monitoring Tool (RDMT). In addition to the Logical Framework indicators, baseline, mid-term and end line data will also be collected on Multidimensional Poverty Index (MPI), soil organic matter (SOM), and Minimum Dietary Diversity for Women (MDDW).
319. For the tracking of various value chain indicators, R-HVAP will follow a system of "rolling baselines" in which data on each production cluster is collected at the time of intervention initiation using smaller samples. Annual Cluster Tracking Surveys (ACTS) will also be organized from Year 2 onwards to regularly assess the development and performance of each cluster and corridor, and to assess the level of satisfaction of programme participants.
320. Under Component 1, data will be chiefly collected through Farm Business Diaries, as well as agroecological lead farmers and community mobilizers' records. The programme will make extensive use of tablets and online databases to enable data collection and entry directly from the field into the MIS by agroecological lead farmers and community mobilisers, who will be provided with tablets or smartphones, along with remunerations for the collection of programme participant data.
321. **Reporting:** The PCO will be responsible for the preparation of monthly, quarterly, bi-annual and annual progress reports. The bi-annual and annual progress reports will be shared with IFAD for feedback. In addition, the PCO will be required to prepare a Programme Completion Review towards the end of the Programme.
322. A draft M&E manual is available in Appendix 2 of the PIM.

Learning, Knowledge Management, and Communication.

323. The Programme will invest in good quality, evidence-based knowledge management to contribute to implementation and policy development processes. Knowledge management activities in R-HVAP will have a triple objective: (i) the sustainable anchoring of technical and managerial knowledge among supported farmers and their groups (e.g. through the production of teaching materials and manuals); (ii) the generation of knowledge from programme experience in market-oriented agroecological production and various other domains, based on the information collected through M&E activities, participatory research and specific thematic studies; (iii) the sharing of this knowledge with interested parties, such as IFAD and MoALD, other donors and policy makers interested in smallholder agroecology or resilient value chain development, using various media (publications, policy formulation workshops, various Communities of Practice and multi-stakeholder platforms, instructional and documentary videos). Ultimately, knowledge management activities will feed the policy dialogue between IFAD and the Government on successful approaches to building sustainable food systems in the country, and scaling up the best practices.
324. **KM Strategy and Policy Engagement Plan:** A KM Strategy and Policy Engagement Plan will be developed that considers and responds to the knowledge and communication needs of all key stakeholders, including programme participants (youth, POs, MSMEs), provincial and local governments, and the R-HVAP team as well. The strategy will respond directly to the findings of the Agroecological Cluster Delineation and Analysis, which will identify the knowledge and capacity gaps and needs of both smallholder communities (production) and of government representatives (policy) for transitioning to market-oriented agroecological production systems. The strategy will also take into consideration the need for both horizontal (peer-to-peer) and vertical (multi-stakeholder) knowledge and communication pathways in order to address issues of risk perception and trust.
325. In particular, the KM Strategy and Action Plan will include and elaborate on the following:
326. **Policy Engagement Plan** to support informed decision-making and the next phase, R-HVAP adopts a programmatic and phased approach. Therefore, gathering evidence-based knowledge on major Programme priorities and investments will be

critical to guide current implementation as well as the next phase of R-HVAP. A Policy Engagement Plan will be developed directly addressing the priority policy research areas and evidence needs of policy-makers identified by the Agroecological Cluster Delineation and Analysis. This will then be used to ensure the Programme is collecting sufficiently robust data on these issues through M&E systems and thematic studies to provide evidence-based policy inputs. Policy research topics could include outcome and impact assessments of Programme activities, as well as key enabling factors and constraints faced, for example, profitability and return on labour of agroecological production, impact on ecological health and biodiversity, resilience and loss and damages during extreme events, balancing quality and affordability of bio-inputs, encouraging private investment, enabling fallow land access, decentralized planning and implementation, and others as relevant.

327. **Participatory research and innovation through demonstration farms.** An analytical framework will be designed for participatory research and monitoring of the agroecology approach, in cooperation with NARC. The analytical framework will be guided by the KM Strategy and Policy Engagement Plan, and will draw on existing frameworks such as, IFAD's Resilience Design and Monitoring Tool (RDMT) and the FAO's Tool for Agroecology Performance Evaluation (TAPE) among others, to delineate a set of research activities and methods for implementation at demonstration farm level. A role-model approach will be adopted for documenting agroecological innovations and lessons with an empirical evidence base. A small number of promising agroecology lead farmers, farms and MSMEs will be selected as role-models. Based on a robust analytical framework, detailed physical and financial data will be collected on a monthly basis, while biophysical data of the farming ecology will be collected bi-annually, or as relevant. This rich evidence base will be used to support several thematic studies and analyses identified by the Policy Engagement Plan. Where relevant, scientific publications and policy briefs will be prepared in partnership with national research institutions and universities and shared to provincial and national level workshops and events.
328. **Transparency for addressing issues of trust and risk perception among programme participants.** At the community level, R-HVAP will develop a network of agroecological lead farmers and demo-farms, as well as market-oriented community mobilizers. These have proven as valuable instruments for peer-to-peer and "learning-by-doing" knowledge and skills sharing within rural communities, addressing key concerns of trust and doubt among smallholders. In addition, with linkages to the agroecological research on model farms and rural enterprises, monthly data will be published online on the Programme website and social media, with select information shared via SMS or radio, such as expenditure, income, net profit and return on labour, to enhance transparency and address risk perception among rural communities. The findings and results will be communicated with a strong youth focus, using popular social media platforms such as YouTube and Instagram for visibility. Exposure events and learnings routes will also be organized to visit well established, high performing, and innovative POs and MSMEs.

b. Innovation and scaling up

329. The overall agroecological approach of the programme is the central driver for innovations. The key innovative feature of the programme is the participatory integrated planning process that will translate into the preparation of Palika Agroecology Plans.
330. Technical innovations for agroecological production practices will be developed and promoted through the co-investment arrangements. Co-financing of multiple production packages is an innovative approach, building on the past project experience, aiming at enhancing landscape and farm level diversification. In addition, the support to gene banks and seed multiplication networks will improve access to new seeds for smallholders. The economic, social and ecological impacts of these technical innovations will be documented and analysed through the analytical framework in partnership with research institutions.
331. Renewable energy technologies (RETs) will also introduce innovative solutions at production level (solar pumps, solar incubators), post-harvest and processing level (solar dryers, biogas, etc.) and energy production (micro grids)
332. The graduation approach for the professionalization of PO is also an innovative pathway towards delivering quality services to PO members and improving market linkages that are inclusive and remunerative. It is expected that professionalised PO will provide a platform for further farmers' driven innovations, stemming from their local knowledge and the circular learning processes fostered by the programme. Information and Communication Technologies (ICT) will be mobilised as new tools to further disseminate innovations and lessons learned and further strengthen the links between stakeholders (PO, public and private entities).
333. Based on the results of the first phase of R-HVAP, a consolidation of programme results and scaling up will be undertaken under phase two. The scaling up will be undertaken geographically and thematically.

M. Project Target Group Engagement and Feedback, and Grievance Redress

a. Project Target Group Engagement and Feedback.

334. The programme approach is based on community consultation and demand-driven development approach, placing attention to capture and integrate the view of all stakeholders into the sub-project design and implementation of PAPs. Mobilization activities include key steps such as: information, consultation, engagement with all social actors and specific measures for social inclusion of the most vulnerable as outlined in the targeting and social inclusion strategy.
335. In the initial stages of implementation, the programme will work with community members and community-based organizations (CBOs as well as POs) including village elders and local leaders, to inform them about the programme activities. Consultations will take place in all communities at ward level to seek concurrence about the relevance of the planned activities and ascertain the community's interest in participating. Community meetings will include a minimum of 50 percent of women, 30 percent of youth, as well as vulnerable social categories such as women head of households (30 percent) Dalits, Janajatis, IPs and involvement of PwD where present in the community.
336. Separate discussion with women, youth, representatives from marginalized groups (including Indigenous Peoples) as well as their representation in decision making will be a key enabling instrument to ensure their pro-active participation, consultation, and feedback. Throughout the facilitation of community consultations and planning, the programme GESI expert and the Community Mobilisers will ensure inclusion of the vulnerable groups, their mobilization within the process, including gathering their feedback. Eventually, separate consultations with those groups could be organized to ensure full participation and ownership. During implementation, regular community meetings will continue to take place to inform community members on the status of implementation with the participation of community facilitators and representatives of the programme and local administration. Focal points at community level to capture community feedback will also be appointed.

b. Grievance redress.

337. **Grievance Redress Mechanism (GRM):** An adequate grievance redress mechanism (GRM) will be established to ensure programme participants may communicate their concerns due to programme activities either with the relevant focal point at the local level or with central level and it is required this mechanism be publicized at the local level and in the local language. The GRM will follow established practices, and will provide multiple access points (telephone, complaints box, website, email, postal address) so that beneficiaries will know whom to contact with regard to their concerns.
338. The R-HVAP manager at PMO and corridor levels will have the overall responsibility to address concerns brought to the attention of the focal point regarding any environmental and/or social impacts due to program activities. As per the government practice, a large poster featuring the contact details of information officer, including photo and phone number, will be prominently displayed in each cost centre. Additionally, a complaint and suggestion box will be made accessible in each office. Complaints received by the implementing agency shall be recorded and duly documented in a progress report, detailing the number and type of complaints, as well as the results of their resolution.

N. Implementation plans

a. Supervision, Mid-term Review and Completion plans.

Implementation readiness and start-up plans.

339. The start-up plan of the programme includes: (i) early mobilisation of service providers for agroecology and PO graduation, (ii) establishment of programme offices and appointed GoN staff at PCO, PMO and corridor levels, (iii) arrangements and TA for the wholesale market in Lumbini provinces and (iv) recruitment of key thematic experts at PCO and PPMOs.

Supervision, Mid-term Review and Completion plans.

340. Programme supervision, Mid-Term Review (MTR) and Completion Reviews will be conducted jointly by GoN, and IFAD. IFAD will mobilise expertise to facilitate supervisions and reviews missions.
341. IFAD and GoN will conduct annual Supervision Missions (SM) and regular Implementation Support Mission (ISM) during programme implementation. There will be eight SMs and eight ISMs, over the eight-year programme lifetime.
342. The programme MTR mission is provisionally planned for early 2027. One Completion Review mission will be conducted in late 2030 or early 2031.

Footnotes

[1] The Nepalese Rupee is pegged at a fixed exchange rate with the Indian Rupee and thus any movement in the value of INR vis-à-vis other currencies reflects in NPR. There is thus a very limited latitude in exercising exchange rate policy to correct macro-economic imbalances. With increasing trade deficit and falling foreign exchange reserve, GON resorted to restricting imports which resulted into substantial decline in government revenue.

[2] Final Report of the Land Degradation Neutrality Target Setting Programme (MoFE, 2018)
https://www.unccd.int/sites/default/files/ldn_targets/2019-03/Nepal%20LDN%20TSP%20Country%20Report.pdf

[3] The 2015 Constitution while requires women to be represented in all 3 tiers of the government to a significant scale, such representation is yet to produce results in terms of women playing effective role in decision making in the governance of the public institutions.

[4] MoFE 2021. Vulnerability and Risk Assessment and Identifying Adaptation Options: Summary for Policy Makers. Ministry of Forests and Environment, Government of Nepal. Kathmandu, Nepal.

[5] <https://dap.climateinformation.org>

[6] CIAT; World Bank; CCAFS and LI-BIRD. 2017. Climate-Smart Agriculture in Nepal. CSA Country Profiles for Asia Series. International Center for Tropical Agriculture (CIAT); The World Bank; CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS); Local Initiatives for Biodiversity Research and Development (LI-BIRD). Washington, D.C. 26 p.

[7] Wezel, A., Herren, B. G., Kerr, R. B., Barrios, E., Gonçalves, A. L. R., & Sinclair, F. (2020). Agroecological principles and elements and their implications for transitioning to sustainable food systems. A review. *Agronomy for Sustainable Development*, 40, 1-13.

[8] www.ifad.org/en/web/latest/-/see-how-permaculture-transformed-farmland-in-nepal-from-barren-to-lush

[9] <https://www.ifad.org/en/web/knowledge/-/stock-take-report-on-agroecology>

[10] https://xdesk.ifad.org/sites/pi/npl/Shared Documents/Knowledge Management/01 IFAD Nepal_HVAP_Organic Ginger Valley Case Study_13May2022_CLEAN.pdf

[11] Gairhe, J. J., Khanal, S., & Thapa, S. (2021). Soil Organic Matter (SOM): Status, Target and Challenges in Nepal. *Malaysian Journal of Sustainable Agriculture (MJSA)*, 5(2), 90-94.

[12] A roundtable discussion on organic agriculture marketing and exports was organized by the IFAD CO on 4 April 2023 with the participation of 15 private enterprises engaged in Nepali organic exports.

[13] https://xdesk.ifad.org/sites/pi/npl/Shared Documents/Knowledge Management/02 IFAD Nepal_AS DP_Vermicompost Case Study_29Apr2022.pdf

[14] 5 Elements Organic Bastion, Panauti, Nepal

[15] Wards zoned as green (organic), yellow (phase to organic), and red (majority chemical).

Project objectives

[16] National Planning Commission (2021). *Nepal Multidimensional Poverty Index: Analysis Towards Action*. Kathmandu, Nepal.

[17] United Nations Children's Fund (2022). *Child and Family Tracker (CFT)*. Kathmandu, Nepal.

[18] Average household size is 4.3.

[19] The design mission observed during consultation with local communities that average farm size is 0.1 to 0.5 ha in the Programme target area.

[20] As per the national definition, youth are people between 16 and 40 years of age. Percentage is based on demographic proportions at national level.

[21] The current census has yet to release data on poverty and also on ultra-poor HHs. In the meantime, the proxy used (4.9%) for ultra-poor households corresponds to the share of population in severe multidimensional poverty (UNDP, 2022).

[22] Smallholder land area is less than one hectare, average is 0.7 ha for men and less than 0.5 for women. Proportion is based on production level and average land size where 47.3 percent subsistence farming households hold an average land size of less than 0.5 hectare and 27.2 percent between 0.5 and 1 ha (CBS, 2011). Farmers with landholding size between 1-5 ha with commercial orientation account for 24.5 percent (ADS, 2015-2035).

[23] Based on practices of GoN, and of previous and ongoing IFAD-financed projects in Nepal (HVAP, ASDP), household poverty can be classified based on food sufficiency (from their own farm production and all other sources of income) as: ultra-poor (less than 3 months), medium poor (3-6 months), and general poor (6-12 months).

[24] <https://www.ifad.org/en/web/knowledge/-/stock-take-report-on-agroecology>

[25] The ten elements are: Diversity, Co-creation and sharing of knowledge, Synergies, Efficiency, Recycling, Resilience, Human and social values, Culture and food traditions, Responsible governance, Circular and solidarity economy.
<https://www.fao.org/agroecology/overview/overview10elements/en/>

[26] Permaculture is defined as, "consciously designed landscapes which mimic the patterns and relationships found in nature, while yielding an abundance of food, fibre and energy for provision of local needs" (Holmgren 2013 *Essence of Permaculture*). Mollison (1991) presented it as the following: "permaculture is a philosophy of working with, rather than against nature; of protracted and thoughtful observation rather than protracted and thoughtless labor; and of looking at plants and animals in all their functions, rather

than treating any area as a [single product system](#)". Fundamental to this approach is the generation of optimal yields per unit of human or other forms of energy expended. As such, among other principles, a permaculture farm is organised (zoned) in a thoughtful manner to facilitate energy conservation and flow among its different zones.

[27] https://www.ifad.org/documents/38714182/41260694/cle_valuechain.pdf/7f0ae37d-5c57-10a2-b14d-0593f08a03d0

[28] In evolutionary plant breeding, crops with a high level of genetic diversity are subjected to the forces of natural selection. In a cycle of sowing and re-sowing seed from the plant population year after year, those plants favoured under prevailing growing conditions are expected to contribute more seed to the next generation than plants with lower "fitness". Thus, evolving crop populations have the ability to adapt to the conditions under which they are grown – variable and unpredictable environments.

(<https://www.ifad.org/documents/38714170/40321134/BiodiversityAdv.pdf/723039d0-f321-46a9-a786-c43819265cbc>)

[29] Based on market needs identified by the cluster analysis, MCPs and MSPs, the units of each type of MSME may be increased by reducing the unit costs, but remaining within the investment ceiling.

[30] Technical and Financial Feasibility Study Report (March-2023); Export-oriented Agriculture Wholesale Market Semlar, Nepal, (Refer to Chapter 3 for detail)

[31] The draft EIA was disclosed to the IFAD EB on 14 August 2023.

[32] The studies for the Semlar market were contracted out to Royal Haskoning DHV (RHDHV).

[33] 40-60 metric tons per square meter (MT/m²)

[34] Draft Technical and Financial Feasibility Study Report (March-2023); Export-oriented Agriculture Wholesale Market Semlar, Nepal by HASKONINGDHV NEDERLAND B.V.

[35] Nepal calendar year

[36] Key considerations for proposing the options include: (i) level of risks the MoALD and potential investors accept in relation to investment costs; (ii) the level of influence MoALD wants to have on design, quality of works during all project phases; (iii) how the procurement process is carried out in a transparent and competitive way; (iv) how the project can be split logically in different procurement packages (basic and detailed engineering / construction / equipment deliveries) to ensure best value for money of the goods, works and services purchased; (v) the experience, capacities and knowledge of (local) contractors and suppliers

[37] Bangladesh projects scaling up note is available [here](#) and MIDPCR digest is available [here](#).

[38] Adopted from the ESIA-Whole Sale Market

[39] Nepal's Food Systems Transformation: Context, Pathways and Actions:

<https://npc.gov.np/images/category/230301032250Food%20Systems%20Dialogues%202021-Country%20Report%20Nepal.pdf>

[40] They will be benefit from programme interventions such as (i) improved access to climate resilient productive infrastructure, and wholesale aggregation and distribution of agroecological commodities for domestic and export markets; and (ii) strengthened policies, regulations and institutions for smallholder agroecological production and trade

[41] These activities are based on crops [year round vegetable production, native crops and neglected and underutilized species (NUS), spices – ginger, and turmeric and potato seed production], livestock (dairy cattle/buffalo, goat and native chicken), agro-forestry [medicinal and aromatic plants (MAPS), non-timber forest products (NTFP), fruits (apple / walnut / citrus) fodder trees, coffee and cover crops) and apiculture [commercial (20 hives models) and pollination and nutrition (2 hives model) activities.

[42] The farm/households model are: Model 1: Year round vegetable production, dairy and apiculture for pollination and nutrition; Model 2: Dairy and MAPs / NTFPs; Model 3: Dairy and potato seeds production, Model 4: Dairy and shade grown coffee and cover crops; Model 5: Goat farming, native chicken, and apiculture for pollination and nutrition; Model 6: Goat farming, backyard poultry, native crops and NUS such as millet, buckwheat, barley, Karnali beans; Model 7: Apiculture for commercial honey production (20 hives model), and agroforestry system; Model 8: Agroforestry systems, spices and apiculture for pollination and nutrition; and Model 9: MAPS and NTFPs, Ginger, and apiculture for pollination and nutrition.

[43] Link: <https://www.ifad.org/documents/38711624/47800070/secap-eia-2000003750.pdf/65c506a7-846e-36c5-8c32-928e44ee4ec6?t=1692016664474>

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 1: Logframe

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

Resilient High Value Agricultural Programme (R-HVAP)

Logical Framework

| Results Hierarchy | Indicators | | | | Means of Verification | | | Assumptions |
|-------------------|---|----------|----------|------------|-----------------------|-----------|----------------|-------------|
| | Name | Baseline | Mid-Term | End Target | Source | Frequency | Responsibility | |
| Outreach | 1 Persons receiving services promoted or supported by the project | | | | MIS | Rolling | PCO | |
| | Males | | 18000 | 30000 | | | | |
| | Females | | 18000 | 30000 | | | | |
| | Young | | 14400 | 24000 | | | | |
| | Not Young | | | | | | | |
| | Indigenous people | | 7200 | 12000 | | | | |
| | Non-Indigenous people | | | | | | | |
| | Total number of persons receiving services | | 36000 | 60000 | | | | |
| | Male | | 50 | 50 | | | | |
| | Female | | 50 | 50 | | | | |
| | Young | | 40 | 40 | | | | |
| | 1.b Estimated corresponding total number of households members | | | | MIS | Rolling | PCO | |
| | Household members | | 154800 | 258000 | | | | |
| | 1.a Corresponding number of households reached | | | | MIS | Rolling | PCO | |
| | Women-headed households | | 5400 | 9000 | | | | |
| | Non-women-headed households | | 30600 | 51000 | | | | |
| Households | | 36000 | 60000 | | | | | |

| Results Hierarchy | Indicators | | | | Means of Verification | | | Assumptions |
|---|---|----------|----------|------------|--|-----------------------------------|----------------|---|
| | Name | Baseline | Mid-Term | End Target | Source | Frequency | Responsibility | |
| Project Goal Reduced poverty and improved resilience of smallholder households | Smallholder households with improved resilience | | | | RDMT Baseline/Mid-term/Endline Surveys | Baseline/Mid-term/Endline | PCO | (A) Continued social, political and economic stability in the country. (B) No major fluctuations in domestic and export demand/prices for agricultural products. (C) No major environmental or climate hazard events. |
| | Women-headed households | | 1620 | 6300 | | | | |
| | Indigenous households | | 2160 | 8400 | | | | |
| | Households | | 10800 | 42000 | | | | |
| | Households | | 30 | 70 | | | | |
| | Households | | 46440 | 180600 | | | | |
| Development Objective Transition smallholder agriculture towards sustainable food systems that are profitable, inclusive and agroecological | Households receiving full programme services achieving return on labour of >125% of the official minimum wage | | | | Baseline/Mid-term/Endline Surveys; Annual Cluster Tracking Survey (ACTS) | Baseline/Mid-term/Endline; Annual | PCO | |
| | Women-headed households | | 1620 | 5400 | | | | |
| | Indigenous households | | 2160 | 7200 | | | | |
| | Households | | 10800 | 36000 | | | | |
| | Households | | 30 | 60 | | | | |
| | Households | | 46440 | 154800 | | | | |
| | IE.2.1 Individuals demonstrating an improvement in empowerment | | | | Baseline/Mid-term/Endline Surveys | Baseline/Mid-term/Endline | PCO | |
| | Indigenous people | | 25 | 60 | | | | |
| | Indigenous people | | 1800 | 7200 | | | | |
| | Young | | 25 | 60 | | | | |
| | Young | | 3600 | 14400 | | | | |
| | Total persons | | 30 | 70 | | | | |
| | Total persons | | 10800 | 42000 | | | | |
| | Females | | 25 | 60 | | | | |
| | Females | | 4500 | 18000 | | | | |
| | Males | | 35 | 80 | | | | |

| Results Hierarchy | Indicators | | | | Means of Verification | | | Assumptions |
|---|---|----------|----------|------------|---|-----------------------------------|----------------|--|
| | Name | Baseline | Mid-Term | End Target | Source | Frequency | Responsibility | |
| | Males | | 6300 | 24000 | | | | |
| | Persons with disabilities | | 0 | 0 | | | | |
| | Persons with disabilities | | 0 | 0 | | | | |
| Outcome Outcome 1. Enhanced capacities for transitioning to market oriented agroecological production systems | SF.2.1 Households satisfied with project-supported services | | | | Baseline/Mid-term/Endline Surveys | Baseline, Mid-term, Endline | PCO | (A) No major fluctuations in domestic and export demand/prices for agricultural products. (B) Programme co-investments are not undermined by the provision of free or heavily subsidized services by others development partners and projects. (C) Participating smallholder producer organizations receive sufficient and timely services for professionalization and agroecological production to meet domestic and export market standards. (D) Producer organizations are effectively linked to premium markets. |
| | Household members | | 126000 | 210000 | | | | |
| | Non-indigenous households | | | | | | | |
| | Indigenous households | | 5040 | 8400 | | | | |
| | Non-women-headed households | | | | | | | |
| | Women-headed households | | 3780 | 6300 | | | | |
| | Households (%) | | 70 | 70 | | | | |
| | Households (number) | | 25200 | 42000 | | | | |
| | SF.2.2 Households reporting they can influence decision-making of local authorities and project-supported service providers | | | | Baseline/Mid-term/Endline Surveys | Baseline, Mid-term, Endline | PCO | |
| | Household members | | 61920 | 154800 | | | | |
| | Non-indigenous households | | | | | | | |
| | Indigenous households | | 2880 | 7200 | | | | |
| | Non-women-headed households | | | | | | | |
| | Women-headed households | | 2160 | 5400 | | | | |
| | Households (%) | | 40 | 60 | | | | |
| | Households (number) | | 14400 | 36000 | | | | |
| | 2.2.1 Persons with new jobs/employment opportunities | | | | Baseline/Mid-term/Endline Surveys; ACTS | Baseline/Mid-term/Endline; Annual | PCO | |
| | Males | | 7000 | 21000 | | | | |
| | Females | | 3000 | 9000 | | | | |
| | Indigenous people | | 2000 | 6000 | | | | |
| Young | | 6000 | 18000 | | | | | |

| Results Hierarchy | Indicators | | | | Means of Verification | | | Assumptions |
|---------------------------|---|----------|----------|------------|---|-----------------------------------|----------------|-----------------------------------|
| | Name | Baseline | Mid-Term | End Target | Source | Frequency | Responsibility | |
| | Total number of persons with new jobs/employment opportunities | | 10000 | 30000 | | | | |
| | Persons with disabilities | | 0 | 0 | | | | |
| | 2.2.2 Supported rural enterprises reporting an increase in profit | | | | Baseline/Mid-term/Endline Surveys; ACTS | Baseline/Mid-term/Endline; Annual | PCO | |
| | Number of enterprises | | 70 | 160 | | | | |
| | Percentage of enterprises | | 30 | 70 | | | | |
| | 2.2.5 Rural producers' organizations reporting an increase in sales | | | | Baseline/Mid-term/Endline Surveys; ACTS | Baseline/Mid-term/Endline; Annual | PCO | |
| | Percentage of rural POs | | 30 | 70 | | | | |
| | Number of Rural POs | | 480 | 1100 | | | | |
| | 3.2.2 Households reporting adoption of environmentally sustainable and climate-resilient technologies and practices | | | | Baseline/Mid-term/Endline Surveys | Baseline/Mid-term/Endline | PCO | |
| | Total number of household members | | 58050 | 135450 | | | | |
| | Households | | 30 | 70 | | | | |
| | Women-headed households | | 2025 | 4725 | | | | |
| | Households | | 13500 | 31500 | | | | |
| | Number of households reporting market-oriented diversification of production | | | | | | | Baseline/Mid-term/Endline Surveys |
| | Total number of household members | | 58050 | 135450 | | | | |
| | Households | | 30 | 70 | | | | |
| | Total number of household members | | 2025 | 4725 | | | | |
| | Households | | 13500 | 31500 | | | | |
| | Total private investment in value chains by smallholder producers, MSMEs and other actors | | | | MIS; ACTS | Rolling; Annual | PCO | |
| | Private investment (USD thousand) | | 8000 | 20000 | | | | |
| Output Output 1 | Number of Palika Agroecology Plans (PAP) formulated | | | | MIS; Programme Reports | Rolling | PCO | |
| | PAPs - Number | | 60 | 80 | | | | |

| Results Hierarchy | Indicators | | | | Means of Verification | | | Assumptions |
|-------------------|---|----------|----------|------------|------------------------|-----------------|----------------|-------------|
| | Name | Baseline | Mid-Term | End Target | Source | Frequency | Responsibility | |
| | Palikas covered | | 60 | 80 | | | | |
| | Number of market oriented agroecological extension service providers trained | | | | MIS; Training Records | Rolling | PCO | |
| | Lead farmers | | 90 | 150 | | | | |
| | Households facilitated in establishing market and service linkages with traders and service providers | | | | MIS | Rolling | PCO | |
| | Households | | 36000 | 60000 | | | | |
| | Participatory agroecology research framework developed and implemented with programme participants | | | | MIS; Programme Reports | Rolling, Annual | PCO | |
| | Number of research frameworks | | 1 | 1 | | | | |
| | 2.1.2 Persons trained in income-generating activities or business management | | | | MIS; Training Records | Rolling | PCO | |
| | Males | | 18000 | 30000 | | | | |
| | Females | | 18000 | 30000 | | | | |
| | Indigenous people | | 7200 | 12000 | | | | |
| | Young | | 14400 | 24000 | | | | |
| | Persons trained in IGAs or BM (total) | | 36000 | 60000 | | | | |
| | 3.1.4 Land brought under climate-resilient practices | | | | MIS; ACTS | Rolling, Annual | PCO | |
| | Hectares of land | | 8100 | 13500 | | | | |
| | Number of MSMEs established | | | | MIS | Rolling | PCO | |
| | Number of MSMEs - bio-inputs and tools - Number (2nd NDC target - 100) | | 30 | 95 | | | | |
| | Number of MSMEs - post-harvest processing | | 20 | 50 | | | | |
| | Number of MSMEs supported with chain-of-custody traceability systems | | | | MIS; ACTS | Rolling, Annual | PCO | |
| | Number of MSMEs | | 5 | 10 | | | | |

| Results Hierarchy | Indicators | | | | Means of Verification | | | Assumptions |
|---|---|----------|----------|------------|-----------------------------------|---------------------------|----------------|---|
| | Name | Baseline | Mid-Term | End Target | Source | Frequency | Responsibility | |
| Outcome Outcome 2. Improved access to climate resilient productive infrastructure | 2.2.6 Households reporting improved physical access to markets, processing and storage facilities | | | | Baseline/Mid-term/Endline Surveys | Baseline/Mid-term/Endline | PCO | (A) Municipal governments endorse PAPs and are willing to co-finance Programme infrastructure activities. |
| | Households reporting improved physical access to markets | | 30 | 70 | | | | |
| | Size of households | | 77400 | 180600 | | | | |
| | Jóvenes | | 29250 | 73500 | | | | |
| | Women-headed households | | 1620 | 6300 | | | | |
| | Households reporting improved physical access to processing facilities | | 10 | 30 | | | | |
| | Size of households | | 19350 | 58050 | | | | |
| | Women-headed households | | 675 | 2025 | | | | |
| | Households reporting improved physical access to storage facilities | | 15 | 40 | | | | |
| | Size of households | | 29025 | 77400 | | | | |
| | Women-headed households | | 1200 | 2700 | | | | |
| | Households reporting improved physical access to markets | | 18000 | 42000 | | | | |
| | Households reporting improved physical access to processing facilities | | 4500 | 13500 | | | | |
| | Households reporting improved physical access to storage facilities | | 6750 | 18000 | | | | |
| | Local governments co-financing Palika Agroecology Plans (PAP) | | | | MIS; Programme Reports | Rolling | PCO | |
| Co-financing - Number of municipalities | | 30 | 50 | | | | | |
| Output Output 2 | 2.1.6 Market, processing or storage facilities constructed or rehabilitated | | | | MIS | Rolling | PCO | |
| | Total number of facilities | | 54 | 135 | | | | |
| | Market facilities constructed/rehabilitated | | 34 | 85 | | | | |

| Results Hierarchy | Indicators | | | | Means of Verification | | | Assumptions | | | |
|--|---|----------|----------|------------|------------------------|-----------------|----------------|---|-----|---------|-----|
| | Name | Baseline | Mid-Term | End Target | Source | Frequency | Responsibility | | | | |
| | Processing facilities constructed/rehabilitated | | 10 | 25 | | | | | | | |
| | Storage facilities constructed/rehabilitated | | 10 | 25 | | | | | | | |
| | 1.1.2 Farmland under water-related infrastructure constructed/rehabilitated | | | | | | | | MIS | Rolling | PCO |
| | Hectares of land | | 1500 | 2400 | | | | | | | |
| Outcome Outcome 3. Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets | Number of supported commodities (agroecologically produced) accessing export markets through Semlar | | | | MIS; Programme Reports | Rolling | PCO | (A) Backward and forward linkages in commodity markets are stable. (B) Organic and safe product regulations of the market are effectively enforced. (C) There is increasing demand for Nepali organic and safe products | | | |
| | Overall | | 0 | 5 | | | | | | | |
| | Through Semlar | | 0 | 2 | | | | | | | |
| Output Output 3 | Semlar agricultural wholesale market constructed | | | | MIS | Rolling | PCO | | | | |
| | Number of infrastructure | | 1 | 1 | | | | | | | |
| Outcome Outcome 4. Strengthened policies, regulations and institutions for smallholder agroecological production and trade | Policy 3 Existing/new laws, regulations, policies or strategies proposed to policy makers for approval, ratification or amendment | | | | Programme Reports | Annual | PCO | (A) Provincial and municipal governments are committed to transition to agroecological production. | | | |
| | Number | | 3 | 8 | | | | | | | |
| Output Output 4 | Policy 1 Policy-relevant knowledge products completed | | | | Programme Reports | Rolling, Annual | PCO | | | | |
| | Number | | 4 | 12 | | | | | | | |
| | Number of rural PO and MSME representatives participating in trade fairs and events | | | | MIS; Programme Reports | Rolling | PCO | | | | |
| | Domestic fairs - Number of events | | 8 | 16 | | | | | | | |

| Results Hierarchy | Indicators | | | | Means of Verification | | | Assumptions |
|-------------------|--|----------|----------|------------|-----------------------|-----------|----------------|-------------|
| | Name | Baseline | Mid-Term | End Target | Source | Frequency | Responsibility | |
| | Domestic fairs - Number of Pos | | 40 | 80 | | | | |
| | International fairs - Number of events | | 4 | 8 | | | | |
| | International fairs - Number of Pos | | 20 | 40 | | | | |

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 2: Theory of change

Mission Dates: 22 March - 10 April 2023

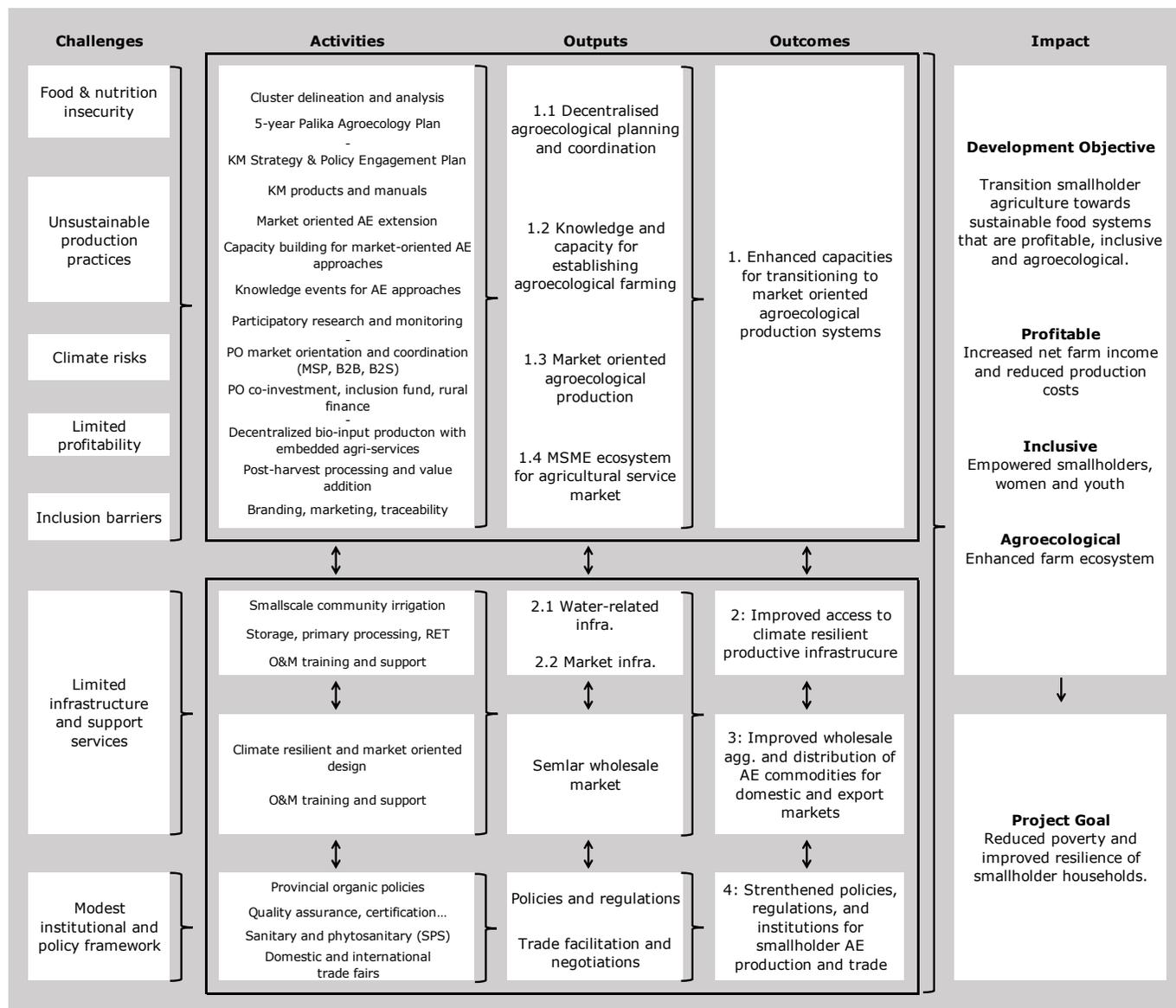
Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

PDR Annex 2: Theory of Change



Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 3: Project cost and financing: Detailed costs tables

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

PDR Annex 3: Programme cost and financing: Detailed costs tables

Component 1

Table: Detailed Cost Table I-A

| Detailed Costs | Unit | Quantities | | | | | | | | | | | Unit Cost | | Totals Including Contingencies (US\$ '000) | | | | | | | | | | |
|--|--------------|------------|--------|--------|--------|--------|-------|-------|-------|-------|-------|--------|-----------|--------|--|---------|---------|---------|---------|---------|---------|---------|----------|--|--|
| | | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | (NPR) | (US\$) | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | | | | |
| I. Investment Costs | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. Sub-component 1.1: Decentralized agro-ecological planning and coordination | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Palika agro-ecological planning framework | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agro-ecological Cluster Delineation and Analysis | Event | 1 | - | - | - | - | - | - | - | - | - | 1 | 3,250,000 | 25,000 | 25.7 | - | - | - | - | - | - | 25.7 | | | |
| PAP Manual Development | Lumpsum | 1 | - | - | - | - | - | - | - | - | - | 1 | 260,000 | 2,000 | 2.1 | - | - | - | - | - | - | 2.1 | | | |
| PAP Manual Publication | Lumpsum | 1 | - | - | - | - | - | - | - | - | - | 1 | 455,000 | 3,500 | 3.6 | - | - | - | - | - | - | 3.6 | | | |
| Training of trainer for MSP and PAP facilitation - Karnali /a | Events | 3 | - | 4 | - | - | - | - | - | - | - | 7 | 585,000 | 4,500 | 13.9 | - | 19.3 | - | - | - | - | 33.2 | | | |
| Training of trainer for MSP and PAP facilitation - Lumbini /b | Events | 2 | - | 3 | - | - | - | - | - | - | - | 5 | 585,000 | 4,500 | 9.3 | - | 14.5 | - | - | - | - | 23.7 | | | |
| Training of trainer for MSP and PAP facilitation - Sudurpaschim /c | Events | 2 | - | 2 | - | - | - | - | - | - | - | 4 | 585,000 | 4,500 | 9.3 | - | 9.6 | - | - | - | - | 18.9 | | | |
| Subtotal | | | | | | | | | | | | | | | 63.8 | - | 43.4 | - | - | - | - | 107.2 | | | |
| 2. 5-year Palika Agro-ecological Cluster Planning | | | | | | | | | | | | | | | | | | | | | | | | | |
| Palika Agroecology Plan (PAP) formulation in MSP setting | Plan | 25 | 25 | 25 | 25 | - | - | - | - | - | - | 100 | 494,130 | 3,801 | 97.9 | 99.8 | 101.8 | 103.7 | - | - | - | 403.2 | | | |
| Corridor level PAP coordination, networking and review /d | Events | - | 12 | 12 | 12 | 12 | 12 | 12 | 12 | - | - | 72 | 29,250 | 225 | - | 2.8 | 2.9 | 2.9 | 3.0 | 3.1 | 3.1 | 17.9 | | | |
| Subtotal | | | | | | | | | | | | | | | 97.9 | 102.6 | 104.6 | 106.7 | 3.0 | 3.1 | 3.1 | 421.0 | | | |
| Subtotal | | | | | | | | | | | | | | | 161.7 | 102.6 | 148.0 | 106.7 | 3.0 | 3.1 | 3.1 | 528.2 | | | |
| B. Sub-component 1.2: Knowledge and capacity for establishing agro-ecological farming | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Knowledge products and manuals | | | | | | | | | | | | | | | | | | | | | | | | | |
| Knowledge management strategy and policy engagement plan | No | 1 | - | - | - | - | - | - | - | - | - | 1 | 650,000 | 5,000 | 5.1 | - | - | - | - | - | - | 5.1 | | | |
| Develop agro ecology curriculum and handbook /e | No | 1 | - | - | - | - | - | - | - | - | - | 1 | 910,000 | 7,000 | 7.2 | - | - | - | - | - | - | 7.2 | | | |
| Agro ecology handbook publication /f | No | 2,000 | - | - | - | - | - | - | - | - | - | 2,000 | 910 | 7 | 14.4 | - | - | - | - | - | - | 14.4 | | | |
| Enhanced FEBL Manual development with agro ecology and GALSsite /g | No | 1 | - | - | - | - | - | - | - | - | - | 1 | 1,950,000 | 15,000 | 15.4 | - | - | - | - | - | - | 15.4 | | | |
| Enhanced FEBL Manual publication /h | No | 10,000 | 10,000 | 10,000 | 15,000 | 15,000 | - | - | - | - | - | 60,000 | 551,98 | 4,246 | 43.6 | 44.1 | 44.6 | 67.7 | 68.5 | - | - | 268.4 | | | |
| Instructional videos on agro ecology approaches and technologies /i | Lumpsum | 1 | - | - | - | - | - | - | - | - | - | 1 | 1,950,000 | 15,000 | 15.4 | - | - | - | - | - | - | 15.4 | | | |
| Set-up and operate social media platform /j | Event | 5 | 10 | 6 | - | - | - | - | - | - | - | 21 | 507,000 | 3,900 | 20.0 | 40.5 | 24.6 | - | - | - | - | 85.2 | | | |
| Guidelines for demonstration farm establishment | Lumpsum | 1 | - | - | - | - | - | - | - | - | - | 1 | 650,000 | 5,000 | 5.1 | - | - | - | - | - | - | 5.1 | | | |
| Subtotal | | | | | | | | | | | | | | | 126.2 | 84.6 | 69.2 | 67.7 | 68.5 | - | - | 416.2 | | | |
| 2. Market oriented agro ecology extension service providers | | | | | | | | | | | | | | | | | | | | | | | | | |
| Training of Trainers (TOT) – JTA, LF, CM | Number | 4 | 4 | 4 | 2 | - | - | - | - | - | - | 14 | 975,000 | 7,500 | 30.8 | 31.2 | 31.6 | 16.0 | - | - | - | 109.6 | | | |
| Enhanced FEBL training - FEBL Facilitators /k | Number | 8 | 13 | 12 | 7 | - | - | - | - | - | - | 40 | 910,000 | 7,000 | 57.5 | 94.6 | 88.4 | 52.3 | - | - | - | 292.8 | | | |
| Enhanced FEBL refresher - FEBL Facilitators /l | Number | - | 3 | 6 | 4 | 2 | - | - | - | - | - | 15 | 390,000 | 3,000 | - | 9.4 | 19.0 | 12.8 | 6.5 | - | - | 47.6 | | | |
| Subtotal | | | | | | | | | | | | | | | 88.3 | 135.1 | 139.0 | 81.1 | 6.5 | - | - | 449.9 | | | |
| 3. Capacity building for agro ecological approaches | | | | | | | | | | | | | | | | | | | | | | | | | |
| Support to set-up agro ecological demonstration farms | Number | 20 | 20 | 20 | 20 | - | - | - | - | - | - | 80 | 130,000 | 1,000 | 20.5 | 20.8 | 21.0 | 21.3 | - | - | - | 83.5 | | | |
| 2-day market oriented agro ecology orientation and investment planning | Number | 400 | 400 | 400 | 400 | - | - | - | - | - | - | 1,600 | 26,000 | 200 | 82.1 | 83.0 | 84.0 | 85.0 | - | - | - | 334.1 | | | |
| Enhanced FEBL sessions to POs /m | Number | 400 | 500 | 600 | 500 | 200 | - | - | - | - | - | 2,200 | 117,000 | 900 | 369.3 | 467.1 | 567.1 | 478.1 | 193.5 | - | - | 2,075.2 | | | |
| PO group dynamics and leadership training /n | Events | - | 25 | 25 | 25 | 25 | - | - | - | - | - | 100 | 156,000 | 1,200 | - | 31.2 | 31.6 | 32.0 | 32.4 | - | - | 127.1 | | | |
| Youth agro ecology apprenticeships at demo farms /o | Months | - | 200 | 200 | 200 | 200 | - | - | - | - | - | 800 | 26,000 | 200 | - | 41.6 | 42.1 | 42.6 | 43.2 | - | - | 169.5 | | | |
| Subtotal | | | | | | | | | | | | | | | 471.9 | 643.6 | 745.8 | 659.0 | 269.1 | - | - | 2,789.5 | | | |
| 4. Knowledge events for agro ecological approaches | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peer-to-peer exposure and learning visits - Pos | Number | - | 25 | 25 | 25 | 25 | - | - | - | - | - | 100 | 130,000 | 1,000 | - | 25.9 | 26.3 | 26.6 | 26.9 | - | - | 105.6 | | | |
| Peer-to-peer exposure and learning visits - MSMEs | Number | - | 1 | 1 | 1 | 1 | 1 | 1 | - | - | - | 5 | 156,000 | 1,200 | - | 1.2 | 1.3 | 1.3 | 1.3 | 1.3 | - | 6.4 | | | |
| Joint monitoring of agroecological impacts with Palikas and other stakeholders | Event | - | 80 | 80 | 80 | 80 | 80 | 80 | - | - | - | 480 | 52,000 | 400 | - | 33.2 | 33.6 | 34.0 | 34.4 | 34.8 | 35.2 | 205.3 | | | |
| Subtotal | | | | | | | | | | | | | | | - | 60.4 | 61.1 | 61.8 | 62.6 | 36.1 | 35.2 | 317.3 | | | |
| 5. Participatory Research and Monitoring | | | | | | | | | | | | | | | | | | | | | | | | | |
| Analytical Framework development | Number | 1 | - | - | - | - | - | - | - | - | - | 1 | 3,250,000 | 25,000 | 25.6 | - | - | - | - | - | - | 25.6 | | | |
| NARC technical support on framework development, supervision and M&E | Event | - | 1 | 1 | 1 | 1 | 1 | - | - | - | - | 4 | 1,300,000 | 10,000 | - | 10.4 | 10.5 | 10.6 | 10.8 | - | - | 42.3 | | | |
| Research institution for technical support in conducting research | Event | - | 1 | 1 | 1 | 1 | - | - | - | - | - | 4 | 455,000 | 3,500 | - | 3.6 | 3.7 | 3.7 | 3.8 | - | - | 14.8 | | | |
| System development for traceability and participatory monitoring (incl. ICT) | Event | 1 | - | - | - | - | - | - | - | - | - | 1 | 3,250,000 | 25,000 | 25.6 | - | - | - | - | - | - | 25.6 | | | |
| ICT and equipment for Demo Farm | Number | - | 5 | 5 | - | - | - | - | - | - | - | 10 | 195,000 | 1,500 | - | 7.8 | 7.9 | - | - | - | - | 15.7 | | | |
| Remunerations to LF for research, monitoring and data collection | Months | - | 60 | 120 | 120 | 120 | 120 | 120 | - | - | - | 660 | 6,500 | 50 | - | 3.1 | 6.3 | 6.4 | 6.5 | 6.5 | 6.6 | 35.4 | | | |
| PhD support for Participatory Action Research | Number | - | 4 | - | - | - | - | - | - | - | - | 4 | 975,000 | 7,500 | - | 31.1 | - | - | - | - | - | 31.1 | | | |
| Farm diary (light) development and printing /p | No | 10,000 | 10,000 | 10,000 | 15,000 | - | - | - | - | - | - | 45,000 | 390 | 3 | 30.8 | 31.1 | 31.5 | 47.8 | - | - | - | 141.2 | | | |
| Thematic studies | Lumpsum | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 650,000 | 5,000 | - | 5.2 | 5.3 | 5.3 | 5.4 | 5.4 | 5.5 | 37.6 | | | |
| Subtotal | | | | | | | | | | | | | | | 82.1 | 92.4 | 65.1 | 73.8 | 26.3 | 12.0 | 12.1 | 369.4 | | | |
| 6. Agro ecological service provider | | | | | | | | | | | | | | | | | | | | | | | | | |
| Technical Coordinator | 'erson montl | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | - | - | 84 | 169,000 | 1,300 | 16.0 | 16.2 | 16.4 | 16.6 | 16.8 | 17.0 | 17.2 | 116.1 | | | |
| Admin and finance officer | 'erson montl | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | - | - | 84 | 190,000 | 1,000 | 12.3 | 12.5 | 12.6 | 12.8 | 12.9 | 13.1 | 13.2 | 89.3 | | | |
| Agroecology Crop Officers | 'erson montl | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | - | - | 504 | 190,000 | 1,000 | 73.9 | 74.7 | 75.6 | 76.5 | 77.4 | 78.3 | 79.3 | 535.8 | | | |
| Agroecology Livestock Officers | 'erson montl | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | - | - | 504 | 190,000 | 1,000 | 73.9 | 74.7 | 75.6 | 76.5 | 77.4 | 78.3 | 79.3 | 535.8 | | | |
| Business Development Officer | 'erson montl | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | - | 252 | 190,000 | 1,000 | 36.9 | 37.4 | 37.8 | 38.3 | 38.7 | 39.2 | 39.6 | 267.9 | | | |
| Knowledge Management Officer | 'erson montl | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | - | 252 | 190,000 | 1,000 | 36.9 | 37.4 | 37.8 | 38.3 | 38.7 | 39.2 | 39.6 | 267.9 | | | |
| POs Strengthening Officer | 'erson montl | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | - | 252 | 190,000 | 1,000 | 36.9 | 37.4 | 37.8 | 38.3 | 38.7 | 39.2 | 39.6 | 267.9 | | | |
| Agricultural Technicians / JTA | 'erson montl | 480 | 480 | 480 | 480 | 480 | 480 | 480 | 480 | - | - | 3,360 | 58,500 | 450 | 221.6 | 224.2 | 226.8 | 229.5 | 232.2 | 235.0 | 237.9 | 1,607.3 | | | |
| Community mobilizers | 'erson montl | 960 | 960 | 960 | 960 | 960 | 960 | 960 | 960 | - | - | 6,720 | 52,000 | 400 | 394.0 | 398.6 | 403.2 | 408.0 | 412.9 | 417.8 | 422.9 | 2,857.3 | | | |
| Subtotal | | | | | | | | | | | | | | | 902.4 | 913.0 | 923.7 | 934.6 | 945.7 | 957.1 | 968.6 | 6,545.1 | | | |
| Subtotal | | | | | | | | | | | | | | | 1,670.9 | 1,929.1 | 2,003.9 | 1,878.1 | 1,378.7 | 1,005.2 | 1,015.9 | 5.6 | 10,887.3 | | |

Table: Detailed Cost Table I-B

| Detailed Costs | Unit | Quantities | | | | | | | | Unit Cost | | Totals Including Contingencies (US\$ '000) | | | | | | | | | |
|--|---------|------------|-------|-------|-------|-------|-------|-------|-------|-----------|-----------|--|---------|----------|----------|----------|-------|-------|-------|-------|----------|
| | | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | (NPR) | (US\$) | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total |
| C. Sub-component 1.3: Market oriented agro-ecological production | | | | | | | | | | | | | | | | | | | | | |
| 1. Producer Organisation (PO) graduation | | | | | | | | | | | | | | | | | | | | | |
| PO orientation and wellbeing ranking | Events | 400 | 400 | 400 | 400 | - | - | - | - | 1,600 | 5,850 | 45 | 18.5 | 18.9 | 19.2 | 19.5 | - | - | - | - | 76.1 |
| Categorization of POs (tool and assessment) | Events | 400 | 800 | 1,200 | 1,600 | 1,600 | 1,600 | - | - | 7,200 | 5,850 | 45 | 18.5 | 37.7 | 57.6 | 78.2 | 79.6 | 81.0 | - | - | 352.6 |
| PO EOI verification and Investment Plan appraisal | Events | 1 | 1 | 1 | 1 | - | - | - | - | 4 | 5,200,000 | 40,000 | 41.2 | 41.9 | 42.7 | 43.4 | - | - | - | - | 169.2 |
| Subtotal | | | | | | | | | | | | | 78.2 | 98.5 | 119.5 | 141.1 | 79.6 | 81.0 | - | - | 597.9 |
| 2. Operationalizing commodity-specific provincial MSP | | | | | | | | | | | | | | | | | | | | | |
| Karnali province | MSP | 2 | 2 | 2 | - | - | - | - | - | 6 | 260,000 | 2,000 | 4.1 | 4.2 | 4.3 | - | - | - | - | - | 12.6 |
| Lumbini province | MSP | 2 | 2 | 2 | - | - | - | - | - | 6 | 260,000 | 2,000 | 4.1 | 4.2 | 4.3 | - | - | - | - | - | 12.6 |
| Sudurpaschim province | MSP | 2 | 2 | 2 | - | - | - | - | - | 6 | 260,000 | 2,000 | 4.1 | 4.2 | 4.3 | - | - | - | - | - | 12.6 |
| Subtotal | | | | | | | | | | | | | 12.4 | 12.6 | 12.8 | - | - | - | - | - | 37.8 |
| 3. Operationalizing commodity-specific Cluster level MSP (including B2B, B2S) | | | | | | | | | | | | | | | | | | | | | |
| Karnali province | MSP | 15 | 30 | 25 | 10 | - | - | - | - | 80 | 130,000 | 1,000 | 15.5 | 31.5 | 26.8 | 10.9 | - | - | - | - | 84.6 |
| Lumbini province | MSP | 10 | 25 | 20 | 10 | 5 | - | - | - | 70 | 130,000 | 1,000 | 10.3 | 26.3 | 21.4 | 10.9 | 5.6 | - | - | - | 74.5 |
| Sudurpaschim province | MSP | 5 | 20 | 15 | 5 | 5 | - | - | - | 50 | 130,000 | 1,000 | 5.2 | 21.0 | 16.1 | 5.5 | 5.6 | - | - | - | 53.2 |
| Subtotal | | | | | | | | | | | | | 30.9 | 78.8 | 64.2 | 27.3 | 11.1 | - | - | - | 212.3 |
| 4. Smallholder co-investments and access to rural finance for agro-ecological production /q | | | | | | | | | | | | | | | | | | | | | |
| Karnali province | Farmers | - | 3,000 | 7,000 | 5,000 | - | - | - | - | 15,000 | 130,000 | 1,000 | - | 3,143.1 | 7,465.9 | 5,428.8 | - | - | - | - | 16,037.9 |
| Karnali province (ASDP, ASHA) | Farmers | 2,000 | 3,000 | - | - | - | - | - | - | 5,000 | 78,000 | 600 | 1,235.0 | 1,885.9 | - | - | - | - | - | - | 3,120.9 |
| Lumbini province | Farmers | - | 3,000 | 7,000 | 5,000 | - | - | - | - | 15,000 | 130,000 | 1,000 | - | 3,143.1 | 7,465.9 | 5,428.8 | - | - | - | - | 16,037.9 |
| Sudurpaschim province | Farmers | - | 2,000 | 5,000 | 3,000 | - | - | - | - | 10,000 | 130,000 | 1,000 | - | 2,095.4 | 5,332.8 | 3,257.3 | - | - | - | - | 10,685.5 |
| Subtotal | | | | | | | | | | | | | 1,235.0 | 10,267.5 | 20,264.7 | 14,114.9 | - | - | - | - | 45,882.1 |
| 5. Inclusion fund | | | | | | | | | | | | | | | | | | | | | |
| Financial inclusion fund | Farmers | - | 750 | 750 | 750 | 750 | - | - | - | 3,000 | 39,000 | 300 | - | 235.7 | 240.0 | 244.3 | 248.7 | - | - | - | 968.7 |
| Subtotal | | | | | | | | | | | | | 1,356.5 | 10,693.1 | 20,701.2 | 14,527.6 | 339.4 | 81.0 | - | - | 47,698.9 |

Table: Detailed Cost Table I-C

| Detailed Costs | Unit | Quantities | | | | | | | | Unit Cost | | Totals including Contingencies (US\$ '000) | | | | | | | | | | |
|---|--------------|------------|-------|-------|-------|-------|-------|-------|-------|-----------|-----------|--|-------|---------|----------|----------|----------|---------|---------|---------|---------|----------|
| | | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | (NPR) | (US\$) | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | |
| D. Sub-component 1.4: MSME ecosystem for agricultural service market | | | | | | | | | | | | | | | | | | | | | | |
| 1. Bio-fertilizers and pesticide production units | | | | | | | | | | | | | | | | | | | | | | |
| Karnali province | Number | - | 2 | 3 | 1 | - | - | - | - | 6 | 6,045,000 | 46,500 | - | 97.7 | 149.4 | 50.8 | - | - | - | - | 297.8 | |
| Lumbini province | Number | - | 2 | 2 | - | - | - | - | - | 4 | 6,045,000 | 46,500 | - | 97.7 | 99.6 | - | - | - | - | - | 197.3 | |
| Sudurpaschim province | Km | - | 2 | 2 | - | - | - | - | - | 4 | 6,045,000 | 46,500 | - | 97.7 | 99.6 | - | - | - | - | - | 197.3 | |
| Subtotal | | | | | | | | | | | | | | 293.0 | 348.5 | 50.8 | - | - | - | - | 692.3 | |
| 2. Seeds and saplings (nurseries) | | | | | | | | | | | | | | | | | | | | | | |
| Karnali province | Number | - | 3 | - | - | - | - | - | - | 3 | 1,813,500 | 13,950 | - | 44.0 | - | - | - | - | - | - | 44.0 | |
| Lumbini province | Number | - | 2 | - | - | - | - | - | - | 2 | 1,813,500 | 13,950 | - | 29.3 | - | - | - | - | - | - | 29.3 | |
| Sudurpaschim province | Number | - | 2 | - | - | - | - | - | - | 2 | 1,813,500 | 13,950 | - | 29.3 | - | - | - | - | - | - | 29.3 | |
| Subtotal | | | | | | | | | | | | | | 102.6 | - | - | - | - | - | - | 102.6 | |
| 3. Breeding units (resource centres) | | | | | | | | | | | | | | | | | | | | | | |
| Karnali province | Number | - | 3 | - | - | - | - | - | - | 3 | 9,672,000 | 74,400 | - | 234.4 | - | - | - | - | - | - | 234.4 | |
| Lumbini province | Number | - | 2 | - | - | - | - | - | - | 2 | 9,672,000 | 74,400 | - | 156.3 | - | - | - | - | - | - | 156.3 | |
| Sudurpaschim province | Number | - | 2 | - | - | - | - | - | - | 2 | 9,672,000 | 74,400 | - | 156.3 | - | - | - | - | - | - | 156.3 | |
| Subtotal | | | | | | | | | | | | | | 546.9 | - | - | - | - | - | - | 546.9 | |
| 4. Agro-vet / Tools /r | | | | | | | | | | | | | | | | | | | | | | |
| Karnali province | Number | - | 10 | 20 | 20 | - | - | - | - | 50 | 650,000 | 5,000 | - | 52.5 | 107.1 | 109.2 | - | - | - | - | 268.8 | |
| Lumbini province | Number | - | 10 | 10 | 5 | - | - | - | - | 25 | 650,000 | 5,000 | - | 52.5 | 53.5 | 27.3 | - | - | - | - | 133.3 | |
| Sudurpaschim province | Number | - | 10 | 10 | - | - | - | - | - | 20 | 650,000 | 5,000 | - | 52.5 | 53.5 | - | - | - | - | - | 106.0 | |
| Subtotal | | | | | | | | | | | | | | 157.5 | 214.2 | 136.5 | - | - | - | - | 508.2 | |
| 5. Cold storage facilities (50MT max) | | | | | | | | | | | | | | | | | | | | | | |
| Karnali province | Number | - | 3 | 4 | 4 | - | - | - | - | 11 | 4,836,000 | 37,200 | - | 117.2 | 159.3 | 162.5 | - | - | - | - | 439.0 | |
| Lumbini province | Number | - | 3 | 3 | 2 | - | - | - | - | 8 | 4,836,000 | 37,200 | - | 117.2 | 119.5 | 81.2 | - | - | - | - | 317.9 | |
| Sudurpaschim province | Number | - | - | 3 | 3 | - | - | - | - | 6 | 4,836,000 | 37,200 | - | - | 119.5 | 121.8 | - | - | - | - | 241.3 | |
| Subtotal | | | | | | | | | | | | | | 234.4 | 398.3 | 365.5 | - | - | - | - | 998.3 | |
| 6. Small scale processing units /s | | | | | | | | | | | | | | | | | | | | | | |
| Karnali province | Number | - | 3 | 4 | 4 | - | - | - | - | 11 | 9,620,000 | 74,000 | - | 233.1 | 317.0 | 323.2 | - | - | - | - | 873.3 | |
| Lumbini province | Number | - | 3 | 3 | 2 | - | - | - | - | 8 | 9,620,000 | 74,000 | - | 233.1 | 237.7 | 161.6 | - | - | - | - | 632.4 | |
| Sudurpaschim province | Number | - | - | 3 | 3 | - | - | - | - | 6 | 9,620,000 | 74,000 | - | - | 237.7 | 242.4 | - | - | - | - | 480.1 | |
| Subtotal | | | | | | | | | | | | | | 466.3 | 792.4 | 727.1 | - | - | - | - | 1,985.8 | |
| 7. Enterprise development | | | | | | | | | | | | | | | | | | | | | | |
| Market analysis and technical feasibility studies (bio-inputs and post-harvest) | Number | 1 | 1 | 1 | - | - | - | - | - | 3 | 2,600,000 | 20,000 | 20.6 | 21.0 | 21.3 | - | - | - | - | - | 62.9 | |
| Branding and marketing support to MSMEs | Number | - | 15 | 20 | 10 | - | - | - | - | 45 | 1,300,000 | 10,000 | - | 157.2 | 213.3 | 108.6 | - | - | - | - | 479.0 | |
| Traceability system support to MSMEs | Number | - | 5 | 10 | 5 | - | - | - | - | 20 | 3,250,000 | 25,000 | - | 131.0 | 266.6 | 135.7 | - | - | - | - | 533.3 | |
| Skills development for youth employment through agri-TVET /t | TVET | - | 100 | 100 | 200 | - | - | - | - | 400 | 40,300 | 310 | - | 32.6 | 33.2 | 67.7 | - | - | - | - | 133.4 | |
| Business incubation support for youth enterprise development | Number | - | 100 | 100 | 100 | - | - | - | - | 300 | 15,600 | 120 | - | 12.6 | 12.8 | 13.0 | - | - | - | - | 38.4 | |
| Subtotal | | | | | | | | | | | | | | 20.6 | 354.2 | 547.3 | 325.0 | - | - | - | 1,247.1 | |
| Total Investment Costs | | | | | | | | | | | | | | 3,209.6 | 14,879.8 | 25,153.8 | 18,117.3 | 1,721.2 | 1,089.2 | 1,019.1 | 5.6 | 65,195.6 |
| II. Recurrent Costs | | | | | | | | | | | | | | | | | | | | | | |
| A. Technical support professional | | | | | | | | | | | | | | | | | | | | | | |
| Value Chain and Business Development Specialist | 'erson montl | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 169,000 | 1,300 | 47.3 | 48.2 | 49.1 | 50.1 | 51.1 | 52.1 | 53.1 | - | 350.9 | |
| GESI and Targeting Specialist | 'erson montl | 12 | 12 | 12 | 12 | 12 | 12 | 12 | - | 84 | 169,000 | 1,300 | 15.8 | 16.1 | 16.4 | 16.7 | 17.0 | 17.4 | 17.7 | - | 117.0 | |
| Agro-ecological specialist | 'erson montl | 12 | 12 | 12 | 12 | 12 | 12 | 12 | - | 84 | 169,000 | 1,300 | 15.8 | 16.1 | 16.4 | 16.7 | 17.0 | 17.4 | 17.7 | - | 117.0 | |
| Rural Finance Officer | 'erson montl | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 130,000 | 1,000 | 36.4 | 37.1 | 37.8 | 38.5 | 39.3 | 40.1 | 40.8 | - | 269.9 | |
| Total Recurrent Costs | | | | | | | | | | | | | | 115.1 | 117.4 | 119.7 | 122.0 | 124.4 | 126.9 | 129.3 | - | 854.8 |
| Total | | | | | | | | | | | | | | 3,324.8 | 14,997.1 | 25,273.5 | 18,239.4 | 1,845.6 | 1,216.1 | 1,148.4 | 5.6 | 66,050.4 |

Notes to COSTAB Table I:

\a Total 35 Palikas

\b Total 25 Palikas

\c Total 20 Palikas

\d 2 times per year for 6 Year in each PPMU & CO

\e Develop market oriented agroecology curriculum and handbook

\f Market oriented agroecology handbook

\g Develop market oriented agroecology curriculum and handbook

\h Market and ICT oriented FEBL handbook

\i Facilitate wider up-take among farmers

\j As a repository and dissemination of knowledge

\k 1600 POs, and 3 POs per facilitators per year, work 2 years, total facilitators: 266, and training: 15

\l Organize refresher training on Enhanced FEBL to facilitators

\m Total 32 sessions (6 technical + 26 others)

\n Average 16 farmers per event

\o 10 youth per farm for 6 months and 2 batch per year

\p Market oriented FEBL handbook

\q Support per HH ranges between USD 300 and USD 600 with an average of USD 450

\r production input supply

\s Sorting, grading, drying, packaging and value addition

\t Skills development for youth employment

Component 2.

Table: Detailed Cost Table II

| Detailed Costs | | Quantities | | | | | | | | | | Unit Cost | | Totals Including Contingencies (US\$ '000) | | | | | | | | | |
|--|--|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|---------|--|---------|---------|---------|---------|-------|-------|-------|----------|--|
| | | Unit | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | (NPR) | (US\$) | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | |
| I. Investment Costs | | | | | | | | | | | | | | | | | | | | | | | |
| A. Water related infrastructure | | | | | | | | | | | | | | | | | | | | | | | |
| | Small scale irrigation system - Karnali | Irrigation system | 30 | 40 | 70 | 60 | 20 | - | - | - | 220 | 1,300,000 | 10,000 | 302.9 | 411.8 | 734.9 | 642.2 | 218.3 | - | - | - | 2,310.1 | |
| | Small scale irrigation system - Lumbini | Irrigation system | 20 | 40 | 50 | 35 | - | - | - | - | 145 | 1,300,000 | 10,000 | 202.0 | 411.8 | 524.9 | 374.6 | - | - | - | - | 1,513.3 | |
| | Small scale irrigation system - Sudurpaschim | Irrigation system | 15 | 30 | 40 | 25 | 10 | - | - | - | 120 | 1,300,000 | 10,000 | 151.5 | 308.9 | 419.9 | 267.6 | 109.1 | - | - | - | 1,257.0 | |
| | Training on committees water systems (pre and post construction, O&M) /a | O&M training | 130 | 220 | 320 | 220 | 80 | 30 | - | - | 1,000 | 16,250 | 125 | 16.4 | 28.3 | 42.0 | 29.4 | 10.9 | 4.2 | - | - | 131.2 | |
| | O&M and repair costs for water related infrastructures | Lumpsum | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 39,000,000 | 300,000 | - | 308.9 | 314.9 | 321.1 | 327.4 | 333.8 | 340.4 | 347.1 | 2,293.6 | |
| | Subtotal | | | | | | | | | | | | | 672.8 | 1,469.8 | 2,036.6 | 1,635.0 | 665.7 | 338.0 | 340.4 | 347.1 | 7,505.3 | |
| B. Market led productive infrastructure (upgrading and new) | | | | | | | | | | | | | | | | | | | | | | | |
| | Karnali province | POs | - | 5 | 15 | 10 | 5 | - | - | - | 35 | 1,950,000 | 15,000 | - | 77.2 | 236.2 | 160.6 | 81.9 | - | - | - | 555.8 | |
| | Lumbini province | POs | - | 5 | 10 | 10 | 5 | - | - | - | 30 | 1,950,000 | 15,000 | - | 77.2 | 157.5 | 160.6 | 81.9 | - | - | - | 477.1 | |
| | Sudurpaschim province | POs | - | 3 | 10 | 5 | 2 | - | - | - | 20 | 1,950,000 | 15,000 | - | 46.3 | 157.5 | 80.3 | 32.7 | - | - | - | 316.8 | |
| | Subtotal | | | | | | | | | | | | | - | 200.8 | 551.1 | 401.4 | 196.4 | - | - | - | 1,349.8 | |
| C. Productive RETs at PO level (solar dryers, incubators) | | | | | | | | | | | | | | | | | | | | | | | |
| | Karnali province | PO | - | 10 | 40 | 25 | - | - | - | - | 75 | 253,500 | 1,950 | - | 20.1 | 81.9 | 52.2 | - | - | - | - | 154.1 | |
| | Lumbini province | PO | - | 10 | 20 | 20 | - | - | - | - | 50 | 253,500 | 1,950 | - | 20.1 | 40.9 | 41.7 | - | - | - | - | 102.8 | |
| | Sudurpaschim province | PO | - | 5 | 20 | 12 | - | - | - | - | 37 | 253,500 | 1,950 | - | 10.0 | 40.9 | 25.0 | - | - | - | - | 76.0 | |
| | Subtotal | | | | | | | | | | | | | - | 50.2 | 163.8 | 119.0 | - | - | - | - | 332.9 | |
| D. Technical support for project implementation | | | | | | | | | | | | | | | | | | | | | | | |
| | Engineer | Lumpsum | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 169,000 | 1,300 | 47.2 | 48.1 | 48.9 | 49.8 | 50.7 | 51.6 | 52.6 | - | 348.9 | |
| | Sub-engineers (3 corridor offices) | Person month | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 70,200 | 540 | 19.6 | 20.0 | 20.3 | 20.7 | 21.1 | 21.4 | 21.8 | - | 144.9 | |
| | Assistant sub-engineers (6 persons) | Person month | 72 | 72 | 72 | 72 | 72 | 72 | 72 | - | 504 | 60,450 | 465 | 33.8 | 34.4 | 35.0 | 35.6 | 36.3 | 36.9 | 37.6 | - | 249.6 | |
| | Topographic equipment | Number | 3 | 3 | - | - | - | - | - | - | 6 | 650,000 | 5,000 | 15.1 | 15.4 | - | - | - | - | - | - | 30.5 | |
| | Motorbikes for civil engineering activities | Number | 12 | - | - | - | - | - | - | - | 12 | 325,000 | 2,500 | 30.3 | - | - | - | - | - | - | - | 30.3 | |
| | Specific studies | Studies | 1 | - | 1 | - | 1 | - | - | - | 3 | 3,627,000 | 27,900 | 28.2 | - | 29.2 | - | 30.2 | - | - | - | 87.6 | |
| | Subtotal | | | | | | | | | | | | | 174.2 | 117.8 | 133.4 | 106.1 | 138.3 | 110.0 | 112.0 | - | 891.9 | |
| | Total | | | | | | | | | | | | | 847.0 | 1,838.6 | 2,885.0 | 2,261.5 | 1,000.5 | 448.0 | 452.4 | 347.1 | 10,079.9 | |

Notes:

\a Two events (pre and Post) per scheme

Component 3

Table: Detailed Cost Table III

| Detailed Costs | Unit | Quantities | | | | | | | | | | Unit Cost | | Totals Including Contingencies (US\$ '000) | | | | | | | | | |
|---|--------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------------|-----------|---------|--|---------|---------|-------|-------|-------|-------|----------|--|--|
| | | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | (NPR) | (US\$) | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | | |
| I. Investment Costs | | | | | | | | | | | | | | | | | | | | | | | |
| A. Semiar Agriculture Regional Wholesale Market | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Direct construction cost | | | | | | | | | | | | | | | | | | | | | | | |
| New buildings incl. building installations | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 173,627,500 | 5,181,750 | 572.7 | 1,751.8 | 1,786.1 | 1,821.1 | - | - | - | - | 5,931.7 | | |
| Infrastructure and utilities | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 128,991,800 | 6,376,860 | 704.8 | 2,155.8 | 2,198.0 | 2,241.2 | - | - | - | - | 7,299.7 | | |
| Additional interventions | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 106,204,780 | 6,970,806 | 770.4 | 2,356.6 | 2,402.8 | 2,449.9 | - | - | - | - | 7,979.6 | | |
| Furniture, computers, laboratory equipment | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 198,280,000 | 756,000 | 83.5 | 255.0 | 259.6 | 264.2 | - | - | - | - | 862.2 | | |
| Flood risk mitigation | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 165,214,500 | 501,650 | 55.4 | 169.2 | 172.2 | 175.3 | - | - | - | - | 572.1 | | |
| Subtotal | | | | | | | | | | | | | 2,186.8 | 6,688.2 | 6,818.7 | 6,951.7 | - | - | - | - | 22,645.4 | | |
| 2. Indirect construction costs | | | | | | | | | | | | | | | | | | | | | | | |
| Contractor's site establishment, supervision, hoisting facilities, etc. /a | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 185,715,400 | 1,428,580 | 157.9 | 482.9 | 492.4 | 502.1 | - | - | - | - | 1,635.3 | | |
| Contractor's general overhead /b | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 108,333,940 | 833,338 | 92.1 | 281.7 | 287.2 | 292.9 | - | - | - | - | 953.9 | | |
| General profit and risk /c | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 177,381,460 | 595,242 | 65.8 | 201.2 | 205.2 | 209.2 | - | - | - | - | 681.4 | | |
| Subtotal | | | | | | | | | | | | | 315.8 | 965.9 | 984.8 | 1,004.2 | - | - | - | - | 3,270.7 | | |
| 3. Sub-project Implementation Support | | | | | | | | | | | | | | | | | | | | | | | |
| Consultants/consultancy firm for detailed design (including workshops for design finalization) /d | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 121,926,580 | 168,666 | 18.6 | 57.0 | 58.1 | 59.3 | - | - | - | - | 193.1 | | |
| Consulting firm for project management, site supervision, construction supervision, quality control /e | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 124,250,620 | 955,774 | 105.6 | 323.1 | 329.4 | 335.9 | - | - | - | - | 1,094.1 | | |
| Flood risk assessment (including managing the assessment) | Lumpsum | 0.5 | 0.5 | - | - | - | - | - | - | - | 126,000,000 | 200,000 | 110.4 | 112.4 | - | - | - | - | - | - | 222.9 | | |
| Market management policies, procedures, Market Business plan development and overall management system development | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 115,600,000 | 120,000 | 13.3 | 40.5 | 41.2 | 41.9 | - | - | - | - | 136.9 | | |
| Community, Farmer, and Trader Liaison Officer-1, Procurement Officer - 1 (for year one), Social and Environment Officer 1 and 2 Office assistants | Lumpsum | 0.5 | 0.5 | - | - | - | - | - | - | - | 132,500,000 | 250,000 | 138.0 | 140.5 | - | - | - | - | - | - | 278.6 | | |
| Develop disaster reduction and recovery response protocols and mechanism | Lumpsum | 1 | - | - | - | - | - | - | - | - | 1 6,500,000 | 50,000 | 55.2 | - | - | - | - | - | - | - | 55.2 | | |
| Training of Market Management Committee (3 events) | Event | - | - | 1 | 2 | - | - | - | - | - | 3 3,466,580 | 26,666 | - | - | 30.6 | 62.5 | - | - | - | - | 93.1 | | |
| Stakeholder consultation workshops and status updates (14 events) | Event | 3 | 3 | 4 | 4 | - | - | - | - | - | 14 325,000 | 2,500 | 8.3 | 8.5 | 11.5 | 11.7 | - | - | - | - | 39.9 | | |
| Other trainings, workshops, studies throughout the project period (6 events) | Event | - | 2 | 2 | 2 | - | - | - | - | - | 6 1,300,000 | 10,000 | - | 22.5 | 23.0 | 23.4 | - | - | - | - | 68.9 | | |
| Subtotal | | | | | | | | | | | | | 449.5 | 704.5 | 493.9 | 534.7 | - | - | - | - | 2,182.7 | | |
| 4. CAR insurance /f | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 114,617,720 | 112,444 | 12.4 | 38.0 | 38.8 | 39.5 | - | - | - | - | 128.7 | | |
| 5. Contingencies /g | Lumpsum | 0.1 | 0.3 | 0.3 | 0.3 | - | - | - | - | - | 118,768,970 | 2,452,069 | 271.0 | 829.0 | 845.2 | 861.8 | - | - | - | - | 2,806.9 | | |
| Total Investment Costs | | | | | | | | | | | | | 3,235.5 | 9,225.6 | 9,181.4 | 9,391.9 | - | - | - | - | 31,034.4 | | |
| II. Recurrent Costs | | | | | | | | | | | | | | | | | | | | | | | |
| A. Semiar Project Implementation Unit | | | | | | | | | | | | | | | | | | | | | | | |
| Project Manager (2nd Class) DUDBC | Person month | 13 | 13 | 13 | 13 | - | - | - | - | - | 52 61,100 | 470 | 6.2 | 6.3 | 6.4 | 6.5 | - | - | - | - | 25.4 | | |
| Engineer - 2 (DUDBC) | Person month | 26 | 26 | 26 | 26 | - | - | - | - | - | 104 50,700 | 390 | 10.2 | 10.4 | 10.6 | 10.9 | - | - | - | - | 42.2 | | |
| Asst. Engineer -2 (DUDBC) | Person month | 26 | 26 | 26 | 26 | - | - | - | - | - | 104 43,680 | 336 | 8.8 | 9.0 | 9.2 | 9.4 | - | - | - | - | 36.3 | | |
| Account Officer-1 (DUDBC) | Person month | 13 | 13 | 13 | 13 | - | - | - | - | - | 52 49,400 | 380 | 5.0 | 5.1 | 5.2 | 5.3 | - | - | - | - | 20.5 | | |
| Admin & Account Assistant -2 (DUDBC) | Person month | 26 | 26 | 26 | 26 | - | - | - | - | - | 104 39,000 | 300 | 7.9 | 8.0 | 8.2 | 8.3 | - | - | - | - | 32.4 | | |
| Agricultural Officer - 1 (MOALD) | Person month | 13 | 13 | 13 | 13 | - | - | - | - | - | 52 50,700 | 390 | 5.1 | 5.2 | 5.3 | 5.4 | - | - | - | - | 21.1 | | |
| Project Officer - 1 (Palika) | Person month | 13 | 13 | 13 | 13 | - | - | - | - | - | 52 50,700 | 390 | 5.1 | 5.2 | 5.3 | 5.4 | - | - | - | - | 21.1 | | |
| Agricultural Officer - 1 (MoLMAC) | Person month | 13 | 13 | 13 | 13 | - | - | - | - | - | 52 50,700 | 390 | 5.1 | 5.2 | 5.3 | 5.4 | - | - | - | - | 21.1 | | |
| Total Recurrent Costs | | | | | | | | | | | | | 53.5 | 54.5 | 55.6 | 56.7 | - | - | - | - | 220.2 | | |
| Total | | | | | | | | | | | | | 3,288.9 | 9,280.1 | 9,237.0 | 9,448.6 | - | - | - | - | 31,254.6 | | |

\a 12% of new buildings including building installations, and infrastructure and utilities

\b 7% of new buildings including building installations, and infrastructure and utilities

\c 5% of new buildings including building installations, and infrastructure and utilities

\d 15% of design fee and environmental management plan

\e 85% of design fee and environmental management plan, includes cost of procurement of firm

\f 0.5% direct and indirect construction cost

\g 10% of direct, and indirect construction cost and other TA cost

Component 4

Table: Detailed Cost Table IV

| Detailed Costs | | Quantities | | | | | | | | | | Unit Cost Unit Cost | | Totals Including Contingencies (US\$ '000) | | | | | | | | | |
|--|-----------------------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|--------|--|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| | | Unit | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | (NPR) | (US\$) | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | |
| I. Investment Costs | | | | | | | | | | | | | | | | | | | | | | | |
| A. Policies, and regulations /a | | | | | | | | | | | | | | | | | | | | | | | |
| Develop organic and agroecology provincial strategies and action plans | Strategies and action plans | - | 2 | - | - | - | - | 3 | - | - | 5 | 3,250,000 | 25,000 | - | 52.4 | - | - | - | 84.4 | - | - | 136.8 | |
| Policies and implementation guidelines for PGS and 3rd party certification schemes and quality assurance | Certification guidelines | - | 2 | 2 | 2 | - | - | - | - | - | 6 | 3,250,000 | 25,000 | - | 52.4 | 53.3 | 54.3 | - | - | - | 160.0 | | |
| Policy studies for developing or upgrading policy frameworks, regulations, and protocols | Lumpsum | - | 1 | - | - | - | - | - | - | - | 1 | 3,250,000 | 25,000 | - | 26.1 | - | - | - | - | - | 26.1 | | |
| Subtotal | | | | | | | | | | | | | | | | | | | | | | 322.9 | |
| B. Trade facilitation and negotiations | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Trade events and associations | | | | | | | | | | | | | | | | | | | | | | | |
| Domestic fairs and events | Events | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 16 | 1,300,000 | 10,000 | 20.6 | 20.9 | 21.2 | 21.5 | 21.8 | 22.2 | 22.5 | 22.8 | 173.4 | |
| Participation to international fairs and events (organic, ethical trade) | Events | - | - | 1 | 1 | 1 | 1 | 1 | 1 | - | 5 | 4,550,000 | 35,000 | - | - | 37.1 | 37.6 | 38.2 | 38.8 | 39.4 | - | 191.0 | |
| Support to industry association (National Organic Associations and others) | Lumpsum | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | 6 | 1,300,000 | 10,000 | - | 10.4 | 10.6 | 10.7 | 10.9 | 11.1 | 11.2 | - | 65.0 | |
| Subtotal | | | | | | | | | | | | | | | | | | | | | | | 429.5 |
| 2. Support to laboratory facilities | | | | | | | | | | | | | | | | | | | | | | | |
| Border checkpoint lab (SPS) | Checkpoint Lab | - | 2 | 3 | - | - | - | - | - | - | 5 | 3,250,000 | 25,000 | - | 52.5 | 80.3 | - | - | - | - | - | 132.8 | |
| Capacity building for border checkpoint staff | Training | - | 2 | 3 | - | - | - | - | - | - | 5 | 1,950,000 | 15,000 | - | 31.5 | 48.2 | - | - | - | - | - | 79.7 | |
| Upgrading biotechnology lab in Surkhet | Lab | - | 1 | - | - | - | - | - | - | - | 1 | 3,250,000 | 25,000 | - | 26.3 | - | - | - | - | - | - | 26.3 | |
| Capacity building for bio-technology lab in Surkhet | Event | - | 1 | 1 | - | - | - | - | - | - | 2 | 650,000 | 5,000 | - | 5.3 | 5.4 | - | - | - | - | - | 10.6 | |
| Subtotal | | | | | | | | | | | | | | | | | | | | | | | 249.4 |
| Subtotal | | | | | | | | | | | | | | | | | | | | | | | 678.8 |
| Total Investment Costs | | | | | | | | | | | | | | | | | | | | | | | 1,001.7 |
| II. Recurrent Costs | | | | | | | | | | | | | | | | | | | | | | | |
| A. Operating costs | | | | | | | | | | | | | | | | | | | | | | | |
| Support to Provincial ministries and Federal agencies for consultations / Meetings / Visits /b | Lumpsum | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 3,900,000 | 30,000 | - | 31.5 | 32.1 | 32.8 | 33.4 | 34.1 | 34.7 | 35.4 | 233.9 | |
| Joint monitoring | Lumpsum | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 1,950,000 | 15,000 | 15.5 | 15.8 | 16.1 | 16.4 | 16.7 | 17.0 | 17.4 | 17.7 | 132.4 | |
| Total Recurrent Costs | | | | | | | | | | | | | | | | | | | | | | | 366.4 |
| Total | | | | | | | | | | | | | | | | | | | | | | | 1,368.1 |

Notes:

\a to stimulate smallholder agroecological production implemented

\b Budget to support provincial and federal agencies for consultations/meetings/ field visits during the policy formulations & others

Programme management costs

Table: Detailed Cost Table V-A

| Detailed Costs | | Quantities | | | | | | | | | | Unit Cost | | Totals Including Contingencies (US\$ '000) | | | | | | | | | |
|--|---------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-----------|---------|--|-------|-------|-------|-------|-------|-------|---------|-------|--|
| | | Unit | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | (NPR) | (US\$) | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total | |
| I. Investment Costs | | | | | | | | | | | | | | | | | | | | | | | |
| A. Technical / Management Team | | | | | | | | | | | | | | | | | | | | | | | |
| Financial Management Specialist /a | Person month | 12 | 12 | 12 | 12 | 12 | 12 | 12 | - | 84 | 169,000 | 1,300 | 16.1 | 16.3 | 16.6 | 16.9 | 17.2 | 17.6 | 17.9 | - | 118.6 | | |
| Procurement Specialist /b | Person month | 12 | 12 | 12 | 12 | 12 | 12 | 12 | - | 84 | 169,000 | 1,300 | 16.1 | 16.3 | 16.6 | 16.9 | 17.2 | 17.6 | 17.9 | - | 118.6 | | |
| Fund and Financial Management Officer /c | Person month | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 130,000 | 1,000 | 37.1 | 37.7 | 38.4 | 39.1 | 39.8 | 40.5 | 41.2 | - | 273.8 | | |
| Financial Management Assistant (Accountants and Book-keeping) /d | Person month | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 58,500 | 450 | 16.7 | 17.0 | 17.3 | 17.7 | 18.0 | 18.4 | 18.7 | - | 123.9 | | |
| Procurement Officer /e | Person month | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 130,000 | 1,000 | 37.1 | 37.8 | 38.5 | 39.3 | 40.1 | 40.9 | 41.7 | - | 275.3 | | |
| Subtotal | | | | | | | | | | | | | 122.9 | 125.2 | 127.6 | 130.0 | 132.4 | 134.9 | 137.4 | - | 910.3 | | |
| B. Technical support on planning, M&E, KM Team | | | | | | | | | | | | | | | | | | | | | | | |
| PME Coordinator | Person month | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 96 | 188,500 | 1,450 | 17.9 | 18.2 | 18.6 | 18.9 | 19.2 | 19.6 | 19.9 | 20.3 | 152.6 | | |
| M&E and KM Specialist | Person month | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 169,000 | 1,300 | 48.2 | 49.0 | 49.9 | 50.8 | 51.7 | 52.7 | 53.6 | - | 355.9 | | |
| MEAL Officer /f | Person month | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 130,000 | 1,000 | 37.1 | 37.8 | 38.5 | 39.3 | 40.1 | 40.9 | 41.7 | - | 275.3 | | |
| MIS and Data Management Officer | Person month | 36 | 36 | 36 | 36 | 36 | 36 | 36 | - | 252 | 130,000 | 1,000 | 37.1 | 37.8 | 38.5 | 39.3 | 40.1 | 40.9 | 41.7 | - | 275.3 | | |
| Subtotal | | | | | | | | | | | | | 140.2 | 142.9 | 145.6 | 148.3 | 151.1 | 154.0 | 156.9 | 20.3 | 1,059.2 | | |
| C. Office equipments | | | | | | | | | | | | | | | | | | | | | | | |
| Office equipments | Lumpsum | 7 | - | - | - | - | - | - | - | 7 | 1,950,000 | 15,000 | 108.1 | - | - | - | - | - | - | - | 108.1 | | |
| Vehicles | Lumpsum | 7 | - | - | - | - | - | - | - | 7 | 10,400,000 | 80,000 | 576.3 | - | - | - | - | - | - | - | 576.3 | | |
| Motor-cycle | Lumpsum | 40 | 40 | - | - | - | - | - | - | 80 | 325,000 | 2,500 | 102.9 | 104.8 | - | - | - | - | - | - | 207.7 | | |
| Laptop | Number | 120 | - | - | - | - | - | - | - | 120 | 130,000 | 1,000 | 123.5 | - | - | - | - | - | - | - | 123.5 | | |
| Desktop computer | Number | 24 | - | - | - | - | - | - | - | 24 | 130,000 | 1,000 | 24.7 | - | - | - | - | - | - | - | 24.7 | | |
| Projectors | Number | 16 | - | - | - | - | - | - | - | 16 | 130,000 | 1,000 | 16.5 | - | - | - | - | - | - | - | 16.5 | | |
| Other equipments | Lumpsum | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 1,950,000 | 15,000 | 15.4 | 15.7 | 16.0 | 16.3 | 16.6 | 16.9 | 17.2 | 17.5 | 131.6 | | |
| Subtotal | | | | | | | | | | | | | 967.4 | 120.5 | 16.0 | 16.3 | 16.6 | 16.9 | 17.2 | 17.5 | 1,188.3 | | |
| D. Meeting and workshop | | | | | | | | | | | | | | | | | | | | | | | |
| PSC Meeting - Federal | Lumpsum | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 32 | 247,000 | 1,900 | 7.8 | 8.0 | 8.1 | 8.3 | 8.4 | 8.6 | 8.7 | 8.9 | 66.7 | | |
| PSC Meeting - Provincial | Times | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 96 | 117,000 | 900 | 11.1 | 11.3 | 11.5 | 11.7 | 11.9 | 12.2 | 12.4 | 12.6 | 94.7 | | |
| Programme Start-up/Completion Workshop - Federal | Events | 1 | - | - | - | - | - | - | - | 1 | 585,000 | 4,500 | 4.6 | - | - | - | - | - | - | - | 5.2 | | |
| Programme Start-up/Completion Workshop - Provincial | Events | 3 | - | - | - | - | - | - | - | 3 | 234,000 | 1,800 | 5.6 | - | - | - | - | - | - | - | 6.3 | | |
| Planning and Review Workshop - Provincial | Lumpsum | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 48 | 247,000 | 1,900 | 11.7 | 11.9 | 12.2 | 12.4 | 12.6 | 12.8 | 13.1 | 13.3 | 100.0 | | |
| Monitoring for POs institution development and graduation | Events | - | - | - | 400 | 400 | 400 | 400 | - | 1,600 | 9,100 | 70 | - | - | - | 30.4 | 30.9 | 31.5 | 32.1 | - | 124.9 | | |
| Coordination meetings and workshop - PAP and Palika annual plan integration and monitoring | Lumpsum | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 800 | 58,500 | 450 | 46.3 | 47.1 | 48.0 | 48.9 | 49.7 | 50.6 | 51.5 | 52.5 | 394.7 | | |
| IFAD Supervision / Implementation Support Mission | Events | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 16 | 364,000 | 2,800 | 5.8 | 5.9 | 6.0 | 6.1 | 6.2 | 6.3 | 6.4 | 6.5 | 48.1 | | |
| Subtotal | | | | | | | | | | | | | 92.9 | 84.2 | 85.8 | 117.7 | 119.8 | 122.0 | 124.2 | 105.3 | 851.9 | | |
| Total Investment Costs | | | | | | | | | | | | | 1,323.5 | 472.8 | 374.9 | 412.3 | 419.9 | 427.7 | 435.6 | 143.1 | 4,009.7 | | |
| II. Recurrent Costs | | | | | | | | | | | | | | | | | | | | | | | |
| A. Programme Coordination and Management | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Programme Management Unit | | | | | | | | | | | | | | | | | | | | | | | |
| Programme Coordinator /g | Person Months | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 112 | 63,050 | 485 | 7.0 | 7.1 | 7.3 | 7.4 | 7.6 | 7.7 | 7.9 | 8.0 | 59.9 | | |
| Deputy Programme Coordinator /h | Person Months | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 112 | 57,200 | 440 | 6.3 | 6.5 | 6.6 | 6.7 | 6.9 | 7.0 | 7.1 | 7.3 | 54.4 | | |
| Account Officer /i | Person Months | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 112 | 48,100 | 370 | 5.3 | 5.4 | 5.5 | 5.7 | 5.8 | 5.9 | 6.0 | 6.1 | 45.7 | | |
| Admin Assistant /j | Person Months | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 112 | 42,900 | 330 | 4.8 | 4.9 | 4.9 | 5.0 | 5.1 | 5.2 | 5.3 | 5.5 | 40.8 | | |
| Driver /k | Person Months | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 112 | 27,300 | 210 | 3.0 | 3.1 | 3.1 | 3.2 | 3.3 | 3.3 | 3.4 | 3.5 | 26.0 | | |
| Support Staff /l | Person Months | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 112 | 22,100 | 170 | 2.5 | 2.5 | 2.5 | 2.6 | 2.6 | 2.7 | 2.8 | 2.8 | 21.0 | | |
| Sweeper /m | Person Months | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 112 | 22,100 | 170 | 2.5 | 2.5 | 2.5 | 2.6 | 2.6 | 2.7 | 2.8 | 2.8 | 21.0 | | |
| Guard /n | Person Months | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 224 | 22,100 | 170 | 4.9 | 5.0 | 5.1 | 5.2 | 5.3 | 5.4 | 5.5 | 5.6 | 42.0 | | |
| Subtotal | | | | | | | | | | | | | 36.3 | 37.0 | 37.7 | 38.4 | 39.2 | 40.0 | 40.7 | 41.5 | 310.8 | | |
| 2. Provincial Programme Management Unit | | | | | | | | | | | | | | | | | | | | | | | |
| Senior Agriculture Officer /Provincial Coordinator /o | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 57,200 | 440 | 19.0 | 19.4 | 19.8 | 20.2 | 20.6 | 21.0 | 21.4 | 21.8 | 163.1 | | |
| Account Officer /p | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 48,100 | 370 | 16.0 | 16.3 | 16.6 | 17.0 | 17.3 | 17.6 | 18.0 | 18.3 | 137.2 | | |
| Admin Assistant /q | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 42,900 | 330 | 14.3 | 14.6 | 14.8 | 15.1 | 15.4 | 15.7 | 16.0 | 16.4 | 122.4 | | |
| Junior Technical / Technical Assistant /r | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 42,900 | 330 | 14.3 | 14.6 | 14.8 | 15.1 | 15.4 | 15.7 | 16.0 | 16.4 | 122.4 | | |
| Driver /s | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 27,300 | 210 | 9.1 | 9.3 | 9.4 | 9.6 | 9.8 | 10.0 | 10.2 | 10.4 | 77.9 | | |
| Support Staff /t | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 22,100 | 170 | 7.4 | 7.5 | 7.6 | 7.8 | 7.9 | 8.1 | 8.3 | 8.4 | 63.0 | | |
| Sweeper /u | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 22,100 | 170 | 7.4 | 7.5 | 7.6 | 7.8 | 7.9 | 8.1 | 8.3 | 8.4 | 63.0 | | |
| Guard /v | Person Months | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 672 | 22,100 | 170 | 14.7 | 15.0 | 15.3 | 15.6 | 15.9 | 16.2 | 16.5 | 16.9 | 126.1 | | |
| Subtotal | | | | | | | | | | | | | 102.1 | 104.1 | 106.1 | 108.2 | 110.3 | 112.5 | 114.7 | 117.0 | 875.1 | | |
| 3. Cluster/Corridor Offices (COs) | | | | | | | | | | | | | | | | | | | | | | | |
| Agriculture Officer / Corridor Coordinator /w | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 52,000 | 400 | 17.3 | 17.6 | 18.0 | 18.3 | 18.7 | 19.1 | 19.4 | 19.8 | 148.3 | | |
| Accountant /x | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 42,900 | 330 | 14.3 | 14.6 | 14.8 | 15.1 | 15.4 | 15.7 | 16.0 | 16.4 | 122.4 | | |
| Admin Assistant /y | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 42,900 | 330 | 14.3 | 14.6 | 14.8 | 15.1 | 15.4 | 15.7 | 16.0 | 16.4 | 122.4 | | |
| Junior Technical / Technical Assistant /z | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 42,900 | 330 | 14.3 | 14.6 | 14.8 | 15.1 | 15.4 | 15.7 | 16.0 | 16.4 | 122.4 | | |
| Driver /aa | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 27,300 | 210 | 9.1 | 9.3 | 9.4 | 9.6 | 9.8 | 10.0 | 10.2 | 10.4 | 77.9 | | |
| Support Staff /bb | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 22,100 | 170 | 7.4 | 7.5 | 7.6 | 7.8 | 7.9 | 8.1 | 8.3 | 8.4 | 63.0 | | |
| Sweeper /cc | Person Months | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 336 | 22,100 | 170 | 7.4 | 7.5 | 7.6 | 7.8 | 7.9 | 8.1 | 8.3 | 8.4 | 63.0 | | |
| Guard /dd | Person Months | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 672 | 22,100 | 170 | 14.7 | 15.0 | 15.3 | 15.6 | 15.9 | 16.2 | 16.5 | 16.9 | 126.1 | | |
| Subtotal | | | | | | | | | | | | | 98.6 | 100.6 | 102.5 | 104.6 | 106.6 | 108.7 | 110.8 | 113.0 | 845.4 | | |
| Subtotal | | | | | | | | | | | | | 237.0 | 241.6 | 246.4 | 251.2 | 256.1 | 261.2 | 266.3 | 271.5 | 2,031.3 | | |

Table: Detailed Cost Table V-B

| Detailed Costs | | | | | | | | | | | | | Totals including Contingencies (US\$ '000) | | | | | | | | | |
|--|---------|------------|-------|-------|-------|-------|-------|-------|-------|----|-----------|-----------------|--|---------|---------|---------|---------|---------|---------|---------|----------|---------|
| | Unit | Quantities | | | | | | | | | Total | Unit Cost (NPR) | Unit Cost (US\$) | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | Total |
| | | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 | 30/31 | 31/32 | | | | | | | | | | | | | |
| B. Operating costs | | | | | | | | | | | | | | | | | | | | | | |
| Office rent | Months | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 96 | 1,040,000 | 8,000 | 98.9 | 100.8 | 102.8 | 104.8 | 106.9 | 109.0 | 111.1 | 113.3 | 847.5 |
| Travel and Daily Allowances | Months | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 96 | 1,300,000 | 10,000 | 123.6 | 126.0 | 128.5 | 131.0 | 133.6 | 136.2 | 138.9 | 141.6 | 1,059.4 |
| Office running cost | Months | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 96 | 1,040,000 | 8,000 | 98.9 | 100.8 | 102.8 | 104.8 | 106.9 | 109.0 | 111.1 | 113.3 | 847.5 |
| Fuel cost | Months | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 96 | 1,430,000 | 11,000 | 136.0 | 138.6 | 141.3 | 144.1 | 146.9 | 149.8 | 152.8 | 155.8 | 1,165.3 |
| Vehicle operation and maintenance | Months | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 96 | 1,040,000 | 8,000 | 98.9 | 100.8 | 102.8 | 104.8 | 106.9 | 109.0 | 111.1 | 113.3 | 847.5 |
| Operation & Management Cost (Service Provider) | Year | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 5,850,000 | 45,000 | 46.4 | 47.3 | 48.2 | 49.1 | 50.1 | 51.1 | 52.1 | - | 344.2 |
| Subtotal | | | | | | | | | | | | | 602.6 | 614.4 | 626.4 | 638.7 | 651.2 | 664.0 | 677.0 | 637.2 | 5,111.5 | |
| C. Monitoring, Evaluation / Knowledge Management | | | | | | | | | | | | | | | | | | | | | | |
| 1. M&E System Development | | | | | | | | | | | | | | | | | | | | | | |
| Programme M&E and MIS Workshop | Event | 4 | - | 4 | - | 4 | - | - | - | - | 12 | 325,000 | 2,500 | 10.3 | - | 10.7 | - | 11.0 | - | - | - | 32.0 |
| MIS System development | Event | 1 | - | - | - | - | - | - | - | - | 1 | 5,850,000 | 45,000 | 46.3 | - | - | - | - | - | - | - | 46.3 |
| Monitoring and data collection training - JTA, LF, CM | Event | 3 | - | - | 3 | - | - | - | - | - | 6 | 585,000 | 4,500 | 13.9 | - | - | 14.6 | - | - | - | - | 28.5 |
| Tablet or smartphone for data collection - CM, FEBL Facilitators | Number | 100 | 100 | - | - | - | - | - | - | - | 200 | 23,400 | 180 | 18.5 | 18.8 | - | - | - | - | - | - | 37.4 |
| Data packages for M&E data upload | Lumpsum | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 390,000 | 3,000 | 3.1 | 3.1 | 3.2 | 3.3 | 3.3 | 3.4 | 3.4 | 3.5 | 26.3 |
| Knowledge management | Lumpsum | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 3,250,000 | 25,000 | 25.7 | 26.2 | 26.6 | 27.1 | 27.6 | 28.1 | 28.6 | 29.1 | 219.0 |
| Subtotal | | | | | | | | | | | | | 117.8 | 48.2 | 40.5 | 45.0 | 41.9 | 31.5 | 32.0 | 32.6 | 389.5 | |
| 2. Studies and Surveys | | | | | | | | | | | | | | | | | | | | | | |
| Baseline Survey incl. SOM and MDDW | Studies | 1 | - | - | - | - | - | - | - | - | 1 | 9,100,000 | 70,000 | 72.0 | - | - | - | - | - | - | - | 72.0 |
| Mid-line Survey incl. SOM and MDDW | Studies | - | - | - | 1 | - | - | - | - | - | 1 | 9,100,000 | 70,000 | - | - | - | 75.9 | - | - | - | - | 75.9 |
| End line Survey incl. SOM and MDDW | Studies | - | - | - | - | - | - | - | - | 1 | 9,100,000 | 70,000 | - | - | - | - | - | - | - | - | 81.5 | 81.5 |
| Data Collection - Remuneration to FEBL Facilitators | Lumpsum | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 1,300,000 | 10,000 | 10.3 | 10.5 | 10.7 | 10.8 | 11.0 | 11.2 | 11.4 | 11.6 | 87.6 |
| Annual Outcome Survey | Lumpsum | - | - | - | - | - | 1 | 1 | 1 | 1 | 4 | 3,900,000 | 30,000 | - | - | - | - | 33.1 | 33.7 | 34.3 | 34.9 | 136.0 |
| Subtotal | | | | | | | | | | | | | 82.3 | 10.5 | 10.7 | 86.8 | 44.2 | 44.9 | 45.7 | 128.0 | 453.1 | |
| 3. Knowledge generation and management | | | | | | | | | | | | | | | | | | | | | | |
| Knowledge product development and publication | Lumpsum | - | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 1,300,000 | 10,000 | - | - | 10.7 | 10.8 | 11.0 | 11.2 | 11.4 | 11.6 | 66.9 |
| Knowledge sharing workshop /ee | Number | - | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 24 | 390,000 | 3,000 | - | - | 12.8 | 13.0 | 13.2 | 13.5 | 13.7 | 14.0 | 80.2 |
| Policy formulation workshop /ff | Events | - | - | 1 | 1 | 1 | 1 | 1 | 1 | - | 5 | 975,000 | 7,500 | - | - | 8.0 | 8.1 | 8.3 | 8.4 | 8.6 | - | 41.4 |
| Media trips | Lumpsum | - | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 650,000 | 5,000 | - | - | 5.3 | 5.4 | 5.5 | 5.6 | 5.7 | 5.8 | 33.4 |
| Subtotal | | | | | | | | | | | | | - | - | 36.8 | 37.4 | 38.1 | 38.8 | 39.5 | 31.4 | 221.9 | |
| Subtotal | | | | | | | | | | | | | 200.1 | 58.6 | 87.9 | 169.2 | 124.2 | 115.2 | 117.2 | 192.1 | 1,064.5 | |
| Total Recurrent Costs | | | | | | | | | | | | | 1,039.7 | 914.6 | 960.7 | 1,059.1 | 1,031.5 | 1,040.3 | 1,060.5 | 1,100.7 | 8,207.3 | |
| Total | | | | | | | | | | | | | 2,363.2 | 1,387.5 | 1,335.6 | 1,471.4 | 1,451.4 | 1,468.0 | 1,496.1 | 1,243.8 | 12,217.0 | |

Notes:

- | | |
|--|---|
| \a Based in PCO | \q Government deputed non-gazetted first class officer |
| \b Based in PCO | \r Government deputed non-gazetted first/second class officer |
| \c Based in PMO | \s GON Contracted |
| \d Based in CO | \t GON Contracted |
| \e Based on PMO | \u GON Contracted |
| \f Based in CO | \v GON Contracted |
| \g Government deputed first class officer - Joint Secretary level | \w Government deputed second class officer - Section Officer level |
| \h Government deputed second class officer | \x Government deputed non-gazetted first class officer |
| \i Government deputed third class officer | \y Government deputed non-gazetted first class officer |
| \j Government deputed non-gazetted first class officer | \z Government deputed non-gazetted first class officer |
| \k GON contracted staff | \aa GON Contracted |
| \l GON contracted staff | \bb GON Contracted |
| \m GON contracted staff | \cc GON Contracted |
| \n GON contracted staff | \dd GON Contracted |
| \o Government deputed second class officer - Under Secretary level | \ee One event per year at provincial and federal level |
| \p Government deputed third class officer | \ff One event per year from third year onwards at corridor, PMO and PCO level |

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 4: Economic and Financial Analysis

Mission Dates: 22 March - 10 April 2023

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Asia and the Pacific Division
Programme Management Department

PDR Annex 4: Economic and Financial Analysis (EFA)

PART A: RESILIENT – HIGH VALUE AGRICULTURE PROGRAMME (R-HVAP)

Background

1. **The Goal** of the R-HVAP is to “reduced poverty and improved resilience of smallholder households”. The Programme development objective is “transition smallholder farming towards sustainable food systems that are profitable, inclusive and agroecological. The programme will contribute to SDGs 1. No Poverty, 2. Zero Hunger, 5. Gender Equality, 8. Decent Work and Economic Growth, 10. Reduced Inequalities, 13. Climate Action and 15. Life on land.

2. **Geographical area:** The programme will cover three provinces in Western Nepal: Lumbini, Karnali, and Sudurpaschim and operate in approximately 80 Municipalities (Palikas). The provinces has been selected based on the highest incidence of multi-dimensional poverty⁴⁶, impacts of COVID-19 on rural livelihoods⁴⁷, location of the Semlar regional wholesale market for national and international distribution of high value agricultural commodities, and a landscape perspective to facilitate the building of an agroecological food-shed.

3. **Target groups:** The main target group consists of smallholder⁴⁸ households engaged in mixed farming systems and deriving most of their income from agricultural production at different scales: subsistence, semi-commercial, and commercial. They are defined mainly on the basis of poverty level, land ownership, and access to production inputs and agricultural services. The programme will provide needs-based services for: (i) poor (including both poor and medium poor) and near-poor (or better off) households practising subsistence and semi-commercial farming with scaling up potential; (ii) ultra-poor households, with a focus on women-headed households and marginalized groups (Dalits, Janajatis and IPs); and (iii) underemployed and self-employed rural youth (including returnee migrants). Poor subsistence farmers with less than 1 ha of land will constitute the majority of programme participants being 70 percent, while near poor (or better off) commercially oriented will be approximately 25 percent.⁴⁹ Ultra-poor will account for about 5 percent.⁵⁰

4. **Programme participants and outreach.** The total R-HVAP outreach is estimated at 60,000 households or 258,000 individuals⁵¹. Of these, 45,000 households will benefit from programme supported production packages and 15,000 will benefit from public goods such as small irrigation, aggregation, processing, storage, and regional wholesale market infrastructure. Women will constitute at least 50% of the total programme participants and youth⁵² will be about 40%.

5. **Duration:** The programme has been designed to be implemented over the period of 96 months. The programme implementation will start in January 2024 and the official closing date of the programme will be December 2031.

⁴⁶ National Planning Commission (2021). Nepal Multidimensional Poverty Index: Analysis Towards Action. Kathmandu, Nepal.

⁴⁷ United Nations Children’s Fund (2022). Child and Family Tracker (CFT). Kathmandu, Nepal.

⁴⁸ The design mission observed during consultation with local communities that average farm size is 0.1 to 0.5 ha in the Programme target area.

⁴⁹ Smallholder land area is less than one hectare; average is 0.7 ha for men and less than 0.5 for women. Proportion is based on production level and average land size where 47.3 percent subsistence farming households hold an average land size of less than 0.5 hectare and 27.2 percent between 0.5 and 1 ha (CBS, 2011). Farmers with landholding size between 1 and 5 ha with commercial orientation account for 24.5 percent (ADS, 2015-2035).

⁵⁰ The current census has yet to release data on poverty and also on ultra-poor HHs. In the meantime, the proxy used (4.9%) corresponds to the share of population in severe multidimensional poverty (UNDP, 2022).

⁵¹ Average household size is 4.3.

⁵² As per the national definition, youth are people between 16 and 40 years of age. Percentage is based on demographic proportions at national level.

6. **Programme components:** RHVAP features four complementary and interlinked components: (i) Enhanced capacities for transitioning to market oriented agroecological production systems; (ii) Improved access to climate resilient productive infrastructure; (iii) Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets; (iv) Strengthened policies, regulations and institutions for smallholder agroecological production and trade, and (v) Project management, monitoring and evaluation, knowledge management and learning. **Component 1** includes four sub-components: (i) decentralised agroecological planning and coordination, (ii) knowledge and capacity for establishing agro-ecology farming, (iii) market oriented agro-ecological production expanded, and (iv) MSME ecosystem for agricultural service market strengthened. **Component 2** focuses on improving access to climate resilient productive infrastructures: (i) water related infrastructure, (ii) market led productive infrastructure (upgrading and new), and (iii) promote productive Renewable Energy Technologies (RETs) at producers' organizations (PO) level (solar dryers and incubators). **Component 3** has single activity of construction and operation of export oriented wholesale market in Semlar. **Component 4** centres around strengthening policies, regulations and institutions for smallholder agro-ecological production and trade through: (i) support to review of policies and regulations for stimulating smallholder agroecological production and trade, and (ii) trade facilitations and negotiations. **Component 5** concentrates on project management, monitoring and evaluation (M&E), knowledge management, and learning.

7. **Programme cost:** Total cost of the programme is estimated at USD 120.97 million. The financiers of the project will be (i) Government of Nepal USD 24.6 million (20.3%) comprising of cash contribution of USD 5.0 million (4.1%) and USD 19.6 (16.2%) million for including tax, duties and salary of counterpart staff, (ii) provincial government USD 0.5 million (0.4%), (iii) local government/Palikas USD 1.52 million (1.3%), (iv) IFAD loan USD 70.94 million (58.6%), (v) Producers Organizations-Households USD 20.87 million (17.3%), and (vi) MSMEs USD 2.56 million (2.1%). The main assumptions underlying the derivation of Programme costs and the financing plan are the following:

- The Programme costs are based on June 2023 prices and amended in December 2023 and programme cost was accounted at constant 2023 prices.
- The proposed Programme will be financed over an eight-year period (2023/24-2031/32).
- Inflation. Inflation in Nepal has fallen to about 5.0 percent per annum (p.a.) in 2021 and it is 7 p.a. to 2022/23. Average inflation rate between 2010 and 2021 is 5 percent p.a., hence, 5% inflation rate has been considered during programme costing.
- Exchange Rate. Base Exchange rate set at NPR 130 to USD 1 as an official exchange rate prevailing in December 2023 (rounded). This exchange rate has been assumed to be constant during the programme period.
- The Programme costs are presented in both NPR and USD. Conversions from current USD values into Nepalese rupees use constant purchasing power exchange rates of NRs. 130 per USD.
- Taxes and Duties. There is value added tax (VAT) of 13 percent levied by GON on all imported and locally procured goods and services. Vehicles have a tax of up to 230 per cent depending on an engine power. International technical assistance does not carry any taxes. These are not eligible for IFAD financing. Personal income tax for the project financed consultant will be 15 percent. Government tax has been accounted on an average at 15%. IFAD loan will not be used to cover the government taxes and it will be the government contribution for the programme.

8. The Government will finance the cost of all taxes on goods and services procured under the Programme. GoN will also finance some PCO, PMO and CO staff (on deputation) and part of the operating costs.

II. Programme benefits and Theory of Change

Programme benefits

9. For the purposes of this Economic and Financial Analysis (EFA), programme benefits and costs are modelled assuming the following programme support:

- (a) **Enhanced capacities for transitioning to market oriented agroecological production systems:** The programme will support for smallholders in increasing the profitability of smallholder agroecological production, despite climate and other shocks, supported by enhancing producer organisation's (POs) capacities and market linkages under four sub-components outlined above in Para 6 above.
- (b) **Improved access to climate resilient productive infrastructure:** In order to operationalize a commercially viable agroecological farming system the programme will support programme participants with improved access to climate resilient productive infrastructure related water for irrigation, market led productive infrastructure, and productive RETs at POs level as discussed on Para 6 above.
- (c) **Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets:** The programme will facilitate to implement the Semlar market co-finance by Invest International from the Netherlands and the GoN that will facilitate the aggregation of commodities from a large catchment area, including from agriculture clusters where R-HVAP is supporting POs. The Semlar market will be constructed as a state-of-the-art market replete with wholesale shutters for fruit, vegetables, cereals, and other priority commodities and will engage in collection, processing, and branding of agricultural products. Over 80% of the primary programme participants are expected to benefit from this market directly or indirectly.
- (d) **Strengthened policies, regulations and institutions for smallholder agroecological production and trade:** Support structures for profitable smallholder agroecological production established, facilitated by participating institutions and communities under detailed sub-components outlined in Para 6 above.
- (e) **Project management, monitoring and evaluation, knowledge management and learning:** The programme will be implemented through PCO, PMO and CO located in different programme areas through mobilization of adequate number of staff / human resources. Programme implementation will be supplemented by M&E, KM and learning management.

10. The first component will be the main driver of the programme. The programme benefits will be translated through all the coordinated effort to enable programme participants to generate income and employment primarily be facilitated through co-investment support from the programme and access to rural finance support.

Theory of Change

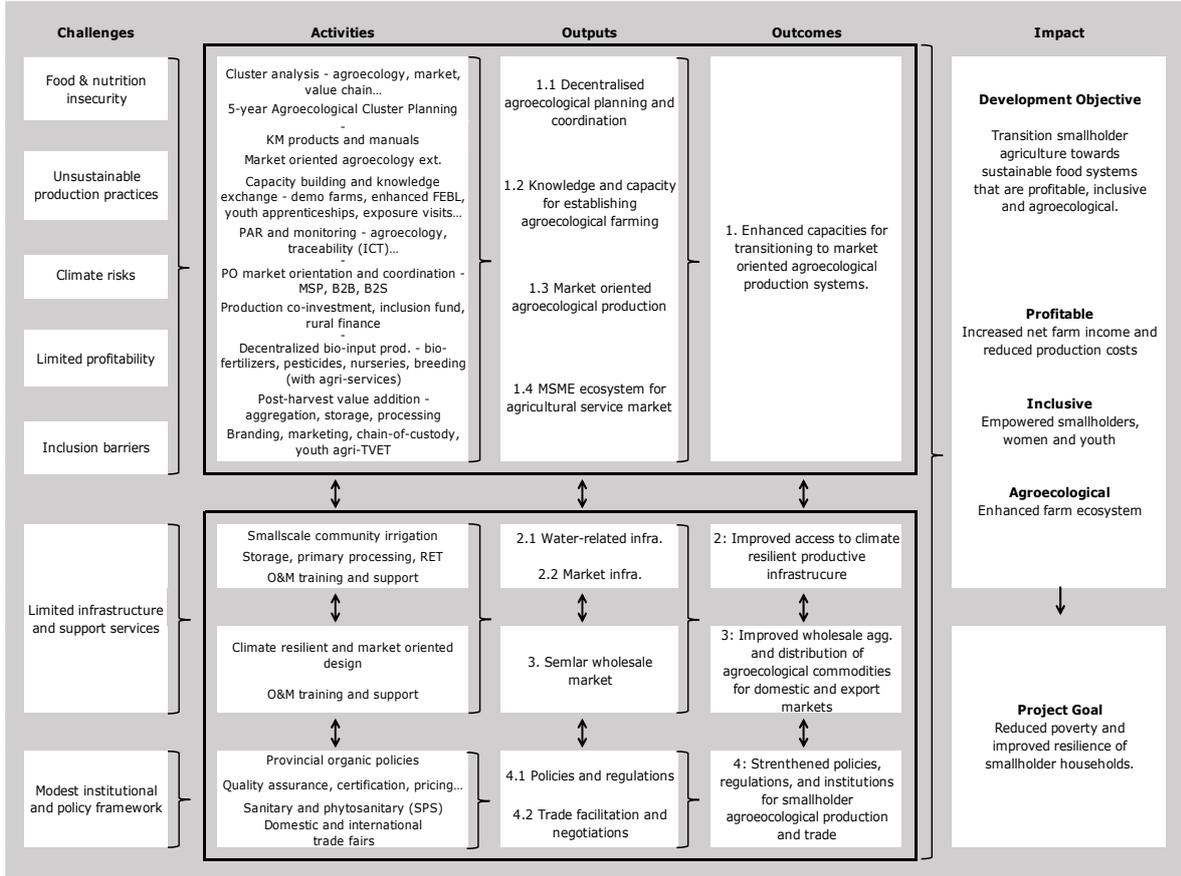
11. The theory of change of the programme has been detailed in **PDR main text E**. Snap-shot of the theory of change is provided hereunder.

12. As outlined in TOC, reveals to address the challenges such as food and nutrition security, unsustainable production practices, climate risks, limited profitability, inclusion barriers, limited infrastructure, and support services, and modest institutional and policy framework.

13. The programme aims to address farm level production related challenges interventions such as cluster analysis (agro-ecology, market, and value chain), 5 year agro-ecological cluster planning, knowledge management products and manuals, market

oriented agro-ecological extension, capacity development and knowledge exchange (demo farms, enhanced financial education and business literacy, youth apprenticeships, exposure visits, performance and accountable reporting (PAR) and monitoring, agro-ecology and traceability (ICT), POs market orientation and coordination (MSP, B2B and B2S), production co-investment, inclusion fund and access to rural finance, decentralized bio-inputs production (bio-fertilizers, pesticides, nurseries, breeding (with agri-services) and agro-vets and tools, and post harvest value addition (aggregation, storage, processing, branding, marketing, chain-of custody and youth agri-TVET. Challenges related to limited infrastructure and support services will be address through packages of support comprising of small scale community irrigation, storage, primary processing, RET through adopting climate resilient and market oriented design complemented by O&M training and support. The programme plan to address the challenges of modest institutional and policy framework through support to formulate provincial organic policies, quality assurance, certification, pricing, and assistance to strengthen Sanitary and Phyto Sanitary (SPS) and domestic and international trade fairs.

14. The programme has been designed to achieve outputs comprising of decentralized agro-ecological planning and coordination, knowledge and capacity for establishing agro-ecological farming, market oriented agro-ecological production, MSME ecosystem for agricultural service market (**component 1**), promotion of water related infrastructure, and strengthening market infrastructure (**component 2**), Semlar wholesale market (**component 3**) and support for policies and regulations, and trade facilitation and negotiations (**component 4**).



15. Thus, R-HVAP reflects an evolution of agricultural development of IFAD country programme towards resilient agri-food systems. In the context of the programme, a resilient agri-food system is one that addresses all three interconnected dimensions of rural smallholder livelihoods, i.e. social, ecological and economic, and therefore, is inclusive, agroecological and profitable. **Outcome 1** aims to enhance capacity for transitioning to market oriented agro-ecological production systems to increase the profitability of smallholder agroecological production systems, despite climate and other

shocks. This increase in net income will primarily be achieved through a combination of increased farm income and reduced production costs, with agroecological production systems as the foundation. Co-investment packages for POs will include needs-based financial and technical support over a period of 4 years, ensuring sufficient graduation support to establish profitable agri-businesses. This will be complemented by developing a vibrant MSME service market for affordable and high-quality bio-inputs, post-harvest value addition, and market access logistics. To support the expansion of agroecological production, **Outcome 2** aims to reduce production costs and post-harvest losses. While market infrastructure (e.g. mini-cold storage, aggregation units) will improve market access and reduce post-harvest losses, renewable and resource efficient technologies (e.g. drip irrigation, solar pumps) will contribute to reduced production costs. Moreover, the programme will work with provincial and local institutions to phase out agro-chemicals, raise awareness on its judicious use, and incentivize local production of affordable bio-inputs for reduced input costs. **Outcome 3** focuses on further strengthening of the agricultural marketing services through improved whole aggregation, and distribution of agro-ecological commodities for domestic and export market. Further, with linkages to **Outcome 4**, enabling environment for agro-ecological production and marketing will be created through strengthened policies, regulations, and institutions for smallholder agro-ecological production and trade.

16. To facilitate Outcomes 1, 2, and 3, an enabling institutional and policy environment for transitioning to agroecological and safe-food production systems will be supported (**Outcome 3**). In line with the decentralized governance structures, provincial institutions will be supported in the development of medium-term policies and strategies for phasing out agro-chemicals policies and promoting agroecological production.

17. The combined effect of the outcomes 1-4 will contribute to achieve the **Development Objective of** "Transition of smallholder agriculture towards sustainable food systems that is profitable (increased net farm income and reduced production costs), inclusive (empowered smallholders, women and youth) and agro-ecological (enhanced farm eco-system). All these will contribute to achieving programme goals of "reduced poverty and improved resilience of smallholder households).

Programme interventions

18. Various interventions planned under the programme are grouped into two: (i) software and (ii) hardware. Softwares activities are focused at creating framework and environment both at policy, and implementation level for overall decentralized planning that will adopt integrated approach through active collaborating between local, provincial and federal government units. Local potential and federal priority shall be linked through integrated, planning, monitoring and evaluation framework through different software (training, capacity development, exposure visits, workshop, participatory planning and development) interventions. The integrated planning framework with different software activities will guide interventions and will be instrumental for increase proper use and enhance productivity of various hardware activities presented in Table 1.

Table 13: Summary of programme interventions

| S.N. | Type of programme interventions | Units | Quantities by provinces | | | |
|------|---|------------|-------------------------|---------|--------------|--------|
| | | | Karnali | Lumbini | Sudurpaschim | Total |
| 1 | Co-investment in agroecological production | Households | 20,000 | 15,000 | 10,000 | 45,000 |
| 2 | Community irrigation and infrastructure systems | Number | 220 | 145 | 120 | 485 |
| 3 | Community irrigation and infrastructure systems | Hectare | 1,100 | 725 | 600 | 2,425 |
| 4 | Market led infrastructure (upgrading and new) | Number | 35 | 30 | 20 | 85 |
| 5 | Productive RET at PO level (solar dryers, incubators) | Number | 75 | 50 | 37 | 162 |
| 6 | Bio-fertilizer and bio-pesticide production units | Number | 6 | 4 | 4 | 14 |
| 7 | Seeds and saplings (nurseries) | Number | 3 | 2 | 2 | 7 |
| 8 | Breeding units (resource centers) | Number | 3 | 2 | 2 | 7 |
| 9 | Agro-vets / Tools | Number | 50 | 25 | 20 | 95 |
| 10 | Cold storage facilities (50 MT capacity) | Number | 11 | 8 | 6 | 25 |
| 11 | Small scale processing units | Number | 11 | 8 | 6 | 25 |
| 12 | Export oriented wholesale market (Semlar) | Number | - | 1 | - | 1 |

19. There are 10 different (6 private, 3 community and 1 public) hardware types programme interventions that supports to increase economy, efficiency, effectiveness and productivity of project support in the form of co-investments in agroecological production to about 45,000 households.

Investment, Programme Support and Cost Sharing

20. As discussed already the project will support to leverage direct private, community and public investment for different type of activities and indirectly assist the private, community and public sector to augment the value for money (economy, efficient, effectiveness and equity) of the investment. The project supports on the cost sharing basis. Total investment of the project promoted activities ranges between USD 1,000.00 (co-investment in agro-ecological production) and USD 31.25 millions (Export Oriented Semlar Wholesale Market). Cost sharing will be 50% for private sector initiatives, 85% for community based infrastructures and 100% for the public infrastructure. Table 2 provides estimated unit cost, programme support and cost sharing for different programme interventions.

Table 14: Investment Programme Support and Cost Sharing

| S.N. | Type of programme interventions | Units | Unit Cost (USD) | Cost sharing (%) | | Cost sharing (USD) | |
|------|---|------------|-----------------|-------------------|--------------------------------------|--------------------|--------------------------------------|
| | | | | Programme support | Programme Participants' contribution | Programme support | Programme Participants' contribution |
| 1 | Co-investment in agroecological production | Households | 1,000 | 50% | 50% | 500 | 500 |
| 2 | Community irrigation and infrastructure systems | Number | 10,000 | 85% | 15% | 8,500 | 1,500 |
| 3 | Community irrigation and infrastructure systems | Hectare | 2,000 | 85% | 15% | 1,700 | 300 |
| 4 | Market led infrastructure (upgrading and new) | Number | 15,000 | 85% | 15% | 12,750 | 2,250 |
| 5 | Productive RET at PO level (solar dryers, incubators) | Number | 1,950 | 85% | 15% | 1,658 | 293 |
| 6 | Bio-fertilizer and bio-pesticide production units | Number | 46,500 | 50% | 50% | 23,250 | 23,250 |
| 7 | Seeds and saplings (nurseries) | Number | 13,950 | 50% | 50% | 6,975 | 6,975 |
| 8 | Breeding units (resource centers) | Number | 74,400 | 50% | 50% | 37,200 | 37,200 |
| 9 | Agro-vets / Tools | Number | 5,000 | 50% | 50% | 2,500 | 2,500 |
| 10 | Cold storage facilities (50 MT capacity) | Number | 37,200 | 50% | 50% | 18,600 | 18,600 |
| 11 | Small scale processing units | Number | 74,000 | 50% | 50% | 37,000 | 37,000 |
| 12 | Export oriented wholesale market (Semlar) | Number | 27,000,000 | 100% | 0% | 27,000,000 | - |

Source: Project Design Report, Project Cost Tables

Programme participants of co-investment packages

21. Based on the results of the Palika Cluster Plans (PAP), R-HVAP will co-finance farm-level investments in agroecological farming practices for crops (year-round vegetable production, spices, native crops / NUS, orchards, etc.), livestock (native chicken, goat, dairy, including shed improvement for manure management, and forage/ fodder production), agro-forestry systems, honey production (both for pollination and commercial purposes), NTFPs and MAPS. About 45,000 participating smallholder farms households will be eligible for support for two types of tailored production support packages, to promote farm diversification for achieving agroecological objectives. There will be differentiated production packages depending on the level of PO maturity that will be determined during the planning process. Number of smallholder farm households by provinces and different investment packages are provided in Table 3.

Table 15: Smallholder farm households benefiting from co-investment packages

| S.N. | Type of activities | Unit | Smallholder farm households by province | | | Total |
|------|---|------------|---|---------------|---------------|---------------|
| | | | Karnali | Lumbini | Sudurpashchim | |
| 1 | Vegetables | Number | 5,000 | 3,000 | 2,500 | 10,500 |
| 2 | Goat + forage/fodder + shed | Number | 5,000 | 3,000 | 2,500 | 10,500 |
| 3 | Dairy + forage/fodder + shed + compost | Number | 3,000 | 2,000 | 1,500 | 6,500 |
| 4 | Backyard chicken | Number | 5,000 | 3,000 | 2,500 | 10,500 |
| 5 | NUS | Number | 1,000 | 800 | 500 | 2,300 |
| 6 | Apiculture - commercial honey + Chhury trees (20 hive model) | Number | 1,000 | 800 | 500 | 2,300 |
| 7 | Apiculture - pollination and nutrition (2 hive model) | Number | 6,000 | 4,000 | 3,000 | 13,000 |
| 8 | HMAPS/NTFPs | Number | 900 | 600 | 450 | 1,950 |
| 9 | Spices Zingiberaceae (Ginger, turmeric, galangal, cardamom) | Number | 1,000 | 1,000 | 500 | 2,500 |
| 10 | Coffee + shade trees and cover crops | Number | 1,000 | 1,000 | 500 | 2,500 |
| 11 | Potato seeds | Number | 100 | 100 | 50 | 250 |
| 12 | Agroforestry systems (apple / walnut / citrus / fodder trees + c) | Number | 1,000 | 700 | 500 | 2,200 |
| | Total | | 30,000 | 20,000 | 15,000 | 65,000 |
| | Standard repartition of investments per province | Percentage | 44% | 33% | 22% | 100% |
| | Total smallholder farm households | Number | 20,000 | 15,000 | 10,000 | 45,000 |

Agro-ecological farming mix

22. The programme will support smallholder farm households to integrate agroecological practices into both subsistence and commercial production systems to revitalize farm ecological health, increase diversity and nutrition benefits, and build climate resilience; combine complementary value chains into integrated systems for enhanced resilience to economic as well as environmental shocks; create incentives for use of bio-inputs, combined with sensitization on judicious use of agro-chemicals, guided by provincial strategies for safe food production; ensure sufficient funds for infrastructure climate resilience and maintenance for long term sustainability; and establish a network of agroecological lead farmers and farmer field schools for knowledge sharing, innovation and research.

23. The programme will support the development of multi-commodity supply chains for farming systems diversification and promote co-investments in commercial production, value addition and market linkages. The programme will facilitate smallholder farm households to integrate vegetable crops, fruit, livestock and other products (apiculture products, NUS, MAPS, NTFPs) that have domestic and export market potential, comparative commercial advantage for smallholder producers and agro-ecologically suitable for production. These products have been successfully promoted by successfully completed HVAP and ongoing ASDP.

Table 16: Diversified agroecological production activities

| S.N. | Programme support / interventions | Programme benefits / market signal / goal |
|------|--|--|
| 1 | Year-round vegetable production: polytunnels, water-efficient systems, seeds, bio-fertilisers and IPM practices | Self-consumption, commercialisation of surplus on local and regional markets (Import substitution) |
| 2 | Goat and dairy combined with improved sheds for manure management (compost) and forage/fodder. Native chicken | Main source of income. Commercialisation on local and regional markets (Import substitution) |
| 3 | Native crops and Neglected and Underutilized species (NUS) such as millet, buckwheat, barley, Karnali beans | Important staple food source. Commercial potential on domestic and export markets |
| 4 | Apiculture for commercial honey production with butter (Chiuri - <i>Diploknema butyracea</i>) trees (20 hives model), pollination and nutrition (2 hives model) | Multiple benefits: nutrition, income generation, pollination, potential for export |
| 5 | Medicinal and Aromatic Plants (MAPS) and Non-Timber Forest Products (NTFPs, such as Indian prickly ash or Timur, soap nuts) | Commercialisation on domestic and export markets |
| 6 | Spices (Ginger, turmeric, cardamom) | Proven under-supplied export markets. Shade tolerant species |
| 7 | Shade grown Coffee and cover crops | Production of quality certified coffee in Lumbini and Karnali provinces, having export markets |
| 8 | Agroforestry systems (apple / walnut / citrus / fodder trees with cover crops) | In conjunction with existing and upcoming orchards (NAFHA project) |
| 9 | Potato seed production | Local inputs supply chain supported by investment in cold storage. Commercialization on local and regional market (import substitution) |

24. The household's level multi-commodities integration and promotion approach will take stock of the experiences of working through MSP as a forum that brings together the stakeholders linked to a value chain such as input providers, producers, processors and distributors to improve communication, trust and mutual understanding, and establish commercial relationships.

Household economy analysis

25. Target programme participants have been involved in agriculture, livestock rising and small-scale productive activities for hundreds of years. They are engaged in some kind of subsistence activity relating to growing vegetables, oilseeds, pulses, cereal crops, and fruits, rising livestock and poultry, and horticulture. Majority of the potential programme participants are engaged with the cultivation of major cereal crops—rice, maize, and/or wheat. Almost all of the households (90%) grew vegetables, and a few of them sell them to vegetable collection centers, with the remainder either selling them to neighbors, hotels, or wholesalers who collect from their residence. Very limited number of the potential programme participants sells through all four of these options. Cattle, buffalo, and goats are being raised by most of the programme participants and keeping few heads of backyard chickens is common practices among potential programme participants in programme areas. However, potential programme participants are mostly subsistence producers living off marginal land of less than 1.0 ha (most owning about 0.5 ha.) of land. Most households lacked access to year-round irrigation. These realities

reveal that data agriculture is still a basic source of income for the potential programme participants.

26. Land owned by potential programme participants is either irrigated (khet) or un-irrigated (upland) or both. In the programme areas, more than one-third of the Khet lands were found to remain uncultivated throughout the year owing to the constraints such as unavailable of labor during the land preparation and harvesting time. There are farmers not growing cereal crops in the dry season due to a lack of irrigation facilities. In most of the areas, only small portion of land are used for growing wheat and pulses during the winter dry months. Since the cultivated lands mostly depend on monsoon rains, programme participants believed that regulated and controlled year-round irrigation would enable farmers to grow crops during three seasons in a year. While a vast majority of the households produce cereal crops for self-consumption, a little over one-third sold their surplus. Less than half of the households needed to buy rice, wheat, and maize for a majority of the year. There exist opportunities to increase farm income through a transition from cereal crops to cash crops like year round vegetable farming through the support on community micro-irrigation technologies (surface, pond, sprinkler, etc.).

27. Livestock play a key role on an organic farm of programme area. Nutrient cycling-Nitrogen fixed by legumes and other nutrients consumed by livestock during grazing are returned to soil via manure and urine. Thus the livestock sector plays a vital role in the national economy, providing a source of food, income, and employment. The agriculture development in the programme area can't be separated and they are close inter-linked.

Programme participants phasing

28. **Phasing of smallholder co-investment and access to rural finance:** The aims of the R-HVAP to increase the agricultural production of selected commodities through the adoption of improved technology, management practices and enhanced access to other complementary services. In total 45,000 smallholders farm households will benefit from co-investment packages for agroecological production. Each household will receive support to promote two types of activities from the list of co-investment packages provided in Table 3 and 4. The programme participants will receive support in phased implementation of the programmes starting from first year. Graduated programme beneficiaries of ASHA and ASDP will receive support from 1st year of programme implementation while programme participants from other locations will received programme support from second year and ending on 4th year of the programme. Table 5 shows the phase-in and total number of direct beneficiaries over the programme period.

Table 17: Phasing of programme participants receiving co-investment for agroecological production (farm typology)

| S.N. | Typology of farm models | Units | Phasing of Activities | | | | | | | | Total | % of Total |
|------|---|--------|-----------------------|--------|--------|--------|------|------|------|------|--------|------------|
| | | | YR-1 | YR-2 | YR-3 | YR-4 | YR-5 | YR-6 | YR-7 | YR-8 | | |
| 1 | Vegetable production (year round), dairy and apiculture for pollination and nutrition | Number | 600 | 3,300 | 5,700 | 3,900 | - | - | - | - | 13,500 | 30 |
| 2 | Dairy and MAPs / NTFPs | Number | 240 | 1,320 | 2,280 | 1,560 | - | - | - | - | 5,400 | 12 |
| 3 | Dairy and potato seeds production | Number | 60 | 330 | 570 | 390 | - | - | - | - | 1,350 | 3 |
| 4 | Dairy and shade grown coffee and cover crops | Number | 200 | 1,100 | 1,900 | 1,300 | - | - | - | - | 4,500 | 10 |
| 5 | Goat farming, native chicken, and apiculture for pollination and nutrition | Number | 300 | 1,650 | 2,850 | 1,950 | - | - | - | - | 6,750 | 15 |
| 6 | Goat farming, native crops and NUS such as millet, buckwheat, barley, Karamli beans | Number | 300 | 1,650 | 2,850 | 1,950 | - | - | - | - | 6,750 | 15 |
| 7 | Apiculture for commercial honey production (20 hives model), and agroforestry system | Number | 100 | 550 | 950 | 650 | - | - | - | - | 2,250 | 5 |
| 8 | Agroforestry systems, spices and apiculture for pollination and nutrition | Number | 100 | 550 | 950 | 650 | - | - | - | - | 2,250 | 5 |
| 9 | MAPs and NTFPs and apiculture for pollination and nutrition | Number | 100 | 550 | 950 | 650 | - | - | - | - | 2,250 | 5 |
| | Total households | Number | 2,000 | 11,000 | 19,000 | 13,000 | - | - | - | - | 45,000 | 100 |

Source: Programme Design Report, Programme Cost Tables

29. These smallholder households will be benefiting through various softwares and hardware support of the programme agro-ecological production and value chains development support and will be supported based on cluster development approach through different packages of services (financial education, business literacy, extension, grant, training on farming practices etc.). This process has been driven by the primary actors themselves, principally farmers and MSMEs through packages of services comprising of mentoring and mobilization of small-scale producers, brokering and cluster

facilitation and inclusive value chains knowledge and policy support. They are receiving skill on financial education, business literacy and household finances; managing own farm as a business; managing a group enterprise as well as technical support aspects of climate change, youth engagement, nutrition and Gender Action Learning System (GALS). The programme interventions including GALS will be integrated mainly among primary programme participants.

30. Beneficiaries will be assisted through multiple services such as adaptation and mitigation technologies and practices, improved access to markets, support to productive infrastructure such as micro-irrigation, improvement of goat and cattle shed and use of wider range of affordable and suitable financial services and products. Under this programme, confidence of the farmers on production will be enhanced to promote their inclusion into market system and improved marketing strategies through joining farmers groups (FGs) that are allowing them to engage in produce aggregation, distribution, and responsiveness to market demands. Programme supports to these producers through FGs will be geared to enable them to promote investments and become reliable value chain partners for buyers and customers.

31. **Climate resilient infrastructure for smallholders:** The programme will support climate resilient infrastructure to augment production and productivity of smallholders' production. This includes: (i) water related systems such as small-scale irrigation schemes, water storage facilities, Multi-Use water systems (MUS), etc., (ii) market led infrastructures (upgrading and new), and (iii) productive renewable energy technology (RET) at PO level. All these infrastructure interventions will be synergetic with other programme interventions aimed to have complementary effects. Table 6 shows phasing of the climate resilient infrastructures for smallholders to augment production and productivity.

Table 18: Phasing of construction of climate resilient infrastructure for smallholders

| S.N. | Type of programme interventions | Units | Phasing of Activities | | | | | | | | Total |
|--|---|---------|-----------------------|------|------|------|------|------|------|------|-------|
| | | | YR-1 | YR-2 | YR-3 | YR-4 | YR-5 | YR-6 | YR-7 | YR-8 | |
| 1 | Community irrigation and infrastructure systems | Number | 65 | 110 | 160 | 120 | 30 | - | - | - | 485 |
| | Community irrigation and infrastructure systems | Hectare | - | 550 | 800 | 600 | 150 | - | - | - | 2,100 |
| 2 | Market led infrastructure (upgrading and new) | Number | - | 13 | 35 | 25 | 12 | - | - | - | 85 |
| 3 | Productive RET at PO level (solar dryers, incubators) | Number | - | 25 | 80 | 57 | - | - | - | - | 162 |
| Source: Programme Design Report, Programme Cost Tables | | | | | | | | | | | |

32. The programme will support about 585 small-scale irrigation schemes that will bring additional 2,100 ha. of land under year round irrigated farming system. Similarly the programme will support 85 market led infrastructures (upgrading and new) as well as support about 162 POs with productive renewable energy technologies (RETs) such as solar dryers and incubators.

33. **Decentralized MSME units:** The programme will support smallholders to improve on-farm production of bio-inputs through proper management of organic waste including farmyard manure, vermicompost and bio-pesticide production. Considering the ever increasing demand of the volume required for programme area in general and programme participants in particulars, programme will support decentralized MSME production and distribution of bio-inputs for transitioning to a safe-food production system. Further, the programme will also support establishment and management of the seed and sapling nurseries, breeding units (resource centers) and agro-vets and tools supply. Table 7 shows phasing of the decentralized MSME units for affordable and high quality bio-inputs and allied production inputs.

Table 19: Phasing of promoting decentralized MSME units

| S.N. | Type of programme interventions | Units | Phasing of Activities | | | | | | | | Total |
|--|---|--------|-----------------------|------|------|------|------|------|------|------|-------|
| | | | YR-1 | YR-2 | YR-3 | YR-4 | YR-5 | YR-6 | YR-7 | YR-8 | |
| 1 | Bio-fertilizer and bio-pesticide production units | Number | - | 6 | 7 | 1 | - | - | - | - | 14 |
| 2 | Seeds and saplings (nurseries) | Number | - | 7 | - | - | - | - | - | - | 7 |
| 3 | Breeding units (resource centers) | Number | - | 7 | - | - | - | - | - | - | 7 |
| 4 | Agro-vets and Tools | Number | - | 30 | 40 | 25 | - | - | - | - | 95 |
| Source: Programme Design Report, Programme Cost Tables | | | | | | | | | | | |

34. **MSME service market:** The programme will support to set-up cold storage facilities (50 MT capacities), some of them solar power operated based on feasibility, small scale processing units for sorting, grading, drying, packaging and value addition. Table 8 shows phasing of the MSME service market to strengthen post harvest value addition.

Table 20: Phasing of supporting MSME service market

| S.N. | Type of programme interventions | Units | Phasing of Activities | | | | | | | | Total |
|--|--|--------|-----------------------|------|------|------|------|------|------|------|-------|
| | | | YR-1 | YR-2 | YR-3 | YR-4 | YR-5 | YR-6 | YR-7 | YR-8 | |
| 1 | Cold storage facilities (50 MT capacity) | Number | - | 6 | 10 | 9 | - | - | - | - | 25 |
| 2 | Small scale processing units | Number | - | 6 | 10 | 9 | - | - | - | - | 25 |
| Source: Programme Design Report, Programme Cost Tables | | | | | | | | | | | |

35. **Export Oriented Regional Agricultural Wholesale Market, Semlar:** The programme will support the construction of the Semlar Agriculture Regional Wholesale Market co-financed by the GoN. This market will facilitate the aggregation of produce from a large catchment area, including from the R-HVAP agriculture clusters and will support smallholders’ commodities to reach both domestic and export markets efficiently and at competitive prices. Economic and financial analysis revealed the investment in regional agricultural wholesale market to be technically feasible and economically / socially viable.

36. **Financial services:** There is no separate rural finance component in the R-HVAP. The potential programme participants will be integrated with *Value chains for Inclusive Transformation of Agriculture (VITA) Programme for access to credit, and digital financial services, market and extension including agro-met advisory services.*

Approach and Methodology of EFA

37. Cost-benefit analysis method was used for carrying out the EFA⁵³. Project benefits from different programme interventions on crops, livestock, fruits, agroforestry, non-timber forest products and api-culture activities and cost incurred to realize those benefits are accounted.

38. Benefits are estimated for all categories of the programme participants. Major sources of quantifiable benefits are incremental agricultural production through adoption of improved technology, management practices and smallholder co-investments and access to rural finance for agro-ecological production sub-component under component 1. The production of the smallholders will be supplemented by economic mobilization through financial education, business literacy, and insurance of economic activities promoted through agro-ecological approaches to production. The potential benefits potentially generated under the programme have been holistically accounted. Additionally, the programme will potentially improve wholesale and retail marketing and support to promote small irrigation schemes which will be generating different benefits. The programme participants will benefit directly from grant support from the programme and through improved agricultural production environment such as irrigation, market linkages, access bio-inputs, assembly, storage, and processing establishment. All the possible types of the benefits were captured through indicative crop and farm / household models that have focussed on input marketing, product aggregation, processing, packaging, storage and distribution.

39. Further, the programme implementation approach to (i) increase sustainability, resilience and profitability as a result of adaptation and mitigation technologies and practices, (ii) improve access to markets, basic and productive and market infrastructure, and (iii) wider range of financial services and products are assumed to reduce price and

⁵³ The project's cost benefit analysis was carried out based on 'with/without' assumptions. Required data were collected from multiple sources including agriculture census survey 2011, publications from Agribusiness Promotion and Marketing Development Directorate, and Agribusiness promotion and statistics division, MoAD, and field level data collected during the programme design mission.

quantity risks of the producers. Benefits generating from these interventions are captured through integrated pricing mechanism.

40. Further, EFA has been done using the assumptions and results of ex-post EFA of HVAP, ex-ante EFA of ASDP and ex-post EFA of ASHA to ensure that process is consistent EFA done under the IFAD funded projects in Nepal.

III. Financial Analysis

41. The objective of the financial analysis is to demonstrate viability of the R-HVAP proposed intervention at the crop farming and farm household levels. The methodology employed is to establish individual gross margin of the potentials project promoted crops, spices, livestock, agro-forestry / NTFP /fruits /fodder trees /coffee/cover crops) and apiculture activities to demonstrate the profitability level of these commodities.⁵⁴ These crop budgets provided basic building blocks of the household farming business as expressed in individual crop budgets. Farm budgets⁵⁵ are developed for nine different farm models based on combination of different (i) crops, (ii) livestock, (iii) agro-forestry, and (iv) apiculture as well as other farmed crops so as to develop an effect of the R-HVAP interventions for programme participants from household perspectives. The EFA is formulated on an incremental basis and comparing the with-project (WP) situation with that of without-project (WoP) circumstances. This is to indicate that the incremental benefit is the basis of the EFA.

42. **Assumptions and observations:** Following assumptions and observations governs the financial analysis of different attributes under consideration as well as the programme as a whole.

- All the costs and benefits are valued at constant market price of June 2023.
- 45,000 programme participants who will receive co-investment support and MSMEs are considered for the analysis. The additional 15,000 households benefitting from capacity building, technical extension, infrastructure and market support were not considered in this analysis.
- Average size of landholding is 0.5 ha in wide agro-ecology of the programme areas and programme participants will plant various seasonal and perennial crops under the community mobilization, and technical support packages of the programme. This will be supplemented by support under smallholder co-investments and access to rural finance for agro-ecological production sub-component. Further, programme support will enable beneficiary households to shifts from traditional cropping patterns to agro-ecological based commercial oriented farming system within the programme areas.
- In all 45,000 households will receive R-HVAP co-investment packages for agroecological production. These households will have access to services such as R-HVAP grants, extension and financial services which will enable them to adopt new packages of production practices, crop varieties and cultivation techniques eventually leading to increased production and income.
- Programme participants already organised into farmers' groups (FGs) will benefit from various programme interventions. Competencies of FG members will be

⁵⁴ The enterprises selected for R-HVAP interventions includes: (i) crops [year round vegetable production, native crops and neglected and underutilized species (NUS), spices – ginger, and turmeric and potato seed production], (ii) livestock (dairy cattle/buffalo, goat and native chicken), (iii) agro-forestry [medicinal and aromatic plants (MAPS), (iv) non-timber forest products (NTFP), (v) fruits (apple / walnut / citrus), (vi) fodder trees, coffee and cover crops and (vii) apiculture [commercial (20 hives models) and pollination and nutrition (2 hives model) activities.

⁵⁵ A farm budget is a function of the farms cropping (and in some cases) livestock production pattern and the representative budget for that household type. The farm budget also reflects the investment, the debt service, the on-farm use, household consumption and the labour availability.

enhanced through participation in FEBL classes, training and capacity development interventions from the programme. Programme participants will actively participate on various packages of services from the programme.

- Programme participants will receive R-HVAP package of services under all the four core components: They will receive technical support through Field Agricultural Officers (FAO), Agricultural Technicians (ATs) and community mobilizers, as well as existing networks of government and non-government service providers.
- Most villages in the proposed programme areas have perennial or seasonal streams that could be tapped for irrigation through the construction of surface, pipelines-based, and small lift irrigation system. Smallholders will benefit from other water related infrastructure; market led productive infrastructure, and renewable energy technologies (RETs).
- Commonly grown crops are paddy, wheat, maize, millets, off-season vegetables, other fruit crops (citrus, apple, pear, plums, etc.), agroforestry, herbs and spices and apiculture activities. The households apply both farm yard manure / compost or chemical fertilizers and households especially in some project areas in Karnali provinces and other provinces use poly-tunnels for improved off-season vegetable (OSV) farming.
- Crop productivity is gradually increase through access to round the year irrigation facilities, adoption of quality of seeds / varieties, weeding, mulching, use of improved farm tools and implements, bio-fertilizers and pesticides, improved seeding, breed (cattle and goat) improvement. The programme participants will enhance their farming knowledge and skill through consultation with lead farmers and observation of demonstration farm. The access to quality seeds has been an issue in programme areas and agro-vet located in several places in R-HVAP areas are supplying quality seed to the farmers and their capacity will be enhanced.
- Off-season vegetable cultivation of mix of crops comprising of cabbage, cauliflower, carrot, radish, coriander, broad leaved mustard, peas, beans, cucumber, etc and average area planted to cultivation of vegetable ranges between 0.5 ropani (0.025 ha) and 5.0 ropani (0.25 ha), with an average of 1 ropani (0.05 ha).⁵⁶
- Improved assembling, collection, storage, storage, processing and other attendant facilities being supported under R-HVAP and already provided by GoN will enable programme participants realise increased margins for their farm produce.
- The programme area households raise cattle, buffalo, sheep, goats, poultry birds, etc. in addition to agricultural activities and there exist potential to up-scale these business through technology, training and Para-vet services. The R-HVAP support smallholder households to specialize and gradually commercialize on goats, dairy cattle/ buffalo farming and back yard poultry farming...
- On an average a household has 2 to 3 does, 1 buck, 1 buckling and 1 doeling and more than 70% of households use sheds for the small ruminants adopt better feeding practices and health care facilities and about 30% are improved breeds. There is demand from programme participants to increase their herd size and shift to stall feeding among beneficiary households.
- Productivity increases under individual farm / household's model varies. In general, farm model with off-season vegetable will have comparatively higher return compared to other identified during programme design.

⁵⁶ Three crops: tomato, cucumber and one of the Cole vegetables has been selected to prepare the representative crop model.

- There will be notable improvement on marketing of the farm produces due to programme support through mentoring and mobilization of small-scale producers, brokering and cluster facilitation and inclusive assembling, collection, storage, processing, etc. Over 50% beneficiary households will get information about prices and nearly 80% receive payments at sale and the remaining after weeks.
- An average wage rate of NPR 1,000/person day for both male and female labour for hard work like land preparation and NPR 500-700/person day for both male and female labour for other activities like care and management of agricultural activities, and inter-cultural operation, and hence this wage rate has been assumed although the farm-wages tended to vary. The same rate is assumed for without project situation.
- Farmers pay land and water taxes as applicable and these form part of the fixed production costs. They use farm implements as well and depreciation in these implements is expected. Considering 8 years economic life of these implements, a 12.5% depreciation rate were assumed / used.
- Commodity prices vary significantly between districts and seasons and the June 2023 prices were collected during the mission from different sources and those prices were compared with the prices used in undertaking EFA during ASDP design, HVAP and ASHA completion missions.
- BFIs are providing mainly the short and medium term loans for the period of 3-4 years. They will extend long term financial support to activities related to aggregation, processing, packaging, storage and distribution in the later phase of the programme. The programme participants will be linked with VITA for accessing required financial services for business scale-up and strengthening.
- Agriculture (crop and livestock) insurance service is gradually expanding in the - HVAP programme areas. The R-HVAP will support programme participants to buy insurance policies as a tool for risk mitigation. Benefits from these services in form of risk reduction for producers and improved repayment performance of loans from BFIs are integrated for higher production and better commodity prices.

Crop model

43. **Crop models type:** following crop models, which are indicative, were developed under without and with programme situation for the purpose of ex-ante EFA.

- Cereal crops (paddy, wheat, maize and millet),
- Vegetable production (winter, spring and rainy season)
- Native crops and neglected and underutilized species (NUS),
- Spices – ginger, and turmeric
- Potato seed production,
- Dairy cattle/buffalo,
- Goat,
- Native chicken,
- Medicinal and aromatic plants (MAPS),
- Non-timber forest products (NTFP),
- Fruits (apple / walnut / citrus)
- Fodder trees,
- Coffee
- Apiculture - commercial (20 hives model) and
- Apiculture - pollination and nutrition (2 hives model)

44. The demand-driven nature of the programme makes both financial modeling and calculation of a benefit stream rather indicative. Above 24 (in total) crop models were prepared to illustrate income generating activities and economics of the crops that will be subject of R-HVAP support. These will be exclusively through various supports under enhanced capacities for transitioning to market oriented agro-ecological production systems component.

45. Adopting farm/households models, the programme will be working improving household's cash flow through a marketing of the surplus production of commodity mix adopted by the farms/households in the programme areas.

46. **Benefits:** The R-HVAP is expected to lead to increase in incomes for smallholder HHs who otherwise lacks access to basic services on extension, finance, and technology to generate employment opportunities in the target areas. Key benefits would accrue from agricultural business creation and expansion, facilitated by programme support on co-investment grant, financial and economic mobilization by community mobilizers, and agriculture technicians, FEBL classes, GALS and F2F learning to establish their linkages with potential suppliers and enhanced access to basic services including finance.

47. Financial analysis was done at programme level using market prices. Incremental benefits were estimated based on actual physical outputs from the selected crops. Prices information was collected for all inputs and output commodities from the markets and adjusted them to farm-gate prices. Using all available data, both primary and secondary, crop production models for the 24 potential agricultural commodities were developed under with and without project scenario.

48. **Without and with project scenario:** Except livestock and api-culture enterprises, other crops, spices, fruits, vegetables, agro-forestry, fruits etc. are land intensive activities. Field observation revealed that goat farming and apiculture (pollination) is very much suitable to marginal and landless farmers. Average farm size and model farm size with and without project situation is not explicitly mentioned in the EFA done at appraisal.

Table 21: Agriculture enterprise under without and with project scenario

| Commodities | Average farm size | With-out project | With project | Model size with project |
|------------------------|-------------------|--------------------------------------|---|---------------------------------|
| Off-season Vegetable | 0.50 | Paddy, wheat, maize | Winter, summer and rainy season vegetable | 0.05 ha |
| Dairy | 0.50 | Upgrading on existing cattle/buffalo | Dairy | 2 mature cattle / buffalo model |
| Goat | 0.50 | Upgrading on existing goat | Goat | 10 mature goat model |
| Ginger / Turmeric | 0.50 | Barren land, maize, wheat | Ginger | 0.2 ha |
| Indigenous crops / NUS | 0.50 | Barren land, maize, wheat | Finger millet, buck wheat | 0.35 ha |
| Potato seed | 0.50 | Barren land, Paddy, wheat, maize | Potato seed | 0.35 ha |
| Api-culture | 0.50 | Paddy, wheat, maize | Winter, summer and rainy season vegetable | 20 hives 2 hives |
| Fruits | 0.50 | Paddy, wheat, maize | Vegetables, Paddy, wheat, maize and fruit orchard | 0.25 ha |
| Coffee | 0.50 | Paddy, wheat, maize | Vegetables, Paddy, wheat, maize and coffee | 0.25 ha |
| Timur | 0.50 | Barren land, Paddy, wheat, maize | Vegetables, Paddy, wheat, maize, Timur | 0.25 ha |

49. Field observation revealed that adoption of R-HVAP promoted technologies by smallholders will be gradual and there will be a gradual shift from current situation to agro-ecological farming practices. For example, smallholders will transfer less than 20% of their farm from cereal crops to cash (year round vegetable farming) crops, indigenous crops (NUS) will be grown in currently under utilized land, farmers raising one cattle/buffalo will start two cattle/buffalo and those raising 2-5 goats will increase the herd size to ten goats. Such a gradual and adoptive process will have no or low

implications on food and nutrition security while there will be gradual increase in farm income. The smallholders will gradually develop resilience on R-HVAP induced changes. Production of staples will decrease marginally while with the adoption of intensive farming in some plots of their farm land, programme participants will have supplementary sources of income to finance other household necessities.⁵⁷

50. Due to programme support on agro-ecological farming, modernization of the farming sector is expected through (i) transformation of paddy, wheat, maize and millet farming to vegetable farming, (ii) shifting of traditionally grown crops (maize, wheat and millet) to potato seed production, and ginger/turmeric farming and (iii) up-grading of the subsistence and traditional goat (2 goats) and dairy (1 cattle/buffalo) farming to commercial activity (10 improved goats and 2 improved cattle/buffalo). This assumption is supported and based on emerging trend of large number of farmers in the programme areas transforming traditional farming to more commercial ones. Such conversion has been gradually taking place in the programme areas and will increase during the programme period through various pro-smallholder programme supports.

51. Crop models were prepared for all farming activities. Profit margin under different farm model (i) without project scenario covering traditional crops like paddy, wheat, maize, vegetable crops, goat and dairy activities, and (ii) with project for improved vegetable farming, commercial (improved) cattle/buffalo, and goat farming, potato seed production, ginger and turmeric farming and indigenous crops (finger millets and buck wheat) were worked-out. These are included in the separate excel file.

Adoption rate

52. Average adoption rate for the programme has been estimated integrating the findings of the mission during field studies, discussion with key informants, focus groups discussions, assumptions on adoption rate used during ASDP design and findings on assumption by similar recently completed projects, especially HVAP, ASHA and KUBK.

53. Field survey conducted under this mission uncovered that in general, adoption rate will be higher in those activities that require high upfront investment that is specific to the crops models and proven evidence of the perpetual flow of income over the longer period with lower intensity and impact of price and production risk. These commodities are dairy, goat farming and fruit farming. On the other hand, adoption rate is lower on commodities with low initial investment cost, and higher intensity and impact of price and production risks. These commodities are potato seed production. Activities such as year round vegetables production, dairy, ginger and turmeric farming are in between in terms intensity and impact of price and production risks.

54. In cognizance to above a 75% adoption rate (ranging between 70% and 80%) was assumed for the selected farm Models included for conducting the EFA.

55. The assumption on adoption rate used in this report is consistent to the other recently appraised report (VITA) and completed projects (HVAP, KUBK and ASHA) and rate used in ASDP at design. The adoption rate used in ex-ante EFA of ADSP was 75% flat, the same adoption rate applied for all the commodities (apple, goat, dairy, off-season vegetable, potato, Timur, turmeric, orange and walnut) analyzed. On the other hand, adoption rate used by ex-post EFA of HVAP ranged between 64% and 91%, with an average of 84%. The adoption rate used was highest (91%) in case of model such as goat and off-season vegetable and lowest (64%) for Timur. The adoption rates used for other crops were: apple (88%), vegetable seed (83%), turmeric (78%), and ginger (72%).

⁵⁷ Household model developed in this EFA has accounted overall HH income of adopting new R-HVAP promoted technologies where self consumption is considered as an "income" as this substitutes their portion to be purchased from market.

56. In view of above, the adoption rate used in the EFA is slightly conservative than the rate used in the programme during ASDP design and completed (HVAP) projects.

57. **Financial benefit and cost analysis of crop model:** Fixed investment and incremental benefits and cost of the 24 crops/farming activities discussed above was estimated and analyzed for 15 year R-HVAP horizon (2023/24 -2037/38). Results of the financial analysis (key financial indicators) of these crops are presented in Table 10.

58. The details are included in the separate excel file.

Table 22: Financial Analysis Results of Crop / Enterprise Model

| S.N. | Type of Crop | Unit | Model Size | Financial Indicators | | |
|------|--------------------|-------|------------|----------------------|-------------------|--------------|
| | | | | IRR (%) | NPV @ 12% DF (Rs) | BCR (12% DF) |
| 1 | Paddy | Ha. | 1.0 | 20.9% | 18 | 1.12 |
| 2 | Wheat | Ha. | 1.0 | 19.9% | 9 | 1.06 |
| 3 | Maize | Ha. | 1.0 | 25.6% | 13 | 1.14 |
| 4 | Millet | Ha. | 1.0 | 27.3% | 4 | 1.05 |
| 5 | Tomato | Ha. | 1.0 | 14.2% | 47 | 1.05 |
| 6 | Cucumber | Ha. | 1.0 | 17.6% | 94 | 1.09 |
| 7 | Cole vegetables | Ha. | 1.0 | 18.4% | 138 | 1.21 |
| 8 | Cattle | No | 5.0 | 20.0% | 305 | 1.26 |
| 9 | Goat | No | 10.0 | 30.3% | 450 | 1.42 |
| 10 | Ginger | Ha. | 1.0 | 13.1% | 1,026 | 1.02 |
| 11 | Turmeric | Ha. | 1.0 | 17.2% | 97 | 1.14 |
| 12 | Potato | Ha. | 1.0 | 18.8% | 116 | 1.08 |
| 13 | Snow pea | Ha. | 1.0 | 32.2% | 22 | 1.06 |
| 14 | Kidney bean | Ha. | 1.0 | 17.5% | 3 | 1.01 |
| 15 | Coffee | Ha. | 1.0 | 16.2% | 153 | 1.14 |
| 16 | Walnut | Ha. | 1.0 | 16.3% | 332 | 1.28 |
| 17 | Apple | Ha. | 1.0 | 13.9% | 101 | 1.06 |
| 18 | Orange | Ha. | 1.0 | 12.4% | 17 | 1.01 |
| 19 | Lime | Ha. | 1.0 | 18.1% | 132 | 1.07 |
| 20 | Timur - existing | Ha. | 1.0 | 17.2% | 26 | 1.12 |
| 21 | Timur - New | Ha. | 1.0 | 13.6% | 23 | 1.03 |
| 22 | Honey - polination | Hives | 2.0 | 18.4% | 10 | 1.08 |
| 23 | Honey - commercial | Hives | 20.0 | 18.8% | 118 | 1.06 |
| 24 | Back yard poultry | No | 100.0 | 32.1% | 116 | 1.09 |

Source: Detailed in Excel file.

59. As anticipated, promotion of these crops / farming activities will play a big role in gainful employment (mainly addressing under-employment and unemployment) generation and diversifying the household's income sources.⁵⁸ All the models demonstrate very satisfactory benefit/cost ratios, financial internal rates of return (FIRR) and positive net present value (NPV). This indicates potentials attractiveness of the investments on these farm activities.

MSMEs and Community Infrastructure Models

60. Benefits and cost analysis of the representative MSMEs and community infrastructure have been done to assess the financial viability of these activities from the individual and community perspectives. The results of the financial analysis of MSMEs and community infrastructure are presented in Table 11.

⁵⁸ Generally, these crop models provide employment to 2 family members and 1 hired worker, and with maturity and confidence over time, there is a prospect to increase employment to a notable level.

Table 23: Financial Analysis Results of MSMEs/Community Infrastructures

| Representative MSME / Community Infrastructure Model Type | Unit | Quantity | Financial Indicators | | |
|---|--------|----------|----------------------|------------------------|--------------|
| | | | IRR (%) | NPV @ 12% DF (Rs.'000) | BCR (12% DF) |
| Bio-fertilizer / pesticide | Number | 14 | 13.1% | 268 | 1.00 |
| Seedlings / Saplings | Number | 7 | 15.1% | 673 | 1.05 |
| Breeding units (resource centers) | Number | 7 | 13.5% | 853 | 1.02 |
| Cold storage (50 MT) | Number | 25 | 13.3% | 697 | 1.00 |
| Dairy processing - Chilling Vat | Number | 5 | 14.3% | 986 | 1.00 |
| Dairy collection centre (600 Litre) | Number | 5 | 14.0% | 321 | 1.00 |
| Small Irrigation System | Number | 485 | 27.6% | 1,277 | 1.27 |

Source: Detailed in Excel file.

61. The representative MSMEs and community infrastructure models analyzed for EFA process revealed that all the five MSMEs (bio-fertilizers / pesticide, seeding/sapling nurseries, breeding units (resource centres), cold storage (50 MT) and dairy processing activities are technically feasible and financially viable. All these investment activities have FIRR more than 13.1% and NPV at 12% DF more than NRs. 268,000 and BCR of above 1.00 at 12% DF.

62. Community/small irrigation system plays a critical role in poverty reduction and food security strategies in the programme areas. Small/community irrigation system is the very effective and efficient to transfer rain fed agriculture of the programme area into irrigated one and critical to enable smallholder households to adopt agro-ecological farming practices for to sustain and improve their livelihood. There is clear evidence that access to irrigation increases food production, on-farm employment, and household income thus reducing the severity of rural poverty. Financial cost benefit analysis of the small community surface irrigation system in Salyan, Rukum and Palpa reveals that investment on community irrigation system to be technically feasible, and socially acceptable. Average financial IRR of small irrigation system was 27.6%, NPV at 12% DF to be NRs. 1.28 million and BCR of 1.27. This indicate that the investment on small irrigation system financially viable.

Farm / Household Models

63. Using agricultural enterprise budgets and models from a range of crop models that is being practised by the smallholder farm households in the programme areas. 'Household model / farm model' for the different crop combinations were prepared to broadly illustrate the R-HVAP's 'expected impacts' on incomes, and use of household labour adopting both on-farm and non-farm activities. For the purpose of assessing household operations, average size of operational landholding size was accounted and analyzed. A total of nine models with different crop combinations were models analyzed. Overview of the nine farm/households models analysed in the EFA is provided in Table 12.

Table 24: Farms/Households Model and Description

| Particulars | Description |
|-------------|---|
| Model 1 | Vegetable production (year round), dairy and apiculture for pollination and nutrition |
| Model 2 | Dairy and MAPs / NTFPs |
| Model 3 | Dairy and potato seeds production |
| Model 4 | Dairy and shade grown coffee and cover crops |
| Model 5 | Goat farming, native chicken, and apiculture for pollination and nutrition |
| Model 6 | Goat farming, backyard poultry, native crops and NUS such as millet, buckwheat, barley, Karnali beans |
| Model 7 | Apiculture for commercial honey production (20 hives model), and agroforestry system |
| Model 8 | Agroforestry systems, spices and apiculture for pollination and nutrition |
| Model 9 | MAPs and NTFPs, Ginger, and apiculture for pollination and nutrition |

Overview of Farms/Households Model

64. **Farm size:** The target group of the programme are the small holders and farm size greatly varies across programme areas and target group types. People in mountain and inaccessible hill area have larger farm size compared to those in accessible hill areas. Further, Dalits and Janajatis have relatively small hold holding size compared to Brahmin and Chhetries. In general, goat farming smallholder farmers will have smallest farm size while those growing OSV, ginger, turmeric, indigenous crops and seed potato value chain will be have on an average larger farm size. As such, average farm size of the R-HVAP target beneficiary farmers will be 0.5 ha.

Table 25: Farms/Households Model Overview and Financial Indicators

| Farm / Houeholds Model | Model Size (ha) | Cropping Intensity | | | Financial Indicators | | |
|------------------------|-----------------|--------------------|--------------|--------|----------------------|------------------------|--------------|
| | | Without project | With project | Change | IRR (%) | NPV @ 12% DF (Rs.'000) | BCR (12% DF) |
| Model 1 | 0.50 | 210.00 | 260.00 | 50.00 | 13.0% | 22.22 | 1.01 |
| Model 2 | 0.50 | 210.00 | 226.00 | 16.00 | 16.6% | 230.49 | 1.09 |
| Model 3 | 0.50 | 210.00 | 226.00 | 16.00 | 22.2% | 488.95 | 1.14 |
| Model 4 | 0.50 | 200.00 | 236.00 | 36.00 | 15.8% | 187.22 | 1.06 |
| Model 5 | 0.50 | 210.00 | 218.00 | 8.00 | 15.0% | 50.60 | 1.01 |
| Model 6 | 0.50 | 210.00 | 238.00 | 28.00 | 12.8% | 135.63 | 1.00 |
| Model 7 | 0.50 | 210.00 | 248.00 | 38.00 | 16.1% | 135.63 | 1.04 |
| Model 8 | 0.50 | 210.00 | 258.00 | 48.00 | 13.6% | 48.35 | 1.02 |
| Model 9 | 0.50 | 210.00 | 238.00 | 28.00 | 22.6% | 266.82 | 1.12 |
| Average | 0.50 | 208.89 | 238.67 | 29.78 | | | |

65. **Cropping intensity:** The programme intervention is expected to brings changes on cropping pattern and eventually on cropping intensity due to increase in area under irrigation as well as shift to low duration crops varieties from long duration one. There will be small change in cropping intensity of farm households engaged in dairy farming, cropping intensity will decrease due to use of part of the farm land on annual crops like ginger and turmeric. Cropping intensity will increase in case of commodities such as indigenous crops and seed potato. Average cropping intensity is 209% without project which will increase to 237% after full development of the programme and an increase by 29.78%.

66. **Financial Indicators:** As anticipated, integrated nature of the farms/households model had worked in synergy to each other and increase in farm income has been evident both through yield effect (productivity increase) and cropping intensity effect, thereby combination of these activities playing a greater role in employment generation, on an average 2 family members and 1 hired worker were employed and there is prospect to increase employment to a notable level as the smallholder farmers will be more experiences and build confidence on the model. All the models demonstrate very satisfactory benefit/cost ratios (BCR above 1.01), financial internal rates of return (FIRR) above 13.5% and net present value (NPV) above NRs. 65,760 at full maturity. This indicates potentials attractiveness of the investments on these farm activities.

67. The details are included in the separate excel file.

Sub-Project Models

68. Household models when grouped and aggregated are aggregated at total number of programme beneficiaries are called "sub-project models" and these need to be estimated to access the overall project performance indicators at sub-project level. The model (discussed above) specific sub-project has been computed for all nine models using the implementation phasing of these sub-projects provided in Table 5 for eight year project period. The analysis results are summarized in Table 14.

Table 26: Financial indicators of the Sub-project Models

| Farm / Houeholds Model | Total programme participants (HHs) | Adoption rate (%) | Adoption adjsuted programme participants (HHs) | Financial Indicators | | |
|------------------------|------------------------------------|-------------------|--|----------------------|------------------------|--------------|
| | | | | IRR (%) | NPV @ 12% DF (Rs.'000) | BCR (12% DF) |
| Model 1 | 13,500 | 75 | 10,125 | 14.4% | 448,807.52 | 1.03 |
| Model 2 | 5,400 | 70 | 3,780 | 13.7% | 433,804.24 | 1.05 |
| Model 3 | 1,350 | 70 | 945 | 23.4% | 453,025.38 | 1.17 |
| Model 4 | 4,500 | 70 | 3,150 | 17.2% | 666,999.81 | 1.09 |
| Model 5 | 6,750 | 80 | 5,400 | 16.5% | 351,188.09 | 1.02 |
| Model 6 | 6,750 | 80 | 5,400 | 14.4% | 178,836.54 | 1.01 |
| Model 7 | 2,250 | 75 | 1,688 | 17.1% | 233,502.42 | 1.05 |
| Model 8 | 2,250 | 75 | 1,688 | 15.8% | 172,377.36 | 1.05 |
| Model 9 | 2,250 | 75 | 1,688 | 24.2% | 466,456.72 | 1.17 |
| Total | 45,000 | 75 | 33,863 | 15.8% | 3,404,998.08 | 1.04 |

69. There will be 45,000 directly benefiting from co-investment packages engaged in one of the nine models supported by the programme. Not all the programme participants will continue benefiting from the programme interventions upto the desired time frame of the programme interventions, and some of them drop-out due to various reasons such as project failure, migration, change on farming taste and preferences, among others. It has been estimated that drop-out will be 35% and adoption rate will be 75% (rational discussed in section 52 below). About 33,863 smallholder farmers will be retained and benefitted directly from the R-HVAP.

70. **Financial indicators:** As anticipated, further to farms/households models, all the nine sub-sector models demonstrate very satisfactory BCR (BCR > 1.02), FIRR above 13.7% and net present value (NPV) above NRs. 172,377,360 at full maturity. This indicates financial soundness and higher return on investment on these models. Model 8 turned-out to be financially attractive at sub-sector level.

71. The details are included in the separate excel file.

Cash flow analysis

72. Cash analysis was done for all nine models. Cash flow is negative in all the models in the first year⁵⁹ and it is necessary for the smallholders to look for alternative financial sources to enable adoption of the proposed technology and to properly manage the capital required for investment. Access to grant support from R-HVAP supplemented through financial linkage for medium term loan from BFIs under VITA programme will be instrumental for farmer to finance the proposed investment. Financing is also required to manage the short term working capital for proper and timely management of the annual operational cost required for these models.

73. Cash flow analysis was done to evaluate the cash inflows and outflows from operations of nine farm/households models. This indicates that these farm households will have difficulties to manage the enterprises in the absence of the external loan and grant support. The cash flow analysis was done integrating planned equity investment, grant from the programme and borrowing from BFIs including projected repayment of principle and interest of the loans in cash flow before financing of each farm/households models.

74. The cash flow after financing / grant support from programme shown for each value chain model proves that for all the year during the project life, there is no negative cash

⁵⁹ Due to upfront investment need for construction of cattle and goat shed, purchase of live animals (goat and cattle/buffalo), irrigation, poly-tunnels, storage requirement, planting materials, etc. cash flow in the first year will be negative. ASDP grant and access to finance is important for farmers to motivate investment on these activities. Owner equity in the form of skill labour, supply of construction materials, equipment, etc. will supplement upfront cost to start these enterprises.

flow.⁶⁰ This indicates that proposal to promote these nine types of models is “financially viable” at household level. Programme proposal will be attractive for the beneficiaries, ensuring high rate of adoption of the proposed farm/households models. This finding provides solid basis to assume that the investment on these farm/households models would yield the expected financial benefits.

75. The details are included in the separate excel file.

Economic Analysis

76. Considering the two different nature of investment that the programme is supporting⁶¹, which differ in terms of nature and level of efforts required for implementation, this reality has been fully acknowledged in undertaking economic analysis.

Main assumptions

77. Following were the assumptions used for economic analysis of the project. These assumptions were cross-checked with the assumptions used in economic analysis during ASDP programme appraisal (ex-ante), HVAP (ex-post) and PCR of KUBK and ASHA

- A twenty five year analysis period is assumed, which included 8 year project investment period.
- Programme produced goods will move freely within programme areas in response to market signals.
- All agricultural inputs and outputs that are traded are valued at price as of December 2023 and constant market price has been used.
- Economic investment costs are net of taxes. All costs directly associated with the incremental production are included in full, including incremental farm inputs and labour.
- A standard conversion factor (SCF) of 0.91 is applied to both traded and non-traded items for adjusting financial prices and to convert financial prices to economic prices...
- The average financial rural wage rate is taken to be the best estimate of the economic value of labour⁶² and shadow wage rate has been computed using the standard conversion factor of 0.85%.
- The analysis includes only direct on-farm benefits. Benefits accruing from community and supply infrastructure such as such market centers, small-scale community infrastructure including small-scale water and irrigation schemes for crops and livestock (< 5 Ha. each) have not been accounted partly in view of the well coordinated nature of R-HVAP implementation at sub-component level. In view that there is potentials for the non-target groups of the project also benefit, the representative models have been prepared for some community irrigation scheme and incremental benefits of 60% of these schemes was integrated separately on EFA. It has been assumed that for the programme participants the incremental benefits of these infrastructures will be captured by incremental income of the commodities includes in the potential crop and farm models.

⁶⁰ These households require term (medium to long term) loan in the first year and nominal working capital loan in subsequent year and this depends on propensity to save/re-invest of these smallholders. Enhancing access to finance has important role for the sustainability of the ASDP intervention.

⁶¹ First, includes the three complementary and interlinked components: (i) enhanced capacities for transitioning to market oriented agroecological production systems; (ii) improved access to climate resilient productive infrastructure; and (iii) strengthened policies, regulations and institutions for smallholder agroecological production and trade, and the second include improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets

⁶² It may be noted that three trends stand out in the project area: first, poverty is falling sharply, second, rural wages are rising significantly, and third farmers are shifting from cereals to superior food crops in response to market signals.

- All costs and benefits are relating to investments made on targeted households in programme area and they will benefit from the resultants incremental benefits;
- Significant changes or shifts in cropping patterns are assumed owing to strengthening of the agro-ecological farming and increased adoption of appropriate agronomic practices such as inter-cropping, crop rotation, use of improved seeds, improved technologies, bio-fertilizers and pesticides, etc. and these reflect in cultivation of off-season vegetables, potato seed, ginger and turmeric farming, apiculture, agro-forestry activities, NTFPs, MAPS, shade loving crops (ginger, turmeric) and cover crops.
- The analysis employs an Opportunity Cost of Capital (OCC) at 9%, which is the current long-term bond rate in Nepal and forecasted future stream of benefits and cost were discounted at 9%. The same rate was applied during EFA at the time of appraisal of ASDP and in the PCR of the recently completed HVAP and ASHA.

Costs and Benefits Streams and Analysis

78. **Production benefits.** The farm productions are direct output from the respective farm/households model and sub-projects. In all, 45,000 households will receive co-investment support. Improved farming practices resulted in productivity increase will be in a range of 30% and 40%. The EIRR is calculated for the all nine farm/household models, decentralized MSMEs units, MSME service markets, community infrastructure (irrigation), and Semlar export oriented regional agricultural wholesale market planned to be promoted under the programme support. This was done in cognizance to the fact that these are the eventual programme results. Incremental net benefits at full programme development were used for all categories of on farm investment and other complementary investment support. Adoption rate of each farm enterprises is estimated to range between 70% and 80% with an average of 75% (for justification refer Para 52 and 56 above) as done during appraisal of the ASDP and other IFAD funded projects in Nepal.

79. **Project economic costs.** The project economic costs are direct expenditures after adjusting for taxes and inflations but inclusive of physical contingencies. Recurrent costs for continued operations and maintenance are included in full. Economic prices for inputs and outputs models were estimated by applying conversion factors on financial prices. Inputs and outputs prices⁶³ were collected during previous mission was reviewed and updated in this mission in addition to the review of published information of Nepal Rastra Bank, Ministry of Agriculture and Livestock Development, and Central Bureau of Statistics and Review of Market Assessment Study on Semlar export oriented regional agricultural wholesale market. Direct farm/households level programme support was deducted to avoid double counting.

80. **Environmental Benefit.** Key environmental benefits were increased in soil fertility, improve soil productivity, increase in rural employment, effective participation of rural poor and the Dalits and indigenous people, linkages with rural economy and markets and overall reduction in vulnerability.⁶⁴

Analysis Results

81. **Economic analysis results.** Economic cost-benefit analysis of total programme investment⁶⁵ yields an overall EIRR of 18.1%. The estimated NPV for a 9% discount rate is NPR 21,267.60 million (USD 163.59 million) and the BCR of 8.52. A positive NPV under the current Opportunity Cost of Capital (OCC) of 9% indicated that the project

⁶³ See attached excel file for list of financial and economic prices used in EFA.

⁶⁴ The project interventions are also expected to reduce GHG emissions through mitigation measures. The economic value of net GHG emissions has not been accounted.

⁶⁵ The programme investment included co-investment packages to smallholder households, decentralized MSMEs, MSMEs service market, community infrastructure, and Semlar export oriented regional agricultural wholesale market.

investments were sound, robust and quite rewarding from economic perspectives. Main results for economic cost-benefit analysis are presented in separate excel file.

82. **Sensitivity Analysis.** A sensitivity analysis was conducted to assess the effect of variations in (i) 10% and 20% decrease in benefits; (ii) 10% and 20% increase in costs, (iii) one year and two year delay on incremental income accrual, and (iv) 10% and 20% decrease in adoption rate.

Table 27: Results of the Sensitivity Analysis⁶⁶ - Entire Project

| Analysis scenario | Δ% | Link with the risk matrix | IRR | NPV (USD M) |
|----------------------------|--------|--|-------|-------------|
| Base scenario | | | 18.1% | 163.60 |
| Programme benefits | -10% | Combination of risks affecting output prices, yields and adoption rates | 17.9% | 145.06 |
| Programme benefits | -20% | | 17.6% | 126.53 |
| Programme costs | 10% | Combination of risk associated to inflation of project related materials | 17.9% | 161.42 |
| Programme costs | 20% | | 17.7% | 159.24 |
| Programme benefits delayed | 1 year | Low readiness on project implementation | 17.6% | 157.22 |
| Programme benefits delayed | 2 year | | 17.0% | 133.68 |
| Adoption rate | -10% | Combination of risks affecting output prices, yields and adoption rates | 18.0% | 151.08 |
| Adoption rate | -20% | | 17.8% | 138.57 |

83. In all these scenarios used for sensitivity analysis, EIRR was above 17%. Result of sensitivity analysis revealed that the programme is highly sensitive on programme benefits delayed by two year, followed by programme benefits declined by 20%, 20% increase in programme cost, 20% decrease on adoption rate and one year delay of programme benefits. The programme is less sensitive to 10% decrease programme benefits and 10% increase in programme cost and 10% increase in adoption rate.

84. **Switching Values.** The switching value for the total project benefits is about - 751.73% while for the project costs it is approximately 88.26%.

Table 28: Results of Switching Value Analysis - Entire Project

| Particulars | NPV (NRs. '000) | Switching value (%) |
|----------------------------|-----------------|---------------------|
| NPV of incremental benefit | 24,096,758.24 | (751.73) |
| NPV of incremental cost | 2,829,164.54 | 88.26 |

Programme Benefits

85. The immediate benefits from the R-HVAP will be increased productivity through the introduction of better management and improved farming practices of potential crops integrated in the farm/household models. The responses could be expressed as increased household income. As discussed already, seasonal gainful employment and under employment (gainful) is the main problem in the R-HVAP areas like in other part of Nepal. The R-HVAP support will enable programme participants to reduce the prevalent under-employment programme in programme areas. At present, smallholders lack resources to start the profitable agri-enterprises and R-HVAP will potentially meet this gap. R-HVAP interventions through GALS and gender analysis will potentially contribute to reduce potential higher labor and drudgery for women. Only a fraction of the land (15-20%) owned by smallholders is suitable for cash crop farming and the transaction from subsistence farming to commercial farming will be slow / low and this requires confidence building through demonstration, exposure and evidence based learning of increased income. Owing to slow transition from traditional to commercial farming, the potential food security and nutrition (FSN) problem will be low and integration of apiculture (2 hive model) for pollination and backyard poultry, dairy and vegetables farming in the cropping patterns of the smallholder farmers will potentially change food habit of the smallholder farmers and there will be marginal or low reduction on current availability of staples. Further, farmers can manage their HH need for staples crops by increased in cropping intensity on land not covered or not suitable for OSV or other cash crops.

⁶⁶ Op cit 20.

86. **Other benefits.** R-HVAP will contribute to generate additional benefits through capacity enhancing interventions on selected crop and household models, expanded financial services for agriculture and increased availability of productive community infrastructure, and improved marketing system of the agricultural products. First, all programme participants and FGs will benefit and take advantages from the services extended by supply chain actors, and private service providers, which will be capacitated through provision of fund support for various economic and commercial developments. Secondly, women from the poor groups will be participating in managing their social and economic development and have better access to inputs and marketing of their products. Thirdly, there are agro-businesses facilitated buy-back arrangement, technical training and capacity development that further strengthen crop and household models. The R-HVAP support adoption of hybrid cattle/buffalo and goats which are strictly raised under stall feeding conditions. The R-HVAP support package include shed improvement, promotion of forage and fodder farming, and chaff-cutter (for making piece straw, grass and fodder), among others, will ensure proper manure management and integration of fodder trees, cover crops, forage, proper use of crop residue, etc. will create enabling environment for growing livestock under stall feeding. Further, in most areas, intensive promotion of community forestry programme prohibit free grazing of livestock (cattle/buffalo and goat) in communal land. Hence, environmental risk arising from over grazing is at a decreasing trend if not fully stopped. Finally, the investment on Semlar regional wholesale market has larger and extended benefit for the growth and development of the regional agricultural serctor. More specifically, the market operation will facilitate increase in production volume due to lower risk and stable price, lower post-harvest losses for handled volumes of production, and lower post-harvest losses for stored volumes of commodities traded from the market.

87. **Tax revenue and other incomes.** The project is generating additional tax revenues to the government in the form of land tax, water tax, and corporate taxes including VAT on the incremental turnover of the R-HVAP generated agro-businesses, the details of which will be realized the maturity of the programme interventions. Promotion, establishment and operation of the MSMEs such as bio-fertilizers/pesticide, seeds/nursery, animal breeding resource centre, cold storage (50 MT), and agricultural processing activities will provide tax revenue and other income to the government.

Programme cost by beneficiary:

88. The project will target to 60,000 households (258,000 individuals), with 45,000 households (193,500 people) receiving co-investment support, and the remaining 15,000 households (64,500 people) receiving other programme services. With the total programme cost estimates of USD 120.97 million, programme cost per beneficiary households is USD 2,016 and that of cost per person is USD 469.

Table 29: Estimates of Cost per Programme Participants HHs and People

| | | | | | |
|--------------------------------------|---|---------|---|--|--------|
| Total project costs (in million USD) | | 120.97 | Base cost | | 111.3 |
| Programme participants | Total people served (@ 4.3 people / HHs) | | Programme Participants (households) | | |
| | Group A: Co-investment and other services | 193,500 | Group A: Co-investment and othe | | 45,000 |
| | Group B: Other services | 64,500 | Group B: Other services | | 15,000 |
| | Total | 258,000 | Total | | 60,000 |
| Cost per prog. participants (USD) | | 469 | Cost per programme participants HHs (USD) | | 2,016 |

89. With the total programme cost estimates excluding investment in Semlar wholesale market of USD 89.72 million, programme cost per beneficiary households is USD 1,495 and that of cost per person is USD 348.

Table 30: Estimates of Cost per Programme Participants HHs and People (Exclude Semlar wholesale market)

| | | | | | | |
|--------------------------------------|---|---------|---|--|------|--------|
| Total project costs (in million USD) | | 89.72 | Base cost | | 84.1 | |
| Programme participants | Total people served (@ 4.3 people / HHS) | | Programme Participants (households) | | | |
| | Group A: Co-investment and other services | 193,500 | Group A: Co-investment and othe | | | 45,000 |
| | Group B: Other services | 64,500 | Group B: Other services | | | 15,000 |
| | Total | 258,000 | Total | | | 60,000 |
| Cost per prog. participants (USD) | | 348 | Cost per programme participants HHS (USD) | | | 1,495 |

Risk Analysis

90. There were a number of risks associated with R-HVAP. These were relating to shift to agroecological practices, farm technology, reluctance on the part of the farmers to continue the new technology, inadequate extension and market linkages and low price margins, lack of service providers and poor coordination and institutional support and policy risks. These issues and risks need to be addressed to some extent during the programme implementation.

Table 31: Risk Analysis

| Risks | Risk description | Probability of occurrence | Mitigation measures | Likely impact on R-HVAP performance |
|---------------------------|--|---------------------------|---|--|
| Economic and market risks | <ul style="list-style-type: none"> External shocks to market economy Increase in cost of production inputs Reduced producers prices Reduced demand | Low to medium | Value chain management | Decline in benefits and increase in costs by 25%: IRR= 17.4% NPV= USD 111.82 million |
| Institutional | Delay in technology transfer/lack of quality planting materials slowing down the uptake rates and production | Medium | Extensive training and support to farm/households integrate commercially viable and agro-ecologically sound key commodities | Benefits lag by 2 years: EIRR= 17.0% NPV= USD 133.68 million |
| | Lack of financial capacity of BFIs to invest in high value agriculture High transaction cost of borrowing and lending to small-holders | Low to Medium | Supply chain and MSME service market development, Commodity specific financial product development and staff training Promotion of digital financial services | Decline in benefits by 20%: IRR= 17.6% NPV= USD 126.53 million |
| Market | Inadequate profit margins due to poor access, lack of transport and of market information and new transition to agro-ecological farming | Medium to high | Strengthen market information system Diversified production, market led production promotion and strengthen supply | Decline in benefits and increases in cost by 15%: IRR= 16.1% NPV= USD 87.82 million |

| Risks | Risk description | Probability of occurrence | Mitigation measures | Likely impact on R-HVAP performance |
|--------------|---|----------------------------------|--|---|
| | <p>Lower market prices of commodities</p> <p>Insufficient historical weather data limits spread and quality of insurance products</p> <p>Relatively high portfolio at risk of agricultural loan portfolio</p> | | <p>chain and service market strengthening</p> <p>Buy-in of credit guarantee and agricultural insurance scheme</p> <p>Design and use of risk shared finance financial products and services</p> <p>Introduction of cash based lending</p> | |
| Policy | Lack of commitment to investing in agro-ecological farming system | Medium | Orientation and awareness on agro-ecological approaches and MSME service market to government officials and policy makers. | Farm operating costs increase by 20%: IRR= 17.7% NPV= USD 159.24 million |
| Others | <p>Climate change risks of delayed and abnormal rainfall, drought, floods, frosts, etc</p> <p>Natural calamities including flood and drought lower output of farm production</p> | Medium | <p>Training farmers on climate smart, and agro-ecological farming system</p> <p>Promotion of agriculture insurance services</p> | <p>Decline in benefits and increase in costs by 15%: IRR= 17.4% NPV= USD 132.53 million</p> |

91. Focus Group Discussion (FGD) and community consultation done at different programme local indicate that more than 60% households had climate related risks and experience of pest incidence. There could be other risks attributable to delayed and abnormal rainfalls, drought, floods, frost etc. As obvious, farmers mention that natural calamities including floods and droughts lower the output of farm production. There are instances that some climate smart agriculture (CSA) technologies and small irrigation (lift, surface and pond) has mitigated drought risk while providing access to drinking water for cattle/buffaloes and goats. The flood incidence and risks associated to drought is still there and the implications of those risks on overall R-HVAP incremental benefits will be decline in overall benefits and increase on cost by 15%. This has eventually reduced return on investment on R-HVAP supported activities as evidenced by reduced EIRR and NPV as compared to base scenario shown in Table 21.

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 5: Social Environment and Climate Assessment (SECAP) Review Note

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

The SECAP Review note should build on the preliminary note mentioned above, draw on the results of the screening exercise and be informed by the issues raised during the design mission, the stakeholders interviews, publicly available tools and dataset, and environmental, social or climate-related studies that inform on the characteristics of the project location. The SECAP review note includes the revised ESMP and should be attached to the Project Design Report, integrated in Draft Project Implementation Manual (PIM) and COSTAB and shall be submitted to Design Review Meeting (DRM) or IRC (for NSOs).

1. Introduction

1. This Social, Environmental, and Climate Assessment Procedures (SECAP) background study contributes to the design of the new Resilient High Value Agriculture Program (R-HVAP) covered under IFAD's 12th replenishment cycle 2022-2024. With the development objective of 'Transition smallholder agriculture towards sustainable food systems that are profitable, inclusive and agroecological' the Program will see to achieve the following: i) Profitable – improved smallholders' livelihoods and poverty reduction; ii) Inclusive- empowered smallholders, women, and youth; and iii) Agroecological – enhanced farm ecosystem and biodiversity. The development objectives will be achieved through four interconnected outcomes: i) Enhanced capacities for transitioning to market oriented agroecological systems, ii) Improved access to climate resilient productive infrastructure, iii) Improved wholesale aggregation and distribution of agroecological commodities for domestic and export market, and iv) Strengthened policies, regulations, and institutions for smallholder agroecological production and trade. This eight-year Program will be implemented in Lumbini, Karnali, and Sudurpashchim Provinces.
2. This SECAP review note is prepared to identify potential social, environmental, and climate risks to the Program, and possible impacts of the Program, and recommend technically feasible and cost-effective adaptation and mitigation measures to be incorporated into the Program design. The review note is guided by a literature review, ten days field visits covering eight districts of Lumbini and Karnali provinces, series of thematic stakeholder consultation workshops, and wider consultations with ongoing IFAD projects in Nepal and related stakeholders.

2. Situational analysis and potential project impacts

3. Landlocked between India and China, Nepal is among the poorest countries in the world. Twenty-five percent of its population live below the national poverty line of USD 0.50 per day (WFP, 2023). Poverty remains a key challenge of the R-HVAP targeted farmers. Traditional production-oriented farming, lack of employment generating activities, deficiency of skills, outmigration to pursue employment options, lack of gender equality and social inclusion are the key identified social challenges. The key environmental impacts facing by the Program targeted provinces include increasing agro-chemical fed agriculture resulting in air, soil and water pollution and hazardous impact on local biodiversity; unsustainable cultivation practices such as excessive tillage, farming on sloping and degraded lands leading to reduced soil fertility; increasing uptake of genetically modified crops; and poorly planned settlement and infrastructure development.

2.1 Socio-economic assessment

a. Overall poverty situation

4. The growth rate of Nepal's agriculture and remittances reliant economy varies significantly from year to year. Asian Development Bank has estimated Nepal's economic growth to moderate to 4.1% in fiscal year (FY) 2023, down from an estimated growth of 5.8% in FY 2022. However, it is estimated to slight growth to 5% in FY 2024 (ADB, 2023).
5. Nepal's Gross Domestic Product (GDP) per capita reached USD 1,371 in July 2022 compared to 1,239 in July 2021 (CEIC, 2022). Nepal's economic growth is expected to slow primarily because of a restrictive monetary policy, weakened domestic demand, the withdrawal of COVID-19 relief measures, and ongoing challenges from the global economic environment (ADB,2023).
6. Despite a relatively long political transition and frequent changes in the government, the proportion of the population living below the poverty line has been decreasing steadily. Before COVID-19 hit the county, it was estimated that around 18.7% of the country's population were below the poverty line (MoF, 2019). This compares very favourably with poverty incidence rate of 41.8% in 1996, 30.6% in 2004, and 25.16% in 2011 (CBS, 2011). Multi-dimensional poverty has also seen significant reductions. The national-level multi-dimensional poverty index (MPI) fell from 59.35% in 2006 and reached 39.13% in 2011, 30.1% in 2014, and 17.4% in 2019 (NPC, 2021). Furthermore, it is estimated that 4.9 % of population is in severe MPI and 17.8 % is vulnerable to Multi-dimensional Poverty (UNDP, 2022).
7. In terms of Human development, Nepal lies behind most of the other South Asian countries. Nepal's national Human Development Index (HDI) score stood at 0.602 in 2021, which puts the country in the medium human development category (UNDP, 2022). HDI score for 2020 in urban areas (0.647) surpasses that of rural areas (0.561) with a large urban-rural gap. The HDI value also varies across provinces, Madhesh Province scores the lowest (0.51) followed by Karnali (0.538) and Sudurpashchim (0.547) (NPC, 2020).
8. *Table 1: Multi Poverty Index per Province (NPC, 2021).*

| | Province | Population Share (%) | MPI Value | Incidence (%) | Intensity (%) | Poor People (000) | Share of MPI Poor (%) |
|----------------------|-----------------|----------------------|--------------|---------------|---------------|-------------------|-----------------------|
| <i>Above average</i> | Karnali | 5.6 | 0.169 | 39.5 | 42.9 | 636 | 12.8% |
| | Madhesh | 18.7 | 0.109 | 24.2 | 45.0 | 1,296 | 12.7% |
| | Sudurpashchim | 8.7 | 0.105 | 25.3 | 41.3 | 631 | 26.0% |
| | Lumbini | 18.4 | 0.078 | 18.2 | 43.1 | 958 | 19.2% |
| | National | 100 | 0.074 | 17.4 | 42.5 | 4,980 | 100% |
| <i>Below average</i> | Koshi | 17.0 | 0.066 | 15.9 | 41.4 | 773 | 15.5% |
| | Gandaki | 8.2 | 0.035 | 9.6 | 36.4 | 227 | 4.6% |
| | Bagmati | 23.3 | 0.028 | 7.0 | 40.3 | 470 | 9.4% |

9. The R-HVAP will target Lumbini, Karnali, Sudurpashchim provinces, which have the lowest HDI and MPI values, highest poor people covering 58% share of the poor people and high unemployment rates. A contiguous zone of production will be created for supply to a large wholesale market planned for construction in Semlar of Butwal Sub Metropolitan City, Lumbini Province.

b. Gender

10. Remarkable progress has been made relating to protection and promotion of women's rights and gender equality. Nevertheless, deeply rooted sociocultural norms still impede further progress in this area. Despite some progress in financial independence, gender gaps, gender-based violence, and disadvantageous social norms facing women and girls persist, and gains in human capital of women and girls remain untapped. Turning human capital investments into economic gains means addressing multiple barriers to women's economic empowerment, including improving their voice and agency.
11. Nepal has one of the highest rates of women's participation in agriculture in the world, making up over 73% of the agricultural workforce. Outmigration of men for employment in urban centers and abroad drives the feminization of agriculture in rural areas. Such migration has also resulted in the proportion of female-headed households which grew from 14.9% in 2001 to 25.7% in 2011 (CBS, 2012) to 31.3% in 2016 (World Bank, 2022 a). 76.4% of women aged 15-49 years engaged in agricultural work are not paid, compared to 15.9% of women engaged in non-agricultural. In rural areas, due to migration and long-term absence of men from agricultural fields, women have now also taken up responsibilities traditionally performed by men, such as ploughing. As a result, it has not only increased the workload of women but also, has caused poor agricultural performance due to labour scarcity as well as lack of access to credit for agriculture inputs. The heavy burden of unpaid household responsibilities borne by women often leads to 'time poverty' (MoPH, 2012), (FAO, 2019).
12. Due to their low income, inadequate access to finance and markets, limited ownership of land and property, and inability to diversify their sources of income, women are particularly vulnerable to climate change. Because women farmers do not have the same access to land, water, seeds, agricultural extension, training, and credit as males, their vulnerability to climate change is compounded. Only 10% of Nepal's farms are owned by women or jointly owned by men, and households headed by women tend to plant fewer types of crops, making them more susceptible to climatic shocks (MoFE, 2022).
13. The global gender gap report by World Economic Forum puts Nepal in 96th position out of 146 countries in 2022, with an average score of 0.692 meaning that there is still more than 30% disparity between men and women in terms of (i) economic participation and opportunity, (ii) educational attainment, (iii) health and survival and (iv) political empowerment (World Economic Forum, 2022). The country stands at 133 out of 162 countries in Gender Inequality Index (GII) (UNDP, 2022). Among the ecological belts, gender inequality is more pronounced in the mountains. Karnali Province has the highest level of gender inequality, followed by Sudurpashchim and Madhesh. Relatively higher maternal mortality and fertility rates together with the lowest female shares in both secondary education and parliamentary seats are causes of greater gender inequality in the mountains and Karnali Province. Discrimination persists in the Program target provinces limiting women's equitable access to and control over productive resources such as land, capital—including credit, markets, and other available opportunities.

c. Youth

14. The Government of Nepal defines 'youth' as people between 16-40 years, which accounts to 40.4% of total population. Population aged 15-29, represent approximately 33% of the population of the country with over 61% of them living in rural areas (UNFPA Nepal, 2022). Nepal thus has a young population demography and overall population is projected to increase. Youth continue to face challenges related to education, civic engagement, political participation and unemployment. Youth migration is one of the major challenges in rural areas that affect agricultural activities at large. Limited economic opportunities in rural areas, high concentration of economic activities in urban areas, wider availability of low- skilled jobs in Middle Eastern Countries, low economic return of traditional agriculture, and demographic changes are powerful push and pull factors affecting the movement of youth.
15. Access to credit for investment is particularly challenging for youth, where they have few assets of their own or other income sources. Other important push factors out of agriculture and rural areas include: lack of proper visioning and planning of life; insufficient mutual discussions and understanding among couples; excessive parental control; insufficient support systems to promote youth in commercial agriculture and limited or poorly targeted public investment to promote economic activities and private investment in rural areas. In rural areas, youth who are self-employed often have little to show in terms of income and market access. The status of farming is also an important factor – with the traditional farming of their parents seen as hard and un-glamorous work, with uncertain incomes and the low social status of agriculture (often affecting their choices of marriage). Self-employment for youth is also constrained due to lack of knowledge and access to efficient production technology, lack of business skills and financial literacy, and the inability of youth to access finance. Changing the perception of farming to be a respected modern profession, with farming as a business, is important in attracting youth. Real role models and success stories are critical.
16. The challenges of young women's participation in the labour force are even more pronounced. Newly married women in migrant families, whose husbands have migrated overseas for work, often live with the husband's family, especially in the Terai and middle-class families. In many cases these women do not have proper communication with husbands and support system from parents-in-laws. They have little control over their own time or the resources and income of their husbands. Such women and their husbands are considered as high-risk households. The different groups within youth require specific attention with regard to the constraints and challenges of exclusion, inequality and discrimination. These groups include young women vulnerable to sexual abuse, trafficking and exploitation; historically marginalized indigenous youth; disadvantaged young women and girls; Dalit youth; young people with disabilities; youth without basic education; unemployed youth; migrant workers and their families; rural landless and land-poor youth; young bonded and forced laborers; young urban slum dwellers and squatters; conflict-affected youth; young people especially vulnerable to climate risks; sexual and gender minority youth; and young people living with HIV, among others (UNDP, 2018).
17. This situation calls for development programs supporting agricultural value chain development, entrepreneurship skill enhancement and greatly increased access to institutional finance in rural areas. Promotion of competitive, smallholder-based agriculture supply chains will help create opportunities to utilize remittances more effectively for productive purposes and ultimately encourage migration returnees and increase the investment in rural areas, increase the productivity of youths and profitability of agriculture.

d. Indigenous peoples

18. Nepal is a multi-lingual, multi-religious, multi-ethnic and multicultural country inhabited by over 125 caste/ethnic groups, 123 languages and 10 religious groups. National census of 2011 calculated 35.8% of the population comprises of indigenous people (IP) and the country has legally recognized 59 indigenous nationalities as *Adivasi Janajati* and classified in 5 different categories as presented in table 2. Lumbini, Karnali and Sudurpashchim Provinces have 19.58%, 13.63% and 3.61% of IPs respectively (CBS, 2012).

19. Table 2: Indigenous People and their Level of Marginalization

| Region | Endangered | Highly Marginalized | Marginalized | Disadvantaged | Advantaged |
|---------------------|--|---|---|---|------------|
| Mountain | | Shiyar, Shingsawa (Lhomi), Thudam | Bhote, Dolpo, Larke, Lhopa, Mugali, Topkegola, Walung | Bara Gaunle, Byansi (Sauka), Chhairotan, Marphali Thakali, Sherpa, Tangbe, Tingaule Thakali | Thakali |
| Hill | Bankariya, Hayu, Kusbadiya, Kusunda, Lepcha, Surel | Baramu, Thami (Thangmi), Chepang | Bhujel, Dura, Pahari, Phree, Sunuwar, Tamang | Chhantyal, Gurung(Tamu), Jirel, Limbu (Yakthung), Magar, Rai, Yakkha, Hyoimo | Newar |
| Inner Terai | Raji, Raute | Bote, Danuwar, Mahi | Darai, Kumal | | |
| Terai | Kisan, Meche (Bodo) | Dhanuk (Rajbansi), Jhangad, Santhal (Satar) | Dhimal, Gangai, Rajbanshi, Tajpuriya, Tharu | | |
| Total Number | 10 | 12 | 20 | 15 | 2 |

20. There is extreme variation in the economic situation of indigenous people – from the *Rautes* who still make their livelihood through hunting and gathering, to the *Newars* and *Thakalis* who are well advanced in commercial and industrial activities (Bhattachan, 2012). More generally, levels of socio-economic exclusion in Nepal vary across indicators and across and within caste/ethnic groups. None of the groups has a significantly lower level of socio-economic exclusion across the broader social groups. Caste/ethnic groups having high levels of exclusion in one indicator may face higher levels of inclusion in another indicator. However, Hill Brahman/Chhetri and Hill Janajati have low rates of exclusion across a fairly high number of indicators. Within the broader groups, hill Brahmans, Newars, and Tarai Brahman/Chhetri have similar scores. In contrast, hill and Tarai dalits scored poorly across a number of indicators and often face higher levels of exclusion than other caste/ethnic groups. This above report further concludes on the poverty gap, it is narrowest among hill Brahman/Chhetri and Muslims, and widest among hill and Tarai Dalits. Disaggregated figures show that the poverty gap is wider among hill Chhetri than it is among hill Brahmans and wider among other hill Janajatis than it is among Newars (CDSA, 2014) (CDA, 2020).

21. The R-HVAP will ensure the meaningful participation of indigenous people from the planning to implementation and supervision. The design process had a wider consultation with IPs in the program target areas and had a meeting with IP leading representatives including member of global steering committee of IP forum at IFAD and Asia focal person coalition of IP food system, FAO Italy, president Asian Indigenous International network. The Program will ensure inclusive and meaning participation of IPs in Agroecological Cluster Plan (PAP) *planning*. There will be a dedicated IP focus group discussion where needed to assess their situation and integrate their demand and needs. There will representatives from IPs in Multistakeholder Platforms (MSPs), which is a key actor to design and implement R-HVAP activities. R-HVAP will have proactive targeting for IPs. They will be actively benefitted from the activities' *implementation*. As a regular practice of IFAD Nepal projects, IPs will be a key member of joint supervision and monitoring of program activities.

e. Marginalised groups

22. National *Dalits* Commission defines *Dalits* as the communities who, by virtue of atrocities of caste-based discrimination and untouchability, are most disadvantaged in social, economic, educational, political and religious fields, and are deprived of human dignity and social justice. Caste Based Discrimination and Untouchability (Offence and Punishment) Act 2011 has made such discrimination punishable in law. National *Dalits* Commission has scheduled 26 castes under Dalit including 7 Hill *Dalit* castes and 19 Tarai/Madheshi Dalit castes^[1]. Lack of productive resources and socio-cultural discrimination, lack of opportunities to advance the traditional skills of providing essential services like tailoring, making shoes, producing ornaments, preparing agriculture tools, masonry and carpentry, and opportunities to acquire marketable skills are the factors that push Dalits in the highest poverty rates.
23. The Program will have a dedicated inclusion fund to benefit pro-poor and highly marginalized communities to benefit them from the Program.
24. ^[1]**List of Hill Dalit:** Gandharva (Gaine), Pariyar (Damai, Dargee, Suchikar, Nagarchee, Dholee, Hudke), Badi, Bishwokarma (Kami, Lohar, Sunar, Od, Chunanra, Parki, Tamata), Mijar (Sarki, Charmakar, Bhool), Poda (Deula, Pujari, Jalari) and Chyame (Kuchikar, Chyamkhal); **List of Tarai Dalit:** Kalar, Kakaihiya, Kori, Khatik, Khatwe (Mandal, Khang) Chamar (Ram, Mochi, Harijan, Ravidas), Chidimar, Dom (Marik), Tatma (Tanti, Das), Dushadh (Paswan, Hajara), Dhobi (Rajak, Hindu), Pasi, Bantar, Musahar, Mestar (Halkhor), Sarbhang (Sarbariya), Natuwa, Dhandi and Dharikar/Dhankar

f. Nutrition

25. Nepal has made impressive strides in reducing the prevalence of stunting, height for age (% of children under 5) nationally, which fell from 68.2% in 1995 to 31.5% in 2019 (World Bank, 2022 a). Poor nutrition, food insecurity, and malnutrition continue to pose risks to Nepal's population, despite the country's progress in reducing stunting in children under-five. The stunting prevalence for children under 5 years does vary by region and is highest in Karnali (55%). Moreover, the chronic undernutrition rate varies by maternal education and wealth levels—23% of children whose mothers have secondary education are stunted, while the rate rises to 46% whose mothers had no formal education (USAID, 2021).
26. The high prevalence of underweight adolescents, combined with the persistent and high adolescent pregnancy rate, is a disturbing trend. Adolescent pregnancy is associated with a 50% increased risk of stillbirth and neonatal death, and an increased risk of low birth weight, premature birth, asphyxia, and maternal mortality. Furthermore, the risk of stunting is 36% higher among first-born children of girls under 18 years in South Asia. (USAID, 2021). This suggests that young women should be a particular priority for the programme for unlocking issues of gender, youth and nutrition.
27. Nepal Demographic and Health Survey (NDHS), 2016 has shown that the national household food security is only 48.2% whereas in rural areas it is only about 38.8%. About 10% of households are severely food insecure. Geographically, the mountain regions suffer from more food insecurity where the %age of food secure households is 38.4% compared to Terai where the statistics is about 51%. Furthermore, the severely food insecure households in the mountain region are about 13.8% compared to 9.2% of Terai region. Among the provisional Programme working provinces, Karnali has the lowest level of food security where food secure households are only 22.5% and the severely food insecure households are about 17.5%. Madhesh province has 43.1% food secure households, and 10.7% households are severely food insecure. Food secure and severely insecure households for Lumbini and Bagmati are 48.4%, 55% and 10.2% and 8.5% respectively (MoPH, 2017).
28. Poor dietary diversity is a major causal factor of high rate of child malnutrition (36% and 27% of children under five are stunted and underweight, respectively). Poor maternal nutrition, especially among adolescent girls, significantly contributes to an intergenerational cycle of malnutrition and poverty. Inadequate infant and young child feeding (IYCF) practices also contribute to high prevalence of undernutrition. About 17% women of reproductive age have chronic energy deficiency (Body Mass Index less than 18.5) and 41% of those populations are anaemic (NDHS, 2016). Anaemia in children is more severe, As per (NDHS, 2022) 43% of children age 6–59 months are anaemic, including 25% who are mildly anaemic, 18% who are moderately anaemic, and less than 1% who are severely anaemic. Similarly, women and children also suffer from some of the world's highest levels of vitamin and mineral deficiencies, which can be imputed from the fact that Vitamin A deficiency is the cause of death of approximately 6,900 children in Nepal each year. About 2-3 % of GDP (US\$ 250 to 375 million) is lost every year in Nepal on account of vitamin and mineral deficiencies alone. The wider availability of diversified and high nutritional value foods in the household and local communities is therefore a key priority, to which R-HVAP will contribute through the development of increased local supply of a series of diversified high nutritional value foods stuff. The local crop varieties with high nutritional value and benefits will be given higher priority.

2.2 Environment and climate context, trends and implications

29. The section below details the environment and climate context in the project areas.

a. Environmental assessment

30. Landscapes and biodiversity:

31. The country is divided into five physiographic regions from north to south: i) High Himalaya (above 5,000 m) with 24% area, ii) High Mountains (3,000 – 5,000 m) with 20% area, iii) Mid-Hills (1,000 – 3,000 m) with 30% area, iv) Siwalik (500 – 1,000 m) with 12% area, and v) Terai (< 500 m) with 14% area (MoFSC, 2014). Lengthwise, all the zones extend from east to west across the country. Altitudinal and physiographic heterogeneity affects temperature and rainfall patterns. R-HVAP targeted provinces span all five physiographic regions although the Program will focus mainly on Mid-Hills and Siwalik, with a reduced set of activities in Terai.
32. The diverse terrain and topography, along with varied climatic conditions across altitudes results in the occurrence of unique flora, fauna, livelihoods, and cultures in different regions. This includes more than 10,630 plants and 3,000 wildlife species growing in 118 different ecosystem types, 75 vegetation types, and 35 forest types. The nation-wide forest resource assessment (2010–2014) of Nepal catalogued 5.96 million hectares (ha) of forest (40.36% of total land area) and 0.65 million ha of other wooded land (4.38% of total land area). Of the total, 18.8% forests lie in Province 1, 18.7 % in Bagmati, 16.2 % in Lumbini, 16.1 % in Sudurpashchim, 13.6 in % Karnali, and only 3.9 % in Madhesh. Similarly, forests cover, 48.8% of the total province area in Lumbini, 38.4% in Karnali and 56.9% in Sudurpashchim province (DFRS, 2018). Agricultural land comprises 28.75% of total land area in 2018. Prominent threats to biodiversity, and main drivers of land use changes are unsustainable agricultural practices, increasing population, aggressive development programmes including construction of roads, hydropower plants, and expansion of urban areas; and extent of their effects are further exacerbated by the impacts of climate change. With increasing built up structures, forest cover has declined, and agricultural and shrub land have decreased (MoFE, 2022). R-HVAP's production activities will be confined to areas designated for agricultural use and will not involve areas designated for forestry, wetland and those with high biodiversity values.
33. The program will support establishing a large wholesale market in Semlar, Lumbini province. The proposed market will cover a total area of about 12.47 ha, which is currently Ratanpur Community Forest. The forest does not represent a wildlife habitat based on the site visit conducted by the Environmental Impact Assessment (EIA) team commissioned by the Investment International. The area is a below 20-year plantation with Sisoo as a dominant tree species. It is estimated that approximately 704 poles and trees will be affected but not all will be harvested to construct infrastructures. The biodiversity management focused planning are included in EIA study which includes dedicated provision and fund for planting and managing 2040 seedlings for five years. This follows the government of Nepal's provision of planting at least 10 times seedlings than expected number of harvestable trees from the site. A series of wider and inclusive consultations were done with communities and stakeholders including Ratanpur community forest user groups to seek their consent and approval. They have provided their agreement, which is documented in EIA and circulated with related stakeholders. As per the national provision, the Butwal Sub Metropolitan city has started the initial process for land title transfer through federal cabinet decisions.
34. Forest encroachment will be strictly monitored in collaboration with Divisional Forest Offices. Dependency on forest products like fodder/forage will be reduced by sufficient plantation of fodder and forage on private lands, leasehold forest lands and promotion of stall feeding. Adoption of agroecological farming will ensure the use of bio-inputs with minimal to no negative implications.

35. Water resources (WECS, 2011):

36. Nepal is rich in water resources. There are about 6,000 rivers having drainage area of 191,000 sq. km, 74% of which lies in Nepal alone. There are 33 rivers having their drainage areas exceeding 1,000 sq. km. Rivers of Nepal can be broadly classified into three types, in accordance with their origins: the first category comprises of the four main river systems of the country: Koshi, Gandaki, Karnali and Mahakali river systems, all of them originating from glaciers and snow-fed lakes; latter three lies in R-HVAP targeted three provinces. Rivers of the second category, originating from Mahabharat range, Babai, West Rapti are located in R-HVAP target provinces. Streams and rivulets originating mostly from the *Chure* hills make up the third category; these rivers cause flash floods during monsoon rains and remain without any flow or very little flow during the dry season. This may have some implications on the program target lower belt of Lumbini and Sudurpashchim.
37. Currently, the middle mountain area of Nepal is facing significant water stress, and access to water is limited. The scarcity of water has become an increasingly significant obstacle to the livelihoods of locals and efforts to reduce poverty in many villages in the region. A recent study conducted on the springs in the mountain watershed of western Nepal determined that the springs are in a precarious state due to human activities and climate change. According to the study, around 70% of the springs are experiencing a decreasing trend in discharge, and it is crucial to undertake restoration activities promptly (Adhikari et al, 2021).

38. Protected Areas (PAs):

39. PAs remain the dominant approach to biodiversity conservation in Nepal. Out of the total forest area 17.32% area is Pas together with core areas and buffer zones. R-HVAP working areas have 6 National Parks (NP), 2 Conservation Area (CA) and 1 Hunting Reserve (HR): Sudurpashchim- Suklaphata and Khaptad NPs, Api Nampa CA; Karnali- Rara and Shey Phoksundo NPs; Lumbini: Banke and Bardiya NPs, Krishnasar CA, and Khaptad HR. The key threats to protected area biodiversity are i) illegal hunting and trade of important wildlife species, ii) human-wildlife coexistence, iii) invasion by alien species of flora, iv) intrusion of tree species in to the grassland, and v) encroachment of forest areas for cultivation and settlement (MoFSC, 2014). R-HVAP will not work inside the protected areas and in the sensitive ecological sites and habitats of endangered wild animals.

b. Climate trends and impacts

40. The country's annual minimum temperature varies from -4°C to 19°C while the maximum temperature ranges from 4°C to 30°C. Normal annual maximum temperature is lowest in high Himalayas (5 to 10°C) and so is normal annual minimum temperature (-5 to 0°C). Most of the low-lying southern districts in Terai and Siwaliks have the highest annual average maximum temperature above 30°C and also the highest annual minimum temperature (15 to 20°C). Nepal receives average annual rainfall of around 1,600 mm but this distribution pattern varies considerably in both north-south and east-west directions. The southern flanks of the Himalayas, such as Pokhara, receive the highest amount of rainfall (3,345 mm), while the rain shadow areas such as Dolpa and Mustang receive less than 10% of that amount (295 mm). Total annual rainfall increases with altitude up to approximately 3,000 masl and then diminishes at higher elevations (MoFE, 2022). The High Himalayas see only 400 to 1000 mm of annual rainfall which is least among all physiographic regions and the remaining regions receive 1500 to 2000 mm of annual rainfall (MoPE, 2017).

41. Observed climate change:

42. Over the historical period 1971-2014, average temperature has increased in all climate zones. Warming occurred in all regions of Nepal, with the highest rate of increase taking place at higher altitudes in the mountains and Himalaya regions. The number of warm days and warm nights, and warm spell duration significantly increased in most districts. The number of cool days per year decreased in most districts, with a significant decrease of cool days noted in high mountains and high Himalayan districts. Among the Nepal's five physiographic regions, trends of decreasing precipitation were observed mainly in the high mountains and high Himalayas in all seasons. The number of rainy days increased significantly in the north-western districts; and very wet days (days with annual daily rainfall >95th percentile) and extremely wet days (days with daily rainfall >99 percentile) decreased significantly in the northern districts. Extreme precipitation showed spatial variability and inconsistent trends (MoFE, 2022).

43. Annual mean temperature increase is more pronounced in the uppermost part of Karnali province and central parts of Sudurpashchim and Lumbini provinces. The annual mean precipitation has declined substantially throughout Lumbini and Sudurpashchim provinces and in the lower parts of the Karnali province. Provinces out of the proposed program areas also show a high decline in average annual precipitation during the 2000-2017 period (MoFE, 2022).

44. Projected Climate Change

45. Temperature in Nepal is projected to increase further until the end of the century (2100), with increases in temperature projected for all seasons under all Shared Socioeconomic Pathways (SSPs) compared to the reference period 1995 to 2014 (World Bank, 2022 b). Warm extreme events (determined by number of warm days and warm nights, and duration of warm spell) are projected to increase, while cold extremes are projected to decrease in both the medium- and long-term periods. The increase in warm days and warm nights is expected to be more pronounced in the mid hills and high Himalayas. Projected changes in average precipitation and temperature under RCP 4.5 and RCP 8.5 for medium- and long-term periods for each physiographic region is presented in table 39. However, there is considerable uncertainty regarding the precipitation projections (MoFE, 2022).

46. *Table 3: Projected change in mean precipitation and temperature in medium- and long-term period for different physiographic regions. Source: (Ministry of Forests and Environment, 2019)*

| Time Period | RCP 4.5 | | | RCP 8.5 | | |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 2016-2045 | 2036-2065 | 2071-2100 | 2016-2045 | 2036-2065 | 2071-2100 |
| Change in precipitation (%) | | | | | | |
| High Mountain | 2.6 | 9.5 | 12.6 | 8.0 | 14.4 | 25.1 |
| Middle Mountain | 1.7 | 7.6 | 10.3 | 6.3 | 12.4 | 21.7 |
| Hill | 2.1 | 7.2 | 9.9 | 5.8 | 11.2 | 22.6 |
| Siwalik | 1.6 | 7.4 | 9.9 | 5.8 | 11.1 | 21.9 |
| Terai | 2.1 | 7.3 | 10.2 | 5.4 | 10.6 | 22.7 |
| Change in temperature (°C) | | | | | | |
| High Mountain | 0.95 | 1.36 | 1.79 | 1.09 | 1.86 | 3.61 |
| Middle Mountain | 0.89 | 1.27 | 1.66 | 1.04 | 1.76 | 3.44 |
| Hill | 0.9 | 1.26 | 1.69 | 1.06 | 1.8 | 3.56 |
| Siwalik | 0.94 | 1.29 | 1.72 | 1.1 | 1.87 | 3.66 |
| Terai | 0.93 | 1.29 | 1.73 | 1.11 | 1.87 | 3.69 |

47. These climate change projections suggest that Nepal will be more exposed to climate hazards in the future. Warming in Nepal could trigger biophysical and socio-economic impacts that will impact livelihoods and well-being, including biodiversity loss, increased glacial melting, and less predictable water availability while this will also shift vegetation upwards. Of particular concern is the potential for changes to the flow and quality of water derived from glaciers, snowmelt, and rainfall, leading to excess water at certain times of the year and prolonged dry periods and extreme drought in others (MoFE, 2022).

48. The detailed climate analysis has been presented on Targeted Adaptation Assessment.

49. Climate hazard

50. Nepal is already exposed to range of climate-related hazards. More than 80% of property loss due to disasters is attributable to climate-related hazards, particularly water-related events such as floods, landslides and glacial lake outburst floods (GLOFs). Water-related disasters claim more than 300 lives a year, displace people, and destroy homes, farmland, and other essential infrastructure. Extreme rainfall in 2020 caused 445 flooding and landslide incidents that claimed about 430 lives and displaced more than 5,000 people (MoFE, 2022).

51. Based on the climate change knowledge portal of the World Bank, flood is the most frequent climate hazard and affects the largest number of people among all other hazards from 1980 to 2020. However, hazard statistics are available only for national level. Also, according to the ThinkHazard tool, the hazard level in Nepal for urban flood, landslide, water scarcity, extreme heat and wildfire is high and for river flood and earthquake is medium. Considering all districts from the target provinces, landslide is the biggest risk and drought is the second biggest risk in the programme area.
52. The program aims to promote the agriculture production and processing, targeting both domestic and international markets. At present, for the domestic market, the identified target commodities are nutritious cereals, off-season vegetables, fruits, livestock, dairy, poultry, nuts and mushrooms. Similarly, for the international market, the identified target commodities are organic honey, spices, Medicinal and Aromatic Plants (MAPs), coffee, and vegetables. Further value chain analysis is needed to finalise the selection of commodities for export. Due to the unavailability of the targeted commodities mentioned above in the CARD assessment tool, the past production trends and the future yield projection of those commodities are not available.

c. Climate change mitigation

53. Nepal is a negligible contributor to global GHG emissions. With 48 million tons of carbon dioxide equivalent (MtCO₂e) in 2019, Nepal contributes around 0.1% of total global GHG emissions. These come primarily from agriculture (54%) and energy (28%). Biofuels and waste (including fuelwood, dung, biogas, and agricultural waste) provide 72% of energy supply, followed by oil, coal, and hydropower. However, the country's GHG emissions are rising. Emissions increased by 26.86% between 2012 and 2019. This is linked to rising energy consumption, which doubled in the residential sector between 1990 and 2018 and, from a smaller base, increased almost tenfold in the transport and industry sectors over this period. The carbon intensity of Nepal's energy supply has also risen steadily since 1990; the largest driver of emission growth was the transport sector (WorldBank, 2022). Through the adoption of agroecological practices that contribute to carbon sequestration, the Program is anticipated to be a net zero emitter of GHGs.

2.3 Target group profiles

54. **Program participants and outreach:** The total R-HVAP direct outreach is estimated at 60,000. Out of which, women will constitute at least 50% of the total program participants and youth^[1] 40%.
55. **Target areas:** The R-HVAP will be implemented over an 8-year period covering Lumbini, Karnali, and Sudurpashchim provinces and operate in approximately 80 Palikas. The provinces have been selected based on the highest incidence of multi-dimensional poverty^[2], impacts of COVID-19 on rural livelihoods^[3], location of Semlar regional wholesale market for national and international distribution, climate vulnerability, market access, potential of organic farming, and a landscape perspective to facilitate the building of an agroecological foodshed.
56. **Target groups:** The main target group consists of smallholder households engaged in mixed farming systems (less than one hectare, average is 0.7 ha for men and less than 0.5 for women)^[4] and deriving most of their income from agricultural production at different scale: subsistence, semi-commercial, and commercial. They are described mainly on the basis of poverty level, land ownership and access to input production and services.
57. R-HVAP will provide needs-based services for: (i) poor (including both poor and medium poor) and near-poor (or better off) households practicing subsistence and semi-commercial farming with scaling up potential; (ii) ultra-poor households, with a focus on women-headed households and marginalized groups (Dalits, Janajatis and IPs); and (iii) underemployed and self-employed rural youth (including returnee migrants). Poor subsistence farmers will constitute the majority of program participants being 70 % while near poor (or better off) will be approximately 25 %. Ultra-poor will account for about 5 %.
58. **Geographic targeting and cluster selection:** Within the program area, R-HVAP will adopt an agroecological cluster-based approach in selecting wards and Palikas. An agroecological cluster is a homogenous geographic unit, within or beyond one Palika, that has production potential of a diversity of high value commodities with market demand. The prioritization and selection of clusters will follow a participatory process using a set of criteria such as: (i) poverty incidence; (ii) presence and quality of Producers Organizations (POs); (iii) proximity to road corridors; and (iv) credible market opportunities, where smallholders can profitably compete. More remote clusters will be brought into operation once the supply chains adjacent to road corridors are operational. Operations will immediately commence in Karnali province.
59. ^[1] As per the national definition, youth are people between 16 and 40 years of age.
60. ^[2] National Planning Commission (2021). Nepal Multidimensional Poverty Index: Analysis Towards Action. Kathmandu, Nepal.
61. ^[3] United Nations Children's Fund (2022). Child and Family Tracker (CFT). Kathmandu, Nepal.
62. ^[4] The design mission observed during consultation with local communities that average farm size is 0.1 to 0.5 ha in the Programme target area.

3. Institutional analysis

63. 3.1 Institutions:

64. **Nutrition** and coordination mechanism: The second phase of ten-year multi sector nutrition plan (2012-2022) led by National Planning Commission in close collaboration with other relevant ministries completed last year. Several ministries are taking the lead on their thematic areas: i) Ministry of Agriculture and livestock development works for the agriculture and livestock related production and consumption; ii) Ministry of Women, Children and Senior citizen works on the behaviour communication change, and improve feeding habits; iii) Ministry of Education takes the lead on awareness raising through different courses specially focusing on adolescent girls; iv) Ministry of water supply looks after the post ODF activities; v) Ministry of Health works on health education with special focus on adolescent health issues; and vi) Ministry of federal administration and good governance supports on administration. Multi stakeholder nutrition coordination teams have been formed at the province, district, and the municipality levels.
65. **Gender**: Gender is not considered a crosscutting issue in Nepal anymore as it is a central concern. The Ministry of women, children and senior citizens leads the Gender issue; however, all the ministries have dedicated sections with certain human resources and a dedicated focal person. The national planning commission takes the lead on monitoring. The National Women Commission is the dedicated commission to work on the Gender inclusion and equity.
66. **Youth**: The ministry of Youth and Sports is the dedicated ministry to work on youth sector. It has various programs designed to support youth such as, 'youth empowerment and development' and 'youth and small entrepreneurs self-employment fund'. National youth council is the organization chaired by the Minister of the Ministry of Youth and Sports which has vision as 'Making the Nepalese youth strong, competent, competitive and self-reliant, to build a modern, just and affluent Nepal through their meaningful participation and promotion of their leadership capacity'.
67. **Environment and Climate Change**: A higher level coordination mechanism has been established at the highest political level for necessary policy guidance and coordination and at local level for implementation on the ground. A climate change division has been established in the Ministry of Forest and Environment solely dedicated for climate change related works. The MoALD leads on organic agriculture. The ministry has formed a National Coordination Committee for Organic Agriculture Production and Processing System (NCCOAPPS) chaired by secretary and a National Agriculture Accreditation Body (NOAAB) led by Nepal Agriculture Research Council (NARC). NARC also leads research in climate impact assessment focused on target agricultural value chains in Nepal.

68. 3.2 Policy and regulatory frameworks

69. Nepal has transformed from a unitary administrative system to a federal governance model. The new **constitution 2015** has provisioned three administrative levels – federal, provincial and municipal levels. Elections of all three levels were successfully held in 2017 and 2018 and in 2022, one federal government, 7 provincial governments and 753 municipal governments were elected and are functional. The Constitution has provided a list of distinct and concurrent powers to all three government levels. This also includes the mandates to each government to formulate and implement laws and policies on sustainable development and environment protection and conservation.
70. **Nutrition**: The first nutrition strategy was developed back in 1978 and the government initiatives have been underway since then. The Multi-Sectoral Nutrition Plans (MSNPs) served as a common results framework for improving nutrition outcomes and setting out plans of action for implementing nutrition-sensitive policies and strategies for key sectors, including agriculture, health, and education. The Government of Nepal has formulated a **Food and Nutrition Security Plan (FNSP)** that constitutes a chapter in the **Agriculture Development Strategy (ADS)** for the decade 2013-23. Like the ADS, FNSP has a vision to ensure national food and nutrition security with a specific focus on the agriculture sector as the main vehicle that can deliver it, as well as the main vehicle for economic growth and balance payments of the Nepalese economy as a whole. The key objective of the FNSP is to reduce hunger, malnutrition, and poverty among the poorest households by improving sustainable agriculture-based livelihoods.
71. The **ADS (2015-2035)** envisions the establishment of the following mechanisms for **ensuring gender equality and social and geographic inclusion**: i) generation and maintenance of national level GESI-based and geographic inclusion-based statistics ii) establishment and strengthening of GESI staff at central department and at district level agencies iii) enhancement of qualitative and quantitative aspects of participation of men and women farmers iv) making the agricultural extension service GESI responsive in all districts v) improvement in access of farmers (from all gender and socio-economic groups in all geographical regions) vi) promotion of GESI responsiveness in agricultural research and vii) development of a GESI strategy.
72. The ADS envisions "a self-reliant, sustainable, competitive, and inclusive agricultural sector that drives economic growth, and contributes to improved livelihoods and food and nutrition security leading to food sovereignty." The ADS has short term, medium term, and long-term targets for 5, 10, and 20 years respectively. The sustainability vision targets to increase soil fertility at 4% organic matter from the baseline of 1% organic matter in 2010 in the long term. Similarly, in the long term, it targets a 50% reduction of degraded lands and doubles the % of agribusiness GDP as a share of GDP to make it 20% and aims to maintain a constant 40% forest cover. The long-term target also aims to increase agricultural land productivity (AGDP/ha) to \$4,787 from \$1,804.
73. To improve the resilience of farmers to climate change, disasters, price volatility, and other shocks the ADS proposes i) conducting research on stress tolerant varieties and breeds, ii) establishing an early warning system, iii) establishing climate information and weather indexation systems, iv) piloting a farmer's welfare fund, v) promoting agricultural insurance, and vi)

strengthening the food reserve system.

74. **Gender:** The Constitution of Nepal is a significant milestone for gender equality and social inclusion (GESI) and enshrines equal rights for women, the poor, the vulnerable and people from different social groups. Strategy against child marriage (2072 BS), National Policy on children (2069 BS), Single women protection fund regulation (2076 BS), Gender based violence mitigation fund regulation (2076 BS) emphasize participation of women, Dalits, Janajatis, Madhesis, Muslims, persons with disability and excluded communities in the formulation, implementation, monitoring, and evaluation of sectoral policies, plans and programs. They recognize the need to identify the specific barriers faced by women, the poor, the vulnerable and the excluded in the sector concerned.
75. **Youth and Social protection:** The national **youth policy 2015** has listed the major challenges faced by youth as lack of qualitative, timely and employment-oriented education, least access to vocational skills and techniques, unemployment, under employment, youth emigration, weak health, nutrition, mental strength, lack of environment of youth friendly investment and entrepreneurship, gender, religion and caste related inequalities and the negative impacts brought about by globalization and liberalization.
76. Environmental management and climate change policies: **Environment Protection Act 1996** and the corresponding **Environment Protection Rule 1997** regulate environmental issues. The act has listed the type of projects that require an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) in the prescribed manner. The Government of Nepal has formulated a **Climate Change Policy in 2019** with the aim to contribute to socio-economic prosperity of the nation by building a climate resilient society. The 2019 policy has the objectives of advancing capacity on climate change adaptation (CCA), developing ecosystem resilience, promoting green economy by adopting low carbon economic development concept, mobilizing national and international financial resources, making effective information service, mainstreaming climate change into relevant policy, strategy, plan and programs, and also mainstreaming gender and social inclusion, including in climate change mitigation and adaptation programs.
77. In 2016, Nepal ratified the Paris Agreement and submitted a **Nationally Determined Contribution (NDC)** that investigated clean energy development, afforestation measures, sustainable transport systems, climate friendly practices in agriculture, waste management and building codes. Nepal has submitted enhanced NDC in December 2020 under the Paris agreement for the period 2021-2030. It recognizes Nepal’s fragile topography, climate-sensitive livelihoods of the people and their limited adaptive capacity, which makes it one of the most vulnerable countries to climate change. Sector-wise GHG emissions reduction targets have been set for the period of 2021-2030, however no specific target has been proposed for the agriculture sector despite the sector contributing more than half of the country’s total emissions. However, the aim to increase soil organic matter from 2% currently to 3.95% by 2030 may increase carbon sequestration in agricultural soils and contribute to emission reductions from the sector. The enhanced NDC also includes an adaptation component in the spirit of the Climate Change Policy (2019) and commits to, inter alia, prepare and implement climate resilient and gender-responsive adaptation plans in all 753 local governments by 2030 and the formulation of a National Adaptation Plan (NAP^[1]). Adaptation priorities of relevance to R-HVAP include establishing a multi-hazard monitoring and early warning system for all provinces by 2030, strengthening the Public Weather Services (including the Agrometeorological Information System), and integrating climate risk assessment mechanisms into WASH programs.

78. *Table 4: Alignment between NDCs priorities actions and R-HVAP*

| NDC programs relevant to the IFAD mandate | R-HVAP contribution to the national NDC targets |
|---|--|
| Mitigation component | |
| Energy: Increase the reliable supply of clean energy ensuring access to all, develop enabling environment to provide power to small and mid-size enterprises using distributed renewable energy generation sources | Support will be made on RETs like solar pump, dryer, lift irrigation |
| Forestry: Include social and environmental safeguards, upgrade watershed health, inclusive/proportional representation in community forest, restore and manage degraded forest land | R-HVAP will work through pro-poor leasehold forestry user groups, which will both manage forest and enhance their livelihood |
| Agriculture: Increase soil organic matter, expand fruit orchard area, improved cattle shed, increase number of organic fertilizer production plants, establish climate smart village and farms, promote sustainable agriculture practice, expand and ensure access of climate smart agriculture technologies to marginalized group, encourage community seed bank and national gene banks | Through agroecological practices, R-HVAP will significantly enhance soil and water quality |

| | |
|--|---|
| Waste: promote 3Rs (Reduce, Reuse, Recycle) approach, focus on co-production of energy and organic fertilizer from solid waste, wastewater and faecal sludge | R-HVAP will promote a circular agriculture model that minimises waste generation |
| GESI: Develop specific programs with dedicated resources (human and financial) to ensure full, equal and meaningful participation of women, children, youth, Indigenous Peoples and marginalized groups in climate change-related policy development; and during the planning, monitoring and implementation processes at local, provincial and national levels; Promote the leadership, participation and negotiation capacity of women, Indigenous Peoples and youth in climate change forums; Ensure gender-disaggregated data when reporting on progress and achievements. | At least half of the beneficiaries will be women, adequate targeting strategies will be adopted to include the most vulnerable communities/households. Provisions are made to ease the access of women in finance and other resources. Program support will seek to reduce drudgery. Capacity building, business skill development, and leadership development activities are provisioned in the Program. |
| Adaptation component | |
| Mobilization of climate change adaptation resource persons | R-HVAP will develop a cadre of “bare foot agroecology consultants” and lead farmers who will manage Farmer Field Schools (FFS). The Program will capacitate smallholders and stakeholders on climate resilient agriculture. |
| Adaptation measures based on circular economy and sustainable resource use will be developed and implemented | R-HVAP will continue supporting integrated water supply management, from source protection to wastewater utilization. |
| NAP implementation | R-HVAP will work on NAP identified resilient agriculture, organic value chains, small irrigation, integrating climate adaptation into palikas planning process, and promotion of RETs. |

79. [\[1\]](#) The National Adaptation Plan for 2021-2050 (NAP) has identified 64 priority programs under ten sectors totally budget of USD 47.4 billion. Under the Agriculture and Food Security sector (total budget USD 11.2 billion), priority adaptation programs includes 1) Program on Sustainable Agriculture, Food and Nutrition Security, and Climate Health and Hygiene, 2) Commercial Animal Husbandry for Climate Resilient Rural Livelihoods (753 Model Demonstration Projects), 3) Development of Insurance, and Community and Peasant Friendly Climate Induced Risk Sharing Model and Expansion in both Agriculture and Livestock, 4) Genetic Resource Conservation Programme for Climate Resilient Agriculture in Nepal, 5) Enhancing Agriculture Productivity through Building Climate Resilient Water Management Systems, 6) Climate Smart Transformative Collective Agriculture Promotion in the Hills and Mountains, 7) Integrated Soil and Nutrient Management for Resilient Agriculture, 8) Strengthening Climate Services and Agriculture Information System, 9) National Capacity Building of Agriculture and Livestock Institutions and Professionals on Climate Change Adaptation Research, Planning and Implementation. Other nine sectors are Forest, Biodiversity and Watershed Conservation (USD 8.7 billion); Water Resources and Energy (USD 5.35 billion); Rural and Urban Settlements (USD 2.85 billion); Industry, Transport and Physical Infrastructure (USD 3.05 billion), Tourism, Natural and Cultural Heritage (USD 1.13 billion); Health, Drinking Water and Sanitation (USD 4.75 billion); Disaster Risk Reduction and Management (USD 8.05 billion); Gender, Social Inclusion, Livelihoods and Governance (USD 0.7 billion); and National Capacity Building, Research and Awareness Raising (USD 0.16 billion).

4. Environmental and social category

80. The environmental and social category for R-HVAP is determined as substantial, based on the screening tool of SECAP 2021. The overall rating has shifted from 'moderate' to 'substantial' preliminary due to the construction activity of the Semlar wholesale market. An international Environmental Impact Assessment (EIA) study team has submitted the final draft of EIA report for approval by the Government of Nepal. The EIA study was conducted in close coordination with IFAD, also adhering to the standards outlined in SECAP 2021. The EIA report encompasses a comprehensive analysis of the social and environmental impacts associated with the wholesale market and includes a list of proposed mitigation measures. The detailed EIA report, accompanied by a dedicated environmental and social management plan, was made available for public disclosure 120 days prior to the submission of the R-HVAP design to IFAD's board meeting scheduled for December 2023.
81. R-HVAP aims to generate positive environmental and social benefits in a comprehensive manner. The program focuses on promoting agroecological farming systems, which will contribute to revitalizing the ecological health of farms, increasing biodiversity, and building climate resilience. R-HVAP will a) encourage gradual phasing out of chemical inputs, while simultaneously providing support for homemade and commercial bio inputs, b) promote integrated farming, mulching, inter/mix cropping, biochar, and integrated pest management to maintain soil health and minimize the damage of disease and pest outbreak, c) promote renewable energy technology as part of the value chain and support market development activities, d) support water source protection, storage and water recharge ponds, ground water recharge structures multiple water use, small irrigation schemes, and efficient water use technologies to reduce water stress, e) minimize waste from agriculture, poultry, processing and market centers, and facilitate for manure production, f) promote agroforestry, fodder plantation, and stall feeding to alleviate pressure on forest, and g) anti-erosion measures for soil and water conservation.
82. The value chain activities implemented by the program will effectively reduce pollution and prioritize resource efficiency. The Semlar wholesale market will incorporate appropriate measures for managing both solid and liquid waste. Furthermore, the program's procurement plan will include provisions to ensure the sustainable management of natural resources.
83. R-HVAP will not have any impact on *cultural heritage*. A small shrine on the border of Semlar market construction site will possibly be closed for a few days, which was discussed and agreed by villagers. An inclusive and meaningful participation of *Indigenous Peoples* will be ensured to address their need, demand, and consensus during Agroecological Cluster Plan (PAP) development and implementation. The program will give priority to IPs in targeting strategy. Likewise, all the R-HVAP implementation will ensure safe *labour and working conditions*. Child labour, sexual harassment, gender violence will be strictly prohibited and carefully monitored. Moreover, the program, on the whole, will have positive impacts on *community health, safety, and security*. The program will not create physical and economic *resettlement*.
84. R-HVAP is a gender transformative and youth sensitive program that places a significant emphasis on social inclusion. It adopts proactive measures to specifically target women, youth, and marginalized communities. The program will enhance women's access to viable economic opportunities, generate economic and professional prospects for the youth, and ensure their active engagement in decision making process.

5. Climate risk category

85. As per the SECAP screening tool, the climate risk category of the program is determined as substantial. Following are the key themes and steps followed to assess climate risks: (i) Hazard identification: As per the ThinkHazard tool, Vulnerability and Risk Assessment (VRA) report by MoFE (2021) and design field visit; R-HVAP intervention area is likely to experience river flood, urban flood, landslides, water scarcity, extreme heat, and wildfires. Likewise, foreseen future climate scenario predicts changes in temperature, climate variability and alterations in intensity and frequency of extreme events. (ii) Exposure Assessment: The program targets agricultural systems or livelihoods and infrastructure, especially Semlar wholesale market, that are exposed to weather-related hazards. Crop and livestock production is frequently affected by rainfall variability, prolonged droughts, changes in temperature, and pests and diseases. (iii) Sensitivity: Major income of the target population predominantly comes from agriculture and livestock. The population's vulnerability is also increasing by diseases like COVID-19. (iv) Adaptation capacity and climate resilience: Nepal still lack disaster coping capacity (DDR score of 5.5 as per the INFORM) and climate and weather information services are not effectively being delivered to farmers, rural dwellers, and end users. Basic infrastructure and technical facilities are still poor in program targeted areas. Farmers still face difficulties in accessing adequate financial credit and loans that are tailored to their needs.
86. The program will promote agroecology, integrated farming, climate smart agricultural practices. Participatory planning process will be adopted to avoid climate hazard hotspots and integrating appropriate adaptation measures. SECAP related responsibilities will be included in the terms of references of thematic specialists in PCO, PMO, and Corridor Offices. Climate risk including in-depth flood risk assessment has been conducted for wholesale market as a part of EIA study, and recommended measures will be incorporated into the EIA ESCMP.

6. Recommendations for project design and implementation

87. Targeting and lessons learned:

88. The targeting strategy built on existing experiences and lessons from other IFAD investments in Nepal which have been successful in supporting poor and vulnerable households. Among them ASHA has reached the most vulnerable households as

determined by the participatory vulnerability ranking following IPCCs approach and Nepal Climate Change Support Program (NCCSP)^[1] By continuing this experience, R-HVAP will have strong pro-poor and inclusive focus in its targeting strategy and thus, will maximize participation from poor and marginalised households, Dalits and indigenous people, young girls, single women, and women headed households.

89. IFAD Mainstreaming areas:

90. R-HVAP will use the following entry points to address mainstreaming themes: (i) improve women's access to viable economic opportunity (on farm and off-farm) as well as social empowerment; (ii) generate economic and professional opportunities for youth (iii) provide nutrition education and improved nutrition especially for ultra-poor vulnerable households (iv) engage in strong consultation process to ensure participation and social inclusion of potentially excluded groups.

91. **Youth participation:** Youth will be organized in groups (young men and young women) on the basis of their interest and different degrees of participation in the programme; i.e. as existing farmers' producers, agri-entrepreneurs, unskilled young agriculture labours, young returning migrants, thus being organized accordingly and receiving targeted interventions and trainings on the basis of their aspirations and interest in engaging in agricultural activities as well as skills and enterprise development (off farm/ value addition/ service provision). It is expected that 40% of youth (16-40 years) will be part of POs (about 24,000 youth led HHs engaged in agriculture) receiving program services under Component 1 and additional 760 youth (50% young women) will be trained in skills and enterprise development (e.g. training in non-agricultural activities, micro-entrepreneurs, apprenticeship training and training for youth employment). These activities will support: (i) enterprise development and self-employment and (ii) employment for youth trained in skills development and able to find employment opportunities including through apprentices. Furthermore, through an internship program a total of 60 students/ undergraduate in agriculture sector will have the opportunity to participate in 6 months internship as part of the program activities in the field at cluster level and enhance their practical knowledge in agroecology. Detailed activities and implementation arrangements are defined in the PIM.

92. **Gender:** The key challenges women face are social barriers, early marriage, and early childbirth, constrained to household and non-economic activities, relatively low education in comparison to males, malnutrition leading to health issues, non-participation in decision making, business illiteracy, and limited access to land and finance.

93. **Women participation:** Women represent at least 50% of program participants (or about 30,000, out of which 30% or 9,000 WHHs). Under component 1, they will be mobilised and organised in groups (mixed POs or women-led POs) to receive specific trainings on the basis of their interests and activities along existing or new opportunities resulting from the agroecology cluster development. Trainings will focus (but not limited to) on improved production and productivity (through FFS), enhanced Financial Education and Business Literacy (FEBL) and digital literacy combined with Gender Action Learning System (GALS) as well as leadership. The last being particularly important for women's groups representatives to actively participate in the Multi Stakeholders Platform (MSP), to ensure that women's view and interests are captured in development planning process and key decisions taken at that level during the formulation of the Agroecology Cluster Plan (PAPs). The Community Mobilisers will encourage the participation of women in the identification and planning of the investments and raise awareness regarding the importance of ensuring that women's priorities are reflected in the choices made. Activities will foster women's participation on equal basis (50%) in developing PAP and be at least 30% active participants in the MSP meetings and boards created for the planning process at all levels (wards, Palika and Province).

94. **Nutrition:** The program will encourage interventions that promote nutritionally diverse and rich foods. The local crop varieties with high nutritional value and benefits will be given higher priority. RHVAP will promote and support the development of post-harvest management, storage and processing technologies at the community and household level. A specific focus on nutrition will be developed for the poorest households (the ultra-poor). The program will provide support for improved family nutrition for the ultra-poor HHs through providing inputs for increasing production of vegetables through kitchen gardens, as well as increased production and consumption of protein rich foods through provision of goats, poultry, small ruminant. The nutrition education sessions will be designed to enhance awareness about nutrition, change attitudes, behaviours and practices that would improve nutrition outcomes of this target group. As entry point for nutrition education the program will also consider additional modules on nutrition as part of the FELB classes.

95. **Social Inclusion and Community mobilisation.** The community mobilisers will be responsible for community mobilisation. They will work in synergy at community level, including the involvement of community-based organizations and local/traditional institutions to mobilise and sensitize communities to get buy in to the Programme and enhance the demand driven nature of the intervention. This activity will be undertaken at the village level and will consist of public consultations with the community as a whole and separate interaction with special groups, such as women and youth but also marginal groups (*Dalits, Janajatis*) and Indigenous Peoples (IPs). A 4 steps process can be followed; i) initial community consultation at ward level, ii) inclusion of women and vulnerable groups, iii) documenting community meeting at ward level, and iv) Representatives appointed to participate in planning exercise and PAPs development. Further details in the PIM.

96. Climate and Environment

97. Planning: The first five-year tenure for municipalities (*Palikas* in Nepali) has completed and they started second tenure from 2022. Experience of IFAD ongoing projects and studies shows that Palikas still need additional capacity and resources to prepare social, climate and economic resilient planning and budgeting. RHVAP will prepare inclusive and participatory Palika Agroecological Plans (PAPs) and blend them with palika's annual budget and plans. The PAP planning process will actively engage poor, marginalized, climate vulnerable, IPs, Dalits, smallholders from the settlement to Cluster level to ensure their needs and demands are adequate addressed. As needed, focus group discussion will be conducted with IPs to discuss on their specific need, plans and seek consent.

98. **Agroecological practices:** Nepal is one of the first countries to sign onto the World Bank's Green, Resilient, and Inclusive Development (GRID) initiative. As such, it is seeking to pursue a path over the next decade to better address climate change and build back better from the COVID-19 crisis. The country aims to address the climate threat, adapt to the new normal and contribute to reduced greenhouse gas emissions. To do so, it needs to trace a path forward for the agriculture sector that can better deliver agricultural productivity, economic growth, climate resilience and reduced greenhouse gas emissions. The shock of COVID-19 on production systems, including food and nutrition security, employment, and trade, has been considerable, highlighting the importance of building resilience across the agriculture system to deal with a range of shocks (WorldBank, 2021).
99. The IFAD supported ASHA project in Karnali and Lumbini provinces has been successfully practicing and upscaling a number of climate smart practices. Smallholders collect livestock urine and together with other allelopathic plants gathered from the forest prepare liquid fertilizer and pesticides (*jholmol*). The users have reported its efficacy in managing pests and diseases. Utilization of improved compost, vermicompost, green manure and slurry have led to increases in soil fertility, with enhanced soil microbial activity. ASHA has successfully promoted soil fertility enhancement practices such as crop rotations, intercropping, symbiotic associations, cover crops, organic fertilizers, minimum tillage, mulching and biochar.
100. Upscaling successes of ASHA and previous IFAD supported successful project, High Value Agriculture Project, R-HVAP will promote commercially viable agroecology.

101. [\[1\] https://www.opml.co.uk/projects/nepal-climate-change-support-programme](https://www.opml.co.uk/projects/nepal-climate-change-support-programme)

7. Further studies needed

102. This project document package includes the draft EIA for the Semlar wholesale market, stakeholder engagement plan (SEP), grievance redress mechanism (GRM) and targeted adaptation assessment (TAA). A detailed climate risk assessment for the wholesale market has been planned and ToRs have been developed for further study. This study will enhance 'climate management plan' to the ESMP annexed in EIA report.

8. Monitoring and evaluation

103. The program's M&E will well capture disaggregated data on gender, youth, socio-ethnicity, and household poverty. The program will reflect issues of gender, youth, Dalit, marginalized and disadvantage communities, and indigenous communities. The Program Coordination Unit will lead in the monitoring and evaluation process of the program together with implementing partners and stakeholders. In addition, monitoring and coordination committees comprising of PMO, representatives from province and municipal government authorities, and other financial organizations will be formed at provincial and municipality level. These committees will regularly monitor and share the report with the program office.
104. The GESI expert in coordination with M &E expert will analyse the data on periodic basis with validation in the field. This process will facilitate the take timely decision by the program management and adopt corrective actions to adhere the targeting strategy. Other participatory monitoring tools like annual outcome survey, environmental and social safeguard monitoring, and regular tracking of ultra-poor women and vulnerable groups with their problems and progress will be adopted to ensure that target groups are effectively participating and getting progress on their livelihood improvement pathways. Social risks and mitigation measures (as outlined in the ESMP) will ensure that these risks are addressed, and the very poor and vulnerable sections benefit from the program interventions.

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ESCMP Matrix

143.

144. Below is the R-HVAP programme-level Environment, Social and Climate Management Plan (ESCMP) Matrix. The Semlar Agriculture Regional Wholesale Market ESMP including pre-construction, construction and operations phases is included in the EIA annex.

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|--|-------------------------------------|-------------|--|---|-------------------------|---|-----------|--|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| 1) Environmental: potential threat | | | | | | | | | |
| Over extraction of NTFPs and MAPs from forest area | NTFPs, MAPs | moderate | i) NTFPs and MAPs cultivation is confined on agriculture or fallow land, ii) proper GIS based record keeping system to trace cultivated area and production, iii) laissez with community forest user groups and divisional forest offices for NTFPs and MAPs cultivation inside forest area. | i) consultation with communities explore opportunities and ways to cultivate in fallow land; ii) consultation with forest user groups and forest offices to promote NTFPs and MAPs in forest area | PMO and cluster offices | % of NTFPs and MAPs harvest from private land | Annual | i) secondary: records of municipality, forest user groups, forest offices, GIS maps ii) primary: program database | no additional cost |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|--|---|---|---|--|--|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Encroachment or expansion of agriculture in forest area | All | Low | Program will adopt zero forest encroachment and deforestation approach. Value chain activities will be confined only in agriculture lands. To address the shortage of agricultural land, program will encourage utilizing fallow cultivable lands. The wholesale market is planned at a community forest area, the EIA and dedicated ESCMP for wholesale market further details on impact and mitigation measures. | i) Meeting with farmers to identify and explore use of abandoned land; ii) Explore with municipalities, forest user groups, and forest officials on encroachment management | PMO, cluster offices, divisional forest offices | Hector of fallow land cultivation in municipalities | Baseline/ mid-term/ completion and annual. | Records from municipalities, forest user groups and forest offices | no additional cost |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|----------------------------------|-------------------------|--|--|-----------------------------------|-------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Use of chemical fertilizer and pesticides | Production | Low | <p>Program will invest in promotion and production of bio inputs through POs and MSMEs. PAP will detail related activities at palika level. Support will be provided to farmers to shift to bio-input use and gradually phase out chemical inputs over programme implementation. The following activities will facilitate the phasing out process: i) increasing production and access of bio-inputs, ii) motivating youth and MSMEs for bio-inputs entrepreneurship, iii) conducting a series of behavioural changes and capacity building events such as: a) actively engaging in PAP preparation, ii) 2-day market oriented agroecology orientation and training, iii) agroecology ToT for lead farmers and social mobilizers, iv) establishment of demo farms, v) farmer field school, vi) enhanced FEBL including agroecology practices etc.</p> | Meeting with farmers, Pos, MSMEs | PPMO. Cos | <p>Tons of Bio fertilizer production increase</p> <p>Amount of bio pesticides production increase</p> <p>No of farmers trained in agroecology practices</p> <p>No of FFS conducted</p> | Baseline/ mid-term/ completion and annual. | Records of PPMO and CO activities | Embedded in component 1 |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|---|---|--|-----------|---|--|
| | | | | | | Indicators | Frequency | Source of data | |
| Over harvesting of forest products, especially fodder, and open grazing | Goat, dairy | moderate | i) promotion of agroforestry to increase fodder; ii) shed improvement support along with provision of stall feeding and sufficient fodder plantation; iii) high nutritious hedge row plantation, cover crops suitable for fodder, iv) fodder plantation on fallow land, v) mandatory provision for sufficient fodder plantation for the goat and dairy value chain support, vi) support and collaboration with community forest and leasehold forest to increase fodder availability, vii) collaborate with forest user groups for the timber, poles needed for shed improvement and other small infrastructure related works, viii) adopt experience from VITA and HEIFER collaboration on carrying capacity and fodder management | Evidence based consultation with interested communities to establish credible and sustainable development plans for Goat and dairy value chains | PMO, cluster offices, forest user groups, divisional forest offices | i) ha of land under agroforestry, ii) number of nursery support and annual seedling supplement and plantation, iii) % of farmers using feed from sustainably managed fodder and forage sources | Annual | Farm Diaries, VC Cluster surveys, Baseline/mid-term/final impact surveys, | Goat, livestock, agroforestry, apiculture etc. support includes budget for mandatory fodder and forage |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|--|--|-------------|--|---|------------------------------|--|-----------|---|------------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Improper solid and liquid waste management | Livestock, processing centers, markets, agriculture residues | moderate | (i) Waste management plan mandatory for the program supported collection and processing centers, and markets; (ii) Work with market management board and local authorities; (iii) Recycling and reuse of waste generated during production to processing including use to make bio-compost ; (iv) Capacitate smallholders and micro entrepreneurs on sustainable waste management by easy and effective technologies and better hygiene. | Awareness, capacity building, and facilitation on easy access to new practices and technologies | PCO, PMO and cluster offices | (a) % of programme - supported collection and processing centers, markets with a waste management plan and an efficient waste management system; (b) No of capacity building events organized for smallholders and micro entrepreneurs | annual | Program infrastructure records; Training reports; Reports from field inspection visits by PIU staff | Design includes related cost |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|---|------------------------------|--|-----------|-------------------------|--|
| | | | | | | Indicators | Frequency | Source of data | |
| Excessive water extraction | All | Low | The program will generate overall positive impacts on water source and quality by: i) support water source protection, storage and water recharge ponds, ground water recharge structures multiple water use, small irrigation schemes, and efficient water use technologies to reduce water stress, ii) minimize waste from agriculture, poultry, processing and market centers, and facilitate for manure production, iii) promote agroforestry, fodder plantation, and stall feeding to reduce pressure on forest, and iv) anti-erosion measures for soil and water conservation. The PAP will include water conservation and efficient water use planning. | Awareness, capacity building, and facilitation on easy access to new practices and technologies | PCO, PMO and cluster offices | i) number of water source protection activities, ii) number of subprojects with efficient water use technologies, iii) number of small and medium water supply systems | Annual | MIS system | Included in sub component 1.3 a and other related value chain activities |
| Solar battery management | All using RETs | Low | i) ensure that RET companies have proper plan to manage battery wastage after its life cycle, ii) aware community on the proper battery management methods | Awareness and capacity building events | PCO, PMO and cluster offices | Battery disposal plan included in RET activities | Annual | RET activities document | no additional cost |
| Environmental: positive impacts | | | | | | | | | |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|--|--|-------------|---|--|------------------------------|---|---|--------------------------------|-----------------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Soil health and water quality improvement Improve agrobiodiversity Reduce land degradation | All, excluding market related infrastructure | Positive | Program will have overall positive impact on soil health by adopting agroecology approach, which will be included in PAP. I) support on regenerative agriculture, ii) gradually phasing out of chemical inputs and promotion of organic inputs, iii) promotion of integrated farming and livestock approach , iv) priority will be given to local and indigenous crops, v) local seeds will be encouraged, vi) agroforestry and sufficient fodder management for livestock, vii) encourage inter/cover/mix cropping and hedge row plantation, viii) use of fallow land, ix) household and community or cluster level to small-medium level bio inputs (compost, fertilizer, pesticide) production and use, x) promotion of Native crops and Neglected and Underutilized species (NUS) such as millet, buckwheat, barley, Karnali beans x) onsite technical support will be arranged | Capacity building, awareness, access to technologies and finance | PCO, PMO and cluster offices | i) improve in soil health and water quality | Baseline/ mid-term/completion and annual. | APR, AOS, and thematic studies | Cost included in programme design |
| Social | | | | | | | | | |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|--|--|------------------------------|--|--|--|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Beneficiary Dissatisfaction and Discrimination | All interventions | Low | Create a qualitative assessment of the aspirations of women and men of various age groups, especially the most vulnerable and marginalized (Dalits, Janajatis) through focus group discussions, to solicit feedback on the challenges being faced by them, their views on solutions and coping mechanisms, as well as feedback on the training programs and how they can be improved during all programme stages. | Community focus groups at baseline. | PCO, PMO and cluster offices | (i) Collect and monitor disaggregated evaluation data. (ii) Review number of complaints and negative data compared to positive feedback and time it took to resolve them. | Annual | Annual Outcome Survey, beneficiary list, number and quality of consultation meetings | Included in M&E |
| Women, Youth and other vulnerable categories and marginalized groups (including from Ips) are excluded from programme benefits | All interventions | Low | During Y1 conduct strong public consultation at different levels on the programme objectives, eligibility criteria and selection process for specific activities directed to specific social categories, and available grievance redress mechanisms. This should be done in partnership with Ips, CDAs, and community leaders. | Start-up workshop with all the stakeholders. | PCO, PMO and cluster offices | Ensure logframe data is disaggregated by sex, age and vulnerable groups where relevant. | Baseline/ mid-term/ completion and annual. | Meeting records, program database | Included in M&E |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|--|-------------------------------------|-------------|--|--|-------------------------|--|-----------|--------------------------------------|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Gender Issues and all forms of Gender-Based Violence, including sexual harassment due to the increasing mobilization of women to participate in program activities | All interventions | Low | (i) Increase local facilitators' engagement to work with local leaders and male household's members and promote campaign for sensitization on gender equality and against gender biases. Community and Household level; (ii) Conducting gender-sensitive and participatory consultations while finalizing and designing the various sub-project activities (Component 1) during the community planning process; (iii) Gender mainstreaming actions should be developed as part of a Gender Development Plan (GDP) prepared by the Ips engaged in the implementation. | Start-up workshop with all the stakeholders. | PCO and PPMOs | (i) Collect gender-disaggregated monitoring and evaluation data to track the extent to which women have been able to participate and benefit from programme activities; and (ii) Cases of sexual harassment has to be dealt with in compliance with IFAD's Policy to Preventing and Responding to SH/SEA and reported directly to IFAD. | Annually | Grievance form, value chain database | |

| Environmental, social and climate impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|--|------------------------------|---|--|--|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| All possible adverse environmental and social impacts as a result of the R-HVAP activities. | All interventions | low | (i) Strictly apply the Grievance Redress Mechanism (GRM) (ii) Ensure dissemination of the GRM to local communities prior to starting programme activities, and (iii) Maintain solid documentation for the received complaints during the operation of the programme and track the level of responsiveness (provision of feedback). | i) Start-up workshop with all the stakeholders, ii) joint supervision, iii) public hearing | PCO, PMO and cluster offices | I) number of complain registered and % of the complaint resolved, ii) number of joint stakeholders' supervision, iii) % of public hearing | Annual | i) Gravedance register, ii) subprojects files, iii) annual progress reports, iv) AOS | Included in M&E |
| Lack of nutrition improvement | all | Low | Gender and nutritional focused value chains, awareness of optimal nutrition practices | Awareness | PMO and cluster offices | % of household and women reporting minimum dietary diversity (MDDW) | Baseline, Midline and Endline | Baseline/mid-term/completion surveys ; Farm diaries ; and program database | no incremental cost |
| Exclusion of IPs | all | Low | i) ensure meaningful participation on Palika agroecology plan (PAP) preparing process, conduct separate IP focused group discussion where needed, ii) adopt proactive targeting strategies to benefit Ips, iii) collaborate with IP local to national organizations to update on issues and policies and to maximize benefits to Ips | Awareness, capacity building, focal group discussions | PCO, PMO and cluster offices | % of IP beneficiaries | Baseline, Midline, Endline, and annual progress report | Program database | no incremental cost |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|--|---|-------------------------|-------------------------------|--|---------------------|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Cultural heritage restriction and chance find | Semlar market | low | <p>ensure that the community get access to the temple and any restrictions due to construction site safety norms will be avoided or temporary in nature. (ii) No structural impacts on the temple foreseen, however, regular inspection of the structural stability will be ensured.</p> <p>Chance find: It is highly unlikely that tangible cultural heritage will be found in project construction site on the compensatory aforementioned site; however, a chance finds procedure will be adopted, if required.</p> | Consultation with contractor, villagers | Market management | | | | |
| Use of child labour | Infrastructure, processing, market | low | i) Strictly follow national and international provisions, ii) procurement plan to strictly mention on labour, working environment, community safety as per the SECAP guidelines. | Awareness | PMO and cluster offices | Baseline, Midline and Endline | Baseline/mid-term/completion surveys ; Farm diaries ; and program database | no incremental cost | |
| Climate Change | | | | | | | | | |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|---|------------------------------|--|--|--|--|
| | | | | | | Indicators | Frequency | Source of data | |
| Flood and landslides | All (including infrastructures) | High | (i) location selection: Program will develop the value chain location/site selection criteria which will exclude activities in flood and landslide prone areas and encourage to use land where farmers are traditionally doing farming ; (ii) support anti-erosion measures such as gabions, rip rap, sediment traps(iii) promotion of bioengineering and nature based solutions; (iv)Provisions of crop, livestock and other value chain based enterprises insurance ; (iv) multi and inter cropping, hedge row plantation, and minimal tillage to reduce surface runoff; (v) avoid steep slopes for cultivation (vi) climate proof infrastructure | Community awareness and capacity building with technical assistance | PCO, PMO and cluster offices | i) % farmers with multi cropping and agroforestry, ii) % of programme beneficiaries with insurance, iii) % of climate proof infrastructure | Annual Progress Report | Program database | included in component 1.3 a |
| Drought | Native crops, livestock | moderate | (i) Improve management practices: Small irrigation, water efficient technologies, infield water harvesting, water catchment pond ; (ii) Selection of drought tolerant species will be encouraged; (iii) Provisions of crop, livestock and other value chain based enterprises insurance | Awareness | PMO and cluster offices | % of household using improved water management practices | (a) Baseline/mid-term/final ; (b) Annual | Baseline/mid-term/final impact surveys ; Farmers' diaries. | Included in component 1.3 a, and other related section in programme design |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|--|-------------------------------------|-------------|---|---|-------------------------|---|--|--|---------------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Pest and disease | All | High | (i) Promotion of IPM, and traditional and indigenous knowledge; (ii) phasing out of chemical inputs, support and promotion to homemade and commercial bio inputs (iii) Promotion of crop, livestock and other value chain based enterprises insurance | Awareness | PMO and cluster offices | % of household producing bio inputs; % of households practicing IPM | (a) Baseline/mid-term/final ; (b) Annual | Baseline/mid-term/final impact surveys ; Farmers' diaries. | Imbedded in relevant components |
| Heat stress i) decrease of milk production, ii) increase livestock mortality, iii) increased pest and disease, iv) increase water scarcity to crops | Crop, livestock, market | Moderate | i) improved shed management with adequate provision of heat stress management, ii) improve water supply, iii) heat stress tolerant seed and breed, iv) encourage plantation | Awareness, capacity building, and facilitation on easy access to new practices and technologies | PMO and cluster offices | % of shed with adequate ventilator and roof | (a) Baseline/mid-term/final ; (b) Annual | (a) Baseline/mid-term/final ; (b) Annual | imbedded in relevant components |
| Road blockage due to climatic hazards Footnotes Footnotes are included in the text. seed, inputs, and equipments on time, ii) obstacle on product sell, iii) increase production price, iv) high wastage | Production, market | Moderate | i) cold storage facility, ii) collection centre and satellite markets, iii) processing support, iv) easy and timely information flow mechanism, v) support on nature based solution as far as possible, vi) adoption of climate proof infrastructure | Awareness, capacity building, and facilitation on easy access to new practices and technologies | PMO and cluster offices | | | | imbedded in relevant components |

Environmental and Social Safeguards Classification: Substantial

| Environmental and Social Safeguards | | | | |
|--|--------|----------------|--|-------------|
| Biodiversity conservation | Yes/No | Likelihood | Consequence | Risk Rating |
| 1.1 Could the project potentially involve or lead to conversion or degradation of biodiversity, habitats (including modified habitat, natural habitat and critical natural habitat) and/or ecosystems and ecosystem services? | Yes | Almost certain | Moderate Project will significantly affect modified habitat, but will not impinge on natural habitat or critical natural habitat. | Substantial |
| 1.2 Could the project involve or potentially lead to activities involving habitats that are legally protected, officially proposed for protection, or recognized as protected by traditional local communities and/or authoritative sources (e.g. National Park, Nature Conservancy, Indigenous Community Conserved Area, ICCA, etc.)? | No | | | Low |
| 1.3 Could the project potentially involve or lead to an increase in the chance of human-wildlife encounters/conflict? | No | | | Low |
| 1.4 Could the project potentially involve or lead to risks to endangered species (e.g. reduction, encroachment on habitat)? | No | | | Low |
| 1.5 Could the project potentially involve or lead to impacts/risks to migratory wildlife? | No | | | Low |
| 1.6 Could the project potentially involve or lead to introduction or utilization of any invasive alien species of flora and fauna, whether accidental or intentional? | No | | | Low |
| 1.7 Could the project involve or lead to the handling or utilization of genetically modified organisms? | No | | | Low |
| 1.8 Could the project involve or lead to procurement through primary suppliers of natural resource materials? | Yes | Almost certain | Minor Project may possibly require procurement of natural resources through primary suppliers, and resource extraction is tightly regulated. Alternatives to procurement of natural resources through primary suppliers exists. | Moderate |
| Resource Efficiency and Pollution Prevention | Yes/No | Likelihood | Consequence | Risk Rating |
| 2.1 Could the project involve or lead to the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts? | Yes | Unlikely | Moderate Pollutants may possibly be released, either routinely or by accident, but treatment systems are proven and verified. Receiving environment is highly sensitive. | Moderate |

| Environmental and Social Safeguards | | | | |
|---|---------------|-------------------|--|--------------------|
| 2.2 Could the project involve or lead to primary not environmentally sustainable production of living natural resources? (Note: this includes the cultivation or rearing of plants or animals, including annual and perennial crop farming, animal husbandry (including livestock), aquaculture, plantation forestry, etc) | Yes | Unlikely | Minor Project is partly dependent on production of living natural resources, but not enough to require serious environmental or social controls. | Low |
| 2.3 Could the project involve or lead to engagement in areas of forestry, including the harvesting of natural forests, plantation development, and/or reforestation? | Yes | Almost certain | Minor Only a small component of the project is focused on forestry, and this aspect is well regulated. | Moderate |
| 2.4 Could the project involve or lead to significant consumption of raw materials, energy, and/or water? | Yes | Almost certain | Minor The project will require consumption of raw materials, energy, and/or water, but this will be a small component of the project, and impacts can be appropriately managed. | Moderate |
| 2.5 Could the project involve or lead to significant extraction, diversion or containment of surface or ground water (e.g. construction of dams, reservoirs, river basin developments, groundwater extraction)? | Yes | Almost certain | Minor The project only needs a minimal amount of water. This can be obtained from existing sources, without the need for extension. | Moderate |
| 2.6 Could the project involve inputs of fertilizers and other modifying agents? | No | | | Low |
| 2.7 Could the project involve or lead to procurement, supply and/or result in the use of pesticides on crops, livestock, aquaculture or forestry? | No | | | Low |
| 2.8 Could the project be located in an area which is being, or has been, polluted by an external source (e.g. a mine, smelter, industry)? | No | | | Low |
| 2.9 Could the project involve livestock – extensive and intensive systems and animal products (dairy, skins, meat, etc.)? | Yes | Likely | Minor The project involves livestock or fisheries, but not in extensive or intensive systems. | Moderate |
| Cultural Heritage | Yes/No | Likelihood | Consequence | Risk Rating |
| 3.1 Could the project be located in areas that are considered to have archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values or contains features considered as critical cultural heritage? | No | | | Low |
| 3.2 Could the project directly or indirectly affect indigenous peoples' rights, lands, natural resources, territories, livelihoods, knowledge, social fabric, traditions, governance systems, and culture or heritage (tangible and intangible)? | No | | | Low |

| Environmental and Social Safeguards | | | | |
|--|---------------|-------------------|--|--------------------|
| 3.3 Could the project involve or lead to significant excavations, demolitions, movement of earth, flooding or other environmental changes? | No | | | Low |
| 3.4 Could the project involve or lead to adverse impacts to sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts) | No | | | Low |
| 3.5 Could the project involve or lead to alterations to landscapes and natural features with cultural significance? | No | | | Low |
| 3.6 Could the project involve or lead to utilization of tangible and/or intangible forms (e.g. practices, traditional knowledge) of Cultural Heritage for commercial or other purposes? | No | | | Low |
| indigenous peoples | Yes/No | Likelihood | Consequence | Risk Rating |
| 4.1 Could the project be sited in areas where indigenous peoples are present (including the project area of influence)? | Yes | Possible | Moderate The project may have a moderate impact on indigenous people, because it is sited within commuting distance of indigenous communities, and because it offers employment to indigenous people. | Moderate |
| 4.2 Could the project result in activities located on lands and territories claimed by indigenous peoples? | No | | | Low |
| 4.3 Could the project result in impacts on the rights of indigenous peoples or to the lands, territories and resources claimed by them? | No | | | Low |
| 4.4 Could the project result in the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples? | No | | | Low |
| 4.5 Could the project lead to impacts on the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices? | No | | | Low |
| Labour and Working Conditions | Yes/No | Likelihood | Consequence | Risk Rating |
| 5.1 Could the project operate in sectors or value chains that are characterized by working conditions that do not meet national labour laws or international commitments? (Note: this may include discriminatory practices, high gender inequality and the lack of equal opportunities, denial of freedom of association and collective bargaining, labour migrants) | Yes | Unlikely | Moderate The project operates in sectors or value chains that have, in the past, not met national labour laws, or international commitments, but is now adequately nationally regulated. However, international value chains are not regularly audited for environmental or social performance. | Moderate |

| Environmental and Social Safeguards | | | | |
|--|---------------|-------------------|--|--------------------|
| 5.2 Could the project use or operate in a value chain where there have been reports of forced labour? (Note: Risks of forced labour may be increased for projects located in remote places or where the status of migrant workers is uncertain) | Yes | Unlikely | Moderate The project does not operate in sectors or value chains where forced labour was evident in the past. The status of forced labour regulation is currently unclear. | Moderate |
| 5.3 Could the project involve children (a) below the nationally-defined minimum employment age (usually 15 years old) or (b) above the nationally-defined minimum employment age but below the age of 18 in supported activities or in value chains? | Yes | Unlikely | Moderate The project does not operate in sectors or value chains where child labour was evident in the past. The status of forced labour regulation is currently unclear. | Moderate |
| translation missing: en.v1.secap_screening_tool.environmental_and_social.labour_and_working_conditions_4.text | No | | | Low |
| Community Health, Safety and Security | Yes/No | Likelihood | Consequence | Risk Rating |
| 6.1 Could the project be at risk from water-borne or other vector-borne diseases (e.g. temporary breeding habitats), and/or communicable and non-communicable diseases? | No | | | Low |
| 6.2 Could the project lead to unintended negative impacts on nutrition? | No | | | Low |
| 6.3 Is there a possibility of harm or losses due to failure of structural elements of the project (e.g. collapse of buildings or infrastructure)? | Yes | Unlikely | Moderate The project has significant reliance on buildings or infrastructure. Risk of failure is unlikely to lead to loss of life or significant environmental damage. The structural integrity of the required infrastructure has been independently verified. | Moderate |
| 6.4 Could the project involve or lead to the construction or rehabilitation of dams? | No | | | Low |
| 6.5 Could the project involve or lead to transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)? | No | | | Low |
| 6.6 Could the project lead to adverse impacts on ecosystems and ecosystem services relevant to communities' health (e.g. food, surface water purification, natural buffers from flooding)? | No | | | Low |

| Environmental and Social Safeguards | | | | |
|--|---------------|-------------------|--|--------------------|
| 6.7 Could the project lead to the potential for gender-based violence, including sexual harassment, exploitation and abuse, as a result of labour influx, land redistribution, or other actions that alter community dynamics? | Yes | Unlikely | Moderate Moderate changes to community dynamics may result in increased potential for gender-based violence or sexual exploitation. Gender-based violence interventions are integrated into project design. | Moderate |
| 6.8 Could the project lead to increases in traffic or alteration in traffic flow? | Yes | Possible | Minor The project will result in minor increases to traffic volume. Only minor increase in risk of injury or death. | Moderate |
| 6.9 Could the project lead to an influx of project workers? | Yes | Possible | Minor The project requires the employment of new labour, but workers can be sourced from local communities, and so influx is kept to a minimum, and risks are effectively managed. | Moderate |
| 6.10 Could the project involve or lead to the engagement of security personnel to protect facilities and property or to support project activities? | Yes | Almost certain | Minor A small number of security personnel are required, but they are well trained, and protocols are in place. | Moderate |
| Physical and economic resettlement | Yes/No | Likelihood | Consequence | Risk Rating |
| 7.1 Could the project result in temporary or permanent and full or partial physical displacement (including people without legally recognizable claims to land)? | No | | | Low |
| 7.2 Could the project result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)? | No | | | Low |
| 7.3 Could the project present a risk of forced evictions? | No | | | Low |

| Environmental and Social Safeguards | | | | |
|---|---------------|-------------------|---|--------------------|
| 7.4 Could the project result in impacts on or changes to land tenure arrangements and/or community-based property rights/customary rights to land, territories and/or resources? | Yes | Possible | Moderate The project will result in moderate changes to land tenure arrangements and/or community-based property rights/customary rights. Legal recourse and other forms of arbitration/conflict resolution are available. | Moderate |
| Financial intermediaries and direct investments | Yes/No | Likelihood | Consequence | Risk Rating |
| 8.1 Could the investment be granted to an institution that does not have an environmental and social policies and an associated environmental and social management system (ESMS) in place (transparent, publicly available)? | No | | | Low |
| 8.2 Could the investment be granted to an institution with insufficient capacities (i.e. unqualified personnel e.g. ES Officer) to implement the ESMS? | No | | | Low |
| 8.3 Could the investment be granted to an institution that does not have an Exclusion List? | No | | | Low |
| 8.4 According to the institution's portfolio classification: Could the institution have potential high-risk projects in their portfolio? | No | | | Low |
| 8.5 Is there evidence that the institution does not comply with the local legal framework? | No | | | Low |
| 8.6 Does the institution provide a stable communication channel with stakeholders and local communities (e.g. a Grievance Redress Mechanism)? | No | | | Low |
| 8.7 Does the organization provide auxiliary or capacity building support services. | No | | | Low |

Climate Risk Classification: Substantial

| Step 1: Hazard identification | |
|--|---------------------|
| What are the expected hazards in the project intervention area? | No, Yes, TBD |
| River flood | Yes |
| Costal Flood | No |
| Urban Flood | Yes |
| Landslide | Yes |
| Cyclone | No |
| Water Scarcity (agricultural droughts and/or dry spells) | Yes |
| Extreme Heat | Yes |
| Wildfires | Yes |
| Future climate scenarios foreseen (period 2040-2059) - Change in frequency and intensity | No, Yes, TBD |
| Change in temperature (increase or decrease) | Yes |
| Change in rainfall (increase or decrease) | Yes |
| Climate variability (larger or smaller) | Yes |
| Intensity and frequency of extreme events (larger or smaller) | Yes |
| Is the project expected to have an impact on climate change (i.e. contribute to greenhouse gas emissions)? | No, Yes, TBD |
| Is the project expected to be a significant emitter of greenhouse gases? | No |
| Step 2: Exposure Assessment | |
| Is the project located in exposed areas to weather-related natural hazards? | No, Yes, TBD |
| Low-lying areas (valleys, coastal zones, and small islands) | No |
| Very warm areas (subtropical) | No |
| Tropical areas (rainforests) | No |
| Arid and semi-arid areas (deserts) | No |
| Mountains zones and permafrost areas (tundra) | No |
| River banks | Yes |
| Does the project target agricultural systems, ecosystems or livelihoods exposed to weather-related hazards? | No, Yes, TBD |
| Is crop production frequently affected by rainfall variability, prolonged droughts, changes in temperature or pests and diseases? | Yes |
| Is livestock productivity frequently affected by rainfall variability, prolonged droughts, changes in temperature or diseases? | Yes |
| Are fisheries frequently affected by ocean acidification, water salinity and changes in sea surface temperature due to ocean-atmospheric oscillations or climate change? | No |
| Is forest productivity frequently affected by wildfires, diseases, rainfall variability, prolonged droughts, or changes in temperature? | Yes |
| Is the biodiversity in the project area likely to be affected by changes in climate variables? | Yes |
| Is any stage of the agricultural value chain (production, storage, processing and marketing) exposed to climate related hazards? | Yes |
| Is any rural infrastructure likely to be affected by flooding, landslides, changes in temperatures, and extreme winds. | Yes |
| Step 3: Sensitivity Assessment | |
| What are key sensitivities for the populations in the project's areas of intervention? | No, Yes, TBD |
| Is conflict exacerbating the population's sensitivity to weather related hazards? | No |
| Is population displacement being exacerbated by climate change impacts? | Yes |

| | |
|---|---------------------|
| Are diseases (e.g. COVID-19, malaria, cholera) increasing the population's vulnerability and affecting their capacity to address potential weather-related hazards? | Yes |
| Is the income of the target population predominately coming from agriculture? | Yes |
| Are social inequalities (e.g. based on gender, youth, indigenous persons and other marginalized groups) being exacerbated by climate change? | No |
| Is the Human Development Index (HDI) equal to or below 0.6? | No |
| Is the Multidimensional Poverty Index (MPI) equal to or above 0.1? | No |
| Step 4: Adaptive capacity and climate resilience | |
| What are key adaptive capacities in the areas of project intervention? | No, Yes, TBD |
| Is the country well ranked in the Disaster risk reduction progress score? | No |
| Are climate and weather information services (real-time weather data, seasonal forecasts etc.) effectively being delivered (through radio, TV, SMS, extension services etc.) to farmers, rural dwellers, and end users? | No |
| Does the project country have an early action plan (preparedness and emergency response) to mitigate the impacts of weather-related hazards once the shock occurs? | Yes |
| Does the government or other institutions support the target population/communities with the necessary social and economic resources to prepare for or respond to climate-related events? | No |
| Is the target community carrying out (using their own means) agricultural adaptation? | Yes |
| Does the target population have the economic means or support to adjust or adapt their activities in response to weather related shocks? | No |
| Do policies/mechanisms exist that make financial credit, loans, and agricultural insurance available? | Yes |
| Are rural infrastructures effectively delivering services to farmers and rural dwellers? | No |

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 6: First Annual Work Plan and Budget (AWPB)

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

PDR Annex 6: First Annual Work Plan and Budget (AWPB)

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|--|--|---------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------|
| | I. Investment Costs | | | | 130 | | | |
| Component 1: Enhanced capacities for transitioning to market oriented agroecological production systems | | | | | | | | |
| A | Sub-component 1.1: Decentralised agro-ecological planning and coordination | | | | | | | |
| 1 | Agro-ecological planning framework | | | | | | | |
| 1.1 | Agro-ecological Cluster Delineation and Analysis | Event | 1 | 3,250,000 | 25,000 | 3,250.0 | 25.7 | IFAD L (100%) |
| 1.2 | PAP Manual Development | Lumpsum | 1 | 260,000 | 2,000 | 260.0 | 2.1 | IFAD L (100%) |
| 1.3 | PAP Manual Publication | Lumpsum | 1 | 455,000 | 3,500 | 455.0 | 3.6 | IFAD L (100%) |
| 1.4 | Training of trainer for MSP and PAP facilitation - Karnali /a | Events | 3 | 585,000 | 4,500 | 1,755.0 | 13.9 | IFAD L (100%) |
| 1.5 | Training of trainer for MSP and PAP facilitation - Lumbini /b | Events | 2 | 585,000 | 4,500 | 1,170.0 | 9.3 | IFAD L (100%) |
| 1.6 | Training of trainer for MSP and PAP facilitation - Sudurpaschim /c | Events | 2 | 585,000 | 4,500 | 1,170.0 | 9.3 | IFAD L (100%) |
| 1.1. | Subtotal | | | | | 8,060.0 | 63.84 | |
| 2 | 5-year Palika Agroecological Cluster Planning | | | | | | | |
| 2.1 | Palika agro-ecological plan formulation in MSP setting | Plan | 25 | 494000 | 3800 | 12,350.0 | 97.9 | IFAD L (100%) |
| 2.2 | Corridor level PAP coordination, networking and review /d | Events | - | 29,250 | 225 | - | - | IFAD L (100%) |
| | Subtotal | | | | | 12,350.0 | 97.85 | |
| | Subtotal (A) | | | | | 20,410.0 | 161.69 | |
| B | Sub-component 1.2: Knowledge and capacity for establishing agroecological farming | | | | | | | |
| 1 | Knowledge products and manuals | | | | | | | |
| 1.1 | Knowledge management strategy and policy engagement plan | No | 1 | 650,000 | 5,000 | 650.0 | 5.1 | IFAD L (100%) |
| 1.2 | Develop agro ecology curriculum and handbook /e | No | 1 | 910,000 | 7,000 | 910.0 | 7.2 | IFAD L (100%) |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|-----|--|---------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------|
| 1.3 | Agro ecology handbook publication /f | No | 2,000 | 910 | 7 | 1,820.0 | 14.4 | IFAD L (100%) |
| 1.4 | Enhanced FEBL Manual development with agro ecology and GALSite /g | No | 1 | 1,950,000 | 15,000 | 1,950.0 | 15.4 | IFAD L (100%) |
| 1.5 | Enhanced FEBL Manual publication /h | No | 10,000 | 551.98 | 4.246 | 5,519.8 | 43.6 | IFAD L (100%) |
| 1.6 | Instructional videos on agro ecology approaches and technologies /i | Lumpsum | 1 | 1,950,000 | 15,000 | 1,950.0 | 15.4 | IFAD L (100%) |
| 1.7 | Set-up and operate social media platform /j | Event | 5 | 507,000 | 3,900 | 2,535.0 | 20.0 | IFAD L (100%) |
| 1.8 | Guidelines for demonstration farm establishment | Lumpsum | 1 | 650,000 | 5,000 | 650.0 | 5.1 | IFAD L (100%) |
| | Subtotal (B) | | | | | 15,984.8 | 126.16 | |
| 2 | Market oriented agroecology extension service providers | | | 0 | | - | | |
| 2.1 | Training of Trainers (TOT) – JTA, LF, CM | Number | 4 | 975,000 | 7,500 | 3,900.0 | 30.79 | IFAD L (100%) |
| 2.2 | Enhanced FEBL training - FEBL Facilitators /k | Number | 8 | 910,000 | 7,000 | 7,280.0 | 57.48 | IFAD L (100%) |
| 2.3 | Enhanced FEBL refresher - FEBL Facilitators /l | Number | - | 390,000 | 3,000 | - | - | IFAD L (100%) |
| | Subtotal | | | | | 11,180.0 | 88.28 | |
| 3 | 3. Capacity building for agroecological approaches | | | 0 | | - | | |
| 3.1 | Support to set-up agroecological demonstration farms | Number | 20 | 130,000 | 1,000 | 2,600.0 | 20.5 | IFAD L (100%) |
| 3.2 | 2-day market oriented agro ecology orientation and investment planning | Number | 400 | 26,000 | 200 | 10,400.0 | 82.1 | IFAD L (100%) |
| 3.3 | Enhanced FEBL sessions to POs /m | Number | 400 | 117,000 | 900 | 46,800.0 | 369.3 | IFAD L (100%) |
| 3.4 | PO group dynamics and leadership training /n | Events | - | 156,000 | 1,200 | - | - | IFAD L (100%) |
| 3.5 | Youth agro-ecology apprenticeships at demo farms /o | Months | - | 26,000 | 200 | - | - | IFAD L (100%) |
| | Subtotal | | | | | 59,800.0 | 471.93 | |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|-----|--|--------------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------|
| 4 | 4. Knowledge events for agroecological approaches | | | 0 | | | | |
| 4.1 | Peer-to-peer exposure and learning visits - Pos | Number | - | 130,000 | 1,000 | - | - | IFAD L (100%) |
| 4.2 | Peer-to-peer exposure and learning visits - MSMEs | Number | - | 156,000 | 1,200 | - | - | IFAD L (100%) |
| 4.3 | Joint monitoring of agroecological impacts with palikas and other stakeholders | Event | - | 52,000 | 400 | - | - | IFAD L (100%) |
| | Subtotal | | 0 | - | - | - | - | |
| 5 | Participatory Research and Monitoring | | | 0 | | - | | |
| 5.1 | Analytical Framework development | Number | 1 | 3,250,000 | 25,000 | 3,250.0 | 25.65 | IFAD L (100%) |
| 5.2 | NARC technical support on framework development, supervision and M&E | Event | - | 1,300,000 | 10,000 | - | - | IFAD L (100%) |
| 5.3 | Research institution for technical support in conducting research | Event | - | 455,000 | 3,500 | - | - | IFAD L (100%) |
| 5.4 | System development for traceability and participatory monitoring (incl. ICT) | Event | 1 | 3,250,000 | 25,000 | 3,250.0 | 25.6 | IFAD L (100%) |
| 5.5 | ICT and equipment for Demo Farm | Number | - | 195,000 | 1,500 | - | - | IFAD L (100%) |
| 5.6 | Remunerations to LF for research, monitoring and data collection | Months | - | 6,500 | 50 | - | - | IFAD L (100%) |
| 5.7 | PhD support for Participatory Action Research | Number | - | 975,000 | 7,500 | - | - | IFAD L (100%) |
| 5.8 | Farm diary (light) development and printing /p | No | 10,000 | 390 | 3 | 3,900.0 | 30.78 | IFAD L (100%) |
| 5.9 | Thematic studies | Lumpsum | - | 650,000 | 5,000 | - | - | IFAD L (100%) |
| | Subtotal | | | | | 10,400.0 | 82.08 | |
| | 6. Service provider (Agroecological) | | | 0 | | - | | |
| 6.1 | Technical Coordinator | Person month | 12 | 169000 | 1300 | 2,028.0 | 16.00 | IFAD L (100%) |
| 6.2 | Admin and finance officer | Person month | 12 | 130000 | 1000 | 1,560.0 | 12.31 | IFAD L (100%) |
| 6.3 | Agroecology Crop Officers | Person month | 72 | 130000 | 1000 | 9,360.0 | 73.87 | IFAD L (100%) |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|----------|---|--------------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------|
| 6.4 | Agroecology Livestock Officers | Person month | 72 | 130000 | 1000 | 9,360.0 | 73.87 | IFAD L (100%) |
| 6.5 | Business Development Officer | Person month | 36 | 130000 | 1000 | 4,680.0 | 36.93 | IFAD L (100%) |
| 6.6 | Knowledge Management Officer | Person month | 36 | 130000 | 1000 | 4,680.0 | 36.93 | IFAD L (100%) |
| 6.7 | POs Strengthening Officer | Person month | 36 | 130000 | 1000 | 4,680.0 | 36.93 | IFAD L (100%) |
| 6.8 | Agricultural Technicians / JTA | Person month | 480 | 58500 | 450 | 28,080.0 | 221.60 | IFAD L (100%) |
| 6.9 | Community mobilizers | | 960 | 52000 | 400 | 49,920.0 | 393.96 | IFAD L (100%) |
| | Sub total | | | | | 114,348.0 | 902.42 | |
| | Sub total (B) | | | | | 211,712.8 | 1,670.86 | |
| C | Sub-component 1.3: Market oriented agroecological production | | | | | | | |
| 1 | Producer Organisation (PO) graduation | | | 0 | | | | |
| 1.1 | PO orientation and wellbeing ranking | Events | 400 | 5,850 | 45 | 2,340.0 | 18.53 | IFAD L (100%) |
| 1.2 | Categorization of POs (tool and assessment) | Events | 400 | 5,850 | 45 | 2,340.0 | 18.53 | IFAD L (100%) |
| 1.3 | PO EOI verification and Investment Plan appraisal | Events | 1 | 5,200,000 | 40,000 | 5,200.0 | 41.17 | IFAD L (100%) |
| | Sub total | | | | | 9,880.0 | 78.22 | |
| 2 | Operationalising commodity-specific provincial MSP | | | | | | | |
| 2.1 | Karnali province | MSP | 2 | 260,000 | 2,000 | 520.0 | 4.12 | IFAD L (100%) |
| 2.2 | Lumbini province | MSP | 2 | 260,000 | 2,000 | 520.0 | 4.12 | IFAD L (100%) |
| 2.3 | Sudurpaschim province | MSP | 2 | 260,000 | 2,000 | 520.0 | 4.12 | IFAD L (100%) |
| | Sub total | | | | | 1,560.0 | 12.36 | |
| 3 | Operationalising commodity-specific Cluster level MSP (including B2B, B2S) | | | 0 | | | | |
| 3.1 | Karnali province | MSP | 15 | 130,000 | 1,000 | 1,950.0 | 15.45 | IFAD L (100%) |
| 3.2 | Lumbini province | MSP | 10 | 130,000 | 1,000 | | | IFAD L (100%) |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|-----|--|---------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------------------|
| | | | | | | 1,300.0 | 10.30 | |
| 3.3 | Sudurpaschim province | MSP | 5 | 130,000 | 1,000 | 650.0 | 5.15 | IFAD L (100%) |
| | Sub total | | | | | 3,900.0 | 30.90 | |
| 4 | Smallholder co-investments and access to rural finance for agro-ecological production | | | | | | | |
| 4.1 | Karnali province | Farmers | - | 130,000 | 1,000 | - | - | IFAD L (50%), PO&HH (50%) |
| 4.2 | Karnali province (ASDP, ASHA) | Farmers | 2,000 | 78,000 | 600 | 156,000.0 | 1,235.0 | IFAD L (50%), PO&HH (50%) |
| 4.3 | Lumbini province | Farmers | - | 130,000 | 1,000 | - | - | IFAD L (50%), PO&HH (50%) |
| 4.4 | Sudurpaschim province | Farmers | - | 130,000 | 1,000 | - | - | IFAD L (50%), PO&HH (50%) |
| | Sub total | | | | | 156,000.0 | 1,235.02 | |
| 5 | Inclusion fund | | | | | | - | |
| 5.1 | Financial inclusion fund for excluded groups | Farmers | - | 39,000 | 300 | - | - | IFAD L (100%) |
| | Subtotal (C) | | | | | 171,340.0 | 1,356.49 | |
| D | Sub-component 1.4: MSME ecosystem for agricultural service market strengthened | | | 0 | | | | |
| 1 | Bio-fertilizers and pesticide production units | | | 0 | | - | | |
| 1.1 | Karnali province | Number | - | 6,045,000 | 46500 | - | - | IFAD L (50%), MSME (50%) |
| 1.2 | Lumbini province | Number | - | 6045000 | 46500 | - | - | IFAD L (50%), MSME (50%) |
| 1.3 | Sudurpaschim province | Km | - | 6045000 | 46500 | - | - | IFAD L (50%), MSME (50%) |
| | Subtotal | | | | | - | - | |
| 2 | Seeds and saplings (nurseries) | | | | | | | |
| 2.1 | Karnali province | Number | - | 1,813,500 | 13,950 | - | - | IFAD L (50%), MSME (50%) |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|-----|--|--------|--------|-----------------|-----------------|------------------|--------------------------------------|--------------------------|
| 2.2 | Lumbini province | Number | - | 1813500 | 13,950 | - | - | IFAD L (50%), MSME (50%) |
| | Sudurpaschim province | Number | - | 1813500 | 13,950 | - | - | IFAD L (50%), MSME (50%) |
| | Subtotal | | | | | - | - | |
| | 3. Breeding units (resource centres) | | | | | | | |
| | Karnali province | Number | - | 9,672,000 | 74,400 | - | - | IFAD L (50%), MSME (50%) |
| | Lumbini province | Number | - | 9672000 | 74,400 | - | - | IFAD L (50%), MSME (50%) |
| | Sudurpaschim province | Number | - | 9672000 | 74,400 | - | - | IFAD L (50%), MSME (50%) |
| | Subtotal | | | | | - | - | |
| | 4. Agro-vet / Tools | | | | | | | |
| | Karnali province | Number | - | 650,000 | 5,000 | - | - | IFAD L (50%), MSME (50%) |
| | Lumbini province | Number | - | 650000 | 5,000 | - | - | IFAD L (50%), MSME (50%) |
| | Sudurpaschim province | Number | - | 650000 | 5,000 | - | - | IFAD L (50%), MSME (50%) |
| | Subtotal | | | | | | - | |
| | 5. Cold storage facilities (50MT max) | | | | | | | |
| | Karnali province | Number | - | 4,836,000 | 37,200 | - | - | IFAD L (50%), MSME (50%) |
| | Lumbini province | Number | - | 4836000 | 37,200 | - | - | IFAD L (50%), MSME (50%) |
| | Sudurpaschim province | Number | - | 4836000 | 37,200 | - | - | IFAD L (50%), MSME (50%) |
| | Subtotal | | | | | - | - | |
| | 6. Small scale processing units /m | | | | | | - | |
| | Karnali province | Number | - | 9,620,000 | 74,000 | | | IFAD L (50%), MSME (50%) |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|----------|---|--------|--------|-----------------|-----------------|------------------|--------------------------------------|--------------------------|
| | Lumbini province | Number | - | 9,620,000 | 74,000 | | | IFAD L (50%), MSME (50%) |
| | Sudurpaschim province | Number | - | 9,620,000 | 74,000 | | | IFAD L (50%), MSME (50%) |
| | Subtotal | | | | | - | - | |
| | 7. Enterprise development | | | | | | | |
| | Market analysis and technical feasibility studies (bio-inputs and post-harvest) | Number | 1 | 2,600,000 | 20,000 | 2,600.0 | 20.6 | LOAN (50%), MSME (50%) |
| | Branding and marketing support to MSMEs | Number | - | 1,300,000 | 10,000 | - | - | LOAN (50%), MSME (50%) |
| | Traceability system support to MSMEs | Number | - | 3,250,000 | 25,000 | - | - | LOAN (50%), MSME (50%) |
| | Skills development for youth employment through agri-TVET /t | TVET | - | 40,300 | 310 | - | - | IFAD L (50%), MSME (50%) |
| | Business incubation support for youth enterprise development | Number | - | 15,600 | 120 | - | - | IFAD L (50%), MSME (50%) |
| | Subtotal | | | | | 2,600.0 | 20.58 | |
| | Subtotal (1.4) | | | | | 2,600.0 | 20.6 | |
| | Total Investment Costs | | | | | 406,062.8 | 3,209.6 | |
| | II. Recurrent Costs | | | | | | | |
| | A. Technical support professional | | | | | | | |
| | Value Chain and Business Development Specialist | | 36 | 169000 | 1,300 | 6,084.0 | 47.26 | IFAD L (100%) |
| | GESI and Targeting Specialist | | 12 | 169000 | 1,300 | 2,028.0 | 15.75 | IFAD L (100%) |
| | Agro-ecological specialist | | 12 | 169000 | 1,300 | 2,028.0 | 15.75 | IFAD L (100%) |
| | Rural Finance Officer | | 36 | 130000 | 1,000 | 4,680.0 | 36.35 | IFAD L (100%) |
| | Total Recurrent Costs | | | | | 14,820.00 | 115.12 | |
| | Total Costs (Comp 1) | | | | | 420,882.8 | 3,324.7 | |
| | COMP 2. Support to promote climate resilient productive infrastructure | | | | | | | |
| | I. Investment Costs | | | | | | | |
| I | Investment Costs | | | | | | | |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|----------|--|-------------------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------------------|
| A | Water related infrastructure | | | | | | | |
| | Small scale irrigation system - Karnali | Irrigation system | 30 | 1,300,000 | 10,000 | 39,000.0 | 302.94 | IFAD L (85%), PO&HH (15%) |
| | Small scale irrigation system - Lumbini | Irrigation system | 20 | 1,300,000 | 10,000 | 26,000.0 | 201.96 | IFAD L (85%), PO&HH (15%) |
| | Small scale irrigation system - Sudurpaschim | Irrigation system | 15 | 1,300,000 | 10,000 | 19,500.0 | 151.47 | IFAD L (85%), PO&HH (15%) |
| | Training on committees water systems (pre and post construction, O&M) /a | O&M training | 130 | 16,250 | 125 | 2,112.5 | 16.41 | IFAD L (100%) |
| | O&M and repair costs for water related infrastructures | Lumpsum | - | 39,000,000 | 300,000 | - | - | MUNI (75%), PO&HH (25%) |
| | Subtotal | | | | | 86,612.5 | 672.78 | |
| B | Market led productive infrastructure | | | | | | | |
| | Karnali province | POs | - | 1950000 | 15,000 | - | - | IFAD L (85%), PO&HH (15%) |
| | Lumbini province | POs | - | 1950000 | 15,000 | - | - | IFAD L (85%), PO&HH (15%) |
| | Sudurpaschim province | POs | - | 1950000 | 15,000 | - | - | IFAD L (85%), PO&HH (15%) |
| | Subtotal | | | | | - | - | |
| C | Productive RETs at PO level (solar dryers, incubators) | | | | | | | |
| | Karnali province | PO | - | 253,500 | 1,950 | - | - | IFAD L (85%), PO&HH (15%) |
| | Lumbini province | PO | - | 253,500 | 1,950 | - | - | IFAD L (85%), PO&HH (15%) |
| | Sudurpaschim province | PO | - | 253,500 | 1,950 | - | - | IFAD L (85%), PO&HH (15%) |
| | Subtotal | | | | | - | - | |
| | Total Investment Costs | | | | | 86,612.5 | 672.8 | |
| | II. Recurrent Costs | | | | | | | |
| D | Technical support for project implementation | | | | | | | |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|---|--|---------------|--------|-----------------|-----------------|------------------|--------------------------------------|------------------------------------|
| | Engineer | Lumpsum | 36 | 169,000 | 1,300 | 6,084.0 | 47.2 | IFAD L (100%) |
| | Sub-engineers (3 corridor offices) | Person months | 36 | 70,200 | 540 | 2,527.2 | 19.6 | IFAD L (100%) |
| | Assistant sub-engineers (6 persons) | Person month | 72 | 60,450 | 465 | 4,352.4 | 33.8 | IFAD L (100%) |
| | Topographic equipment | Number | 3 | 650,000 | 5,000 | 1,950.0 | 15.1 | IFAD L (100%) |
| | Motorbikes for civil engineering activities | Number | 12 | 325,000 | 2,500 | 3,900.0 | 30.3 | IFAD L (100%) |
| | Specific studies | Studies | 1 | 3,627,000 | 27,900 | 3,627.0 | 28.2 | IFAD L (100%) |
| | Subtotal | | | | | 22,440.6 | 174.17 | |
| | Total Recurrent Costs | | | | | 22,440.60 | 174.17 | |
| | Total Budget Component 2 | | | | | 109,053.1 | 847.0 | |
| Comonent 3. Semlar Agriculture Regional Wholesale Market | | | | | | | | |
| | 1. Direct construction cost | | | | | | | |
| | New buildings incl. building installations | Lumpsum | - | 673,627,500 | 5,181,750 | - | | GOVTC (18.514%), LOAN (81.486%) |
| | Infrastructure and utilities | Lumpsum | - | 828,991,800 | 6,376,860 | - | | GOVTC (18.514%), LOAN (81.486%) |
| | Additional interventions | Lumpsum | - | 906,204,780 | 6,970,806 | - | | GOVTC (18.514%), LOAN (81.486%) |
| | Furniture, computers, laboratory equipment | Lumpsum | - | 98,280,000 | 756,000 | - | | GOVTC (18.514%), LOAN (81.486%) |
| | Flood risk mitigation | Lumpsum | 0.1 | 65,214,500 | 501,650 | 6,521.5 | 55.4 | GOVTC (18.514%), LOAN (81.486%) |
| | Subtotal | | | | | 6,521.5 | 55.40 | |
| | 2. Indirect construction costs | | | | | | | |
| | Contractor's site establishment, supervision, hoisting facilities, etc. /a | Lumpsum | 0.1 | 185,715,400 | 1,428,580 | 18,571.5 | 157.9 | GOVTC (18.514%), LOAN (81.486%) |
| | Contractor's general overhead /b | Lumpsum | 0.1 | 108,333,940 | 833,338 | 10,833.4 | 92.1 | GOVTC (18.514%), LOAN (81.486%) |
| | General profit and risk /c | Lumpsum | 0.1 | 77,381,460 | 595,242 | 7,738.1 | 65.8 | GOVTC (18.514%), LOAN (81.486%) |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|--|---|--------------|--------|-----------------|-----------------|------------------|--------------------------------------|------------------------------------|
| | Subtotal | | | | | 37,143.1 | 315.77 | |
| | 3. Sub-project Implementation Support | | | | | | | |
| | Consultants/consultancy firm for detailed design (including workshops for design finalization) /d | Lumpsum | 0.1 | 21,926,580 | 168,666 | 2,192.7 | 18.6 | GOVTC (18.514%), LOAN (81.486%) |
| | Consulting firm for project management, site supervision, construction supervision, quality control /e | Lumpsum | 0.1 | 124,250,620 | 955,774 | 12,425.1 | 105.6 | GOVTC (18.514%), LOAN (81.486%) |
| | Flood risk assessment (including managing the assessment) | Lumpsum | 0.5 | 26,000,000 | 200,000 | 13,000.0 | 110.4 | GOVTC (18.514%), LOAN (81.486%) |
| | Market management policies, procedures, Market Business plan development and overall management system development | Lumpsum | 0.1 | 15,600,000 | 120,000 | 1,560.0 | 13.3 | GOVTC (18.514%), LOAN (81.486%) |
| | Community, Farmer, and Trader Liaison Officer-1, Procurement Officer - 1 (for year one), Social and Environment Officer 1 and 2 Office assistants | Lumpsum | 0.5 | 32,500,000 | 250,000 | 16,250.0 | 138.0 | GOVTC (18.514%), LOAN (81.486%) |
| | Develop disaster reduction and recovery response protocols and mechanism | Lumpsum | 1 | 6,500,000 | 50,000 | 6,500.0 | 55.2 | GOVTC (18.514%), LOAN (81.486%) |
| | Training of Market Management Committee (3 events) | Event | - | 3,466,580 | 26,666 | - | - | GOVTC (18.514%), LOAN (81.486%) |
| | Stakeholder consultation workshops and status updates (14 events) | Event | 3 | 325,000 | 2,500 | 975.0 | 8.3 | GOVTC (18.514%), LOAN (81.486%) |
| | Other trainings, workshops, studies throughout the project period (6 events) | Event | - | 1,300,000 | 10,000 | - | - | GOVTC (18.514%), LOAN (81.486%) |
| | Subtotal | | | | | 52,902.7 | 449.50 | |
| | 4. CAR Insurance & Contingencies | Lumpsum | 0.1 | 333,386,690 | 2,564,513 | 33,338.7 | 283.43 | GOVTC (18.514%), LOAN (81.486%) |
| | Subtotal | | | | | 33,338.7 | 283.43 | |
| | Total Investment Costs | | | | | 129,905.9 | 1,104.10 | |
| | II. Recurrent Costs | | | | | | | |
| | A. Semlar Project Implementation Unit | | | | | | | |
| | Project Manager (2nd Class) DUDBC | Person month | 13 | 61,100 | 470 | 794.3 | 6.2 | GOVT |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|---|--|--------------|--------|-----------------|-----------------|------------------|--------------------------------------|--------------------------|
| | Engineer - 2 (DUDBC) | Person month | 26 | 50,700 | 390 | 1,318.2 | 10.2 | GOVT |
| | Asst. Engineer -2 (DUDBC) | Person month | 26 | 43,680 | 336 | 1,135.7 | 8.8 | GOVT |
| | Account Officer-1 (DUDBC) | Person month | 13 | 49,400 | 380 | 642.2 | 5.0 | GOVT |
| | Admin & Account Assistant -2 (DUDBC) | Person month | 26 | 39,000 | 300 | 1,014.0 | 7.9 | GOVT |
| | Agricultural Officer - 1 (MOALD) | Person month | 13 | 50,700 | 390 | 659.1 | 5.1 | GOVT |
| | Project Officer - 1 (Palika) | Person month | 13 | 50,700 | 390 | 659.1 | 5.1 | GOVT |
| | Agricultural Officer - 1 (MoLMAC) | Person month | 13 | 50,700 | 390 | 659.1 | 5.1 | GOVT |
| | Total Recurrent Costs | | | | | 6,881.7 | 53.5 | |
| | Total Budget Component 3 | | | | | 136,787.6 | 1,157.6 | |
| Comp 4. Strengthened policies, regulations and institutions for smallholder agro-ecological production and trade | | | | | | | | |
| | I. Investment Costs | | | | | | | |
| A | Policies, and regulations | | | | | | | |
| | Develop organic and agroecology provincial strategies and action plans | No | - | 3250000 | 25000 | - | - | IFAD L (100%) |
| | Policies and implementation guidelines for PGS and 3rd party certification schemes and quality assurance | No | - | 3250000 | 25000 | - | - | IFAD L (100%) |
| | Policy studies for developing or upgrading policy frameworks, regulations, and protocols | Lumpsum | - | 3250000 | 25000 | - | - | IFAD L (100%) |
| | Subtotal | | | | | - | - | |
| B | Trade facilitation and negotiations | | | | | | | |
| 1 | Trade events and associations | | | | | | | |
| | Domestic fairs and events | Events | 2 | 1,300,000 | 10,000 | 2,600.0 | 20.6 | IFAD L (85%), MSME (15%) |
| | Participation to international fairs and events (organic, ethical trade) | Events | - | 4,550,000 | 35,000 | - | - | IFAD L (85%), MSME (15%) |
| | Support to industry association (National Organic Associations and others) | lumpsum | - | 1,300,000 | 10,000 | - | - | IFAD L (100%) |
| | Subtotal | | | | | | | - |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|----|--|----------------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------------------|
| | | | | | | 2,600.0 | 20.55 | |
| 2 | Support to laboratory facilities | | | | | | | |
| | Border checkpoint lab (SPS) | checkpoint lab | - | 3,250,000 | 25,000 | - | - | IFAD L (75%), PGOVT (25%) |
| | Capacity building for border checkpoint staff | Training | - | 1,950,000 | 15,000 | - | - | IFAD L (100%) |
| | Upgrading biotechnology lab in Surkhet | Lab | - | 3,250,000 | 25,000 | - | - | IFAD L (75%), PGOVT (25%) |
| | Capacity building for bio-technology lab in Surkhet | Event | - | 650,000 | 5,000 | - | - | IFAD L (100%) |
| | Subtotal | | | | | - | - | |
| | Total Investment Costs | | | | | 2,600.0 | 20.55 | |
| II | Recurrent Costs | | | | | | | |
| | A. Operating costs | | | | | | | |
| | Support to Provincial ministries and Federal agencies for consultations / Meetings / Visits /b | Lumpsum | | 3,900,000 | 30,000 | - | - | IFAD L (100%) |
| | Joint monitoring | Lumpsum | 1 | 1,950,000 | 15,000 | 1,950.0 | 15.5 | IFAD L (100%) |
| | Total Recurrent Costs | | | | | 1,950.0 | 15.45 | |
| | Total Budget Component 4 | | | | | 4,550.0 | 36.0 | |
| | A. Technical / Management Team | | | | | | | |
| | Financial Management Specialist | Person month | 12 | 169000 | 1300 | 2,028.0 | 16.1 | IFAD L (100%) |
| | Procurement Specialist /b | Person month | 12 | 169000 | 1300 | 2,028.0 | 16.1 | IFAD L (100%) |
| | Fund and Financial Management Officer /c | Person month | 36 | 130000 | 1000 | 4,680.0 | 37.1 | IFAD L (100%) |
| | Financial Management Assistant (Accountants and Book-keeping) /d | Person month | 36 | 58500 | 450 | 2,106.0 | 16.7 | IFAD L (100%) |
| | Procurement Officer /e | Person month | 36 | 130000 | 1000 | 4,680.0 | 37.1 | IFAD L (100%) |
| | Subtotal | | | | | 15,522.0 | 122.93 | |
| | B. Technical support on planning, M&E, KM Team | | | | | | | |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|--|---|--------------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------|
| | PME Coordinantor | Person month | 12 | 188,500 | 1,450 | 2,262.0 | 17.9 | IFAD L (100%) |
| | ME & KM Specialist | Person month | 36 | 169,000 | 1,300 | 6,084.0 | 48.2 | IFAD L (100%) |
| | MEAL Officer /e | Person month | 36 | 130,000 | 1,000 | 4,680.0 | 37.1 | IFAD L (100%) |
| | MIS and Data Management Officer | Person month | 36 | 130,000 | 1,000 | 4,680.0 | 37.1 | IFAD L (100%) |
| | Subtotal | | | | | 17,706.0 | 140.23 | |
| | C. Office equipments | | | | | | | |
| | Office equipments | Lumpsum | 7 | 1,950,000 | 15,000 | 13,650.0 | 108.1 | IFAD L (100%) |
| | Vehicles | Lumpsum | 7 | 10,400,000 | 80,000 | 72,800.0 | 576.3 | IFAD L (100%) |
| | Motor-cycle | Lumpsum | 40 | 325,000 | 2,500 | 13,000.0 | 102.9 | IFAD L (100%) |
| | Laptop | Number | 120 | 130,000 | 1,000 | 15,600.0 | 123.5 | IFAD L (100%) |
| | Desktop computer | Number | 24 | 130,000 | 1,000 | 3,120.0 | 24.7 | IFAD L (100%) |
| | Projectors | Number | 16 | 130,000 | 1,000 | 2,080.0 | 16.5 | IFAD L (100%) |
| | Other equipments | Lumpsum | 1 | 1,950,000 | 15,000 | 1,950.0 | 15.4 | IFAD L (100%) |
| | Subtotal | | | | | 122,200.0 | 967.43 | |
| | D. Meeting and workshop | | | | | | | |
| | PSC Meeting - Federal | Lumpsum | 4 | 247,000 | 1,900 | 988.0 | 7.8 | IFAD L (100%) |
| | PSC Meeting - Provincial | Times | 12 | 117,000 | 900 | 1,404.0 | 11.1 | IFAD L (100%) |
| | Programme Start-up/Completion Workshop - Federal | Events | 1 | 585,000 | 4,500 | 585.0 | 4.6 | IFAD L (100%) |
| | Programme Start-up/Completion Workshop - Provincial | Events | 3 | 234,000 | 1,800 | 702.0 | 5.6 | IFAD L (100%) |
| | Planning and Review Workshop - Provincial | Lumpsum | 6 | 247,000 | 1,900 | 1,482.0 | 11.7 | IFAD L (100%) |
| | Monitoring for POs institution development and graduation | Events | - | 9,100 | 70 | - | - | IFAD L (100%) |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|--|---|---------------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------|
| | Coordination meetings and workshop - ACP-Palika plan integration and monitoring | Lumpsum | 100 | 58,500 | 450 | 5,850.0 | 46.3 | IFAD L (100%) |
| | IFAD Supervision / Implementation Support Mission | Events | 2 | 364,000 | 2,800 | 728.0 | 5.8 | IFAD L (100%) |
| | Subtotal | | | | | 11,739.0 | 92.93 | |
| | Total Investment Costs | | | | | 167,167.0 | 1,323.5 | |
| | II. Recurrent Costs | | | | | | | |
| | A. Programme Coordination and Management | | | | | | | |
| | 1. Programme Management Unit | | | | | | | |
| | Programme Coordinator /g | Person Months | 14 | 63,050 | 485 | 882.7 | 7.0 | GOVT |
| | Deputy Programme Coordinator /h | Person Months | 14 | 57,200 | 440 | 800.8 | 6.3 | GOVT |
| | Account Officer /i | Person Months | 14 | 48,100 | 370 | 673.4 | 5.3 | GOVT |
| | Admin Assistant /j | Person Months | 14 | 42,900 | 330 | 600.6 | 4.8 | GOVT |
| | Driver /k | Person Months | 14 | 27,300 | 210 | 382.2 | 3.0 | IFAD L (100%) |
| | Support Staff /l | Person Months | 14 | 22,100 | 170 | 309.4 | 2.5 | IFAD L (100%) |
| | Sweeper /m | Person Months | 14 | 22,100 | 170 | 309.4 | 2.5 | IFAD L (100%) |
| | Guard /n | Person Months | 28 | 22,100 | 170 | 618.8 | 4.9 | IFAD L (100%) |
| | Subtotal | | | | | 4,577.3 | 36.27 | |
| | 2. Provincial Programme Management Unit | | | | | | | |
| | Senior Agriculture Officer /Provincial Coordinator /o | Person Months | 42 | 57,200 | 440 | 2,402.4 | 19.0 | PGOVT (100%) |
| | Account Officer /p | Person Months | 42 | 48,100 | 370 | 2,020.2 | 16.0 | PGOVT (100%) |
| | Admin Assistant /q | Person Months | 42 | 42,900 | 330 | 1,801.8 | 14.3 | PGOVT (100%) |
| | Junior Technical / Technical Assistant /r | Person Months | 42 | 42,900 | 330 | 1,801.8 | 14.3 | PGOVT (100%) |
| | Driver /s | Person Months | 42 | 27,300 | 210 | 1,146.6 | 9.1 | IFAD L (100%) |
| | Support Staff /t | Person Months | 42 | 22,100 | 170 | 928.2 | 7.4 | IFAD L (100%) |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|--|--|---------------|--------|-----------------|-----------------|------------------|--------------------------------------|-------------------------|
| | Sweeper /u | Person Months | 42 | 22,100 | 170 | 928.2 | 7.4 | IFAD L (100%) |
| | Guard /v | Person Months | 84 | 22,100 | 170 | 1,856.4 | 14.7 | IFAD L (100%) |
| | Subtotal | | | | | 12,885.6 | 102.09 | |
| | 3. Cluster/Corridor Offices (COs) | | | | | | | |
| | Agriculture Officer / Corridor Coordinator /w | Person Months | 42 | 52,000 | 400 | 2,184.0 | 17.3 | GOVT |
| | Accountant /x | Person Months | 42 | 42,900 | 330 | 1,801.8 | 14.3 | GOVT |
| | Admin Assistant /y | Person Months | 42 | 42,900 | 330 | 1,801.8 | 14.3 | GOVT |
| | Junior Technical / Technical Assistant /z | Person Months | 42 | 42,900 | 330 | 1,801.8 | 14.3 | GOVT |
| | Driver /aa | Person Months | 42 | 27,300 | 210 | 1,146.6 | 9.1 | IFAD L (100%) |
| | Support Staff /bb | Person Months | 42 | 22,100 | 170 | 928.2 | 7.4 | IFAD L (100%) |
| | Sweeper /cc | Person Months | 42 | 22,100 | 170 | 928.2 | 7.4 | IFAD L (100%) |
| | Guard /dd | Person Months | 84 | 22,100 | 170 | 1,856.4 | 14.7 | IFAD L (100%) |
| | Subtotal | | | | | 12,448.8 | 98.63 | |
| | Subtotal Recurrent Cost | | | | | 29,911.7 | 236.99 | |
| | B. Operating costs | | | | | | | |
| | Office rent | Months | 12 | 1,040,000 | 8,000 | 12,480.0 | 98.9 | IFAD L (50%); GoN (50%) |
| | Travel and Daily Allowances | Months | 12 | 1,300,000 | 10,000 | 15,600.0 | 123.6 | IFAD L (50%); GoN (50%) |
| | Office running cost | Months | 12 | 1,040,000 | 8,000 | 12,480.0 | 98.9 | IFAD L (50%); GoN (50%) |
| | Fuel cost | Months | 12 | 1,430,000 | 11,000 | 17,160.0 | 136.0 | IFAD L (50%); GoN (50%) |
| | Vehicle operation and maintenance | Months | 12 | 1,040,000 | 8,000 | 12,480.0 | 98.9 | IFAD L (50%); GoN (50%) |
| | Operation & Management Cost (Service Provider) | Year | 1 | 5,850,000 | 45,000 | 5,850.0 | 46.4 | IFAD L (50%); GoN (50%) |
| | Subtotal Recurrent Cost | | | | | 76,050.0 | 602.55 | |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|--|--|---------|--------|-----------------|-----------------|------------------|--------------------------------------|---------------|
| | C. Monitoring, Evaluation / Knowledge Management | | | | | | | |
| | 1. M&E System Development | | | | | | | |
| | Programme M&E and MIS Workshop | Event | 4 | 325,000 | 2,500 | 1,300.0 | 10.3 | IFAD L (100%) |
| | MIS System development | Event | 1 | 5,850,000 | 45,000 | 5,850.0 | 46.3 | IFAD L (100%) |
| | Monitoring and data collection training - JTA, LF, CM | Event | 3 | 585,000 | 4,500 | 1,755.0 | 13.9 | IFAD L (100%) |
| | Tablet or smartphone for data collection - CM, FEBL Facilitators | Number | 100 | 23,400 | 180 | 2,340.0 | 18.5 | IFAD L (100%) |
| | Data packages for M&E data upload | Lumpsum | 1 | 390,000 | 3,000 | 390.0 | 3.1 | IFAD L (100%) |
| | Knowledge management | Lumpsum | 1 | 3,250,000 | 25,000 | 3,250.0 | 25.7 | IFAD L (100%) |
| | Subtotal | | | | | 14,885.0 | 117.82 | |
| | 2. Studies and Surveys | | | | | | | |
| | Baseline Survey incl. SOM and MDDW | Studies | 1 | 9,100,000 | 70,000 | 9,100.0 | 72.0 | IFAD L (100%) |
| | Mid-line Survey incl. SOM and MDDW | Studies | - | 9,100,000 | 70,000 | - | - | IFAD L (100%) |
| | End line Survey incl. SOM and MDDW | Studies | - | 9,100,000 | 70,000 | - | - | IFAD L (100%) |
| | Data Collection - Remuneration to FEBL Facilitators | Lumpsum | 1 | 1,300,000 | 10,000 | 1,300.0 | 10.3 | IFAD L (100%) |
| | Annual Outcome Survey | Lumpsum | - | 3,900,000 | 30,000 | - | - | IFAD L (100%) |
| | Subtotal | | | | | 10,400.0 | 82.32 | |
| | 3. Studies and Surveys | | | | | | | |
| | Knowledge product development and publication | Lumpsum | - | 1,300,000 | 10,000 | - | - | IFAD L (100%) |
| | Knowledge sharing workshop /dd | Nuber | - | 390,000 | 3,000 | - | - | IFAD L (100%) |
| | Policy formulation workshop /ee | Events | - | 975,000 | 7,500 | - | - | IFAD L (100%) |
| | Media trips | Lumpsum | - | 650,000 | 5,000 | - | - | IFAD L (100%) |
| | Subtotal | | | | | - | - | |

| | Details of Subcomponents /Activities | Unit | Target | Unit Cost (NPR) | Unit Cost (USD) | Budget (NPR'000) | Budget incl. contingencies (USD'000) | Financing % |
|--|--------------------------------------|------|--------|-----------------|-----------------|------------------|--------------------------------------|-------------|
| | Subtotal (M& E and KM) | | | | | 25,285.0 | 200.1 | |
| | Total Recurrent Costs | | | | | 105,961.7 | 839.5 | |
| | Total Investments Cost | | | | | 192,452.0 | 1,523.7 | |
| | Total Budget Comp 5 | | | | | 298,413.7 | 2,363.2 | |
| | Total Budget (C1+C2+C3+C4+C5) | | | | | 969,687.2 | 7,728.5 | |

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 7: Procurement Plan for first 18 months

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

PDR Annex 7: Procurement Plan for first 18 months

Table 48: Procurement Plan for first 18 months (Summary)

| Procurement Plan SUMMARY | | | | |
|--------------------------|----------|-----------------------|----------|----------|
| Country: | Nepal | | | |
| Project Name: | | | | |
| Project ID: | | | | |
| Version | | | | |
| Version Date | | | | |
| Prepared by: | | | | |
| Approved by: | | | | |
| Procurement Category | Plan | | Actual | |
| | Currency | USD | LCU | USD |
| Goods | - | 143,759,800.00 | - | - |
| Works | - | - | - | - |
| Consulting Services | - | 249,706,550.00 | - | - |
| TOTAL | - | 393,466,350.00 | - | - |

| Prior Review Thresholds | | | | | | | |
|-------------------------|--|------------|--|------------|-------------------------|-----------------------------|-----------------------------------|
| Thresholds | | Goods | | Works | Non-Consulting Services | Firms - Consulting Services | Individuals - Consulting Services |
| Prior Review | | ≥ \$150000 | | ≥ \$200000 | ≥ \$ 100000 | ≥ \$ 100000 | ≥ \$ 30000 |

| Procurement Method Thresholds | | | | | |
|-------------------------------|--|-------------|--|----------------|-----------------|
| | | Shopping | | NCB | ICB |
| Goods | | < \$ 40,000 | | < \$2,000,000 | > \$2,000,000 |
| Works | | < \$ 40,000 | | < \$40,000,000 | > \$ 40,000,000 |
| Non-Consulting Services | | < \$ 40,000 | | < \$1,500,000 | > \$1,500,000 |
| | | ICS/CQS | | LCS | QCBS |
| Individuals | | | | | |
| Firms | | | | | |

Table 49: Procurement plan for first 18 months (Goods)

| Version | | Basic Data | | | | | | | | | | | | | Pre-qualification | | | | | Bidding Process | | | | Bidding Evaluation | | | | Contract Award & Execution | | | | | | |
|-------------------------|--|------------|--------------------|--------------|-----------------|------------------------------|-------------------------|-----------------------|----------|-----------------|----------------------------------|----------------------|-------------------------------|----------------------------|------------------------------------|----------------------|------------------|----------------------|-----------------------|-----------------------|-----------------------------|----------------------|-------------------------------------|----------------------|-----------------|-------------------------------|---------------------------|-------------------------------|--------------|----------------|-----------------|-----------------|---------|--|
| AM/PS/Com parent Ref | Description | Funding | Lot Description | Project Area | Plan vs. Actual | Pre or Post Qualification | Prior or Post Review | Procurement Method | Envelope | Amount (USD) | Submission of PreQual Docs | No-Objection Date | PreQual Evaluation Date | PreQual Closing Date | Submission of PreQual Report | No-Objection Date | Submission of BQ | No-objection Date | BQ Evaluation Date | BQ Closing Opening | Submission Tech Eval Rpt | No-objection Date | Submission Contract Eval Rpt* | No-objection Date | Plan vs. Actual | Issue of NOTA/AG/award/let | Date Contract Award | Date Contract Signature | Contract No. | Vendor Name/ID | Amount (USD) | Amount (LGD) | Remarks | |
| 1 | Tables or workstations for data collection (100 nos) | | | | Plan | Post-Qual | Post-Review | NCB | | 2,340,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Sim Cards for internet Connectivity for data uploading | | | | Plan | Post-Qual | Post-Review | NS | | 600,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Procurement of Double cab Pick-up (1 nos) | | | | Plan | Post-Qual | Prior-Review | NCB | | 72,800,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Procurement of 4 WD Jeep (1 no) | | | | Plan | Post-Qual | Post-Review | NCB | | 10,400,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Procurement of Motor Saws (12 nos) for road engineering activities | | | | Plan | Post-Qual | Post-Review | NCB | | 16,900,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Procurement of Lap-tops (120) nos | | | | Plan | Post-Qual | Post-Review | NCB | | 15,000,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Procurement of Desk top computers (24 nos) | | | | Plan | Post-Qual | Post-Review | NCB | | 3,100,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Office equipment - 7 nos (to be sub-awarded further) | | | | Plan | Post-Qual | Post-Review | NCB | | 9,100,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Projectors (16 nos) | | | | Plan | Post-Qual | Post-Review | NCB | | 2,080,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Scanner (7 nos) | | | | Plan | Post-Qual | Post-Review | NS | | 600,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Procurement of Photocopy machine (7nos) | | | | Plan | Post-Qual | Post-Review | NS | | 600,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | Topographic equipment procurement | | | | Plan | Post-Qual | Post-Review | NS | | 600,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | Market oriented agroecology curriculum and handbook publication (1000 nos) | | | | development and | Post-Qual | Post-Review | NCB | | 1,820,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | Enhanced FFB Manual development and publication (1000 nos) | | | | Plan | Post-Qual | Post-Review | NS | | 7,469,800.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | Farm diary (light) development and printing (1000 nos) | | | | Plan | Post-Qual | Post-Review | NCB | | 5,200,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | Instructional video on agroecology approaches and technologies (to be developed further) | | | | Plan | Post-Qual | Post-Review | NCB | | 1,100,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | PAP Manual Publication | | | | Plan | Post-Qual | Post-Review | NS | | 455,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | Data packages for M&E data upload | | | | Plan | Post-Qual | Post-Review | NS | | 150,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | Support to set-up agroecological demonstration farm, to be sub-awarded further (20 nos) | | | | Plan | Post-Qual | Post-Review | NCB | | 1,900,000.00 | | | | | | | | | | | | | | | | | | | | | | | | |

Procurement Methods
 NS: National Shopping
 IS: International Shopping
 NCB: National Competitive Bidding
 ICB: International Competitive Bidding
 L1B: Limited (International) Bidding
 DC: Direct Contracting

| Work/Component | Description | Funding | Project Area | Budget (USD) | Prior or Post Review | Procurement Method | Amount (USD) | Plan vs. Actual | Submission of RECI | No Objections Date | RECI Launch Date | CEI Submission Deadline | Submission of Shortlist Report | No Objections Date | Submission of RFP/RFQ | No Objections Date | RFP/RFQ Launch Date | Proposal submission deadline | Submission of TIR | No Objections Date | Submission of CER | No Objections Date | Plan vs. Actual | Issue of NOTA/Standstill | Negotiations completed | Submission of Draft Contract and MOU | No Objections Date | Date Contract Award | Date Contract Signature | Contract No. | Vendor Name/ID | Amount (USD) | Amount (IGD) | Remarks | | |
|----------------|---|---------|--------------|--------------|----------------------|--------------------|---------------|-----------------|--------------------|--------------------|------------------|-------------------------|--------------------------------|--------------------|-----------------------|--------------------|---------------------|------------------------------|-------------------|--------------------|-------------------|--------------------|-----------------|--------------------------|------------------------|--------------------------------------|--------------------|---------------------|-------------------------|--------------|----------------|--------------|--------------|---------|--|--|
| 26 | Value Chain and Business Development Specialist (2 nos) | | | | Post Review | IC3 | 4,084,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | GESI and Targeting Specialist | | | | Post Review | IC3 | 2,038,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Agro-ecological specialist | | | | Post Review | IC3 | 2,038,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | PO- Strengthening Officer | | | | Post Review | IC5 | 4,680,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Rural Finance Officer | | | | Post Review | IC3 | 4,680,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Driver (8 nos) | | | | Post Review | IC3 | 4,368,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Support Staff (8 nos) | | | | Post Review | IC5 | 3,536,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | Swamp (8 nos) | | | | Post Review | IC3 | 3,536,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | Guard (8 nos) | | | | Post Review | IC3 | 3,536,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | IFDC Certified Engineer (International) | | | | Prior Review | IC3 | 7,800,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | Environment and Social Safeguards Specialist | | | | Post Review | IC3 | 2,038,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | Procurement Specialist | | | | Post Review | IC3 | 2,038,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 | Consultancy Firm- Similar SPU | | | | Post Review | CEB5 | 27,600,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 | Agro-ecological Cluster Delineation and Analysis, Analytical Framework Development, MS Manual Development, SM Strategy and Policy Engagement Plan | | | | Post Review | CEB5 | 7,410,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 | Market analysis and technical feasibility studies (pre-ops and post harvest) | | | | Post Review | CEB5 | 2,600,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45 | Develop market oriented agroecology operations and handbook | | | | Post Review | CEB5 | 2,750,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 | Enhanced FEB. Manual development with appropriate and clear the | | | | Post Review | CEB5 | 1,300,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47 | Training of Trainers (TOT) – FA, LF, CM (4 nos) | | | | Post Review | CEB5 | 3,900,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 | Enhanced FEB training – FEB Facilitators (80) | | | | Post Review | CEB5 | 6,875,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49 | 2-day market oriented agroecology operation and training (400 nos) to | | | | Post Review | CEB5 | 3,900,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | Enhanced FEB sessions to PO (400 nos) to be elaborated further | | | | Post Review | CEB5 | 53,000,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51 | System development for traceability and participatory monitoring (incl. ICT) | | | | Post Review | CEB5 | 3,490,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53 | Specific studies to be elaborated further | | | | Post Review | CEB5 | 3,275,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54 | Set up and operate social media platform to be elaborated further | | | | Post Review | CEB5 | 3,023,500.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55 | Guidelines for demonstration farm establishment | | | | Post Review | CEB5 | 650,000.00 | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 52: Procurement timeframes (estimates in days)

Day Ranges These tables provide estimated timelines by procurement methods, based on experience and guidance in the Procurement Handbook where specified. The approximate number of days are used in the default Procurement Plan Formulas. Timelines in the Approx fields/Formulas, are not prescriptive, and may be modified by the project. Approx figures entered will be highlighted/flagged, if they are not applicable to the method, and are indicated as N/A in the Formulas.

Goods & Works

| Procurement Method | Submission of PreQual docs | | | No Objection Date | | | PreQual Invitation Date | | | PreQual Closing Date | | | Submission of PreQual Report | | | No Objection Date | | | Submission of BD | | | No-objection Date | | | Bid Duration Date | | | Bid Closing-Opening | | | Submission Tech Eval Rpt | | | No-objection Date | | | Submission Combined Eval Rpt/Bid Evaluation Report | | | No-objection Date | | | Issue of NDTA & Standstill | | | Date Contract Award | | | Date Contract Signature | | | Totals | | |
|------------------------|----------------------------|-----|------------------|-------------------|-----|--------|-------------------------|-----|--------|----------------------|-----|--------|------------------------------|-----|--------|-------------------|-----|--------|------------------|-----|--------|-------------------|-----|--------|-------------------|-----|--------|---------------------|-----|--------|--------------------------|-----|--------|-------------------|-----|--------|--|-----|--------|-------------------|-----|--------|----------------------------|-----|--------|---------------------|-----|--------|-------------------------|-----|--------|--------|----|----|
| | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | | | |
| Single Envelope | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RFQ (Shopping (No/Is)) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 60 | 40 |
| RFQ (No PreQual) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 100 | 90 | | | |
| RFI (No PreQual) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 83 | 155 | 100 | | | |
| RFI (No PreQual) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 83 | 155 | 100 | | | | | | |
| RFI (With PreQual) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 110 | 206 | 166 | | | |
| RFI (With PreQual) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 110 | 211 | 171 | | | |
| RFI (With PreQual) | 1 | 4 | N/A - Start Date | 5 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 110 | 211 | 171 | | | |
| Direct Contracting | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 96 | 45 | | | |
| Two Envelope | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 78 | 147 | 99 | | | |
| RFQ (No PreQual) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 78 | 147 | 99 | | | | | | |
| RFQ (No PreQual) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 93 | 172 | 117 | | | | | | |
| RFQ (No PreQual) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 93 | 172 | 117 | | | | | | |
| RFQ (With PreQual) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 120 | 218 | 178 | | | |
| RFQ (With PreQual) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 120 | 218 | 178 | | | |
| RFQ (With PreQual) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 120 | 247 | 185 | | | |
| RFQ (With PreQual) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 120 | 247 | 185 | | | |

Services

| Selection Method | Submission of RFP | | | No Objection Date | | | RFP Launch Date | | | RFP Submission Deadline | | | Submission of Shortlist Report | | | No Objection Date | | | Submission of RFP/RFPQ | | | No-objection Date | | | RFP/RFPQ Launch Date | | | Proposed submission deadline | | | Submission of TOR | | | No-objection Date | | | Submission of CER | | | No-objection Date | | | Issue of NDTA & Standstill | | | Negotiations completed | | | Submission of Draft Contract and M&A | | | No-objection Date | | | Date Contract Award | | | Date Contract Signature | | | Totals | | |
|--------------------|-------------------|-----|------------------|-------------------|-----|--------|-----------------|-----|--------|-------------------------|-----|--------|--------------------------------|-----|--------|-------------------|-----|--------|------------------------|-----|--------|-------------------|-----|--------|----------------------|-----|--------|------------------------------|-----|--------|-------------------|-----|--------|-------------------|-----|--------|-------------------|-----|--------|-------------------|-----|--------|----------------------------|-----|--------|------------------------|-----|--------|--------------------------------------|-----|--------|-------------------|-----|--------|---------------------|-----|--------|-------------------------|-----|--------|--------|--|--|
| | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | Min | Max | Approx | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 14 | 14 | 7 | 10 | 7 | 1 | 170 | 280 | 204 | | | | | | | |
| QCBS (w/Shortlist) | 1 | 4 | N/A - Start Date | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | 14 | 21 | 14 | 7 | 10 | 7 | 1 | 7 | 4 | 7 | 10 | 7 | 1 | 3 | 2 | 14 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 8: Project Implementation Manual (PIM)

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

ANNEX 8: Draft Project Implementation Manual (PIM)

Version: 2.0

Date: August 2023

**Resilient High Value Agriculture Programme
Contents of Annex 8: Draft Project Implementation Manual (PIM)**

- 1. Introduction to the PIM 304
- 2. Programme Objectives, Geographic Area and Duration 305
- 3. Outreach and Target Groups..... 308
- 4. Targeting and Palika Selection..... 310
- 5. Programme Components, Sub-components and Activities 313
- Component 1. Enhanced capacities for transitioning to market oriented agroecological production systems 313
- Component 2. Improved access to climate resilient productive infrastructure 336
- Component 3. Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets..... 340
- Component 4. Strengthened policies, regulations and institutions for smallholder agroecological production and trade 347
- 6. Co-investment Guidelines..... 349
- 7. Programme Management and Coordination..... 355
- 7.1 Implementation Structure..... 355
- 7.2 Planning (AWPB), Fund Flow and Reporting 359
- 7.3 Financial management..... 361
- 7.4 Procurement..... 363
- 7.5 Risks management including SECAP risks mitigation measures..... 363
- 7.6 M&E, Knowledge Management, and Policy Engagement 365

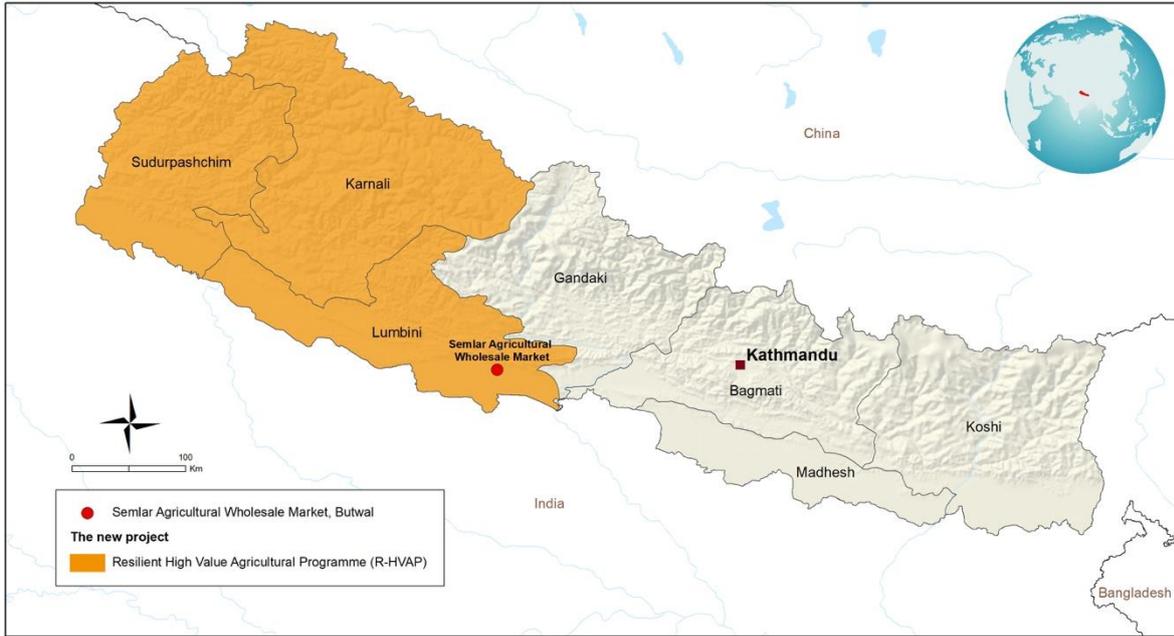
Appendices to the PIM

- PIM Appendix 1: Template of Annual Work Plan and Budget (AWPB) 372
- PIM Appendix 2: List of selected Palika and detailed maps..... 380
- PIM Appendix 3: Draft M&E manual 388
- PIM Appendix 4: Draft Knowledge Management Plan 398
- PIM Appendix 5: Draft Financial Management manual..... 399
- PIM Appendix 6: Procurement manual..... 464
- PIM Appendix 6a: Draft Procurement Strategy..... 475
- PIM Appendix 7: Terms of Reference 497
- PIM Appendix 8: R-HVAP Gender, youth and social inclusion strategy 549
- PIM Appendix 9: Semlar Operational Guideline and Action Plan – Table of Content..... 573

Programme Summary

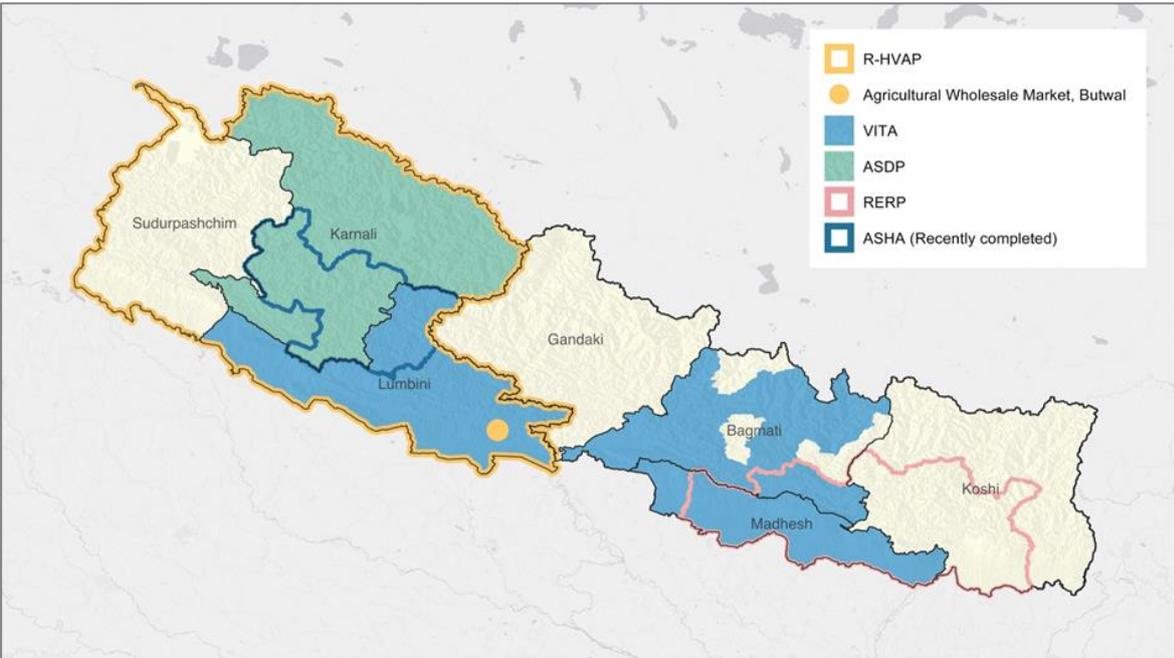
| Resilient High Value Agriculture Programme (R-HVAP) | |
|--|--|
| <i>Lead Programme Agency (LPA)</i> | Ministry of Agriculture and Livestock Development (MoALD) |
| <i>Implementing Agencies (IA)</i> | Ministry of Urban Development (MoUD) Ministry of Industry, Commerce and Supplies (MoICS) Provincial ministries |
| <i>Start Date</i> | 2024 |
| <i>End Date</i> | 2031 |
| <i>Programme Cost</i> | US\$ 120.97 million |
| <i>Programme Financing</i> | IFAD Loan: US\$ 70.9 million (58.6%) Government of Nepal (federal): US\$ 24.6 million (20.3%) Provincial governments: US\$ 0.5 million (0.4%) Local governments: US\$ 1.52 million (1.3%) Programme participant households: US\$ 20.87 million (17.3%) MSMEs US\$ 2.56 million (2.1%) |
| <i>Sectors</i> | Agriculture |
| <i>Themes</i> | Agroecology, Producers Organisations, Agricultural Trade, Rural Enterprise Development |
| <i>Target Area</i> | Lumbini, Karnali, and Sudurpashchim Province |
| <i>Targeting Strategy</i> | Participating households are identified through participatory processes during the Agroecology Cluster Planning and the PO Investment Planning stages. Programme target groups include poor, ultra-poor and near-poor smallholder households in the target provinces. Women, youth, indigenous (janajati) and dalit communities will be prioritized. |
| <i>Goal</i> | Reduced poverty and improved resilience of smallholder households. |
| <i>Development Objective</i> | Transition smallholder agriculture towards sustainable food systems that are profitable, inclusive and agroecological. |
| <i>Components</i> | <ol style="list-style-type: none"> 1. Enhanced capacities for transitioning to market oriented agroecological production systems 2. Improved access to climate resilient productive infrastructure 3. Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets 4. Strengthened policies, regulations and institutions for smallholder agroecological production and trade |
| <i>Programme Participants</i> | 60,000 smallholder households or 258,000 individuals 240 MSMEs |

Map of the Programme Area



IFAD The designations employed and the presentation of the material in this map do not imply the expression of any opinion whatsoever on the part of IFAD concerning the delimitation of the frontiers or boundaries, or the authorities thereof.
 Map compiled by IFAD | 25-04-2023

Overlay of R-HVAP target provinces over on-going and recently completed projects.



Currency Equivalents

Currency Unit = Nepalese Rupee (NPR)
US\$1.0 = NPR 130

Weights and Measures

1 kilogram = 1000 g
1 000 kg = 2.204 lb.
1 kilometre (km) = 0.62 mile
1 metre = 1.09 yards
1 square metre = 10.76 square feet
1 acre = 0.405 hectare
1 hectare = 2.47 acres

1. Introduction to the PIM

This Programme Implementation Manual (PIM) serves as an initial guiding document for all programme components. The present PIM sets out principles but does not define all detailed procedures needed for programme implementation. The PIM is a living document that will be subject to periodic review and updating.

An integral part of the PIM are the implementation guidelines and manuals as described below:

| Manuals | Attached at design stage (in PDR) | Steps for finalization |
|---|--|---|
| Palika Agroecology Planning Manual | Summary | Preparation at start-up stage |
| Co-investment Guidelines (PO and MSMES) | Summary | Preparation at start up stage based on manuals developed by ASDP / RERP |
| Gender empowerment and Social Inclusion (GESI) Guidelines | PIM Appendix 8: R-HVAP Gender, youth and social inclusion strategy | Develop the strategy into an operational manual, updating existing manuals used by other projects (ASDP) |
| Enhanced FEBL | Summary | Update and adapt existing manuals used by other projects (by integrating agroecology and GALS lite) |
| Multi Stakeholder Platforms | Summary | Update from existing manuals used by other projects |
| Financial Management | PIM Annex 6: Draft manual | Finalization and formal endorsement |
| Procurement Manual | PIM Annex 7: Draft manual | Finalization and formal endorsement |
| M&E Manual | PIM Annex 3: Draft manual | Develop the operational manual using the existing draft, and adopting best practices and lessons from other projects (ASDP, RERP) |
| KM Strategy and Policy Engagement Plan | Summary | To be prepared |
| SECAP ESCMP | Annex 5a of the PDR | Develop social, ecological and economic resilience checklist for all subprojects. |

All manuals and guidelines will be finalised before the programme entry into force or at start-up stage. The manuals and guidelines are to be endorsed by PSC and subject to "No Objection" by IFAD for implementation.

2. Programme Objectives, Geographic Area and Duration

2.1 Programme Objectives

Programme Objectives. R-HVAP aims at scaling-up market-oriented agroecological farming systems that generate economic benefits for poor smallholder farmers, while providing environmental and food system benefits. The Programme Goal is to reduce poverty and improve the resilience of smallholder households. The Development Objective is to transition smallholder agriculture towards sustainable food systems that are profitable, inclusive and agroecological.

| | Indicators | Target | |
|------------------------------|---|--------|---------------|
| Goal | Smallholder households with improved resilience | 70% | 42000 HH |
| Development Objective | Households receiving full programme services achieving return on labour of >125% of the official minimum wage ⁹⁹ | 60% | 36000 HH |
| | IE.2.1 Individuals demonstrating an improvement in empowerment | 70% | 42000 Persons |

The Programme has four major outcomes, organized as components, listed below. Please see Chapter 5 for detailed description of components and activities.

| Outcomes | Outcome Indicators | Target | |
|---|---|--------|-----------------|
| Component 1 Enhanced capacities for transitioning to market oriented agroecological production systems | SF.2.1 Households satisfied with project-supported services | 70% | 42000 HH |
| | SF.2.2 Households reporting they can influence decision-making of local authorities and project-supported service providers | 60% | 36000 HH |
| | 2.2.1 Persons with new jobs/employment opportunities | - | 30000 Persons |
| | 2.2.2 Supported rural enterprises reporting an increase in profit | 70% | 160 Enterprises |
| | 2.2.5 Rural producers' organizations reporting an increase in sales | 70% | 1100 POs |
| | 3.2.2 Households reporting adoption of environmentally sustainable and climate-resilient technologies and practices | 70% | 31500 HH |
| | Number of households reporting market-oriented diversification of production | 70% | 31500 HH |
| | Total private investment in value chains by smallholder producers, MSMEs and other actors | - | USD 20 million |
| Component 2 Improved access to climate resilient productive infrastructure | 2.2.6 Households reporting improved physical access to markets, processing and storage facilities | 70% | 42000 HH |
| | Local governments co-financing Palika Agroecological Plans (PAP) | - | 50 Palikas |
| Component 3 Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets | Number of supported commodities (agroecologically produced) accessing export markets through Semlar | 5 | |

⁹⁹ As per the Labour Act 2017 (amendment August 2023) of the Government of Nepal, the official minimum wage is NPR 668/day or 17,300/month.

Component 4

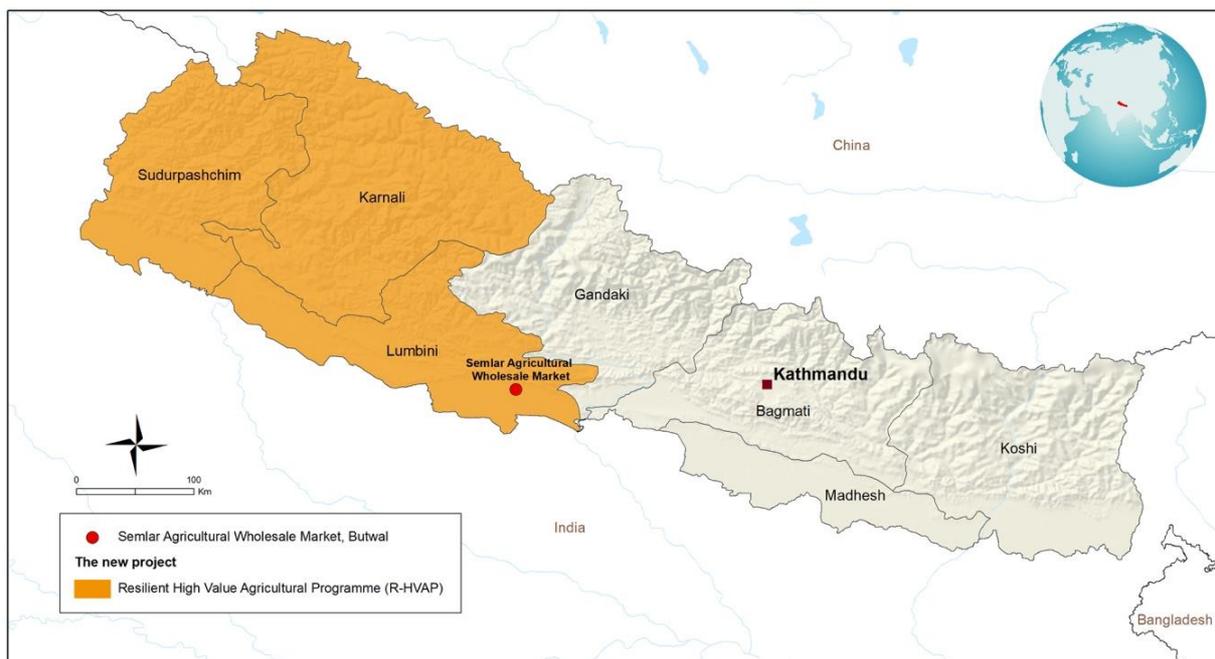
Strengthened policies, regulations and institutions for smallholder agroecological production and trade

Policy 3 Existing/new laws, regulations, policies or strategies proposed to policy makers for approval, ratification or amendment

8

2.2 Geographic Area

The programme will cover three provinces in Western Nepal: Lumbini, Karnali, and Sudurpashchim and operate in approximately 80 Municipalities (Palikas). The provinces have been selected based on the highest incidence of multi-dimensional poverty¹⁰⁰, impacts of COVID-19 on rural livelihoods¹⁰¹, location of the Semlar regional wholesale market for national and international distribution, and a landscape perspective to facilitate the building of an agroecological foodshed.



The designations employed and the presentation of the material in this map do not imply the expression of any opinion whatsoever on the part of IFAD concerning the delimitation of the frontiers or boundaries, or the authorities thereof.
IFAD Map compiled by IFAD | 25-04-2023

Figure. Map of R-HVAP programme area.

2.3 Duration

R-HVAP has been designed as a foundation building initiative that establishes the necessary capacity, service provision, infrastructure and enabling policy and regulatory frameworks for initiating the transition towards self-reliant agroecological farming systems that produce a range of commodities for domestic and export markets. Therefore, as the first phase, R-HVAP covers a period of eight years from 2024 to 2031. A second phase is envisaged for further scaling up the market-oriented agroecology approaches and successful outcomes of the first phase.

¹⁰⁰ National Planning Commission (2021). Nepal Multidimensional Poverty Index: Analysis Towards Action. Kathmandu, Nepal.

¹⁰¹ United Nations Children's Fund (2022). Child and Family Tracker (CFT). Kathmandu, Nepal.

3. Outreach and Target Groups

3.1 Outreach

The total R-HVAP outreach is estimated at 60,000 households or 258,000 individuals. Of these, 45,000 households will benefit from market-oriented agroecological production packages, and an additional 15,000 households will benefit from capacity building and extension services (enhanced FEBL, lead farmers, community mobilizers), market linkage services (MSP, B2B, B2S), and public goods (irrigation, aggregation, and regional wholesale market infrastructure). Women will constitute at least 50% of the total programme participants and youth 40%. Indigenous (janajati) and dalit communities will be prioritized.

3.2 Target Groups

The main target group of R-HVAP consists of poor smallholder households engaged in mixed farming systems and deriving most of their income from agricultural production at different scales: subsistence, semi-commercial, and commercial. Women-headed households, women farmers, youth and minority communities (Dalits and Janajatis/indigenous people) will be prioritized. R-HVAP will classify smallholder households into three classifications based on household food sufficiency¹⁰² for needs-based services: (i) ultra-poor, (ii) poor, and (iii) near-poor.

Poor households (including medium-poor) have 3-12 months of food sufficiency from their own farm production and other regular sources of income. These households derive their income from agriculture and forest foraging coupled with other incomes derived from off-farm activities, combined with irregular remittances from seasonal migration. These include poor men and women farming small areas of land of up to 0.7 ha, growing vegetables, rearing livestock (approximately 1-3 buffalos, up to 10-20 goats) and having access to rangelands for animal feed. They often have irregular access to productive water sources and irrigation, limiting their productivity and levels of volumes produced. Households in this category constitute 70-75% of the targeted households.

Ultra-poor households have less than 3 months of food sufficiency from their own farm production and other regular sources of income. These are disadvantaged HHs due to their socio-economic condition and social exclusion, which include landless, persons with disabilities (PWD), women headed HHs, marginalized communities such as Dalits and Janajatis. Their source of income is primarily from agricultural labour, limited and irregular farm income, and may receive government support. Most of them are not actively engaging in agriculture production because of fragmented, marginal (often unproductive) and small pieces of land, and lack of access to inputs, motivation and business environment. They produce traditional crops that partly meet their subsistence needs. They have the potential to participate in agriculture production through improved access to water and inputs, enhanced capacity, and additional financial support. They constitute 5-10% of the targeted households.

Near-poor households have more than 12 months of food sufficiency from their own farm production and other regular sources of income. However, they are only marginally above the poverty line, and lack affordable inputs, finance, connectivity to networks and markets, technical capacity and scale. They are full time involved in agriculture production and have the potential to provide consistent increased volumes and quality of their output to meet safety compliance standards and market requirements. They represent 20% of the targeted households.

¹⁰² Based on GoN definitions, and previous and ongoing IFAD-financed projects in Nepal (HVAP, ASDP).

Transformation Drivers. Another group consists of transformation drivers such as lead farmers and agri-entrepreneurs who can serve as champions to demonstrate the viability of agroecological approaches to increase rural resilience and provide potential development pathways for the poor. Furthermore, in the commercially oriented cluster-based approach, the private sector will play a crucial role in driving market-led enterprise growth for smallholders. Micro, small and medium enterprises (MSME) will be provided co-investment support to establish rural agri-services for affordable bio-inputs, and post-harvest processing and value addition, with in-built agri-extension services. Supported MSMEs will be mandated to provide their services to R-HVAP target groups in proportion to the co-investment amount provided, and are expected to benefit up to 25,000 smallholder HHs.

Figure: Programme outreach and target groups.

| Component | Number of PO/ MSME | Est. HH Outreach | Total Outreach | |
|---|--------------------|------------------|-------------------|--|
| 1. Enhanced capacities for transitioning to market oriented agro-ecological production systems | | | | |
| SC 1.1 / 1.3 AE planning, market linkage and cluster coordination | 2200 | 60,000 | 60,000 households | |
| SC 1.2 Knowledge and capacity for AE farming | | | | |
| SC 1.3 PO co-investment for market-oriented AE production | 1600 | 45,000 | | |
| SC 1.4 MSME co-investment for agri-services | 240 | 15,000 - 25,000 | | |
| 2. Improved access to climate resilient productive infrastructure | | | | |
| Water-related infrastructure (small-scale irrigation) | 485 | 20,000 | | |
| Market-led productive infrastructure | 595 | | | |
| Productive RET at PO level | 162 | | | |

| Target Group | Target % | Number of HHs / individuals |
|-------------------|----------|-----------------------------|
| Ultra-poor HH | 80% | 48000 |
| Poor HH | | |
| Near-poor HH | 20% | 12000 |
| Women-headed HH | 15% | 9000 |
| Women | 50% | 30000 |
| Youth | 40% | 24000 |
| Indigenous people | 20% | 12000 |

PO graduation approach. To maximize the inclusion of disadvantaged individuals and households, the programme will adopt a 'graduation' approach among supported small-scale producers and groups, building on the experience from HVAP. In the context of R-HVAP, producer organizations will be mobilized on an inclusive basis, i.e. with the participation of like-minded small-scale producers in a community but with varying levels of individual resources and starting incomes. More able and less risk averse small-scale producers from the community may be the first to mobilize themselves into producer groups to interact jointly with the market. As initial linkages with buyers and service providers become more established, other interested but poorer or risk averse individuals will then be supported by the programme and existing group members to join these producer groups. This 'graduation-based' growth of producer groups allows the groups to achieve scale and also attract more buyers and services providers, hence delivering benefits to all the members, as was seen in HVAP. Poor and ultra-poor households will together account for at least 80 percent of the PO members.

4. Targeting and Palika Selection

4.1 Targeting strategy

The programme will apply a combination of self-targeting and direct targeting methods. R-HVAP will promote relevant services in line with the needs of all target groups. Some activities will be of interest for the community as a whole, such as Palika Agroecology Plans (PAPs), community irrigation, small-scale cold storage, and market infrastructure. The PAP consultation process will engage a broad range of stakeholders mobilized through existing or newly established rural institutions, POs, and platforms (e.g. Multi Stakeholder Platforms). Furthermore, targeted activities are directed to specific disadvantaged categories (ultra-poor, women, youth, indigenous people, and marginalized groups). The robustness of the targeting strategy relies on a strong mobilisation and consultation process to be conducted at the beginning of operations.

Self-targeting. The programme will mainly work with POs (approximately 2,200 POs in phase I) and cooperative networks composed of members with diverse socio-economic backgrounds, gender and age groups. POs composition will be driven by self-targeting principles. POs will conduct participatory wellbeing ranking of their member households for poverty classification (ultra-poor, poor, and near-poor). Poor and ultra-poor households will together account for at least 80 percent of the PO membership. POs already supported by other programmes (e.g. ASDP, ASHA, HVAP) will be eligible for R-HVAP support.

Women's participation. Women represent at least 50% of the programme participants (or about 30,000, out of which 30% or 9,000 women-headed HHs). Under Component 1, they will be mobilised and organised in producer groups (mixed or women-led) to receive specific trainings on the basis of their interests and activities along existing or new opportunities resulting from the agroecology cluster development. Trainings will focus on (but not limited to) improved production and productivity (through demo farms), enhanced Financial Education and Business Literacy (FEBL) combined with agroecology and Gender Action Learning System (GALS lite) as well as leadership. The last is particularly important to encourage women's active participation during PAP formulation and in various other Multi Stakeholders Platforms (MSP), to ensure that women's views and interests are captured at all levels.

Youth participation. Youth will be organized in groups (young men and young women) on the basis of their interest and different degrees of participation in the programme and will receive targeted interventions and trainings; i.e. as existing farmers' producers, agripreneurs, unskilled young agriculture labours, young returning migrants. It is expected that at least 40% of youth (about 24,000 youth, 16-40 years of age) will be part of POs receiving programme services on market-oriented agroecological production (Component 1). An additional 400 from agriculture related vocational trainings, 300 from business incubation support, and 60 youth will benefit from agroecology apprenticeships with lead farmers. This set of direct targeted activities will support: (i) enterprise development and self-employment for 2,000 young entrepreneurs and (ii) employment for 1,000 youth trained in skills development and able to find employment opportunities including through apprenticeships .

Orientation and Outreach: The targeting and social inclusion strategy will rely on a strong mobilisation strategy to be undertaken in all selected clusters at the beginning of the programme. It is expected that the Corridor offices and community mobilisers will play a crucial role in mobilising communities and have specific focus group discussions with women, youth groups, indigenous peoples, Dalits and other marginalised communities.

Identification and selection of beneficiaries will be conducted in a series of steps as follows: (i) mobilization campaign to present the programme; (ii) participatory household wellbeing ranking exercise facilitated by Community Mobilisers for PO household poverty classification; and (iii) involvement of the local community

leaders/committee to validate the proposed list of beneficiaries and thereby avoid risk of elite capture.

4.2 Palika Selection

Figure: Prioritized Palikas for R-HVAP implementation

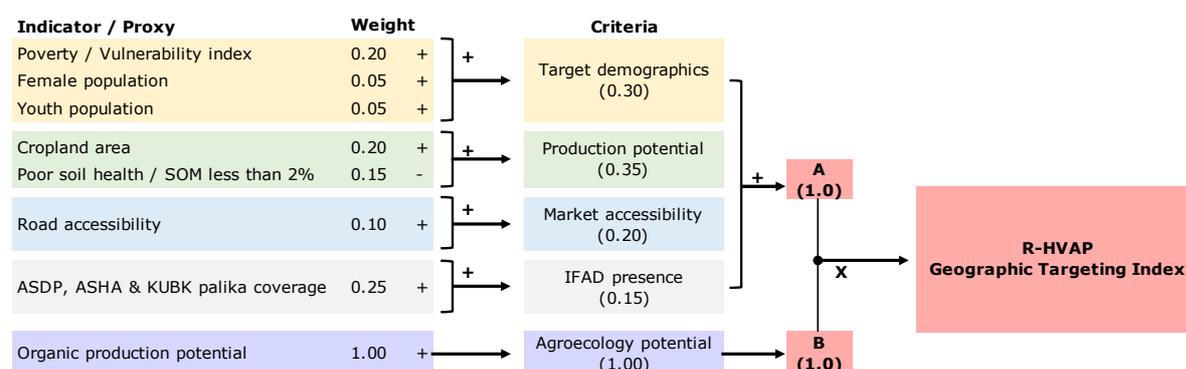
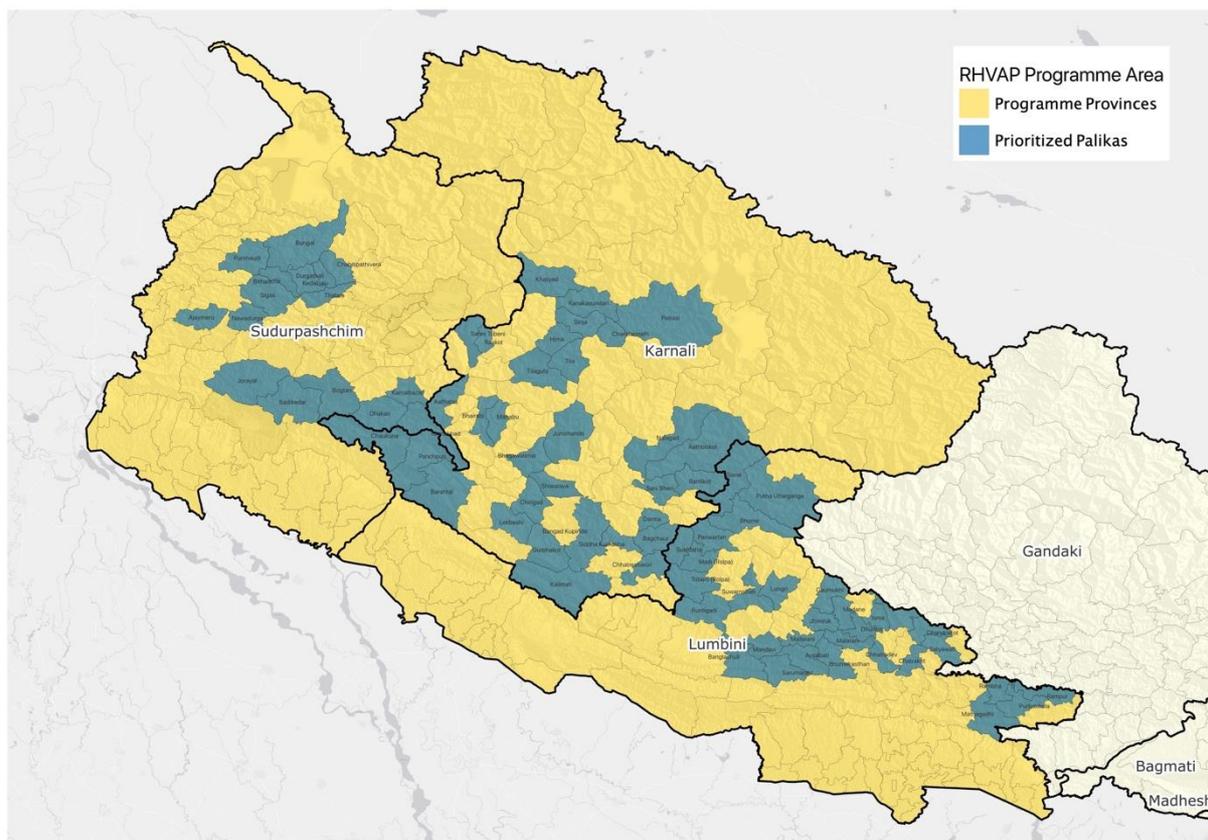


Figure: Palika selection criteria

Note:

Equation 1. Weighted Indicator 1 = Indicator Value 1 x Weight 1

Equation 2. Index = A (Weighted Indicator 1 + Weighted Indicator 2 + ...) x B

Geographic Targeting Framework. To inform R-HVAP's palika selection, a targeting framework was developed to create a Geographic Targeting Index that combines the following selection criteria: (i) presence of target groups (poor and vulnerable communities, women and youth); (ii) production potential; (iii) market accessibility; (iv) presence of ongoing or recently completed IFAD-financed projects (ASDP, ASHA, and

KUBK) and (v) agroecology potential. Relevant indicators and proxies were identified for the set of criteria within the targeting framework. Data was acquired from well-established and reputable sources. Figure below presents the indicators used.

| Indicator / Proxy | Description | Data source | Date |
|-------------------------------------|--|-----------------------|------|
| Poverty / Vulnerability index | Combination of hazard sensitivity and lack of adaptive capacity. | MOFE | 2021 |
| Female population | Population of female of reproductive age (15-49yrs). | Meta | 2018 |
| Youth population | Population of technologically aware youth (15-24yrs). | Meta | 2018 |
| Cropland area | Cropland percentage of palika land area. | MOFE | 2019 |
| Poor soil health / SOM less than 2% | Area of cropland with less than 2% soil organic matter (SOM). | NARC | 2022 |
| Road accessibility | Percentage of population living within 2km of all-season roads. | WFP / Meta | 2018 |
| ASDP, ASHA & KUBK palika coverage | Percentage of wards within each palika covered by ASDP, ASHA & KUBK. | IFAD | 2023 |
| Organic production potential | Potential for organic production within the programme period. | IFAD / MOLMAC Karnali | 2023 |

Geographic Targeting Index. GIS and statistical methods were used for data processing, including calculation of absolute to relative numbers and zonal statistics for converting gridded datasets to the palika level. The datasets were then normalized using the linear min-max method, bringing all values to a range between zero and one. Indicators contributing negatively to the targeting framework (i.e. poor soil health) were inverted during the normalization process. The indicators were weighted and calculated (Equation 1), and the geographic targeting index was calculated for each palika using the weighted values based on additive and multiplicative aggregation (Equation 2).

Palika Selection. Palikas with the highest scores were identified based on the Geographic Targeting Index. Palikas with lesser scores but adjacent to Palikas with high index scores were also prioritized as a means to create a contiguous agroecological cluster. High hill palikas with high index scores but without current road access will be revisited for implementation after roads have been constructed and market accessibility is ensured. Based on the above, a total of 80 Palikas have been prioritized for implementation (presented in Table 2), to be validated at programme start-up in consultation with the respective provincial governments. The complete list of selected Palika and the detailed datasets and maps used for selection are available in Annex of the PIM.

Within the prioritized Palikas, an exercise will be carried out to demarcate and analyse agroecological production clusters for priority commodities that have proven domestic and export market demand. The prioritisation and selection of clusters within the palikas will be done using the following criteria: (i) poverty incidence; (ii) presence and maturity of Producers Organisations (POs); (iii) proximity to road corridors; and (iv) credible market opportunities where smallholders can profitably compete. More remote clusters will be brought into operation once the supply chains adjacent to road corridors are operational. Operations will commence immediately in Karnali province given the advanced level of POs supported by previous and on-going IFAD projects.

5. Programme Components, Sub-components and Activities

R-HVAP aims at scaling-up market-oriented agroecological farming systems that generate economic benefits for smallholder farmers, while providing environmental and food system benefits. The programme ambition is to support smallholder agriculture transition towards inclusive, agroecological and profitable agri-food systems.

RHVAP features four complementary and interlinked components: (1) Enhanced capacities for transitioning to market oriented agroecological production systems; (2) Improved access to climate resilient productive infrastructure; (3) Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets; and (4) Strengthened policies, regulations and institutions for smallholder agroecological production and trade.

Market demand is the main driver and pull factor of the programme as a whole.

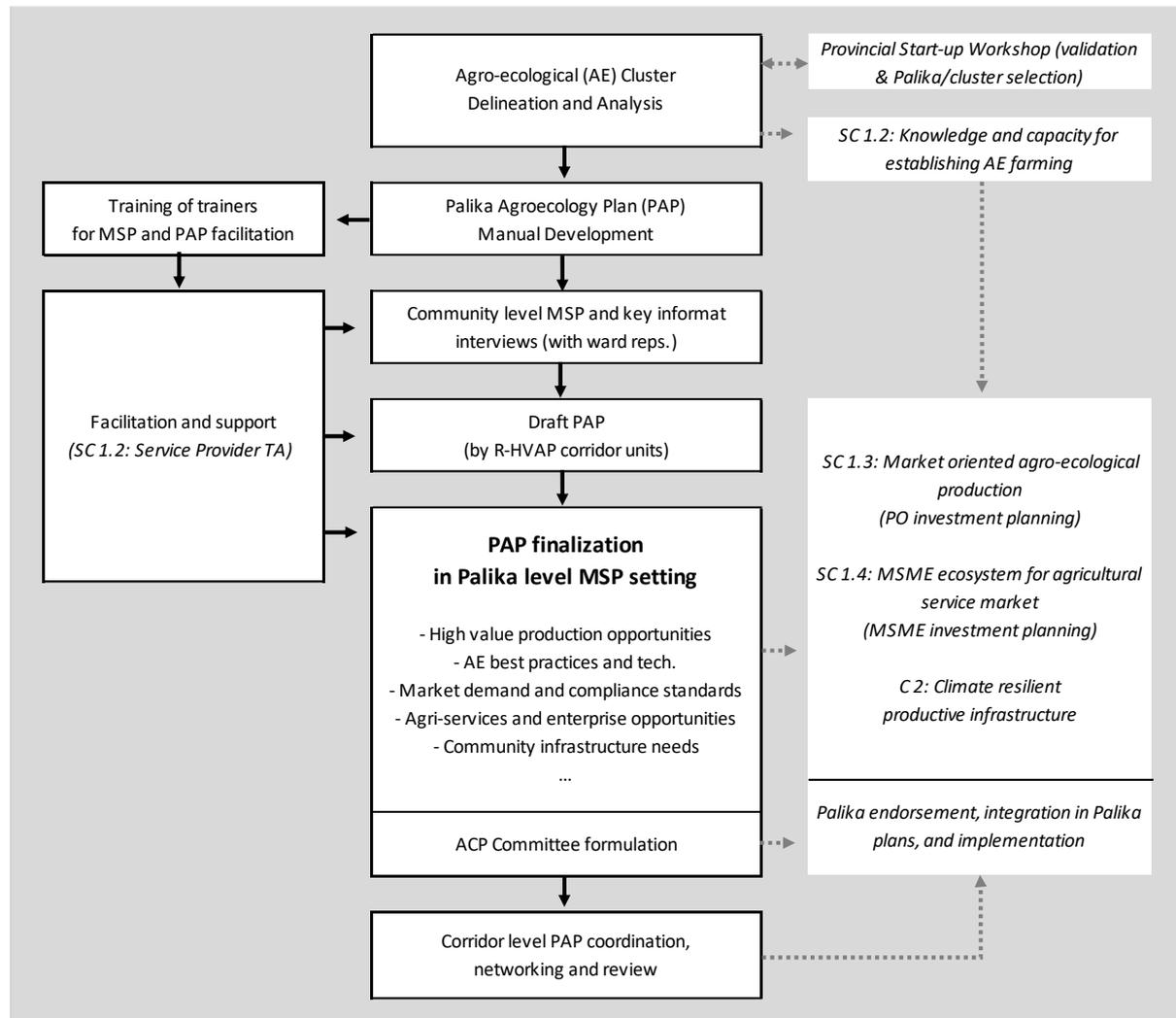
The agroecological approach will directly contribute to enhance product quality, and therefore will allow producers to access better remunerative markets, both domestically and internationally. By promoting the production and use of bio-inputs the programme will facilitate the expansion of certified organic production that can access foreign markets and fetch higher prices for smallholders, and generate foreign currency inflows.

Profitability and viability of agroecological production systems have been confirmed by the Economic and Financial analysis that showed that all 24 crop, livestock, agro-forestry and apiculture production models are financially attractive investments for the programme participants with a financial internal rate of return of above 12.4%, a Benefit to Cost Ratio of more than 1.01 and a positive Net Present Value.

Economic cost-benefit analysis of total programme investment yields an overall EIRR of 18.1%. The estimated NPV for a 9% discount rate is NPR 21,267.60 million (USD 163.59 million) and the BCR of 8.52. A positive NPV under the current Opportunity Cost of Capital (OCC) of 9% indicated that the project investments were sound, robust and quite rewarding from economic perspectives.

Component 1. Enhanced capacities for transitioning to market oriented agroecological production systems

Sub-Component 1.1: Decentralised agroecological planning and coordination



To mainstream the agroecology practices and principles across programme interventions, a 5-Year Palika Agroecological Plan (PAP) will be developed through a local level territorial planning process. The participatory preparation of PAPs will be the principal planning process for mainstreaming market-oriented agroecology practices and principles into smallholder production systems. The key objective of the PAP will be to identify high-value commodities that can be nested within agroecological farming systems and establishing mutually beneficial relationships between POs, vendors and financiers. The territorial planning process will identify opportunities for creating synergies and collaboration between municipalities, networks of agroecology POs and other VC actors around investing in and governance of shared resources and assets. The PAP will also address social economic inclusion, climate change vulnerabilities and circular economy opportunities. As such the PAP planning process will identify investment opportunities for building sustainable agri-food systems and for developing synergies and inter-dependencies between different stakeholders within an agroecological cluster.

Around 80-100 PAPs will be formulated one each in the selected Palika. These PAPs will form the central guiding document for the development of AE investment plans of both POs (SC1.3) and MSMEs (SC1.4) in a synergetic manner, and also guide investments in climate resilient infrastructure (C2). In addition, the PAPs will be the key instrument for orienting the bulk of the R-HVAP financing for alignment with respective ward and municipal development plans and formulating provincial Annual Workplans and Budget (AWPBs) and Procurement Plans (PPs).

As highlighted in the Stock-take report on agroecology in IFAD operations¹⁰³, three key elements of agroecology will be promoted by R-HVAP at farm and/or landscape level: (i) increased resource use efficiency to reduce and/or substitute external inputs; (ii) recycling of water, nutrients, biomass and energy; and (iii) diversification and integration of different farming sectors (various crops and/or animals) for high levels of biodiversity. Considering R-HVAP is an investment programme, particular attention will be given to ensure the market orientation and economic viability of the agroecological practices and technologies promoted.

The overall framework for the programme interventions will draw on an agroecology approach defined by the ten elements of agroecology approved by the FAO council in 2019¹⁰⁴, described in the box below:

Box 1. Agroecology (AE) appeared in the 1920s when scientists used the term to refer to the application of ecological principles to agriculture, where diversity, recycling (energy, nutrients, water and biomass) and effective use of resources in the farming systems are essential. It is an innovative approach that over time has become a holistic approach defined by Gliessman (2018) as the integration of ecology, economy and society in food systems. The Gliessman establishes five levels that characterize a gradual agroecological transition: in the first two levels, the increase in efficiency and recycling in the use of resources allows for a substitution and reduction in synthetic chemical inputs; at the third level agro-ecosystems are redesigned according to ecological processes, while the last two levels look at direct commercialization and transformation to local and regional food systems. In December 2019, the member countries of the FAO Council adopted the framework of the ten elements of EA.

The five levels defined by Gliessman are not meant to be sequentially implemented. Innovative market access approaches should be integrated from the beginning of an AE transition process. Through low-cost participatory guaranty systems (PGS), digital platforms and tools for traceability it is important to create more direct connections between producers and consumers around the value of sustainably produced, safe and healthy food and ensure more value is allocated to the small-scale producers in the agri-food chain.

EA can increase the resilience capacities of family farmers, reduce their costs and dependence on external inputs, and improve access to nutritious and safe food. EA practices maintain a high diversity and integration of crops and animals in farming systems complemented by practices that conserves soil and water resources. As such, these practices build resilience by spreading risks and improving the nutrient and water buffer capacity of the system. The EA emphasizes the importance of farmer empowerment, joint experimentation and sharing of knowledge. AE also emphasises the inclusion of women and youth. As such, it can be a successful approach to achieving IFAD's four main priorities: climate change, gender, nutrition and youth, and is also a relevant option for indigenous peoples.

1. Agroecological planning framework

Currently, agriculture sector planning at the municipal level is done on an annual basis and lacks a medium to long term framework that facilitates iterative and incremental

¹⁰³ <https://www.ifad.org/en/web/knowledge/-/stock-take-report-on-agroecology>

¹⁰⁴ The ten elements are: Diversity, Co-creation and sharing of knowledge, Synergies, Efficiency, Recycling, Resilience, Human and social values, Culture and food traditions, Responsible governance, Circular and solidarity economy. <https://www.fao.org/agroecology/overview/overview10elements/en/>

agriculture sector development. The PAP will be a strategic costed multi-year framework that will inform the respective municipalities' Agriculture Sector Development Plans (that have yet to be developed) and integrated into the municipal Medium-Term Expenditure Framework (MTEF). The PAP development process will incorporate proven tools, methods, and best practice for community-based planning from previous projects, such as HVAP and ASDP's multi-stakeholder platforms (MSPs), and LAPA planning under ASHA. The PAP process will be informed by the following: (i) Agroecological Cluster Delineation and Analysis, and (ii) Development of the PAP Manual.

Agroecological Cluster Delineation and Analysis: A participatory exercise will be carried out to demarcate agroecological production clusters for priority commodities that have proven domestic and export market demand. Existing provincial zoning, such as under the Karnali Organic Mission, will form the basis. An agroecological cluster is a geographic unit with common agroecological features within the municipalities and has potential for the production of a diversity of commodities, including high value commodities with proven market demand. The cluster delineation will be a landscape level analysis of the programme area based on the following:

- Agroecological conditions, current production levels, farming practices, food and nutrition security needs, climate risks, infrastructure, market access (road corridors), market and value chain analysis.
- Potential programme participants, including poor, women, youth, marginal groups (IP and Dalits) and POs, expressing interest and specific needs with regard to transitioning to commercially oriented agroecological production systems.
- Opportunities, capacity and knowledge gaps and needs within each cluster (among both smallholder communities and government representatives) for facilitating the transition to commercially oriented agroecological farming, such as agroecology advisory services, bio-input production, community infrastructure, partnerships between POs and MSMEs, agroecological action research, aggregation and processing needs, geographical identification and branding, traceability, PGS certification, and marketing and e-commerce.
- Most suitable high value commodities, and agroecological best practices at the farm and landscape level.

This exercise will be conducted within the first 6 months of programme start-up in order to inform other activities in a timely manner. The findings of this exercise will be validated and used during the Start-up Workshop for the prioritization of palikas and clusters of implementation. Further, the findings of the exercise on the knowledge and capacity gaps within identified clusters for transitioning to agroecological production systems will guide the implementation of Sub-component 1.2 Knowledge and capacity for establishing agroecological farming, and in particular, to the development of the R-HVAP Knowledge Management Strategy and Policy Engagement Plan.

PAP Manual. An PAP Manual will be developed prior to the launch of the PAP formulation process for guiding the planning process, including a 5-year planning template and community-based monitoring mechanisms (in line with PGS). Each PAP will assess respective clusters for the challenges, opportunities and gaps in AE production and services, and will include a detailed 5-year action plan, with annually prioritized and budgeted investment activities, identify the following:

- High-value commodities that can be nested within agroecological farming systems;
- Farm level agroecological best practices suited to local socio-economic and ecological contexts, and aligned to the compliance standards of domestic and export markets;
- Market demands and compliance standards for both domestic and export markets;
- Agri-services and enterprise opportunities;
- Public goods and productive infrastructure needs;
- Potential programme participants for channelling direct support for agroecological production and MSME development; and
- Community-based monitoring mechanisms.

The PAP Manual will be informed by the findings of the Agroecological Cluster Delineation and Analysis, and will be developed by the same service provider. Following the PAP Manual development, facilitators will be trained for guiding the PAP process, including 40 Junior Technical Assistant (JTAs) and 80 Community Mobilisers (CM).

2. 5-year Palika Agroecology Planning

The agroecological clusters identified within the programme area through the Cluster Delineation and Analysis will form the geographic units for the formulation of 5-year Palika Agroecological Plans (PAPs). PAPs will be formulated through a community level participatory process. Within each Palika, multi-stakeholder platforms (MSP) will be created comprising of key stakeholders including representatives of each beneficiary group, including marginalised communities, POs, cooperatives, MFIs, MSMEs, traders, service providers, and ward and palika governments, who will engage in the development of their respective PAPs.

A draft PAP will first be formulated by programme staff using the findings of the Cluster Delineation and Analysis as the evidence base, and through consultations in community-level MSP settings and key informant interviews involving ward and community representatives. Following the formulation of the draft PAP, a palika level MSP workshop will be organized to review and finalize the PAP. In particular, for ensuring sufficient market-orientation, the identification of major traders and enterprises will be a continuous process under Sub-component 1.3, and when possible, they will be encouraged to participate in MSP processes during the Draft PAP formulation and finalization. PAPs will be considered “living plans” and will be reviewed and revised by respective MSPs annually or as needed. Consequently, the PAPs will guide the formulation of individual POs and MSME business plans that respond to the clear identification of opportunities and gaps in production, services, and potential partnerships within each cluster.

PAP Committee. During the MSP workshop for PAP finalization, a PAP Committee will be formed to facilitate the implementation, monitoring and progress review processes. The Committee will be led by a Palika representative, and will include 5-7 members from POs, MSMEs, and other key stakeholders, and will support the Palika endorsement and integration of PAP activities into Palika plans. The Committee will also participate in corridor level coordination, networking and review events. In addition, they will facilitate the identification and selection of community resource persons such as community mobilizers and lead farmers.

| | | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul |
|-------------------|--|------|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-------------------------|
| Phase | Local-Level Plan Formulation Guideline 2075 | Shra | Bha | Ash | Kar | Man | Pou | Mag | Fal | Chai | Bai | Jes | Asa | |
| Budget Assessment | Income/Expense Statement submission | | | | | | | | | | | | | Poush-End / Mid-Jan |
| | Federal and Provincial budget ceiling announcement | | | | | | | | | | | | | Chaitra End / Mid-April |
| | Budget source assessment and ceiling finalization | | | | | | | | | | | | | Baisakh 10 / April 25 |
| Planning | Community level activity selection | | | | | | | | | | | | | Baisakh End / Mid-May |
| | Ward level activity selection and prioritization | | | | | | | | | | | | | Jestha15 / End-May |
| | Palika work plan and budget formulation | | | | | | | | | | | | | Asaar 5 / June 20 |
| Endorsement | Palika plan submission | | | | | | | | | | | | | Asaar 10 / June 25 |
| | Palika plan presentation | | | | | | | | | | | | | Asaar 10 / June 25 |
| | Palika plan endorsement | | | | | | | | | | | | | Asaar End / Mid-July |

Table. Local level plan formulation process and deadlines (LGOA 2074).

Palika Plan integration. The PAP activities eligible for R-HVAP financing will be consolidated at the ward and municipal level. Following the Local Government Operation Act 2074 (LGOA 2017), and with the support of the PAP Committee, the programme will participate and present the PAPs in respective ward and municipal planning processes for endorsement. The PAP development process will be aligned with select entry points of the annual local planning process for identification of municipal co-financing and integration into the municipal annual development plans. The PAP will be the basis for developing the R-HVAP AWPBs through the aggregation at municipal, provincial and

federal levels. In addition, the PAPs will also be used as a multi-year agroecology strategy to inform the respective municipalities' Agriculture Sector Development Plans (that have yet to be developed in most municipalities) and integrated into the municipal Medium-Term Expenditure Framework (MTEF). Around 200 PAPs will be formulated within 80-100 municipalities.

Implementation Arrangements. The PAP formulation process will be facilitated by R-HVAP Corridor Offices, in coordination with and participation of local government representatives. Under the oversight of the Corridor Offices, the development of the PAPs will be led by a service provider that has the appropriate skills and knowledge to mainstream agroecological approaches and practices and supported by JTAs and CMs.

Table. Key activities and responsibilities under Sub-component 1.1.

| SN | Activities | Responsibility | | Partner | Notes |
|----------|---|----------------|-----------------------------|-----------------------|---|
| 1 | Agro-ecological planning framework | | | | |
| A | Agro-ecological Cluster Delineation and Analysis <ul style="list-style-type: none"> • Selection of service provider for 1a and 1b (Consulting Firm 1) • Develop ToR for hiring Consulting firm • Recruitment Process • Monitoring & Supervision of Consulting Firm | PCO | Agroecology & Business Team | SP: Consulting firm 1 | Results will be validated and used during the Provincial Start-up Workshop for the selection of Palikas and clusters. Informed by the cluster analysis, the KM Strategy and Policy Engagement Plan, and the Analytical Framework (SC1.2) for participatory research and monitoring will be developed by the same SP. |
| B | PAP Manual Development | PCO | Agroecology & Business Team | SP: Consulting firm 1 | |
| C | PAP Manual Publication | PCO | Procurement Officer | SP: Goods | |
| D | Training of trainer for MSP and PAP facilitation <ul style="list-style-type: none"> • Recruitment guidelines • Recruitment of staff • Training of trainer events | PCO / Experts | Agroecology & Business Team | | |
| 2 | Palika Agro-ecological Planning | | | | |
| A | Palika Agro-ecological plan formulation in MSP setting <ul style="list-style-type: none"> • Stakeholder mapping for palika and community consultation • Community level consultation in MSP settings and KII involving Palikas representatives • Draft PAP formulation (D.0) by project staff - with linkages to AE Analysis - | PPMO / CU | Field staff | SP -TA | The PAPs will directly inform the investment plans of both POs (SC1.3) and MSMEs (SC1.4), and also guide investments in climate resilient infrastructure (C2) |

| | | | | | |
|----------|--|-----------|--|---------|--|
| | <ul style="list-style-type: none"> integrating AE principles • PAP finalization in palika level MSP setting • Formulation of PAP Committee during PAP finalization MSP | | | | |
| B | <p>Local level plan integration</p> <ul style="list-style-type: none"> • PAP integration - Ward / community level planning process - participation • Facilitate and support Palika for PAP endorsement & implementation • Facilitate PAP integration in Ward level planning Process | PPMO / CU | | Palikas | |
| C | Corridor level PAP coordination, networking and review | | | | |

Sub-component.1.2 Knowledge and capacity for establishing agroecological farming

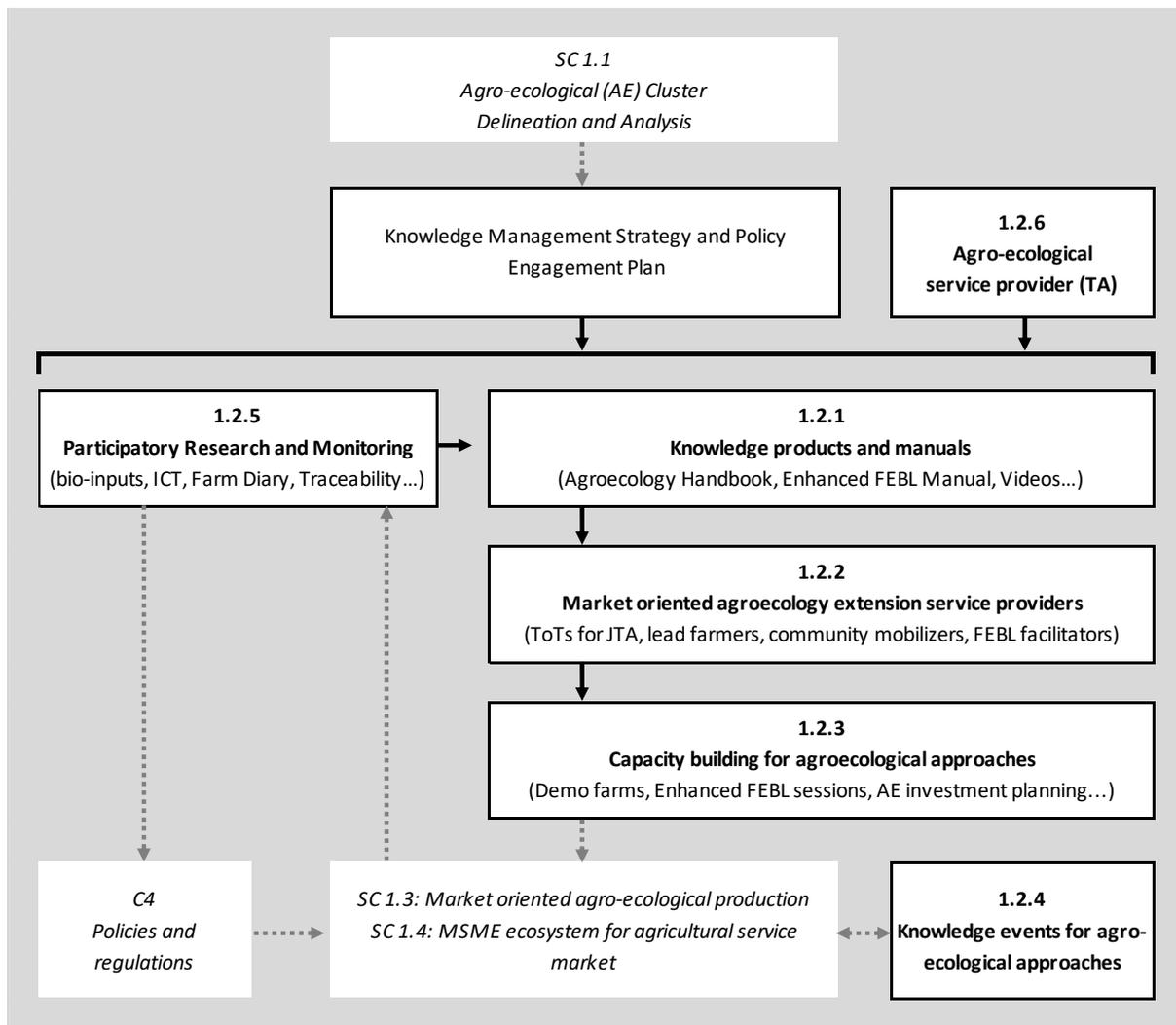


Figure: Key activities and interlinkages under Sub-component 1.2

Under sub-component 1.2, R-HVAP will build on the existing knowledge base of agroecology by upgrading the currently available knowledge products and resources (such as the permaculture handbook), and by disseminating good practices through a training of trainer approach for Junior Technical Assistants and Community Mobilisers. Agroecological demonstration farms will be established in cooperation with around 80 lead farmers. This activity will be combined with in-depth training on the different technical aspects of agroecological farming, together with a Financial Education and Business literacy trainings (FEBL) as well as a lighter version of the Gender Action Learning System (GALS lite). The FEBL-GALS-lite sessions will be used as an entry point to advance women's leadership and economic empowerment. This sub-component also includes youth agroecology apprenticeship for about 60 young agricultural trainees, as well as Farmer to Farmer exchange that will contribute to building a large community-of-practice (COP). Finally, Participatory Research and Monitoring will involve the preparation of an analytical framework designed to study and monitor the ecological, economic and social outcomes and impacts of agroecological farming and marketing systems.

1. Knowledge products

KM Strategy and Policy Engagement Plan. The Programme will invest in good quality, evidence-based knowledge management to contribute to implementation and policy development processes. A KM Strategy and Policy Engagement Plan will be developed that considers and responds to the knowledge and communication needs of all key stakeholders, including programme participants (youth, POs, MSMEs), provincial and local governments, and the R-HVAP team as well. The strategy will respond directly to the findings of the Agroecological Cluster Delineation and Analysis, which will identify the knowledge and capacity gaps and needs of both smallholder communities (production) and of government representatives (policy) for transitioning to market-oriented agroecological production systems. The strategy will also take into consideration the need for both horizontal (peer-to-peer) and vertical (multi-stakeholder) knowledge and communication pathways in order to address issues of risk perception and trust.

Along with the KM Strategy, a Policy Engagement Plan will be developed directly addressing the priority policy research areas and evidence needs of policy-makers identified by the Agroecological Cluster Delineation and Analysis. This will then be used to ensure the Programme is collecting sufficiently robust data on these issues through M&E systems and thematic studies to provide evidence-based policy inputs, particularly through activities under Participatory Research and Monitoring.

Agroecology Curriculum and Handbook. R-HVAP will build on the existing knowledge base of sustainable agriculture, agroecology and permaculture¹⁰⁵ practiced in the country for over 30 years, and improve on it by adding aspects of market orientation for economic viability. While permaculture is able to create resilient multi-commodity production systems it needs further improvement for making these systems financially attractive to the farmers. In this regard, the existing The permaculture curriculum and handbook will be upgraded through the inclusion of market orientation and financial education and business literacy (FEBL) for training smallholder farmers. This will be used as a resource material for Enhanced FEBL courses and technical trainings on demonstration farms aimed at enhancing smallholder capacities.

Extension through videos and social media. R-HVAP will produce instructional videos (in vernacular) on agroecology approaches and technologies for facilitating wider up-take among farmers. Further, social media platforms will be used as a knowledge repository and medium for dissemination.

Manuals and Guidelines. A critical number of manuals and guidelines will be developed to support the Programme's knowledge and capacity building activities, including the Enhanced FEBL Manual, and a guideline for demonstration farm establishment. For FEBL, the Programme will take existing resources from ongoing IFAD-financed projects (ASDP-FEBL, RERP-FEEK/GALS), and enhance the modules by integrating agroecology and GALS.

2. Market oriented agroecology extension service providers

Market-oriented AE extension agents. A cadre of 40 Junior Technical Assistants (JTAs) and 80 Community Mobilisers (CMs) will be trained, both in-class and on-farm, on commercially oriented agroecological farming, PAP preparation and cluster coordination (MSP, B2B, B2S). This cadre will undertake outreach, agroecological extension,

¹⁰⁵ Permaculture is defined as, "consciously designed landscapes which mimic the patterns and relationships found in nature, while yielding an abundance of food, fibre and energy for provision of local needs" (Holmgren 2013 Essence of Permaculture). Mollison (1991) presented it as the following: "permaculture is a philosophy of working with, rather than against nature; of protracted and thoughtful observation rather than protracted and thoughtless labor; and of looking at plants and animals in all their functions, rather than treating any area as a single product system". Fundamental to this approach is the generation of optimal yields per unit of human or other forms of energy expended. As such, among other principles, a permaculture farm is organised (zoned) in a thoughtful manner to facilitate energy conservation and flow among its different zones.

household level investment plan development, and M&E. R-HVAP will work with certified permaculture trainers to undertake TOT based on the Agroecology curriculum. Among other tasks, the trainees will be required to organise and assist the certified permaculture trainer with PO trainings described under Activity 1.2.3 Capacity building for agro-ecological approaches. This will provide further exposure for the trainees on how to conduct trainings and it is expected that after 5 – 6 PO trainings the JTAs/CMs will be able to provide trainings independently.

Enhanced FEBL facilitators. The programme will train around 700 FEBL Facilitators, who will be responsible for conducting FEBL courses for approx. 3 POs. FEBL and GALS lite will be delivered by FEBL Facilitators (FEBLF). The FEBLFs will be trained by the programme in both financial and women’s empowerment aspects, as successfully demonstrated in IFAD’s ASDP and RERP projects. The Programme will also consider FEBL Facilitator’s role in farm diary entry, especially in regularly capturing data on the sales and financial performance of the producers and producer groups in clusters. The Facilitators will be paid certain remuneration for delivering the training course and providing support to the producer organization on data collection through Farm Business Diaries.

FEBL facilitators will be selected from within the POs and communities supported. The following are the proposed selection criteria:

- At least 10+2 or intermediate equivalent education.
- Priority given to Candidates having prior experience on adult literacy classes.
- Female candidates will be prioritized.
- Good understanding on local and Nepali language
- Good communication and motivation skills
- Age 16 to 40 years

3. Capacity building for agro-ecological approaches

Agroecological demonstration farms: For effective programme implementation it is estimated that 80 agroecological demonstration farms need to be established initially, one in each Palika, with the option of further demonstration farms set up with additional financing. During the PAP development process, interested lead farmers will be identified for establishing strategically located demonstration farms. The lead farmer will be trained in agroecology for converting their existing farm into fully functional agroecological farms. The cost of establishing a demonstration farm will be borne by the programme, with in kind contribution from the lead farmers. The lead farmer will also be eligible for accessing the MSME financing window if he/she wishes to establish an enterprise.

The demonstration farms will serve three purposes: i) function as an on-farm training and demonstration centre for capacitating the different categories of beneficiaries and POs with the knowledge necessary to transit to commercially oriented agroecological farming; ii) provide youth apprenticeships for on-farm training; and iii) conduct participatory action research (on 10 of 80 farms).

2-day market oriented agroecology orientation and investment planning. After the selection interested POs for production support (SC 1.3), a 2-day orientation training will be held for each PO on commercially viable and gender empowered agroecological farming, followed by the preparation of investment plans informed by respective PAPs. Where possible, these orientations will be held in demonstration farms.

Enhanced FEBL for POs. The 2-day orientation will be followed by Enhanced Financial Education and Business Literacy (FEBL) for all members of the producer's organisations, particularly women. The programme will provide essential financial and business skills so they can transform their farming as a business and managing a group enterprise

The classes will be conducted 1-2 sessions per week, delivered on a peer-to-peer basis by FEBLF trained by the programme. Each FEBLF will facilitate FEBL courses to 3 POs on average. The course will span around 60-70 hours spread over 32 sessions, and will cover the different technical aspects of agroecological farming, a truncated version of the Gender Action Learning System (GALS lite), combined with FEBL courses on financial literacy and household finances, managing a farm as a business, and managing a group enterprise. The lead farmers will be required to provide 6 technical sessions (2 -3 hours per session) on more in-depth training on specific aspects of agroecology (beneficial soil micro-organisms, plant guilds and IPM etc.). The sessions will focus on Agro-ecological farming approaches and be delivered on-farm by the person (Lead Farmer, Agriculture technicians) having sound practical knowledge of Agro-ecological farming system in the demonstration farm established under the Programme. The Community mobiliser associated with the service provider will provide regular backstopping and supervision of the FEBLFs and facilitate the participation of suitable resource persons from relevant Institutions to attend selected sessions of the FEBL training course.

The FEBL-GALS-lite sessions will be used as an entry point to advance women's economic empowerment. These sessions will address the structural socio-cultural and economic barriers that women experience and identify action points for addressing them. The GALS visioning tool, for example, will be introduced so that women may map out their challenges, opportunities, milestones, and support needs. These visioning roadmaps will be monitored by FEBLFs and community mobilisers to assess progress and to identify additional supports for reaching the next milestone. Once group members have mastered the methodology, they will be encouraged to replicate the visioning exercise at the household level. FEBLFs and CMs will provide peer support to individual members to address challenges raised at the household level. The sessions will include discussions on family support for achieving roadmap milestones and elimination of gender-based violence.

Youth agroecology apprenticeships at demo farms: Initially, 60 youth agricultural trainees will apprentice under lead farmers over a 6-month period of two cropping cycles. The lead farmer will be providing knowledge in exchange for cost-free labour. The trainees will be provided with USD165 per month (NPR 21,500) to cover the costs of board and lodging, and a stipend as an incentive. Where possible the trainees will reside with the lead farmer or alternatively in nearby home stays. Drawing on the initial lessons from this initiative, the number of youth trainees will be scaled up significantly with additional financing.

4. Knowledge events for agro-ecological approaches

The programme will facilitate peer-to-peer exchanges among POs and MSMEs for cross fertilisation of knowledge and for building a large community-of-practice (COP). These exchanges will be calibrated to exchange knowledge between those at a more advanced stage with those seeking to reach the same level, within and across provinces.

5. Participatory Research and Monitoring.

An analytical framework will be developed in partnership with the National Agricultural Research Council (NARC) to study and monitor the ecological, economic and social outcomes and impacts of agroecological farming and marketing systems. The analytical framework will be guided by the KM Strategy and Policy Engagement Plan, and will draw on existing frameworks such as, IFAD's Resilience Design and Monitoring Tool (RDMT) and the FAO's Tool for Agroecology Performance Evaluation (TAPE) among others, to delineate a set of research activities and methods for implementation at demonstration farm level. Topics for thematic research and monitoring will include key intended outcomes and impacts of Programme activities, and the enabling factors and constraints faced, for example, profitability and return on labour of agroecological production

systems, impact on ecological health and biodiversity, resilience and loss and damages during extreme events, foreign exchange generated or saved through exports and import substitution, and other relevant aspects. This will not only support monitoring progress of interventions and making course corrections, but also, support evidence-based knowledge generation, knowledge products, and policy briefs.

PAR. The programme will support joint experimental learning and participatory action research at 10 demonstration farms in collaboration with researchers focusing on optimizing agroecology practices and technologies for generating multiple benefits. To support the systematic monitoring and learning for scaling up and course corrections, the programme will work in partnership with NARC, 4 PhD degree students and an agriculture policy-oriented institute. A lumpsum budget has been allocated for this intervention, and details will be jointly worked out in start-up phase of the programme implementation.

Farm Diaries. In addition to the research at demonstration farms, the Programme will also make use of simplified farm business diaries, with lessons from other IFAD-financed projects in Nepal. The diaries will be used by all supported PO, allowing the Programme to monitor and study the ecological, economic and social outcomes of agroecological farming and marketing systems. To the extent possible, tablets and mobile phones will be used for data entry of farm diary accounts into the MIS, enabling immediate outcome level analysis.

6. Agro-ecological service provider

Agroecological farming is knowledge and skill intensive, and needs structured technical support over the medium-term. As observed during field visits, adoption of effective agroecology practices cannot be achieved through a single and stand-alone training but requires a “learning-by-doing” approach over the course of 2 – 3 years. This needs to be supplemented by the creation of a network for exchange of experiences and innovations. As such, the engagement of a service provider with technical and practical experience in agroecology is needed. This service provider will support the Programme in a host of activities as below.

Table. Key activities and responsibilities under Sub-component 1.2.

| SN | Activities | Responsibility | Partner | Notes | |
|----------|---|----------------|-------------------------------------|-----------------------|---|
| 1 | Knowledge products and manuals | | | | |
| A | Knowledge Management Strategy and Policy Engagement Plan | PCO / PPMO | KM with Agroecology & Business team | SP- Consulting firm 1 | Informed by the SC1.1.1 AE cluster analysis, by the same SP. |
| B | Develop agroecology curriculum and handbook | PCO / PPMO | Agroecology & Business team | SP- Consulting firm 1 | Existing permaculture handbooks will be used and enhanced on market orientation |
| C | Agroecology handbook publication | PPMO | Procurement | | |
| D | Enhanced FEBL Manual development with agroecology and GALSlite | PCO / PPMO | Agroecology, Business and GESI team | | Using existing resources of ASDP, RERP and others |
| E | Enhanced FEBL Manual publication | PPMO | Procurement | | |
| F | Instructional videos on agroecology approaches and technologies | PCO / PPMO | KM with Agroecology & Business team | SP - Consulting firm | |
| G | Set-up and operate social media platform | PCO | KM and GESI | | |

| | | | | | |
|----------|--|------------|------------------------------|---------------------------|--|
| H | Guidelines for demonstration farm establishment | PCO / PPMO | Agroecology & Business team | NARC / SP-TA | |
| 2 | Market oriented agroecology extension service providers | | | | |
| A | Enhanced FEBL training - FEBL Facilitators <ul style="list-style-type: none"> • Selection of FEBL Facilitator from within POs/community • Training events | PPMO / CO | | POs | After POs have been selected for co-investment, FEBL Facilitators (preferably women) will be selected from within the PO community with the nomination of PO members. |
| B | Training of Trainers (TOT) – JTA, LF, CM <ul style="list-style-type: none"> • Selection of LF by PAP Committee • Recruitment of CMs and JTAs • Training events | PPMO / CO | | Training consultant | Trainings will be based on the SC1.2.1 Agroecology curriculum/handbook |
| 3 | Capacity building for agroecological approaches | | | | |
| A | Support to set-up agroecological demonstration farms | PPMO/CO | Agroecology & Business team | NARC, Lead Farmer, SP -TA | SC1.2.1 Guidelines for demonstration farm establishment Selection of LF by PAP Committee |
| B | Youth agroecology apprenticeships at demo farms <ul style="list-style-type: none"> • Selection of Youth • Selection of Lead Farmer Facilitate youth placement | PPMO/CO | | PAP committee | Interested and enterprising youth will be selected from within the supported communities through the support of the PAP Committees and agriculture/technical schools in the area |
| C | 2-day market oriented agroecology orientation and investment planning <ul style="list-style-type: none"> • Selection of Trainer • Selection of Demo Farm /Training site • Conduct training at POs level | PPMO/CO | Agro-ecology & Business team | SP - Trainer | |
| D | Enhanced FEBL sessions to POs <ul style="list-style-type: none"> • Selection of Trainer • Conduct FEBL at POs level • Monitoring of FEBL class | PPMO/CO | Field staff | FEBL Facilitator | |
| E | PO group dynamics and leadership training <ul style="list-style-type: none"> • Selection of Trainer • Conduct training at cluster level | PPMO/CO | | | Categorization of POs |
| 4 | Knowledge events for agro-ecological approaches | | | | |
| A | Peer-to-peer exposure and learning visits - Pos | PPMO/CO | | POs | |

| | | | | | |
|----------|--|---------|--------------------------------------|----------------------|--|
| B | Peer-to-peer exposure and learning visits - MSMEs | PPMO/CO | | MSMEs | |
| C | Joint monitoring of agroecological impacts with palikas and other stakeholders | PPMO/CO | | Palikas | |
| 5 | Participatory Research and Monitoring | | | | |
| A | Analytical Framework development | PPMO/CO | M&E with Agroecology & Business team | SP-Consulting firm 1 | Informed by the SC1.1.1 AE cluster analysis and KM & Policy Engagement Plan, by the same SP. |
| B | NARC technical support on framework development, supervision and M&E | PPMO/CO | | NARC | |
| C | System development for traceability and participatory monitoring (incl. ICT) | PPMO/CO | | SP-Consulting firm | |
| D | ICT and equipment for Demo Farm | PPMO/CO | Lead Farmer | SP - TA | |
| E | Remunerations to LF for research, monitoring and data collection | PPMO/CO | | | |
| F | PhD support for Participatory Action Research | PPMO/CO | | | |
| G | Farm diary (light) development and printing | PCO | M&E with Agroecology & Business team | SP - TA | Align with traceability parameters |
| H | Thematic studies (As required) | PPMO | | SP - Various | |
| 6 | Agro-ecological service provider | PPMO/CO | | | Referred to as SP-TA |

Sub-Component 1.3: Market oriented agroecological production expanded

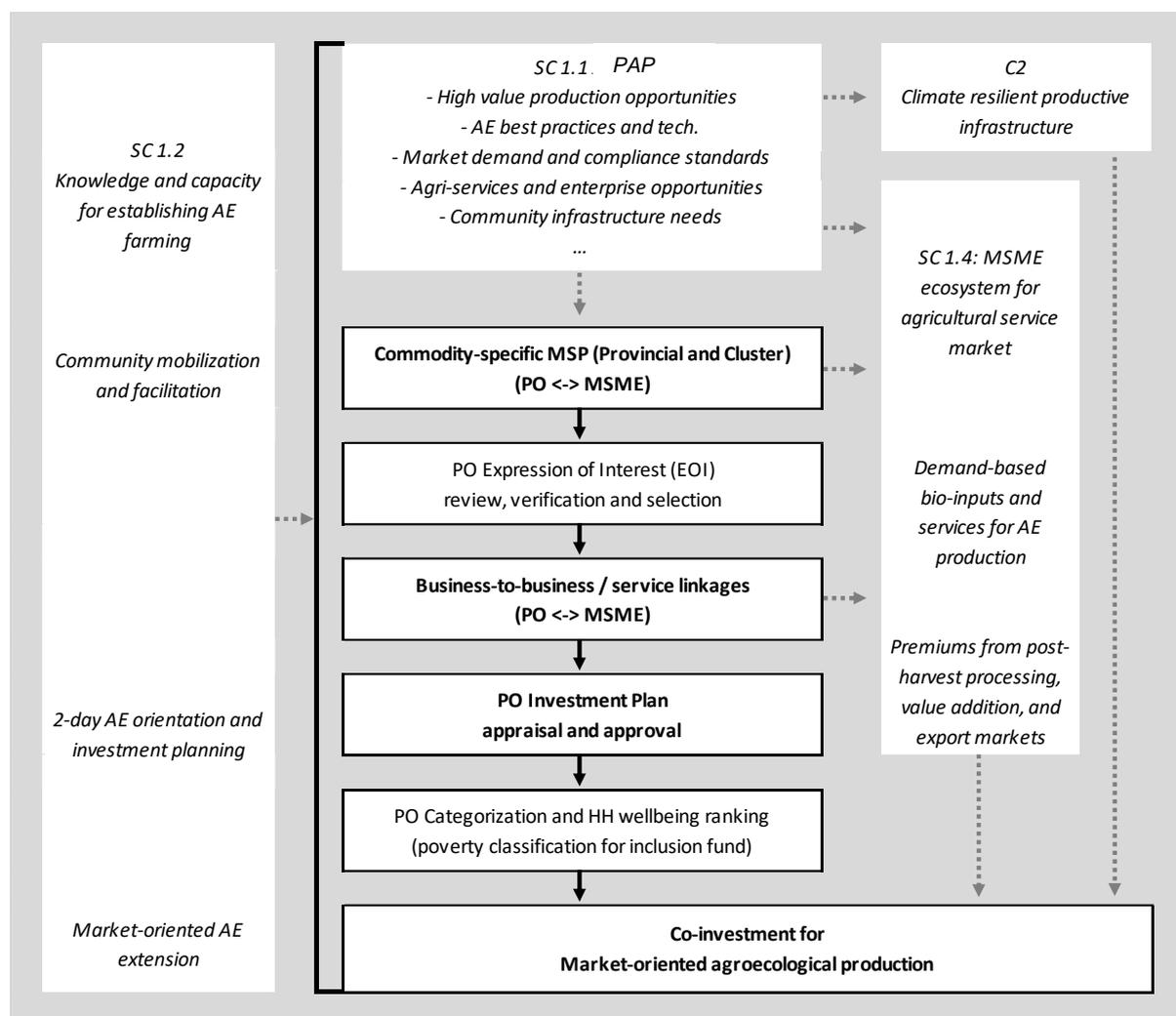


Figure: Key activities and interlinkages under Sub-component 1.3

The Programme will provide market-oriented agroecological production support to at least 1,600 POs (approximately 45,000 farmers), including those support by ASDP, over a period of 4 years. To enhance the capacity of these POs and facilitate the PO graduation process, a specialised service provider will be recruited.

This capacity building process will be assessed to measure the PO and sub-PO graduation to professionalized organisations, using a PO capacity assessment tool adapted from the Producer Organization Diagnostic (POD) tool of the Committee on Sustainability Assessment ([COSA](#)) or other relevant PO assessment tool. COSA's POD: Producer Organization Diagnostic tool. The POD is a free, public online self-assessment that gives immediate scoring and benchmarking as well as useful tips and insights about what makes organizations successful. The core element of the PO assessment will include:

- Producer Organization (PO) Profile
- Products and Productivity
- Membership
- Organizational Structure
- Organizational Systems, including administration, bylaws, accounting, etc
- Financing Sources
- Agricultural inputs supply

- Credit provided to members
- Training and Information including ICT tools
- Commercialization
- Storage and Transport
- Certifications or Standards
- Environment and climate change aspects: water management, resilience to shocks
- Social aspects and inclusiveness : gender, youth dimensions

Multi-Stakeholder Platforms (MSPs). Based on the lessons learned from HVAP, Multi-Stakeholder Platforms (MSPs) will be operationalised to link PO with MSMEs at the cluster and provincial level. Business to Business (B2B) and Business to Service (B2S) linkages will be facilitated for building profitable trading relationships between POs and respectively agribusiness/traders (B2B) and commercial service providers (B2S).

MSPs and B2B/B2S will be high priority ongoing processes from programme start-up in order to create early linkages between POs and major MSMEs and buyers, and leverage the private sector's market intelligence for informing PAPs, PO and MSME investments, market compliance standards, and reduce risks. These will be facilitated by the Provincial Management Unit (PMO) and Corridor Office staff working together with the service provider. It is envisaged that once the MSPs and B2B/B2S mature, the producers and businesses themselves will carry it forward.

Smallholder co-investments and access to rural finance. Based on the PAP, R-HVAP will co-finance PO capacity building and farm-level investments in agroecological farming practices for crops, livestock, agroforestry systems, honey production, NTFPs and PAPS. Participating smallholder farms (around 45,000 households) will be eligible for support of two types of tailored production support packages. The R-HVAP programme participants will be eligible to access financial products supported by the USD 83 million Line of Credit under IFAD's on-going Value Chains for Inclusive Transformation of Agriculture (VITA) project implemented by the Agriculture Development Band Ltd (ADBL)

Measures for inclusiveness: About 3,000 ultra-poor and poor households including those from marginalized groups (Janajatis, Dalits and IPs) will be eligible to access the Inclusion Fund for additional subsidised support.

1. Commodity-specific Multi-stakeholder Platform (MSP)

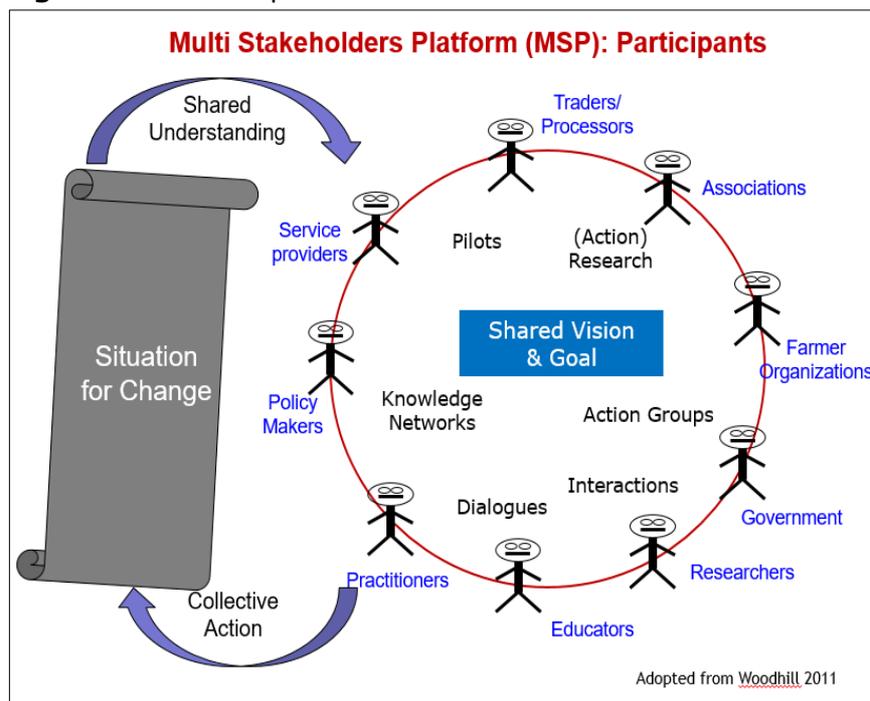
MSPs will be the central element in RHVAP to facilitate the development of Programme prioritized high-value commodities in identified clusters. Through rolling cycles of MSP meetings, MSMEs /Agribusiness are able to identify opportunities and coordinate action to jointly promote the growth and competitiveness of their local industry, tackling issues that individual businesses or POs cannot tackle on their own. MSPs are typically commodity and location-specific and can happen at different levels: corridor/market centre, regionally or at the national level.

MSP is a platform or process of different actors/stakeholders with similar interests interacting with each other to improve the situations affecting them through building trust and confidence, promoting shared learning, joint decision-making and collective action as shown in Fig below. Producers, traders/processors, service providers (Inputs, technical, business, financial) as well as government agencies (provinces, municipalities) and other supporters including research institutions, and insurance companies are participants of MSP meetings as illustrated below.

MSP-specific results include: i) developing a common vision and ownership among value chain stakeholders of opportunities and constraints for growth, ii) Setting priorities and validation of intervention for upgrading the value chain addressing critical bottlenecks, iii) Business to Business (B2B) linkages & relationship, iv) Business to Services (B2S) linkages & relationship, v) Stakeholder coordination, collaboration and partnership, vi)

Knowledge sharing & brokering and vii) Policy advocacy for enabling business environment.

Figure. MSP Participants



MSPs help the POs to meet and forge new and profitable relationships with various businesses and service providers. For government agencies and other supporters, the MSPs allow them to better understand the development opportunities in the local industry and how best to target public resources to support this and achieve the greatest impacts.

Table. MSP process.

| Description | Responsible | | Partners | Remarks |
|---|-------------|--------------|------------------|---|
| Initiation of MSP trajectory | PCO, PPMO | VC & BD team | Private sectors | Carry out a detailed assessment of the sector and value chain (joint mapping, tracking and studies) Connect with key actors for the establishment of MSP. |
| Agenda setting | PCO, PPMO | VC & BD team | | Organise exploration and identification of issues and Draft Agenda |
| Convene MSP meetings. | PCO, PPMO | VC & BD team | TA-SP | Ensure the participation of Key actors and stakeholders during the MSP. - Manage platforms: administrative, logistically |
| MSP facilitation & Coordination | PCO, PPMO | VC & BD team | MSP participants | Multi-actor dialogue to explore and identify challenges and opportunities and jointly identify solutions and Link actors from different institutional backgrounds |
| Mediate sessions for B2B contacts, B2S Contacts within MSP | PCO, PPMO | VC & BD team | POs, MSMEs | Linkages between POs & Business for demand and supply, service delivery, inputs management etc |
| Develop time bound Action Plan and Follow up on the implementation of | PCO, PPMO | VC & BD team | TA -SP | Relationship Buildings and Implementing the solutions addressing the constraints and |

| | | | | |
|----------------------|-----------|--------------|--------|---|
| action plans | | | | tapping the opportunities creating win-win situation |
| B2B and B2S Meetings | PCO, PPMO | VC & BD team | TA -SP | Based on the business opportunities explored during MSP |

MSP will be organised at regular intervals in RHVAP separately for each HVC driven by the actors both at the province/corridor and cluster level with anticipated objectives evolving in a gradual manner, starting with a focus on creating ownership stimulating B2B/B2S linkages relationship.

MSPs require the voluntary active participation of a range of agribusiness/buyers, producer organizations, technical and financial service providers as well as government agencies. The agenda should be led jointly by the businesses and producer organization and not by public sector agencies.

In their role as “Honest Broker” the project teams act as the host/convener of the MSP process for the first 2-3 years. As businesses and POs become more familiar with the process, leadership and coordination of the MSP process are handed over to local industry leaders – typically with several business leaders and leaders of POs working together to lead the process.

Implementation arrangement: MSP will be facilitated by the Provincial and corridor level staff in liaison with concerned stakeholders and institutionalize MSP mechanism, MSPs will be assisted to become self-governing forums, owned by the producers and businesses themselves and aligned with Provincial and Municipal institutions as they establish. The province and corridor team will facilitate this type of B2B, B2S interaction at group and cluster levels at regular intervals followed by regular support and monitoring to ensure the implementation of the joint action plan.

2. Commodity-specific Business-to-business (B2B) and Business to Service Linkages (B2S)

B2B/B2S brokering is the process of supporting specific businesses to build new profitable trading relationships together – typically between an agribusiness/buyer and a producer organization (B2B) or a producer organization and a commercial service provider (B2S). The B2B meetings will focus on developing and negotiating market-led production/ sourcing plans between producers and buyers for a reliable supply of products as required by the market that have a competitive advantage (volume, seasonal & and varietal) creating a win-win situation for both parties as illustrated in the figure below.

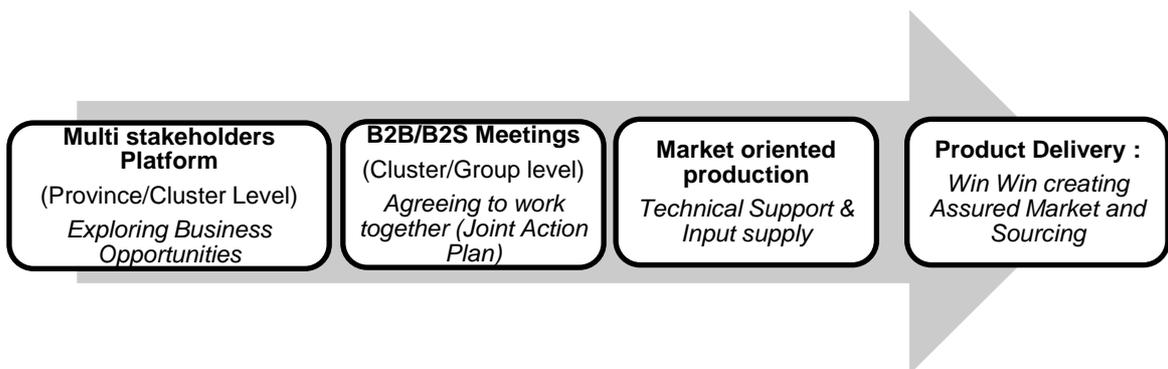


Figure: MSP and B2B interaction sequence to Product delivery

The B2B and B2S linkages are expected to evolve after the MSPs at the province /cluster level, based on experience in the HVAP and ASDP. A key focus is on building trust in the B2B/B2S relationships and supporting the PO so they can develop the skills and confidence to be reliable partners with the business/service providers. In RHVAP,

Business to Business Interactions (B2B/B2S) meetings, as a follow-up of Province/Cluster level MSP, will be held 2-3 times per year depending on the nature of commodities between producer's organisation and buyers/processors that form the basis for individual or joint plans for financing.

Like B2B meetings, after the MSPs, Business to services meetings/interactions will be held so as to facilitate linkages between value chain actors in particular producers and service providers (input supply, business, technical, financial etc.) with a focus on delivering a wide range of services/products to help them transition to agro-ecological farming and grow their businesses.

Implementation arrangement: Being a neutral broker, the B2B/B2S brokering process will be as follows:

- i) Support the Producer Organization to discuss internally and prepare in advance to meet potential business partners, then reflect on these business meetings and make informed collective decisions on whom they want to do business with and how.
- ii) Facilitate introduction and networking among producer organizations, businesses and service providers likely to want to do business together,
- iii) Moderate and monitor bilateral meetings between traders /agri-business and producer organizations,
- iv) Moderate an informal or formal contract with the following contents:
 - a. Basic price or mechanism for setting the price at the time of delivery with prescribed quantity and qualities,
 - b. Expected primary processing and packaging before delivery.
 - c. Mechanism for quality assessment on delivery
 - d. The mechanism for increasing/decreasing offered price in case of change in market price at the time of buying,
 - e. Mechanism to establish reference market price .e.g. published price in the wholesale market
 - f. Agreement on the embedded services and support (post-harvest materials as crates, sacks, advance money etc.) to be provided,
 - g. Description of mechanisms to cover potential non-fulfilment of contract terms in terms of quality, quantity and timely delivery,
 - h. Acceptable mediation partners in case of disputes.
- v) Backstopping the relationship through the first 2-3 years of trading while the relationship matures.

3. Smallholder Co-investment and Access to Rural Finance for Agroecological Production

The objective of the Smallholder co-investment fund is to stimulate private investment by providing partial grants of total investment, to producers' groups for producing market-oriented high-value commodities to promote farm diversification, resource use efficiency and recycling that will contribute to transition into the agro-ecological production system and profitable farm enterprises. Following the Palika Agroecological plan (PAP), R-HVAP will co-finance PO capacity building and farm-level investments in agroecological farming practices for two complementary high value commodities such as crops (vegetables, spices, native crops/NUC, fruits etc.), livestock (native chicken, goat, dairy including shed management for improved compost and fodder/forage management), agro-forestry and other products (apiculture products, NTFPs/PAPs) that have domestic and export market potential, comparative commercial advantage for smallholder producers, and agroecologically suitable production. Commodities that have been successfully promoted by previous projects such as HVAP, KUBK, RERP and ASDP will be prioritized. Commodity combinations with varied gestation periods will be considered to create production packages that provide a steady stream of income in the

short and medium term. Where relevant, perennials with low labour requirements will be considered, especially for women-headed households and persons with disabilities. The indicative diversified packages are outlined in the table below. However, more contextualised agro-ecological packages will be identified from the Agro-ecology cluster delineation and analysis study followed by the scoping market assessment of HVC (domestic and export) conducted during the early stage of Programme implementation.

Table: Indicative diversified agroecological production packages

| Possible Production packages | Purpose |
|--|---|
| Year-round vegetable production: polytunnels, water-efficient systems, seeds, bio-fertilisers and IPM practices | Self-consumption, commercialisation of surplus for local and regional markets (import substitution) |
| Goat and dairy combined with improved sheds for manure management (compost) and forage/fodder plantation. Native chicken | Main source of income. Commercialisation for local and regional markets (import substitution) |
| Native crops and NUS such as, millet, buckwheat, barley, Karnali beans | Important staple food source. Commercial potential for domestic and export markets |
| Apiculture for commercial honey production with butter trees (Chiuri - <i>Diploknema butyracea</i>) (20 hives model), pollination and nutrition (2 hives model) | Multiple benefits: nutrition, income generation, pollination, potential for export |
| NTFPs/PAPs, such as Indian prickly ash or Timur, soap nuts, Cinnamon | Commercialisation for domestic and export markets |
| Spices (ginger, turmeric, cardamom) | Under-supplied export markets. Shade tolerant species |
| Shade grown coffee and cover crops | Production of quality certified coffee in Lumbini and Karnali provinces for export markets |
| Agroforestry systems (apple / walnut / citrus / fodder trees with cover crops) | In conjunction with existing and upcoming orchards (NAFHA project) |
| Seed potato production | Local inputs supply chain supported. Commercialisation for local and regional markets (import substitution) |

The Programme will support up to 50% of the cost in any two types of tailored production packages that complement each other to around 45,000 participating smallholder farmers organised in producers' groups, The co-investment windows for smallholders' investment (Window 1) amount will be a maximum of USD 500 for each household within the POs. However, the differentiated production packages depend on the level of PO maturity and, the type of production packages suitable in the clusters/locality that will be determined during the investment plan development process.

The Producer organisations supported under ASDP and ASHA will be supported USD 300 for only one production package that complements the value chain support they have already received under ASDP. The co-investment support will account for up to 50 % cost of the packages excluding the family labour and local materials and the remaining 50% will be the contribution from the farmers or POs both in-kind (labour, local materials) and nominal cash. The Programme field staff will provide technical support in preparing the investment plan of each HH in POs, which is then compiled and form a common investment plan.

The selection of the production packages for investment will be guided by PAP and driven by the market players with proven demand via the ongoing brokerage and facilitation process organised around the commodity-specific MSP and B2B meetings. However, the

minimum standard interventions (soil & and water management) required for agroecological farming will be part of all the production packages.

The RHVAP will invest approximately USD 45.8 million including IFAD (USD 19.5 million, GoN (USD 6.8 million) and the rest of the beneficiary contribution in kind and cash from its own source or loan from financial institutions to promote market-oriented and profitable agro-ecological production system and diversify climate resilient technologies and value addition on farms, by reducing the risk to the farmer from agro-ecological transformation.

In addition to the above, RHVAP will provide support for community-based irrigation infrastructure development to Producer organisations that will enhance the farming system.

Inclusion Fund. For ultra-poor and poor households including those from marginalized groups (Janjatis, Dalits and IPs), the co-financing fund can be increased up to 80% and the remaining 20% contribution is in kind by these groups. This funding mechanism will enable them to join POs and gradually increase their income for transitioning from subsistence-based agriculture to more commercially oriented agro-ecological farming. The programme has planned to support 3,000 such households under the Inclusion Fund.

The Programme field staff will facilitate to identification of such ultra-poor members involving the community by applying various PRA tools including the Participatory Wellbeing Ranking method as practiced by HVAP and ASDP.

Rural Finance. RHVAP will encourage producers' groups to acquire loans from cooperatives including those supported under KUBK and ASDP and Banks/MFIs. In addition, R-HVAP programme beneficiaries will be eligible to access loan products, supported by the USD 83 million Line of Credit under IFAD's ongoing Value Chains for Inclusive Transformation of Agriculture (VITA) project implemented by the Agriculture Development Bank Ltd (ADBL). The dedicated rural finance officer placed in each PMO in coordination with other staff will facilitate the linkage of POs with financial institutions (Cooperatives, MFIs, Banks including ADBL) to access loans required for their farm investment. The Programme will also facilitate access to financial services, through support to business plan development and through the development of innovative finance and insurance products in partnership with private banks, co-operatives, MFIs and insurance companies.

Please see Chapter 6 for detailed co-investment guidelines.

Sub-component 1.4: MSME ecosystem for agricultural service market strengthened.

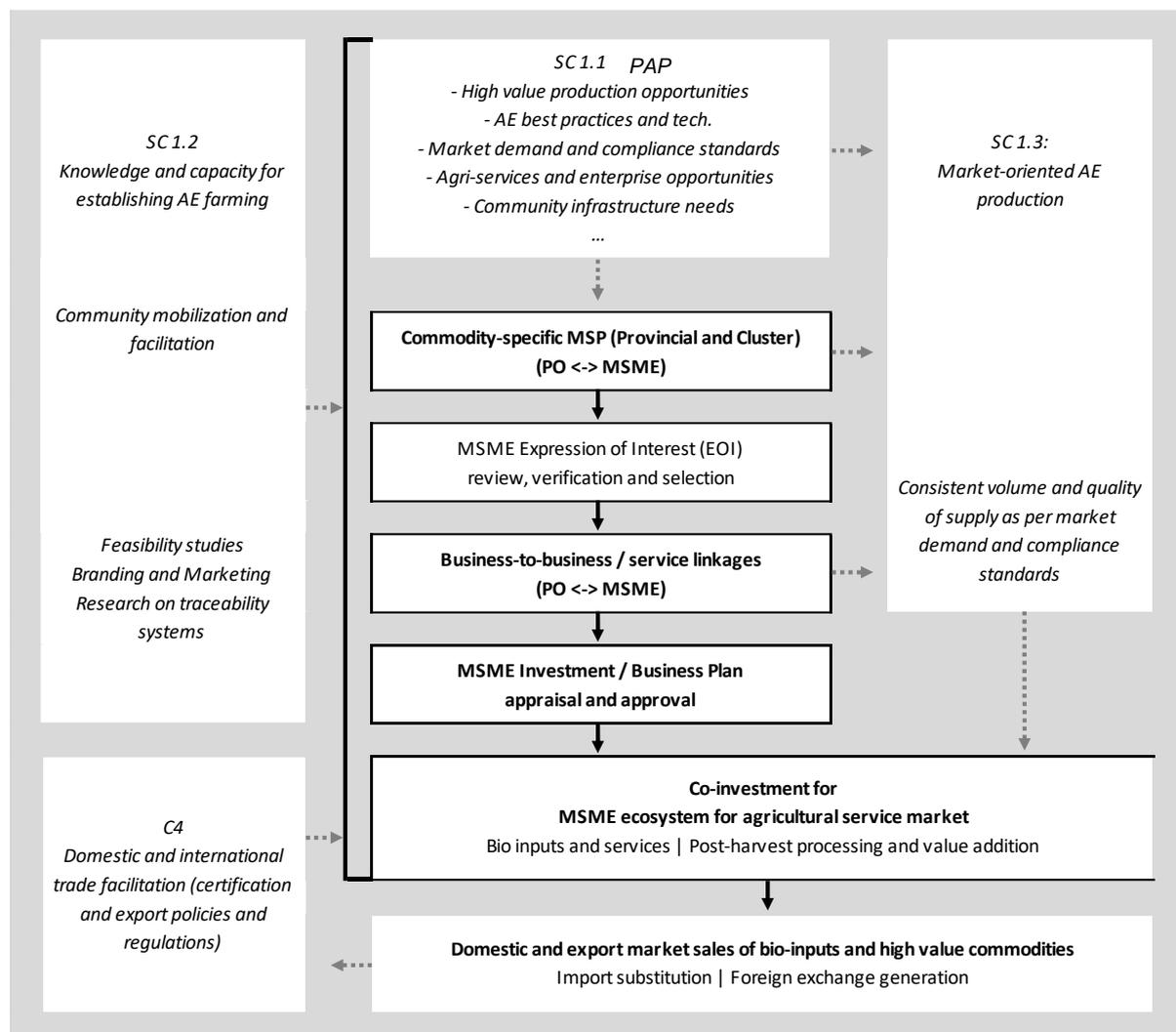


Figure: Key activities and interlinkages under Sub-component 1.4

To facilitate the development of an ecosystem of MSME services to meet upstream and downstream needs of the agroecological multi-commodity value chains, the programme will mobilise specialised expertise at PMO level. Co-investment support will be provided to : (i) Decentralized MSME units for affordable and high-quality bio-input production and (ii) MSME service market for post-harvest value addition.

MSMEs Co-financing. The objective of the MSMEs co-financing are mainly to encourage potential MSMEs to adopt new technologies, new business models or other new services/functions leveraging investment in marketing, the establishment of satellite processing units, export grade packhouses, modern slaughterhouses, multi-chambered cold storage & and aggregation facilities in rural areas for value addition and reducing the post-harvest loss for both producers' groups/cooperatives, agribusiness and processors. The co-financing will make use of identified opportunities and demonstrate innovations in the rural enterprise sector that facilitate wider adoption and scaling-up to develop competitive supply chains creating overall growth without government subsidy and helping create turnover, income, tax revenues and employment.

The Programme will support approx. USD 5.90 million (including MSMEs contribution of 50%) fund as co-finance packages for MSMEs promotion of both Micro and small enterprises (Window 2 A) and Medium enterprises (Window 2 B) for value addition and reducing the post-harvest loss, branding, marketing, traceability etc. including the

establishment of Bio inputs, plant nurseries, resource centres etc. critical for the expansion of agro-ecological farming. The Programme will also co-finance MSMEs for recruiting legal, technical, and marketing consultants, organic certification schemes, chain-of-custody and traceability, standards development, and participation in international trade fairs and events including branding and market promotion for enhanced access to domestic/ export markets. The certification will facilitate the premium price which will be ultimately transferred to the small-scale producers¹⁰⁶.

The Programme will co-finance up to USD 15,000 for Window 2A and up to USD 100,000 for Window 2 B MSMEs, a maximum of 50% of the investments such as civil works, equipment, transportation, RETs, and marketing including certifications but excluding working capital and land of each proposal but not exceeding the above overall thresholds. The actual areas of support and size of investment will be based on selected MSMEs' detailed feasibility studies and business plans viability.

The PMO expert will support MSMEs in preparing technical feasibility studies for bio-inputs production and post-harvest processing units, and development of business and marketing plans. In addition, the service provider will also support launching calls for interest, screen proposals and support MSMEs in their planning and operational stages. The service provider will mobilise short-term expertise for specific technical areas and technology selection.

MSME services to smallholder POs. Each supported MSME will be required to transfer benefits and services to R-HVAP target groups (smallholder POs, prioritising women, youth, indigenous and Dalit communities). The minimum number of HHs to be serviced will be proportionate to the co-investment support provided - for every USD 1000 of co-investment, the MSME will be mandated to provide services to at least 4 smallholder . The assumption is that each HH will receive direct services equivalent to an average of USD 250 from the supported MSME over the Programme period. For example, if an MSME receives USD 20,000 as co-investment support, it will be required to provide direct services to at least 80 HHs.

Informed by activities under Component 4, companies that have adopted "ethical trade" approaches, support agroecologically produced commodities, and promote quality certification schemes (organic, fair trade, forest alliance, forest stewardship council, etc.) will be given priority to engage with the POs supported by R-HVAP.

The MSMEs provide an assured market of the produce for the suppliers along with embedded support and services such as crates, tools, primary processing equipment, establishment of aggregation facilities in clusters including training (Organic inputs, production, grading, sorting etc.) and on-farm technical support to the producers HHs (suppliers), as exists in the current IFAD investment projects: ASDP, and RERP, which is fundamental in building trust and sustainable business relationship among the MSMEs and producers.

Please see Chapter 6 for detailed co-investment guidelines.

¹⁰⁶ Organic Valley pays NRs.2 per kg as organic premium to Farmers supplying ginger to the company

Component 2. Improved access to climate resilient productive infrastructure

R-HVAP will meet infrastructure needs to complement production activities supported through co-investments under sub-component 1.1. Under the PAP process, climate resilient infrastructure for smallholders and POs will be identified and selected. These will include: (i) water related systems such as small-scale irrigation schemes, water storage facilities, Multi-Use water systems (MUS) etc.; (ii) collection points and storage facilities for efficient commodity aggregation; and (iii) post-harvest primary processing facilities. All infrastructure interventions will be synergetic with other project interventions.

Table. Process for identification, selection and construction of infrastructure.

| Steps | Activities | Responsibility |
|--|--|---|
| PAP process | Community level consultation: Identify the infrastructure as per need of the beneficiary community/PO/ Cooperatives/MSMEs. Participants: Smallholders and POs, MSMEs, Palika, Line agencies, stakeholders etc | PPMO and CO: Field staffs |
| | Draft PAPs: List the infrastructure identified during the community consultation. | PPMO and CO, technical support from Service Provider-TA |
| | PAP finalization event: Present the list of infrastructures, select them as per the list of production activities finalized in PAP Participants: Smallholders and POs, MSMEs (buyers, processors, exporters, service providers, cooperatives etc.), Palika, Line agencies, stakeholders etc | PPMO and CO, technical support from Service Provider-TA |
| | Local level plan integration: Facilitate to integrate selected infrastructures into the Palika's annual plan and budget | PPMO, CO, SP-TA Palika POs MSMEs |
| Call for the EOI | Infrastructure demand collection from POs: In EOI call for the production investment, make a provision to include infrastructure requirements needed for the proposed production | PPMO POs MSMEs |
| 2-day market oriented agroecology orientation and investment planning | Finalize the type, size, and location of the infrastructure together with PO members to incorporate in investment plan | PPMO, Cos SP-TA |
| Field verification | Conduct preliminary technical and social feasibility/assessment of the identified sub-project with the support of beneficiary community/PO/Cooperative and PPMO/corridor engineering and social team. The assessment will determine the technical viability of the sub-project to be eligible for R-HVAP investment/support. Map out the spatial and temporal impacts of climate change, environmental considerations (SECAP requirements); and integrate in the technical and social feasibility/assessment | PPMO PPMO and Cos: Lead by Engineering team with the support from thematic specialist on social inclusion, environmental sustainability, and business development etc |
| Detail design | Social and technical Detail Survey, Design, Cost Estimates Evaluation of prioritized sub-projects. Determine beneficiary contribution (cash and in-kind) | PPMO PPMO and CO: Engineering Team |
| For RETs | If the infrastructure is RET, provide a list of AEPC listed RETs to the POs for contract and further process | PPMO PPMO and CO: Engineering Team AEPC |

| Steps | Activities | Responsibility |
|---|--|---|
| | | AEPC listed companies |
| Agreement | <ul style="list-style-type: none"> • MoU with POs, and MSMEs for processing facility • Formation of User Committee (UC) • Preparation of Operation & Maintenance Plans and Financing System (OMPF/S) • Signing of Agreement with UC • Construction Management Training | PPMO and Cos |
| Construction and Supervision | <ul style="list-style-type: none"> • Construction and construction supervision • Monitoring and Verification of required community contribution • RETs instalment quality. • Sub-project completion commissioning and reporting including public audit | PPMO and Cos POs User Committee Palika MSMEs |
| Operation and maintenance | <ul style="list-style-type: none"> • Form WUA/maintenance committee comprising 3-5 members from the beneficiary community/PO/cooperatives/farmers. • Develop sub-project specific O&M plans for routine and periodic maintenance. • Conduct awareness sessions/O&M trainings (developing O&M plans, user fee/charges and collection modalities, key maintenance activities, establishing liaison and coordination with other development partners/ palika authorities for seeking technical guidance and tapping additional financial resources; procurement of maintenance material/parts, and simple financial matters/literacy). | Engineering Team Corridor Office Project Implementer / Beneficiary Community / PO / Cooperative Palika Authority |
| Sustainability & Development Effectiveness | <ul style="list-style-type: none"> • Ensure the intended benefits of the completed sub-project should continue till the useful life of the project for sustainability and development effectiveness. • Conduct periodic spot checks, to ensure that the WUAs/O&M committees are functional, performing their role and meeting their objectives. • Review and support in revising the operational plans, to adjust the changing context. • Provide guidance to WUAs/O&M committee, where needed. | Engineering Team Corridor Office Project Implementer / Beneficiary Community / PO / Cooperative Palika Authority |

Sub-component 2.1: Water related infrastructure

The dependence of Nepali farmers on monsoon rains makes their productivity uncertain, and multiple crop cycles are not always possible. In context of climate change and anticipated drier conditions projected for project area, the provision of reliable, sustained, and timely supply of water is critical. The programme will support the rehabilitation and upgrading of existing water systems and construction of new ones.

Eligible water-related infrastructure are small-scale crop irrigation systems (both open channels and pipe networks combined with drip and sprinkler irrigation), Multi Use water Systems (MUS) that can serve crop and livestock production and domestic water needs, and water storage facilities such as lined ponds and reinforced concrete tanks. Such models have been piloted and successfully scaled up under ASHA and ASDP.

Farmer managed irrigation systems (FMIS) are generally surface water irrigation systems developed and managed by the beneficiary farming community and comprise the largest part (80-90%) of total irrigation systems. These are simple (in terms of technology and operation); and small-scale in terms of command area (1-10 hectare). The programme will support existing and new FMISs.

A total of 485 water related subprojects will be co-financed by the programme for up to 85% of the investment cost and the communities will contribute at least 15% of the investment in-kind (labour, local material). Water related subprojects will be identified during the PAP process and selected by applying criteria to ensure inclusiveness and sustainability of the investment. In particular, the ecological context will be considered when determining the type and design of irrigation subprojects, as well as needs for conservation of the catchment and water sources. Climate proofing measures will be integrated in the design, based on a cost-benefit analysis and site -specific vulnerability assessment. This will be supported by the civil engineering teams mobilised at PPMO and Corridor Offices. The programme will follow IFAD Social, Environmental and Climate Assessment Procedure (SECAP) guidelines and requirements to ensure sustainability of the infrastructure.

Sub-component 2.2: Market led productive infrastructure

Drawing on the experience of ASDP and ASHA, community-based small-scale infrastructure and facilities for post-harvest primary processing, aggregation and storage, and packaging will be supported. Depending on the commodities produced and in coordination with the specific market demand requirements, these operations may include aggregation facilities (collection points, loading docks) and other value adding operations, drying (drying floor, solar dryers, etc.), sorting, shelling, pressing, primary extraction (for honey, MAPs), packaging, and storage (including warehouses, small-scale cold storage). Eligible investments will be identified and selected at planning stage in the PAP process. This infrastructure will be complementary to the larger operations being established by MSMEs.

Where appropriate, renewable energy technologies (RET), will be introduced and scaled up. The majority of farmers in Nepal practice open sun drying, which has several limitations, including slow drying rates, contamination risks, insufficient drying, and weather conditions. In addition, inadequate and inefficient cold storage systems often result in limited market opportunities and economic losses.

As part of this intervention, the first step will be to identify areas where high-value crops are most likely to suffer postharvest losses with poor electricity grid connectivity. Investments in cooperative-scale solar dryers will be strategically located near collection centres and market outlets. There will also be a need for adequate volumes, so ideally areas will be selected where two to three POs can aggregate their produce. There are several value chains that can greatly benefit from the adoption of solar dryers. Through the implementation of this activity, perishables will be able to have a longer shelf life, which in turn will increase farmer income by reducing spoilage, enabling aggregation, reducing transportation bottlenecks during peak operations, and providing the opportunity to sell during the off-season at higher prices.

These investments, identified in the PAP, will involve POs, MSMEs (buyers, processors, exporters, service providers, etc.), Wards and Palika and facilitated by programme teams mobilised at PMO and Corridor Offices. The profitability and sustainability of the investments will be assessed through business plans that will include a risk screening and mitigation measures in line with IFAD SECAP guidelines.

A total of 85 market led productive infrastructure subprojects and 162 PO-level RETs will be co-financed by the programme for up to 85% of the investment cost and the communities will contribute at least 15% of the investment in-kind (labour, local material). Selected subprojects will be implemented and managed by the community-based organizations and POs with support from the PMO and Corridor Offices. To ensure the quality and sustainability of proposed infrastructure, the design and supervision will be overseen by PMO and Corridor Office engineers and sub-engineers. POs will take responsibility for O&M and financing arrangements of the productive infrastructure. These arrangements will be defined and formalised at planning stage.

Renewable Energy Technologies (RETs) such as solar pumps for lift irrigation will also be deployed where appropriate. In hilly areas due to the high total pumping head lifting water may require multistage pumping. MoALD and MoEWRI will coordinate to determine the best locations for solar lift irrigation. The Alternative Energy Promotion Center (AEPC) provides subsidies up to 60% of total costs but not exceeding approximately USD12,250 (NPR 2 million) per system for photovoltaic pumping systems for irrigation of agricultural lands managed by a community or private company. Rental and lease of portable solar pumps is also another option, which eases payment terms for smallholders and POs and improves financial viability.

To enhance the likelihood of sustainability, and building on the lessons learned from previous projects, R-HVAP will support the formation and capacity building of O&M committees/water user associations responsible for O&M, at the early stage of the process. These committees will be involved in coordinating the construction, and in managing operation and maintenance of the water related infrastructure. They will collect O&M user-fees to cover operation and routine maintenance costs. For major maintenance and repairs, the respective Palikas, who will participate in the identification and approval of the schemes and may even supplement to the equity (beneficiary) contribution, will be responsible as per their mandate. The corresponding costs are accounted for as contributions from municipalities.

Links to Guidelines / References.

Ecozen / Ecofrost solutions: <https://www.ecozensolutions.com/ecofrost>

UN ESCAP – IFAD Grant on Solar Micro-grids – Evaluation Report
<https://www.unescap.org/sites/default/files/5P-Evaluation-Report.pdf>

Component 3. Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets

R-HVAP will support the first phase of construction of the Semlar Agriculture Regional Wholesale Market in Butwal Sub-Metropolitan City, Rupandehi District, Lumbini province. The component budget is estimated at US\$ 31.25 million, including US\$ 22 million from IFAD and US\$ 9.25 million GoN contributions (US\$ 5 million in cash contributions, and US\$ 4.25 million covering duties, taxes, salary, and operational cost of deputed staff). The proposed market will facilitate the aggregation of commodities from a large catchment area, specifically from agriculture clusters where R-HVAP is supporting POs. The Semlar market will be constructed as a state-of-the-art market replete with wholesale shutters for fruit, vegetables, cereals, and other priority commodities and will engage in collection, processing, and branding of agricultural products. The market is strategically located within a 20-minute drive to the Gautam Buddha International Airport and about 40 km from the Indian border. The market will support smallholders' commodities to reach both domestic and export markets efficiently and at competitive prices.

Establishing wholesale markets at strategic locations is one of the key development priorities of GoN. The programme's support in establishing and developing an "Export Oriented Agricultural Wholesale Market in Butwal" would not only carry forward the GoN's development agenda, but also would effectively contribute in meeting the country's agriculture strategies and sector specific programs, explicitly aiming at development of wholesale markets in the south-western part of Nepal.

Current Situation and Key Challenges: The marketing opportunities for agricultural products in the south-western part of Nepal are comparatively less than in the eastern side of the country. The existing wholesale market in Butwal was established in 2010 and is unable to cope with the current market demand. Also, expansion of the existing market is not possible due to the unavailability of land as it is located in the centre of Butwal city. Given the situation, the region will continue to experience insufficient trade and storage facilities for surpluses produced in the region. Efforts were made to address the situation by developing a new wholesale market in Hetauda, in Bagmati Province (not among the Programme provinces). However, such efforts remain insufficient to fill the gap and to exploit the full potential of the region. It is anticipated that in the absence of a larger wholesale market increased production will lead to food loss and waste. Currently, increasing local demand for agriculture produce is being met from imports. This is contributing to the trade deficit, especially with India, and a drain on hard currency in the country.

The design mission's discussions with the wholesale traders revealed that the agriculture produce that could not be traded in a timely manner led to significant loss and waste amounting to about 25% of the total harvested volume. This is causing huge income losses and adding to the hardship of smallholder farmers. Furthermore, the lack of backward and forward linkages in commodity markets are significantly impacting the capacity of farmers and retailers to competitively engage in market demand and supply.

Outcomes and anticipated positive impacts: A Technical and Financial Feasibility Study¹⁰⁷ and an Environmental Impact Assessment (EIA)¹⁰⁸ for the market was commissioned by Invest International and endorsed by GoN on 29 September 2023¹⁰⁹. The Feasibility Study concluded that there is an opportunity to capture substantial volumes of fruits, vegetables and other commodities produced in the programme catchment area. The market will serve as a nodal point to facilitate the movement of agriculture commodities across various markets and facilitate export of a number of commodities. The market will

¹⁰⁷ Technical and Financial Feasibility Study Report (March-2023); Export-oriented Agriculture Wholesale Market Semlar, Nepal, (Refer to Chapter 3 for detail)

¹⁰⁸ The draft EIA was disclosed to the IFAD EB on 14 August 2023.

¹⁰⁹ The studies for the Semlar market were contracted out to Royal Haskoning DHV (RHDHV).

also stimulate socio-economic development of the programme target area and provide direct employment opportunities to especially women and youth from the area.

The Semlar market will also help address the infrastructure and environmental issues associated with the wholesale market in Butwal, by providing infrastructure facilities for meeting the current demand, avoiding traffic congestion, while efficiently laying out facilities for logistics, people and product flows. Furthermore, the Semlar market would be properly equipped to prevent environmental pollution that is currently experienced in Butwal.

Market Design

Based on the Feasibility Study and EIA, a preliminary design of the market has been developed. Guided by this, a detailed engineering design of the market infrastructure will be prepared soon after programme initiation. In consultation with MoALD and IFAD, the construction of the market will be staggered into multiple phases. The main units of the market will be constructed during Phase I under R-HVAP for establishing a functioning wholesale market. Expansion of the market will be based on market functionality, projected surplus production, and availability of supplementary financing. This staggered approach will enable continued efforts by GoN to mobilize supplementary grant financing for market expansion and upgrades, as well as, for construction of a satellite market in the far West for improved channelling of agricultural products to the Semlar Market.

The main elements of the Semlar market, implementation and management modalities will include the following:

- (a) Wholesale Shutters: Around 120 wholesale shutters with adequate capacity¹¹⁰ are planned to be available for the traders. In order to facilitate loading/unloading of commodities, a wide canopy (6m) will be provided in front of the shutters. This space will also serve as temporary storage for commodities before being taken inside the shutters. Based on the successful operational experience of existing market(s), some of the shutters will have flexibility for conversion to cold storage for improving shelf-life of agricultural commodities.
- (b) Processing Facilities: The market will have cleaning, washing, sorting, grading and packing facilities housed in a separate block. Cold storage facilities for key commodities will be available.
- (c) Support Facilities: A water supply system including, overhead and underground tanks will be constructed. While the main source of electricity will be supplied from the grid, renewable energy alternatives (solar, biogas) will be supplementary. Furthermore, firefighting arrangements, sanitary facilities, conference and meeting rooms, and parking spaces will be developed. An auction block will be established to facilitate trading of commodities.
- (d) Pesticides Residues Lab: A "Rapid Bioassay Pesticide Residue Lab (RBPR)" is one of the key facilities at the market. Among other contaminants, Carbamate and Organophosphate present in the commodities collected from different production pockets will be tested for. The laboratory will also be equipped to undertake testing of the effluent from the onsite wastewater treatment plant.
- (e) Waste management facilities: The market will have an integrated waste management system. The management of biodegradable solid waste will be outsourced to an approved waste management operator for conversion into compost. Non-biodegradable waste will be disposed in a landfill site by the municipality, while ensuring the treatment and disposal takes place in a sustainable manner with minimal impact on the environment and surrounding communities.

¹¹⁰ 40-60 metric tons per square meter (MT/m²)

- (f) Wastewater Treatment Plant: Wastewater generated from washing undercarriages of trucks and produce, other processing, grey water, and toilets will be treated in a wastewater treatment plant (WWTP). The final discharge will meet the GON and IFC environmental protection criteria.
- (g) Administration Block: The market will have an administration block to house the programme management and administrative staff. The block will be fully equipped with IT and telecommunication facilities for both staff and visitors. This block will also have a conference room for conducting meetings and other events.

Quality Standards and Design Norms¹¹¹: Building planning and construction in Nepal is regulated at two levels: (i) federal; and (ii) local government. The construction of the wholesale market in Semlar will comply with all relevant and applicable federal and local policies, acts and regulations. Some of these include: Land Use Policy, 2072¹¹² (2015); Nepal Land Act, 202131 (1964); Building Act, 205531 (1998); Fundamental Construction Standards for Settlement Development, Town Planning and Building; and Building Construction and Planning Standards, Butwal Sub Municipal City, 207231 (2015).

All applicable building codes at the Federal and local levels will be adhered to. Some of these include, the Nepal National Building Code, NBC 206(2015): Architectural Design Requirements; Nepal National Building Code, NBC 105 (2020): Seismic Design of Building of Nepal; and Nepal National Building Code, NBC 202 (2015): and Load Bearing Masonry.

Implementation

All regional markets come under the purview of MoALD, and as such, MoALD will have overall oversight over the market construction and operation. DUDBC will lead the construction of the Semlar market. Given the scale and complexity of the intervention, a dedicated Sub-Project Implementation Unit (SPIU) with government deputed staff, recruited professional and general service staff will be established for day-to-day supervision of the construction. The implementation unit will either be hosted by the Butwal municipality or housed in a rented space in Butwal.

The proposed composition of the SPIU is as follows:

- Government deputed staff: An Undersecretary from DUDBC will function as the Sub-Project Coordinator. In addition, two engineers, two assistant engineers, one account officer, and two Junior Officers will be deputed from DUDBC. At least one officer-level staff will be deputed from CAIDMP, MoLMAC Lumbini, and Butwal Sub-metropolitan City to support the SPIU.
- Recruited staff: FIDIC certified engineer for quality control of detailed project design, drawings, estimation and implementation modalities; FIDIC certified procurement expert for preparation of bid documents, bid evaluation, and contract awarding; Legal services for contract negotiation, follow up, and management of grievance mechanism; Financial Management Expert to support government accountants in preparing Withdrawal Applications, Interim Financial Reports, and payments to contractor; Community, Farmer, and Trader Liaison Officer; and 2 Office Assistants. The R-HVAP PCO will also have dedicated staff for monitoring implementation.
- Sub-Project Construction Management, Supervision and Quality control of the Semlar wholesale market implementation will be done by a Consulting Firm procured through competitive Quality Cost Based Selection (QCBS) method. The

¹¹¹ Draft Technical and Financial Feasibility Study Report (March-2023); Export-oriented Agriculture Wholesale Market Semlar, Nepal by HASKONINGDHV NEDERLAND B.V.

¹¹² Nepal calendar year

Feasibility Study provides the following three procurement options¹¹³ describing the pros and cons for each and recommending the most feasible option: (i) EPC (Engineering, Procurement and Construction) Lump-sum/turnkey); (ii) Packages approach; and (iii) EPC management approach (EPCm). The option recommended by the Feasibility Study is a combination of the EPCm approach and packages approach. MoALD in consultation with MoLMAC, DUDBC and IFAD will make the appropriate decision taking into consideration the specificities of the Nepali context.

Pre-implementation preparatory tasks: The bulk of preparatory works required for establishing the wholesale market have been concluded. These include the Feasibility Study and EIA, concluding the final site selection process, community consultations, and preliminary market design. For project execution, the Feasibility Study provides the guiding structural plan which includes a: (i) procurement plan; (ii) implementation plan; (iii) governance, management and operation plan; and (iv) monitoring and evaluation plan. An additional market assessment is being conducted by IFAD in light of R-HVAP's programme interventions and other recently launched donor projects, to calculate production volumes for further informing the market set-up and management.

Given the scale and complexity of the Semlar market and the capacity constraints at the different levels of implementation, several capacity enhancement measures will be provisioned, including: (i) FIDIC certified engineer and procurement experts to be housed in the SPIU; ii) dedicated staff for sub-project coordination, financial management, legal services and community liaison; (iii) studies for developing the market business plan, market management policies and procedures, disaster risk and recovery response etc.; iv) trainings for relevant stakeholders, DUDBC, CAIDMP, MOLMAC and PPMO; and v) stakeholder workshops for consultation and status updates. Similarly, IFAD country office needs to strengthen its in-house capacity to oversee the procurement and construction processes by recruiting a dedicated engineer and a procurement expert.

Governance, Management and Operations: Governance and management is a critical aspect for successful operation of the Semlar market for ensuring the sustainability of the investment. The design mission interacted with several wholesale markets and had discussions with their respective management committees. Only a few (6-8) of around 30 wholesale markets in Nepal are functioning successfully in at least meeting their operational expenditures. The key to success is a dedicated management committee. The well-functioning wholesale markets are being run by management committees that are well-represented by key stakeholders (farmers, POs, wholesale traders, and government authorities), and sufficiently autonomous to take timely decisions in a transparent manner.

Based on feedback received during stakeholder consultations and the RHDHV's feasibility study, the Semlar market will be set up and operated under the Development Board Act, 2013 BS. The market will be governed and managed by a Market Management Committee (MMC). The proposed composition of the MMC is the following: Joint Secretary of the GoN (Chair); representative of the Center for Agricultural Infrastructure Development and Mechanization Promotion (CAIDMP); Planning Division Chief of MoLMAC Lumbini; representative of Federation of Nepalese Chambers of Commerce and Industry (FNCCI); Chief Administration Officer of the Butwal Sub-metropolitan City; Chairperson of Ward 15 of Butwal Sub-metropolitan City and an alternative representative; a male and female representative from POs and cooperatives located in R-HVAP clusters supplying products to the wholesale market (two persons); a male and

¹¹³ Key considerations for proposing the options include: (i) level of risks the MoALD and potential investors accept in relation to investment costs; (ii) the level of influence MoALD wants to have on design, quality of works during all project phases; (iii) how the procurement process is carried out in a transparent and competitive way; (iv) how the project can be split logically in different procurement packages (basic and detailed engineering / construction / equipment deliveries) to ensure best value for money of the goods, works and services purchased; (v) the experience, capacities and knowledge of (local) contractors and suppliers

female representative of vendors/traders of the wholesale market (two persons); a representative of agriculture exporters; a representative of FNCCI’s local unit representing the transport sector; and the Managing Director of the Semlar Market (Secretary of the MMC).

The MMC will function as a governing body and provide strategic guidance and approvals with regard to development of policies and procedures relating to all aspects of running the market in a professional, efficient and sustainable manner. The MMC will hire a full time Managing Director (MD) and support staff to run the day-to-day operations of the market. The MD will be an experienced market management professional either deputed from MoALD or recruited from the open market through a competitive process. Similarly, all professional, technical and support staff for market operation will be recruited through a competitive process. The MD reports to the Chair of the MMC, while a hierarchical reporting structure for the sub-teams dealing with various aspects of market management will culminate with the MD.

A Market Operational Guideline and Action Plan (MOGAP) will be developed together with the MMC, vendors, farmers and other key stakeholders, with the support of the SPIU. A draft table of contents for the Semlar Market Operational Guideline and Action Plan is included in the PIM. The MOGAP will include policies and guarantees for ensuring the long-term access of R-HVAP and other smallholder farmers to the Semlar market. R-HVAP will be monitoring the engagement of smallholders in the Semlar market (M&E indicator – “Number of R-HVAP POs/HHs reporting access to Semlar market services”).

Lessons will be leveraged from the Kalimati Market in Kathmandu, and other wholesale markets in Nepal and internationally to inform the MOGAP. IFAD-funded projects such as the Market Infrastructure Development Project in Charland Regions (MIDPCR)¹¹⁴ project, among other projects in Bangladesh, have gained a wealth of experience on facilitating the establishment of MMCs and building their capacity for sustainable and sound market management arrangements. Such approaches and lessons learned will be made available to the SPIU for informing the MMC when developing the MOGAP.

To ensure sustainability and successful operation of the market, an Operational and Reserve Fund will need to be established to support the day-to-day running of the market and for long term market development. The RHDHV Feasibility Study further recommends that the operations of the wholesale market should be contracted to professionally capable and experienced entities that can manage relevant technical aspects of market operations, such as, lab testing, machine maintenance, transportation, utilities, waste management, management information system (MIS) etc.

While endorsing the proposed market governance and management structure, the design mission recommends revisiting and revalidating the overall management structure prior to operations. This will allow any adjustments needed post-construction work and equipment installation.

Implementation Schedule and Timeline: It is estimated that about 3 and a half years would be required for construction. The Semlar market is scheduled for implementation and operationalization in three phases¹¹⁵: (a) Pre-construction; (b) Construction; and (c) Operational phase. The key activities envisaged under each phase is listed in the table below:

Table 53: Semlar Agriculture Regional Wholesale Market: Key Activities by phases.

| Pre-Construction Phase | Construction Phase | Operation Phase |
|--|--|--|
| <ul style="list-style-type: none"> Acquisition of permission for construction of buildings at site as per | <ul style="list-style-type: none"> Site clearance Earthwork and site preparation | <ul style="list-style-type: none"> Operation of the market (wholesale and retail) Operation of the |

¹¹⁴ Bangladesh projects scaling up note is available [here](#) and MIDPCR digest is available [here](#).

¹¹⁵ Adopted from the ESIA-Whole Sale Market

| | | |
|---|---|---|
| final design <ul style="list-style-type: none"> • Land transfer of the project site from MoFE to MoALD • Forest clearance approval from the Ministry of Forests and Environment • Marking and counting of the trees to be felled • Establishment of construction camp | <ul style="list-style-type: none"> • Hauling of construction materials and equipment • Construction of the project structures and facilities • Installation of equipment • Landscaping and rehabilitation of the site | processing and storage facilities <ul style="list-style-type: none"> • Transportation of produces. |
|---|---|---|

Implementation steps for the Semlar Wholesale Market

| S.No. | Key Activities | Activity Description | Responsible |
|--------------|--|--|---|
| 1 | EIA approval from MoFE | <ul style="list-style-type: none"> • Finalize the EIA and get approval from the MoFE | Investment International / IFAD / MOALD |
| 2 | Disclose EIA along with appendixes | <ul style="list-style-type: none"> • Disclose ESIA 120 days prior to Board Meeting as a mandatory requirement | IFAD / MOALD |
| 3 | Flood risk assessment | <ul style="list-style-type: none"> • Conduct detailed flood risk assessment for Semlar wholesale market and integrate mitigation measures to ESCMP and design | IFAD/MoALD |
| 4 | Implement EIA and ESCMP | <ul style="list-style-type: none"> • Ensure to i) integrate EIA and ESCMP recommended mitigation measures into the design and ii) quality implementation | SPIU/PCO IFAD MoALD |
| 5 | Detail Design for Execution | <ul style="list-style-type: none"> • Agree on one of the three procurement options provided in the Feasibility study (FS) to initiate the detail design of Butwal market. • Issue RFPs/EOI and Bidding Documents in consultation with IFAD Procurement Specialist. | IFAD / MOALD |
| 6 | Implement TA to Support the procurement /bidding and execution process | <ul style="list-style-type: none"> • Agree on the TA implementation modalities. • Establish separate implementation unit in Butwal as per TA agreement and guidelines provided in the FS. • Strengthen IFAD local office as per agreed TA. | IFAD / MOALD |
| 7 | Evaluation of Bidding Proposals & Award of EPC Contract | <ul style="list-style-type: none"> • Evaluate the bids received in accordance with the IFAD guidelines. • Award the detail design Work. • Start execution at site as per final detailed design. | IFAD / SPIU/PCO PCO |
| 8 | Execution of Works | <ul style="list-style-type: none"> • Site Acquaintance • EPC Contractor mobilization • Construction of the project structures and facilities | EPC Contactor SPIU/PCO |

| | | | |
|----|--|---|---|
| | | <p>as per detailed design</p> <ul style="list-style-type: none"> • Installation and erection of equipment • Equipment testing and commissioning • Landscaping and rehabilitation of the site | IFAD/Butwal Sub-metropolitan |
| 9 | Form Market Management Committee (MMC) & Hiring of Staff | <ul style="list-style-type: none"> • Form a dedicated MMC, well represented by key stakeholders. • Hire CEO for MMC (from the Govt. or from an open market on competitive basis) • Hire support staff as per FS, and agreed with the MMC. • Develop operational plans (O&M, financial, waste management, traded commodities etc.) for smooth operation and management of markets | <p>SPIU/PCO</p> <p>Butwal Sub-metropolitan</p> <p>MMC</p> |
| 10 | Construction Supervisions and Quality Assurance | <ul style="list-style-type: none"> • Depute field engineers dedicated for establishing market. • Develop construction and quality assurance mechanism as per detailed design. • Implement the monitoring and quality assurance mechanism. • Conduct regular spot checks by the PCO/IFAD/II staff and provided strategic guidance during execution. • Conduct material quality tests as specified in the detailed design/ required as per local/national standards. | <p>PIU/PCO</p> <p>Butwal Sub-metropolitan</p> <p>MMC</p> |
| 11 | Operationalization and Management | <ul style="list-style-type: none"> • Formally handover the completed market under contract to MMC, clearly delineating the roles and responsibilities of all stakeholders. • Operate and manage with professionally sound and best management practices as articulated (previously) in the operational/management plans | <p>PIU/PCO</p> <p>Butwal Sub-metropolitan</p> <p>MMC</p> |

Component 4. Strengthened policies, regulations and institutions for smallholder agroecological production and trade

R-HVAP will aim at establishing and strengthening enabling policy, regulations and other supporting frameworks for profitable smallholder agroecological production, facilitated by participating institutions and communities. In addition, in support to promoting export trade of agricultural produce, the programme will enhance the capacity for compliance to Sanitary and phytosanitary (SPS) measures, support Trade facilitation and negotiations and participation in international trade events and international ethnical and bio trade fairs.

Policies and regulations

The project will facilitate the participation of the small-scale producers as well as other key actors in the safe, organic or agroecology value chains in policy dialogues identifying systemic barriers to be addressed by policies and regulations at Palika, Province or the Federal level. This participation will be ensured through the participatory agroecology cluster planning processes. Policies and regulation barriers, opportunities and proposed actions that can be implemented at the Palika or Provincial level will be included in the PAPs.

The following policy and regulation gap areas have been identified in consultations with producers, institutional and private stakeholders:

- Out of the R-HVAP target provinces, currently only Karnali province has developed with the support of FAO a Karnali Organic Mission Plan 2079 (2022);
- There are no quality assurance, certification and subsidised pricing regime for bio-inputs differentiating between farm, community factory or industry produced bio-inputs;
- Registration of landraces/local varieties, seed mixtures and evolutionary populations relevant for agroecology farming conditions are limited by the requirement of uniformity in seeds regulations (the inherent resilience benefits of these varieties, mixtures and populations are linked to their polymorphic nature and do not meet the variety registration standards of uniformity);
- Lack of policies that can facilitate the long-term lease of idle/abandoned land to young farmers, women or land poor households; and (v) There are various structural and systemic barriers for export i.e. no credible national organic certification scheme acceptable to export markets, and only a limited number of commodities are eligible for trade incentives.

To respond to the above challenges, R-HVAP will support the following:

Provincial Organic Policies. R-HVAP will support the development of organic policies for Lumbini and Sudurpashchim, similar to the Karnali Organic Mission, aiming to promote safe and organic agriculture and phase-out the use of agro-chemicals. Discussions have been held with FAO regarding raising a Technical Cooperation Programme (TCP) for supporting Lumbini and Sudurpashchim provinces in this regard.

Quality assurance, certification and pricing protocols. The programme will provide technical assistance and work with the relevant divisions in MOALD to develop the protocols and regulations for: quality assurance, certification and pricing of bio-inputs with differentiated requirements for farm, community/micro enterprise factory and industrial produced bio-inputs; and registration of landraces/local varieties, seed mixtures and populations.

Export facilitation. Likewise, the program will support MOICS with technical assistance as needed to facilitate MOICS' leadership in addressing structural and systemic export

barriers, export procedures, and trade facilitation and negotiation for organic and/or agroecology products.

Policy studies for trade promotion. A trade promotion policy is currently being prepared by the Ministry of Industry, Commerce and Supplies (MoICS) to tackle these constraints, aiming at reducing the current trade deficit. Feedback from the exporter workshop that the design mission held indicated that exports to European and Middle Eastern markets face constraints in logistics and compliance with national and international regulations. MOICS will engage relevant institutions to conduct specific policy studies for developing or updating policy frameworks, regulations and protocols. Over the first 4 years of programme implementation, identification of incoherence in policy and regulatory frameworks will be conducted to define policy responses.

Policy development initiatives will include the development of related action plans and a M&E framework. Where relevant, policy monitoring indicators will be linked with indicators related to reporting commitments towards international conventions such as Land Degradation Neutrality targets, Nepal's National Determined Contributions, and the Convention on Biological Diversity.

Furthermore, MOALD will work with Palikas and undertake specific studies to develop a legal framework for long-term leasing of fallow and abandoned lands by municipalities for provision to agroecology producers with less than 1 ha, youth and landless.

Sanitary and phytosanitary (SPS) measures

One of the critical criteria for ensuring access to export markets is the adherence to stringent Sanitary and Phyto Sanitary (SPS) standards. In this regard, the programme will enhance the capacity of public agencies in conducting pesticide residue analysis to comply with SPS regulations of importing countries. Further, given the high volume of cross-border trade with India the programme will provide capacity building support to laboratories at border checkpoints to operate and maintain the facilities and equipment, and for accreditation of the laboratories in the medium term. This will increase competitiveness and facilitate export trade to neighbouring countries and beyond. R-HVAP will also support upgrading of the biotechnology lab in Surkhet and provide capacity support to the laboratory staff. This facility will be involved in conducting quality analysis for both bio-inputs and agricultural products.

Trade facilitation and negotiations.

Business matching and trade facilitation will be conducted in partnership with provincial and federal line agencies (MoALD, MoICS, TEPC, MoITFE, FNCCI, etc.). Provincial level MSPs will provide the arena for business matching between PO and MSMEs, some of which have access to export markets.

Participation in international trade events and international ethnical and bio trade fairs Trade barriers faced by MSMEs aiming to export (Sanitary and Phyto-Sanitary requirements, certificates of origin, logistics, legal agreements, customs clearance) are addressed under Component 3 as part of the enabling environment to develop export supply chains.

This component will be implemented in coordination with MoICS, Department of Customs, the provincial line Ministries, and the Trade and Export Promotion Centre (TEPC). The Federation of Nepalese Chambers of Commerce & Industry (FNCCI), responsible for issuing Certificates of Origin that are required by importing countries, will also be involved in support of export-oriented trade.

6. Co-investment Guidelines

The co-investment funds under sub-component 1.3 (PO) and sub-component 1.4 (MSME) will be strictly managed according to the Guidelines to be developed by the PCO and approved by RHVAP Programme Steering Committee (PSC) and “no objection” from IFAD. The eligibility criteria, eligible investment areas, size of the co-investment sizes by type of interventions including other terms and conditions along with the screening, appraisal and approval process for Smallholders and MSMEs co-financing different windows are presented in the table below, which will be detailed in the fund guidelines mentioned above during the implementation.

RHVAP will consider existing guidelines of IFAD programmes ASDP and RERP including the lessons learned in simplifying the process during evaluating co-financing proposals and fund release as a basis for developing the Co-investment fund guidelines. The co-investment offered and other terms will be actively monitored and revised from time to time, if necessary, based on actual uptake for different types of investments and high-value commodities.

In line with SECAP requirements, risk screening and mitigation measures the Programme will examine key aspects of the business, in particular, sourcing of raw materials (for compost production units for example), waste management and other social and environmental impacts during the appraisal and assessment of business proposals.

Summary of Different Investment Windows under co-financing matching grant

| Category | Window 1: Producer Organisations | Window 2 A: Micro and Small Enterprises | Window 2 B: Medium Enterprises/ Processors |
|--|--|---|--|
| Definition / Eligibility Criteria** | Small holder producers organised in Group/ Cooperatives (Existing or New) from identified Agroecological clusters that are ready to transition into the market-oriented agroecological production system and produce commodities with credible market demand. Formally registered in the concerned municipality or GoN authorities | Private actors interested in working with POs of targeted agro-ecological clusters (Co-operatives, traders, agribusiness, Agro-vets, Multi-purpose Nurseries and Bio-Input suppliers, Breeding farms, logistics providers, etc.) (h) Formally registered and having experience of at least 1 years in similar business/ commodities (i) Proposed Enterprises shall be within the RHVAP Province | Private actors interested in working with POs of targeted agro-ecological clusters (Co-operatives, traders, agribusiness, Agro-vets, Multi-purpose Nurseries and Bio-Input suppliers, Breeding farms, logistics providers, etc.) Formally registered and having experience of at least 3 years in similar business/ commodities. Proposed Enterprises shall be within the RHVAP Province |
| Area of Support | Small-scale producer investments for transition into the agro-ecological production system and profitable farm enterprises through the production of market-oriented high-value commodities | Small business investments in the inputs supply strengthening (Agro-vets, Bio-inputs, Nurseries) post-harvest interventions, value addition, branding and marketing | Medium business investments in inputs supply strengthening and downstream value chain interventions such as storage facilities, processing, Certification, branding and marketing |
| Examples of Investment Activities | Diversified production packages complement each other and support the agroecological suitable commercialisation of potential multi-commodity supply chains having domestic demand (import substitution) and export market potential and are competitive for smallholder producers. | Any enterprises that are linked directly and deemed essential with the target commodity as identified by MSP. Such as Collection and assembling, Storage, transportation, cold chain facilities, post-harvest processing and packaging/ branding enterprises. Service enterprises as the multi-purpose nursery, Bio-inputs production, and breeding farms including Certification, branding & marketing | |
| Maximum amount of co- | Maximum USD 500 per HH involved in POs (Group/ | Maximum USD 15,000 equivalent or 50% of fixed | Maximum USD 100,000 equivalent or 50% of fixed |

| Category | Window 1: Producer Organisations | Window 2 A: Micro and Small Enterprises | Window 2 B: Medium Enterprises/ Processors |
|---|--|---|---|
| investment and Matching Grant percentage¹¹⁶ | cooperative) for 2 packages or 50% of total investments excluding the local materials and family/unskilled labour. For, Producer organisations supported under ASDP: Maximum USD 300 per HH for one package or 50% of total investments excluding the local materials and family/unskilled labour. Inclusion fund: For ultra-poor, the co-financing fund can be increased up to 80% and the remaining 20% contribution is in kind by these groups. | capital investment including technical support, traceability, branding/marketing cost and embedded services whichever is lower. | capital investment including technical support, traceability, branding/marketing cost and embedded services whichever is lower. |
| Minimum number of Beneficiary household Covered | 25 HH minimum involved in POs with minimum 50% women and 80% poor HHs. POs with Youth, Dalits, janjatis and other socially underprivileged group of people will be given priority | Minimum number of HHs to be serviced will be proportionate to the co-investment support provided and will be calculated by dividing the co-investment amount by 250. if an MSME receives USD 15,000 as co-investment support, it will be required to provide direct services to at least 60 HHs | Minimum number of HHs to be serviced will be proportional to the co-investment support provided and will be calculated by dividing the co-investment amount by 250. if an MSME receives USD 100,000 as co-investment support, it will be required to provide direct services to at least 400 HHs. |
| Projected No of Grantees | 1600 + Groups / Cooperatives /Sub-group within Cooperatives (Approx. 45000 HHs) | Anticipated MSMEs: Approx. 240 (Agrovet, Bio inputs Supplier, Nurseries, Breeding farm/Resource centres, Cold storage, Processing units, Certification/traceability, branding & Marketing services) | |
| Desk review of EOI and Evaluation | TA Service Provider ¹¹⁷ | Corridor Office (CO) team led by Agro-ecology & Business | Pprovincial Management Office(PMO) team led by Agro-ecology & Business |
| Field verification | TA Service Provider, Ward representative and Municipal Agriculture/ Livestock unit staff | CO team, Municipality representative, Chambers of commerce & Industry (CCI) representative | PMO team, Municipality representative, Provincial Chambers of commerce & Industry (PCCI) representative |
| Investment Plan / Business Plan preparation & submission | POs with support from TA service Providers | MSMEs hired Private Business Development Service Provider and Project Business team | MSMEs hired Private Business Development Service Provider and Project Business team |
| Endorsement & Recommendations | Municipal Agriculture Development Committee (MADC) / Municipality Economic Development Section (MEDS) | Recommendation from PCCI | Recommendation from PCCI No objection from IFAD |

¹¹⁶ Enterprises run by women, Dalits, janjatis and other socially underprivileged groups of people will be given priority for co-financing.

¹¹⁷ TA service provider are responsible have pools of staff from community mobilisers, Agriculture technicians, Agro-ecology, GESI, Producer organisation strengthening and Value chain/Business Development officers, responsible for planning, implementation and coordination of programmes at field .

| Category | Window 1: Producer Organisations | Window 2 A: Micro and Small Enterprises | Window 2 B: Medium Enterprises/ Processors |
|---|--|---|---|
| Evaluation, Appraisal & Recommendation | CO level investment committee (Internal) | PMO level investment Committee (Internal) | For Grant financing above USD 50,000: Independent Panel Evaluation Committee -IPEC (External) No objection from IFAD (External) PMO level investment Committee (Internal) |
| Approval and Contract | Provincial Programme Coordinator/Corridor Coordinator | Provincial Programme Coordinator/Corridor Coordinator | Provincial Programme Coordinator |
| Fund Release & Payment Method | Grantees Account by PMO/CO in Advance (After deposit of Grantees counterpart investment in Bank's account as per the contract) | Grantees Account by PMO/CO on Reimbursement basis in installments as per running bills | Grantees Account by PMO on Reimbursement basis in installments as per running bills |
| Payment Method | Installment basis: First installment (approx. 30%) as mobilisation fund in advance after agreement Successive installments after completion of pre- defined milestone (the milestone is defined in Grant Agreement) along with public hearing report. | Reimbursement of eligible expenditures as per contract on the actual basis against the completion of pre-defined milestones (Volume of product sourced, No of HHs benefitted, Sequencing of intervention etc.) mentioned in the grant agreement including submission, acceptance & approval of Progress report. | Reimbursement of Eligible Expenditures as per contract on the actual basis against the completion of pre-defined milestones (Volume of product sourced, No of HHs benefitted, Sequencing of intervention etc.) mentioned in the grant agreement including submission, acceptance & approval of Progress report. |

Operations of Co-investment Funds: The fund guidelines incorporating operation mechanisms as EoI call, screening, approval and monitoring, including minimum performance standards etc. is outlined below which may be amended by the approval of PSC and IFAD if necessary.

Table. Process for Co-financing Investment Plan Evaluation, Appraisal and Approval including Responsibility and Timeline

| Process /Steps | Responsibility | | Partners/Support | Remarks |
|---|----------------------------------|--|---|--|
| Scoping study to Identify potential MSMEs (buyers/ Processors, Inputs suppliers, Service providers etc.) - Rolling Process | PPMO, CO | Value chain and Business Development Team | Chambers of Commerce, Commodity Associations, Exporters | During the PAP formulation and prior the commodity-specific MSP |
| Prepare draft market-oriented Agro-ecological Cluster Plan following the consultations, KII with the Private sector, Community leader, ward representative & other stakeholders including FGD surveys at the cluster level | PPMO, CO TA -Service Provider | Community Mobiliser, Agriculture Technician, Agro-ecology, Business Development and Engineering Team | | After cluster delineation and Analysis including PAP manual development |
| Finalisation of Agro-ecological Cluster Plan in MSP settings | PPMO, CO | Agro-ecology, Value chain & Business Development Team | Municipality, MSP committee | During the MSP Review, Validate and Finalise |
| Organise Commodity Specific MSP -Province & Cluster Level (Identifying PAP-guided and MSP-prioritised Investment Priorities and Exploring Business Opportunities among the commodity chain actors). - Rolling Process | PPMO, CO | Value chain & Business Development Team | | One month to complete MSP in all prioritised commodities |
| Call for Expression of Interest (EoIs) from POs & MSMEs for co-investment in prioritised investment areas (National/ Local newspapers/ Media and Notices displayed at Municipality/ Ward offices & Federal/provincial Chambers of Commerce including commodity association) | PCO, | Value chain & Business Development Team | FNCCI, PCCI, CCI & Municipality | Open-ended call POs mobilised by MSMEs/RHVAP can be considered without EoIs <i>EoI guided by PAP and MSP prioritised clusters and investment priorities</i> |
| Receipt of EOIs | PPMO, CO | TA -Service Provider | Municipalities | After solicitation of EoIs notice |
| Desk Review and Shortlisting | PPMO, CO | TA - Service Provider | | One week after receipt of EOI <i>Pre-assessment against the set criteria and short-listing of EOI</i> |
| Field verification and Final selection of EoIs (POs & MSMEs) | PPMO, CO | Value chain & Business Development and Agro-ecology team TA - Service Provider | Ward representative, Municipal Agriculture/ Livestock Unit (MAU/ MLU) staff for POs; CCI/ PCCI representative for MSMEs | One week after short-listing of EOI |
| Business to Business (B2B) and Business to Service (B2S) Meetings. - Rolling Process | PPMO, CO | Value chain & Business Development team TA - Service Provider | MSMEs & POs | <i>B2B/B2S meetings conducted between interested POs in clusters & MSMEs to facilitate linkages and identify investment areas based on demand driven by market</i> |

| Process /Steps | Responsibility | | Partners/Support | Remarks |
|---|----------------|--|--|--|
| 2 days Orientation to POs on Market-oriented Agroecological production and Investment plan facilitation Business Ideation and Interaction with MSMEs | PPMO, CO | TA - Service Provider Value Chain & Business Development Team | Trainers - Agro-ecology Expert, Lead Farmers | Immediately after field verification (Ongoing Process) <i>Information & Knowledge on Agroecological production systems facilitate to prepare Market oriented agro-ecological Investment Plan</i> |
| Finalisation of Investment Plan (POs) & Business Plan (MSMEs) | PPMO, CO | TA - Service Provider Value Chain & Business Development Team | Private Business Development Service Provider (MSMEs hired) | <i>Detail investment activities along with budget and co-financing requirements</i> |
| Endorsement of Investment Plan by MADC/MEDS and send to Coordinator, PPMO, CO Recommendation from CCI/PCCI-MSMEs | PPMO, CO | TA-Service Provider | Municipal Agriculture Development Committee (MADC) /Municipality Economic Development Section (MEDS) PCCI & CCI | Immediately after IP preparation (Ongoing Process) <i>Endorsed by Municipality based committee create ownership and Synergy, Joint monitoring and reduce duplication.</i> |
| Evaluation and Appraisal of Investment Plan and Business Recommendation for Approval | PPMO, CO | PPMO & CO level Investment Committee (Internal) | For Co-investment above USD 50,000: Independent Panel Evaluation committee (External) IFAD - NoL (External) | Immediately <i>Compliance check ensuring all the documents exists and recommend to PM & CO for approval</i> |
| Contract Agreement | PPMO, CO | Provincial Programme Coordinator, Corridor Coordinator Fund & Contract Officer | | Immediately after recommendation from Investment Committee <i>Contract signed between Project and Grantees (POs, MSMEs)</i> |
| Grantees Orientation (POs, & MSMEs) | PPMO, CO | TA-Service Provider - POs Value chain & Business Development Team Admin & Finance Team Procurement Team | Municipality | Immediately After the contract agreement <i>POs/MSMEs clarified on Contract agreement clause & procedure. Formation of action plan including subcommittee (Monitoring, Procurement) within POs; HHs well-being ranking & POs categorisation</i> |
| Support POs & MSMEs Investment & Business Plan Implementation | PPMO, CO | TA-Service Provider Value chain & Business Development and Agro-ecology Team Procurement Team | | Regular |

7. Programme Management and Coordination

7.1 Implementation Structure

The Ministry of Agriculture and Livestock Development (MoALD) is the Programme Lead Agency (PLA), in coordination with the Ministry of Finance (MoF), and the Ministry of Industry, Commerce and Supplies (MoICS), the respective Ministries of Agriculture, and Environment and Forests at provincial level, and other relevant agencies/stakeholders. A forestry technician will be appointed by the provincial ministry in charge of Forest and Environment (MoITFE or equivalent), to ensure coordination for interventions related to soil and water protection measures in the agroecological clusters.

Programme Steering Committees. A Programme Steering Committee (PSC) at federal level will be chaired by the secretary of MoALD with representatives from the concerned line ministries (MoF, MoICS, MoFE). Three Provincial Programme Steering Committees (PPSC) will be established under the chairmanship of the Secretary from MoLMAC, with representatives from the relevant provincial ministries (MoITFE, etc.) of Lumbini, Karnali and Sudurpashchim.

Management Structures. Management structures will include:

- One Programme Coordination Unit (PCO) at federal level, hosted by MoALD,
- Three Provincial Programme Management Units (PPMO) in the three provincial capitals of Lumbini, Karnali and Sudurpashchim
- Three Corridor Offices will be established in strategic locations and will host the technical staff in the various fields of expertise required: agroecology, agronomy and livestock, engineering, social inclusion, business development (MSP, B2B, B2S)

The PCO at federal level will be responsible for the overall programme planning, technical guidance for implementation and monitoring and supervision of PPMOs including preparation and submission of Progress and Audits reports to IFAD . The PCO will coordinate the operations of the PPMOs for harmonization of planning, activities implementation, monitoring and reporting. The PCO will also be in charge of establishing and managing partnerships with service providers, research institutions, as well as collaborating with other projects and development initiatives.

Government appointed staff will be deputed to the PCO.

- Programme Coordinator /f
- Deputy Programme Coordinator /g
- Account Officer /h
- Admin Assistant /i

The provincial PMOs will be responsible for delivering the programme services and interventions in the three respective target provinces of Lumbini, Karnali and Sudurpashchim.

The provincial PPMO and three decentralized corridor offices will be in charge of facilitating the PAP and MSP as well as providing technical guidance to PO and MSME receiving programme support.

Government appointed staff will be deputed at PMO level in each of the target provinces.

- Senior Agriculture Officer /Provincial Coordinator (Government deputed second class officer - Under Secretary level)
- Account Officer (Government deputed third class officer)
- Admin Assistant (Government deputed non-gazetted first class officer)/p

- Junior Technician / Technical Assistant (Government deputed non-gazetted first/second class officer)

For specialised expertise and programme management functions, programme staff will be recruited through Service Providers specialised in the three key areas of the programme: PO professionalization, agroecology, and MSME development. A research consortium led by NARC will also be involved in the programme implementation structure for the design, promotion and monitoring of the agroecology approach.

Service providers will be selected through a competitive bidding process or through direct selection. Lengthy competitive bidding processes have proven to significantly delay the start-up phase of previous projects and these delays have had a negative impact on the overall projects' performance. To mitigate these constraints, it is recommended that IFAD be requested by GON to recruit service providers and facilitate direct payment.

Staff and any service providers hired under the programme will be sensitised on the importance of youth and gender mainstreaming. A gender empowerment, youth and social inclusion expert (GESI) stationed in one of the provincial PMO will be responsible for implementation of gender and youth action plan as well as oversight the mobilisation strategy; selection of programme participants through an inclusive and transparent process. The gender, youth and social development specialist will also oversee the adoption of GALS and also Nutrition mainstreaming activities. At cluster level GESI focal points will be appointed among the social mobilisers (ToRs are available in the PIM).

Figure: R-HVAP organisational structure

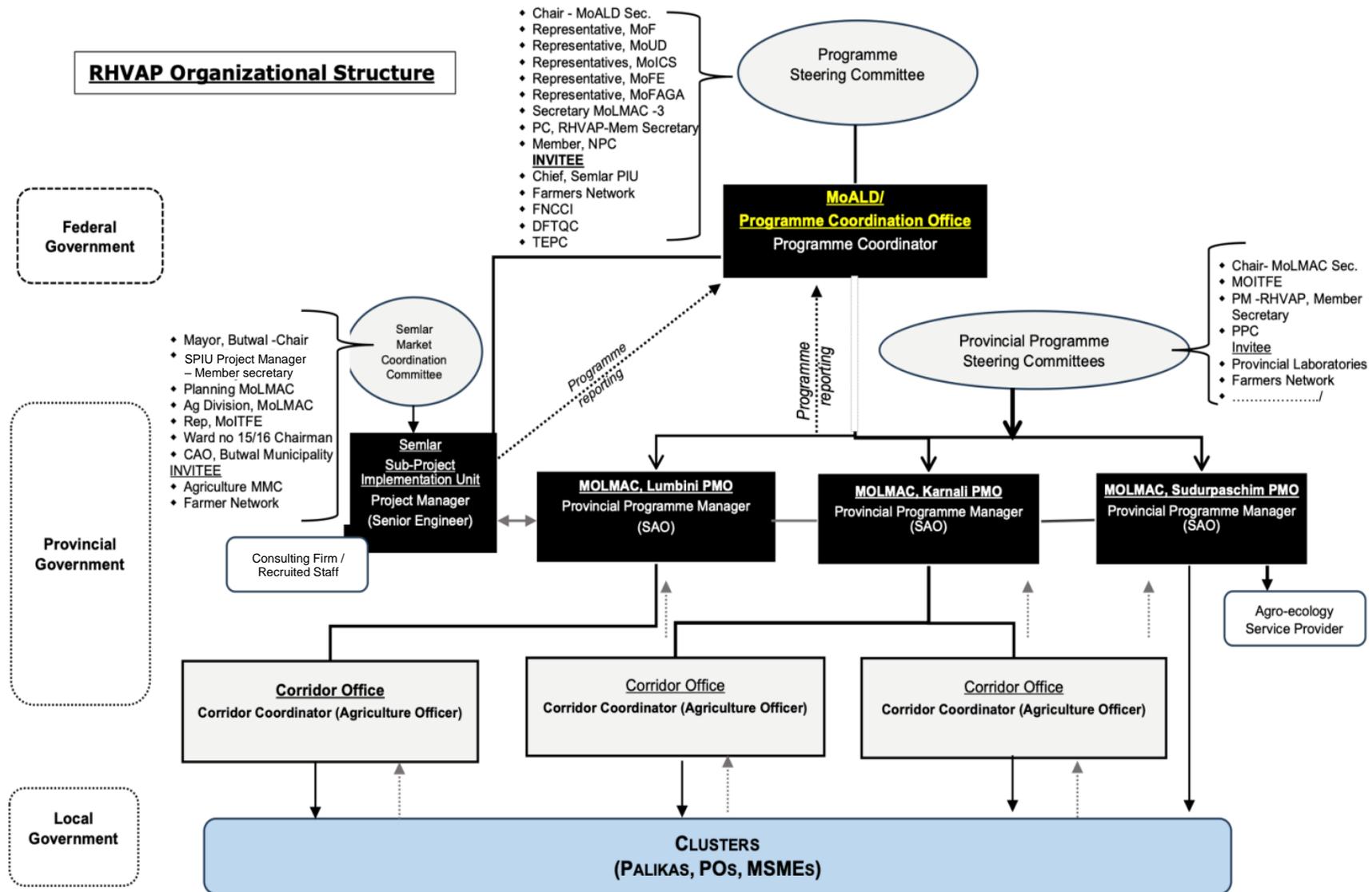
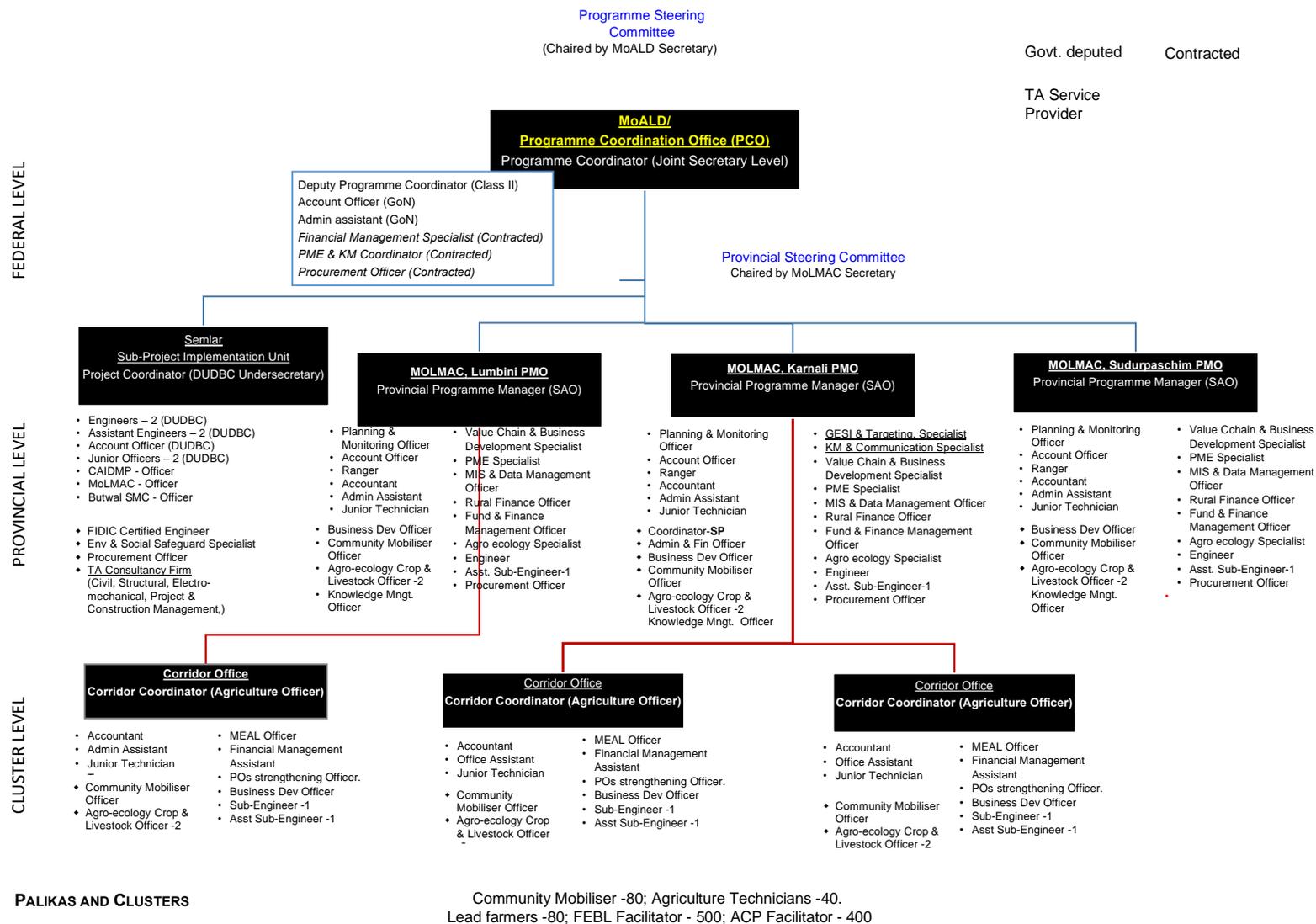


Figure: Programme organigram:



7.2 Planning (AWPB), Fund Flow and Reporting

Annual Work Plans and Budgets. Successful R-HVAP implementation requires the Programme AWPB planning process to effectively articulate the views of government institutions at various levels, private entities, farmers' groups and communities.

The R-HVAP budget process will be conducted in line with national procedures, which require consultation with all stakeholders, including beneficiaries. In the first year, the PCO will provide training workshops on the Programme strategy and approaches, AWPB, and procurement procedures for implementing agencies. This will ensure an accurate and shared understanding of the Programme strategy, procedures and information needs.

Palika Agroecological Planning (PAP) in each Palikas will be through participatory processes engaging farmer's groups, Palikas and communities participating. This process will ensure the inclusion of disadvantaged groups, who may be provided with an independent forum to develop and express their opinions if required.

Based on PAPs, Corridor Offices will prepare their AWPBs to be compiled by respective PPMOs at the Provincial level and approved by respective Provincial PSCs. PCO will compile AWPBs of all three PPMOs, Semlar SPIU and that of PCO. Final AWPB will be approved by the PSC and PCO will obtain a No Objection from IFAD. PCO will enter AWPB activities of PCO and PIU along with the conditional budget allocated to respective Provinces into the Line Ministry Budget Information System (LMBIS) hosted by the Ministry of Finance. These annual programme activities will be published in the Red Book upon approval of the budget by the parliament. For provincial PPMOs, PCO will provide excel sheet of compiled programme activities with budgets to the Ministry of Finance. Ministry of Finance will send budget to the respective provincial governments as conditional grants.

Upon receiving the notification of conditional grant for R-HVAP activities, PPMOs will enter AWPB activities of PMO and Corridor Offices within the province into the Provincial LMBIS. These annual programme activities will appear in the provincial Red Books upon approval by the provincial parliament.

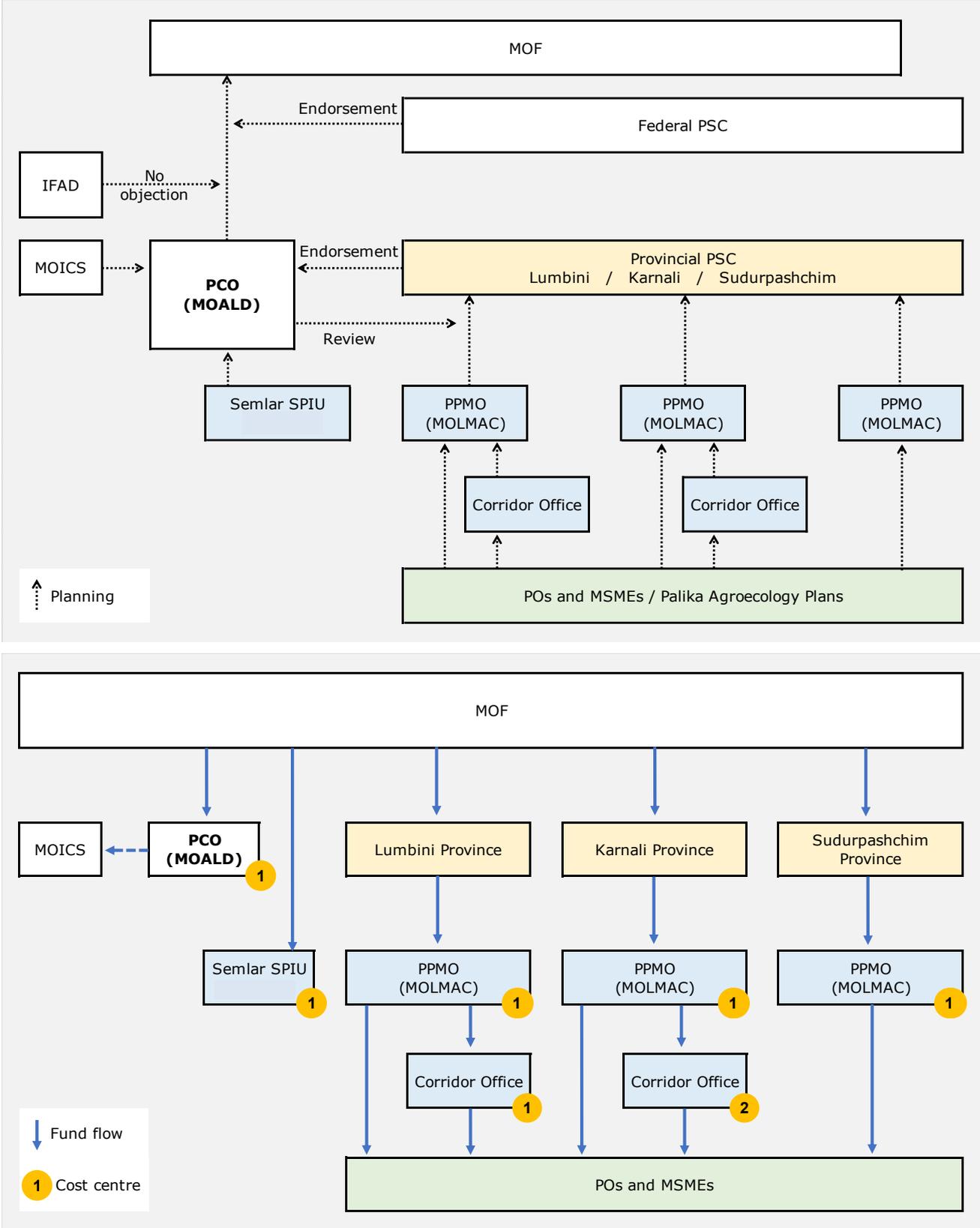
Upon approval of the budget published in the Red Books (both federal and Provincial) and budget allocation to the PCO, PIU, PPMOs and Corridor Office cost centres, the R-HVAP approved budget will be inserted into the FMIS by FCGO and provincial treasury Offices. Budget allocation will be available real time at the district branches of FCGO, the District Treasury Controller Office (DTCO) for R-HVAP use. The Red Books would specify the budget codes and funding source. The R-HVAP should adhere to the GoN budgeting/accounting rules as well as the percentage of financing of activities from the various financiers. The PCO is also responsible to assess the performance of the PPMOs against the planned AWPB and then allocate the resources to respective PPMOs based on the performance of the previous year

Progress Reporting: The Programme Coordinator (PC) will be responsible for the preparation of periodic progress reports for submission to the PSC and IFAD within a month from the end of the reporting period. Provincial Programme Managers (PMs) and Project Manager (of Project Implementation Unit for Semlar Agriculture Wholesale market) will compile their progress reports and forward to the PC. The implementing agencies (PPMOs and their Corridor Offices and PIU) will be required to provide their progress reports as an input for PCO to prepare a report that will be submitted to IFAD and Government in a timely and accurate manner. These reports will include the narrative report as a harmonised source of key data and ensure the trends are highlighted. The reports will record the financial and physical progress against AWPB targets. Programme implementing agencies will - within 2 weeks from the end of the reporting period - submit quarterly progress reports to the PCO.

Annual Results and Impact Reporting: The PCO will report separately to IFAD on the Programme indicators that overlap with IFAD's COSOP. The information contained in

these Annual Results and Impact Reports will be drawn from the Programme MIS and set in relation to the targets contained in this Report and those in the AWPB.

Figure: Planning and flow of funds (chart)



7.3 Financial management

The Financial Management Manual (FMM) annex includes detailed FM arrangements. This section briefly describes the overall FM framework of the project.

The total cost of the programme is estimated at US\$ 120.9 million. The financiers and contributions are the following: (i) IFAD loan US\$ 70.9 million (58.6%); (ii) Federal Government of Nepal US\$ 24.6 million (20.3%) comprising of (a) US\$ 19.6 million (16.2%) covering duties, taxes, salary and operational cost of deputed staff, and (b) US\$ 5.0 million (4.1%) cash contribution for the Semlar wholesale market; (iii) provincial government US\$ 0.5 million (0.4%); (iv) local government / Palikas US\$ 1.52 million (1.3%), (v) Producers Organizations-Households US\$ 20.87 million (17.3%), and (vii) MSMEs US\$ 2.56 million (2.1%).

Programme cost by components and financiers: The programme is composed of five components. Of the total programme cost, US\$ 66.05 million (54.6%) will be used for Component 1, US\$ 10.08 million (8.3%) for Component 2, US\$ 31.25 million (25.8%) for Component 3, US\$ 1.37 million (1.1%) for Component 4, and US\$ 12.22 million (10.1%) for Component 5. Table below provides programme cost by component and financier.

Table: Programme costs by component (and subcomponents) and financier

| NEPAL Resilient High Value Agriculture Programme (R-HVAP) Components by Financiers (US\$ '000) | | | | | | | | | | | | | | | | |
|---|-----------------|-------------|--------------------------------------|------------|------------------|------------|------------------------------|------------|-----------------|-------------|---|-------------|----------------|------------|------------------|--------------|
| | GON (Federal) | | GON (Federal) - Cash Contribution | | GON (Provincial) | | Local Government (Palika) | | IFAD Loan | | Producers' Organizations and Households | | MSME | | Total | |
| | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % |
| 1. Enhanced capacities for transitioning to market oriented agro-ecological production systems | 9,714.8 | 14.7 | - | - | - | - | - | - | 34,324.2 | 52.0 | 19,499.9 | 29.5 | 2,511.5 | 3.8 | 66,050.4 | 54.6 |
| 2. Improved access to climate resilient productive infrastructure | 1,512.0 | 15.0 | - | - | - | - | 1,518.0 | 15.1 | 5,681.6 | 56.4 | 1,368.3 | 13.6 | - | - | 10,079.9 | 8.3 |
| 3. Improved wholesale aggregation and distribution of agro-ecological commodities for domestic and export markets | 4,254.7 | 13.8 | 5,000.0 | 16.0 | - | - | - | - | 22,000.0 | 70.4 | - | - | - | - | 31,254.6 | 25.8 |
| 4. Strengthened policies, regulations and institutions for smallholder agro-ecological production and trade | 205.2 | 15.0 | - | - | 33.8 | 2.5 | - | - | 1,062.6 | 79.1 | - | - | 46.5 | 3.4 | 1,368.1 | 1.1 |
| 5. Programme management, monitoring and evaluation, knowledge management and learning | 3,907.1 | 32.0 | - | - | 463.3 | 3.8 | - | - | 7,646.6 | 64.2 | - | - | - | - | 12,217.0 | 10.1 |
| Total Programme Costs | 19,593.8 | 16.2 | 5,000.0 | 4.1 | 497.1 | 0.4 | 1,518.0 | 1.3 | 70,935.0 | 58.6 | 20,868.2 | 17.3 | 2,557.9 | 2.1 | 120,970.0 | 100.0 |

Programme costs by expenditure categories and financiers: The programme cost has been budgeted under four expenditure categories: (i) works, (ii) goods, services and inputs, (iii) Training and (iv) operating costs. Of the total programme cost, 35.3% will be works, 54.0% will be goods, services and inputs, 2.7% will be training, and 8.0% will be operating cost. Table below provides definitions of programme expenditure categories and the associated costs by financiers.

Table: Programme expenditure categories and associated costs by financier

| NEPAL Resilient High Value Agriculture Program Disbursement Accounts by Financiers (US\$ '000) | | | | | | | | | | | | | | | | |
|---|--|-------------|--------------------------------------|------------|------------------|------------|------------------------------|------------|-----------------|-------------|---|-------------|----------------|------------|------------------|--------------|
| | GON (Federal) | | GON (Federal) - Cash Contribution | | GON (Provincial) | | Local Government (Palika) | | IFAD Loan | | Producers' Organizations and Households | | MSME | | Total | |
| | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % |
| Works | 5,839.1 | 13.7 | 4,624.6 | 10.8 | 33.8 | 0.1 | 1,462.2 | 3.4 | 27,390.7 | 64.1 | 1,349.7 | 3.2 | 2,054.5 | 4.8 | 42,754.5 | 35.3 |
| Goods, services and inputs | 9,711.3 | 14.9 | 342.9 | 0.5 | - | - | 55.8 | 0.1 | 35,236.9 | 53.9 | 19,518.5 | 29.9 | 457.0 | 0.7 | 65,322.4 | 54.0 |
| Training | 462.6 | 14.3 | 32.5 | 1.0 | - | - | - | - | 2,702.9 | 83.3 | - | - | 46.5 | 1.4 | 3,244.6 | 2.7 |
| Operating costs | 3,580.8 | 37.1 | - | - | 463.3 | 4.8 | - | - | 5,604.5 | 58.1 | - | - | - | - | 9,648.6 | 8.0 |
| Total Programme Costs | 19,593.8 | 16.2 | 5,000.0 | 4.1 | 497.1 | 0.4 | 1,518.0 | 1.3 | 70,935.0 | 58.6 | 20,868.2 | 17.3 | 2,557.9 | 2.1 | 120,970.0 | 100.0 |
| Categories | Description | | | | | | | | | | | | | | | |
| (i) Works | Project works and for Project equipment and materials, including eligible costs for Project vehicles and standard office equipment | | | | | | | | | | | | | | | |
| (ii) Goods, Services and Inputs | project goods and services, including consultancy services, and other direct inputs | | | | | | | | | | | | | | | |
| (ii) Training | Project training activities and workshops, e.g. costs of venue, participant travel, food and beverages and publication materials. | | | | | | | | | | | | | | | |
| (iv) Operating costs | Project for operating costs and eligible expenditures incurred under all components of the Project for salaries and allowances of Project staff directly and fully assigned to the Project. Salaries of staff assigned to the Project on a part time basis should be costed pro rata | | | | | | | | | | | | | | | |

Programme costs by component and year: Programme costs will be incurred over the period of 8 years. About 8% of the cost will be incurred in 1st year. The programme cost will be 23%, 32%, 26%, 4%, 3%, 3% and 1% in the 2nd, 3rd, 4th, 5th, 6th, 7th and 8th year respectively. Table 6 provides programme cost by component and year.

The ratio of recurrent expenditures to total programme financing under IFAD loan is 7.98%, which is within the 15% limit.

Disbursement. The Government of Nepal will pre-finance project expenditures. The project will reimburse Central Treasury actual expenditures pre-financed by the government quarterly. Report-based disbursement modality will be applied to request funds from IFAD. The PCO will submit consolidated quarterly IFRs within 45 days from the end of the relevant quarter. Two WAs, one for justification for actual spent amount

and the second for advance, will be submitted each quarter. The PCO will maintain the DA at Nepal Rastra Bank. The project team will use ICP to request funds from IFAD. The latest IFRs will be linked to each WA and submitted via the Finance Execution Model of ICP. The IFAD Client Portal (ICP) with a new module, called the Financial Execution module (FE module), is used to direct upload of certain project financial reports into the IFAD Client Portal (ICP). The PCO (Role of 'Borrower Author' in ICP) will upload the IFR into the system and link the WA to the IFR before submitting it to the Borrower/Recipient for approval in ICP and final submission to IFAD.

Planning and Budgeting. Annual project budgets will be prepared within the overall government budgeting process. The PCO will coordinate preparing and submitting accurate and realistic budgets from local PPMOs. The draft AWPB, split by components, categories, and sources of funds, will be sent to IFAD 60 days before the start of the relevant financial year. Detailed planning and budgeting policies are included in the FMM annex.

Internal control. The project will follow Government regulations in payments, funds flow, and treasury operations. However, PIM and FMM will be developed to include detailed roles and responsibilities for all project staff. In addition, the FMM will include specific procedures for the segregation of duties among FM staff.

Accounting systems, policies, procedures, and financial reporting. Centralized Government Accounting Software (CGAS) will be used for accounting record-keeping and financial reporting. However, CGAS does not generate IFAD-required IFRs and can't consolidate financial reports for all PPMOs and PCO. Therefore, Project will work with the MOF Treasury to customize CGAS to generate IFRs and automatically consolidate IFRs at the PCO level.

Country systems. Government staffing, budgeting, single treasury, funds flow, financial reporting, accounting and audit standards, and SAI will be used to implement R-HVAP.

Lessons learned. ASDP could not timely disburse to project beneficiaries and suppliers due to the long distance to PMO. Therefore, R-HVAP will have multiple PPMOs close to suppliers and beneficiaries. In addition, all projects in Nepal had issues with the timely start of project activities after entry into force. Therefore, R-HVAP will have a retrospective financing option. Lastly, IFAD will work with OAG to engage private-sector auditors to audit R-HVAP financial statements due to the delay in submitting audit reports during the last few years.

Financial Management risks and mitigation measures: (i) Risks associated with multiple PPMOs at provincial levels and Central PCO. Each PPMO and the PCO will require separate government-deputed Accounts Officers. PIM and FMM will have detailed roles and responsibilities. The PCO will have the necessary technical experts and be vital in coordinating all PPMOs, consolidating IFRs, and allocating timely budgets. In addition, the PCO will ensure all PPMOs and Corridor Offices have government-deputed Accounts Officers / accountants. The Part-time Accounts Officer option will be explored where the government does not have full time staff for R-HVAP; (ii) The risk that the government will delay the implementation of programme activities after entry into force. The programme legal documents will include a start-up advance financing provision to finance consultancy contracts from PDR approval until entry into force. The Financing Agreement (FA) will include a start-up financing provision of US\$ 1 million to finance the establishment of coordination and implementation offices/units, launching of initial procurements, recruitment of staff, and undertaking preparatory studies such as the baseline survey. Conditions prior to disbursement do not apply to start-up finance and GoN may request up to US\$ 1 million upon the FA entering into force. PCO will prepare AWPB and other procurement documents for the initial year of programme activities. In addition, the PCO will be responsible for other arrangements necessary to start programme activities shortly after entry into force of the programme; and (iii) The risk that the Office of the Auditor General will delay the submission of annual audit reports. Normally, annual audits are to be submitted within 6-months of annual financial closure,

however, in light of the consistent challenges in meeting this deadline, it is proposed that a 9-month period be accepted.

7.4 Procurement

The procurement of goods, works and services financed from project resources will be undertaken in accordance with the provision of the Public Procurement Act (PPA) and Public Procurement Regulations (PPR), 2007 as amended from time to time and the provisions of IFAD's Procurement Guidelines and Handbook (dated September 2010) and as amended from time to time. Goods and services (non-consulting) procured using National Competitive Bidding (NCB), National Shopping (NS) and Direct Contracting (DC) will follow the procedures and processes defined in the Project Implementation Manual (PIM) approved by the Project Steering Committee and no objection provided by IFAD. The selection of individual consultants and service providers will also be defined in the PIM, which shall include details of the selection method to be applied in case of consultancies services such as Quality and Cost Based Selection, Fixed Budget Selection, Least Cost Selection, Consultants Qualification Selection and Single Source Selection. The PCO will prepare Procurement Plan annually and update/upgrade as required to reflect actual implementation needs. Procurement will be undertaken as per the consolidated procurement plan submitted by the PCO approved by the Project Steering Committee (PSC) and no objection provided by IFAD. The details of program procurement strategy (PPS) and risk mitigation measures are detailed under Annex 8.

The program also aims to construct an export oriented regional wholesale market in Butwal Sub-Metropolitan City, Rupandehi District, Lumbini province under component 1. R-HVAP will co-finance the market construction and build the capacity of the personnel involved in procurement and construction. The EIA/EMP was approved by GON on 29 September 2023. Procurement activities for the Semlar wholesale market will be proceeded based upon the provisions of PPA/R 2007 of Nepal after the consultation of MOALD with MOLMAC Lumbini, and IFAD.

7.5 Risks management including SECAP risks mitigation measures.

Anticipation of risks and proactive action to prevent or minimise their influence form key responsibilities of the National Project Director and National Project Coordinator. The Management Reflection in the Annual Progress Report should include up-to-date information on risks and describe the mitigation measures pursued or proposed by the NPCO.

Key risks identified during the design of AFN II are listed in the Integrated Project Risk Matrix. The risks are listed by category. Each risk is assessed according to a scale: Low / Moderate / Substantial / High. Each risk has two assessments: Inherent Risk and Residual Risk:

- Inherent Risk means the risk level if no risk mitigation measures are implemented;
- Residual Risk means the risk level if risk mitigation measures are implemented.

The IPRM includes risk mitigation measures for any risk that has a level of "Moderate" or higher in the Residual Risk column.

Each Annual Report must include an updated IPRM. The updated IPRM should report on:

- For each risk identified in the IPRM, did the risk affect project implementation during the previous year? Write a brief comment.
- Was the risk mitigation measure implemented?
- What is the assessed risk level the next year?
- Are any additional mitigation measures needed?

If any new risks are identified, these should be added to the updated IPRM. The updated IPRM will be reviewed by the IFAD project supervision mission.

Environmental, Social and Climate risks are identified in detail in the ESCMP in Annex of the SECAP note in Annex 5 of the PDR. Mitigation measures are indicated and corresponding tools (screening, impact monitoring, mitigation reporting) are to be developed at start-up phase of the programme.

7.6 M&E, Knowledge Management, and Policy Engagement

Monitoring and Evaluation.

The M&E system developed and managed by the PCO will cover: (i) monitoring of implementation performance, execution of the AWPB, outreach and effectiveness of the targeting strategy, and (ii) periodic measurement of programme results (outputs, outcomes and impact) in relation to agreed targets. All provinces will contribute to a single R-HVAP M&E System and have access to the data generated.

Outreach monitoring. For each key output, as and when they will be delivered, the M&E system shall track the number of direct programme participants. In so doing, the M&E system will help monitor the extent to which intended programme participants, in particular young smallholder farmers, poor women and marginalized groups, are actually being reached, helping thus track targeting performance. This means that, each time a specific programme output is delivered, the specific implementer shall collect information on the number of programme participants, their gender, age (both GoN 16-40 and IFAD 15-24) and if they belong to the janajati (IP) or dalit community. In addition, the programme will also track migrant families and returning migrants.

Georeferenced Management Information System (MIS): A key focus for the R-HVAP M&E System will be to operate a highly effective Geo-MIS (online and offline, internet and mobile devices) that provides programme managers and teams with timely and reliable information to support adaptive programme management. A foundation MIS will be developed for R-HVAP in cooperation with ASDP prior to start-up. The Programme will adapt and improve on this foundation MIS using lessons from ASDP, ASHA and RERP. Unique ID will be provided to each programme participant and household, similar to the ASDP and ASHA MIS, to enhance transparency of investments, prevent duplication, and track change over time. Georeferencing of productive infrastructure will also contribute to enhancing transparency by enabling remote monitoring of infrastructure locations using freely available satellite imagery. Outcome level indicators will also be integrated into the MIS, such as increase in net income, employment status, PO and MSP activity status, and others. Further, the ESCMP indicators (overall Programme and Semlar) will be integrated into the M&E System and MIS to enable remote monitoring by international stakeholders (please see the ESCMP Matrix included in the PDR). To the extent feasible, the R-HVAP MIS will align with the VITA MIS for tracking lending activities to Programme beneficiaries.

The MIS user-interface will be improved for simplicity and results visualization, in order to make it more accessible for all users, especially for decision and policy makers. While the current RERP and ASDP MIS have informative MIS dashboards with results and progress diagrams, they focus on total and average numbers that provide a static snapshot of progress. To better inform the management and monitoring team, data analysis and evaluations will be improved by adding spatially and temporally dynamic diagrams and figures such as annual trendline figures on outreach, physical and financial progress, and relevant outcome indicators such as net income, production and sales volumes, and others. All PO output and outcome data will be disaggregated by annual batches to assess batch-specific trend analysis and year-over-year change in key value chain outcomes such as production volume, sales volume and value, and others.

MIS data-entry will be made mandatory for the disbursement of co-investment packages and funds.

Data collection: In each province, a baseline survey will be conducted among a representative sample of initial programme participants in order to collect quantitative and qualitative information on the socio-economic conditions of these households prior to programme interventions. The same exercise will be repeated at mid-term and completion (in time to inform the MTR and PCR preparation processes), in order to measure and appreciate changes since baseline. Attention will be given to consistently

collect baseline, mid-term and end line data on all performance indicators as noted in the Logical Framework, including IFAD's core output and outcome indicators as described by IFAD's Core Indicators (CI) Framework. A resilience matrix and scorecard will be developed to measure household resilience, based on the IFAD Resilience Design and Monitoring Tool (RDMT). In addition to the Logical Framework indicators, baseline, mid-term and end line data will also be collected on Multidimensional Poverty Index (MPI), soil organic matter (SOM), and Minimum Dietary Diversity for Women (MDDW).

For the tracking of various value chain indicators, R-HVAP will follow a system of "rolling baselines" in which data on each production cluster is collected at the time of intervention initiation using smaller samples. Annual Cluster Tracking Surveys (ACTS) will also be organized from Year 2 onwards to regularly assess the development and performance of each cluster and corridor, and to assess the level of satisfaction of programme participants.

Under Component 1, data will be chiefly collected through Farm Business Diaries, as well as agroecological lead farmers and community mobilizers' records. The programme will make extensive use of tablets and online databases to enable data collection and entry directly from the field into the MIS by agroecological lead farmers and community mobilisers, who will be provided with tablets or smartphones, along with remunerations for the collection of programme participant data.

Reporting: The PCO will be responsible for the preparation of monthly, quarterly, bi-annual and annual progress reports. The bi-annual and annual progress reports will be shared with IFAD for feedback. In addition, the PCO will be required to prepare a Programme Completion Review towards the end of the Programme.

A draft M&E manual is available in Appendix 2 of the PIM.

Knowledge Management and Policy Engagement

The Programme will invest in good quality, evidence-based knowledge management to contribute to implementation and policy development processes. Knowledge management activities in R-HVAP will have a triple objective: (i) the sustainable anchoring of technical and managerial knowledge among supported farmers and their groups (e.g. through the production of teaching materials and manuals); (ii) the generation of knowledge from programme experience in market-oriented agroecological production and various other domains, based on the information collected through M&E activities, participatory research and specific thematic studies; (iii) the sharing of this knowledge with interested parties, such as IFAD and MoALD, other donors and policy makers interested in smallholder agroecology or resilient value chain development, using various media (publications, policy formulation workshops, various Communities of Practice and multi-stakeholder platforms, instructional and documentary videos). Ultimately, knowledge management activities will feed the policy dialogue between IFAD and the Government on successful approaches to building sustainable food systems in the country, and scaling up the best practices.

KM Strategy and Policy Engagement Plan: A KM Strategy and Policy Engagement Plan will be developed that considers and responds to the knowledge and communication needs of all key stakeholders, including programme participants (youth, POs, MSMEs), provincial and local governments, and the R-HVAP team as well. The strategy will respond directly to the findings of the Agroecological Cluster Delineation and Analysis, which will identify the knowledge and capacity gaps and needs of both smallholder communities (production) and of government representatives (policy) for transitioning to market-oriented agroecological production systems. The strategy will also take into consideration the need for both horizontal (peer-to-peer) and vertical (multi-stakeholder) knowledge and communication pathways in order to address issues of risk perception and trust.

In particular, the KM Strategy and Action Plan will include and elaborate on the following:

- **Policy Engagement Plan** to support informed decision-making and the next phase. R-HVAP adopts a programmatic and phased approach. Therefore, gathering evidence-based knowledge on major Programme priorities and investments will be critical to guide current implementation as well as the next phase of R-HVAP. A Policy Engagement Plan will be developed directly addressing the priority policy research areas and evidence needs of policy-makers identified by the Agroecological Cluster Delineation and Analysis. This will then be used to ensure the Programme is collecting sufficiently robust data on these issues through M&E systems and thematic studies to provide evidence-based policy inputs. Policy research topics could include outcome and impact assessments of Programme activities, as well as key enabling factors and constraints faced, for example, profitability and return on labour of agroecological production, impact on ecological health and biodiversity, resilience and loss and damages during extreme events, balancing quality and affordability of bio-inputs, encouraging private investment, enabling fallow land access, decentralized planning and implementation, and others as relevant.
- **Participatory research and innovation through demonstration farms.** An analytical framework will be designed for participatory research and monitoring of the agroecology approach, in cooperation with NARC. The analytical framework will be guided by the KM Strategy and Policy Engagement Plan, and will draw on existing frameworks such as, IFAD's Resilience Design and Monitoring Tool (RDMT) and the FAO's Tool for Agroecology Performance Evaluation (TAPE) among others, to delineate a set of research activities and methods for implementation at demonstration farm level. A role-model approach will be adopted for documenting agroecological innovations and lessons with an empirical evidence base. A small number of promising agroecology lead farmers, farms and MSMEs will be selected as role-models. Based on a robust analytical framework, detailed physical and financial data will be collected on a monthly basis, while biophysical data of the farming ecology will be collected bi-annually, or as relevant. This rich evidence base will be used to support several thematic studies and analyses identified by the Policy Engagement Plan. Where relevant, scientific publications and policy briefs will be prepared in partnership with national research institutions and universities and shared to provincial and national level workshops and events.
- **Transparency for addressing issues of trust and risk perception among programme participants.** At the community level, R-HVAP will develop a network of agroecological lead farmers and demo-farms, as well as market-oriented community mobilizers. These have proven as valuable instruments for peer-to-peer and "learning-by-doing" knowledge and skills sharing within rural communities, addressing key concerns of trust and doubt among smallholders. In addition, with linkages to the agroecological research on model farms and rural enterprises, monthly data will be published online on the Programme website and social media, with select information shared via SMS or radio, such as expenditure, income, net profit and return on labour, to enhance transparency and address risk perception among rural communities. The findings and results will be communicated with a strong youth focus, using popular social media platforms such as YouTube and Instagram for visibility. Exposure events and learnings routes will also be organized to visit well established, high performing, and innovative POs and MSMEs.

Various tools and processes will be followed for knowledge management and sharing, including:

- Capitalization of experience: Through the regular analysis of results in the field, the collection of testimonies, interviews with programme participants and resource persons and other qualitative studies or quantitative surveys, M&E activities should culminate in the identification and documentation of good practices and relevant

lessons learned from programme implementation. These processes of learning and capitalizing on experience will help capture and formalize tacit knowledge, so that it can be documented and shared. Such knowledge should eventually provide a basis for policy dialogue.

- Case studies: Specific case studies will be undertaken when the programme will need to properly document some specific implementation aspects, results or lessons learned, or to illustrate cases of successful farmers or farmers' groups. The purpose will be to deepen the understanding and knowledge on key success factors, or the reasons for the possible failure of some approaches. These case studies may, or not, include the conduct of a thematic/quantitative survey, or will be mainly based on interviews and field observations.
- Knowledge fairs and events: These events will be periodically organized at provincial and national level to share innovations, promote local products, stimulate exchanges between producers and new buyers or share knowledge between corridors.
- Exchanges and study trips: Selected producers and MSMEs will participate in exchange visits and study tours in order to acquire new knowledge, agricultural practices or ways of working from their peers, which will facilitate learning and the adoption of best practices.
- Production and dissemination of teaching materials: appropriate supports (posters, technical handbooks, videos, etc.) intended for producers or members of farmers' groups will be developed and widely disseminated in order to ensure the sustainable anchoring of improved production techniques or management skills and to perpetuate the messages of the various awareness campaigns.
- Establishment of an electronic library. In order to safeguard the institutional memory and the accessibility of information, all the documents, studies and reports produced by the PCO, as well as all the documents developed for knowledge management or sharing purposes (videos, material) will be carefully archived in a central electronic library.

The following table presents a tentative action plan for knowledge management and communication activities during the first year of implementation.

Tentative KM activities and plan

| KM Activity | Type/Description | Responsible staff | Time frame |
|---|--|---|---|
| Knowledge needs and gaps stakeholder analysis | Stakeholders' consultation and analysis to be carried out to determine existing levels of knowledge among the different stakeholders (rapid review of knowledge and information flows, current good practices) and to identify their information and knowledge needs and gaps at (and between) all levels. | PCO & P-PMO | First three months of implementation |
| KM Strategy, including Policy Engagement Plan | Based on stakeholders' analysis and consultation outcomes, develop a full KM Strategy, including the Policy Engagement Plan, and an annual KM and communication action plan. | PCO & P-PMO | Within first six months of implementation |
| Link KM & M&E | Build effective learning processes into the programme M&E system and introduce any relevant additional KM indicators in the M&E system. | PCO PM&E Coordinator, Provincial M&E and KM Specialists | When M&E system is being operationalized |
| Documentation | Use simple documentation tools and methods, such as: print, photography, audio and video. Document case studies (success and failures). Support collection and initial analysis of data to generate relevant knowledge. | Provincial KM Specialist, and relevant technical staff (Social Inclusion, Agroecology...) | Year 2 to year 8. |
| Communication and sharing | Use the documented best practices to communicate results in different settings, such as workshops, IFAD website, print publications, | Provincial KM Specialist, and relevant technical staff (Social Inclusion, | Within Year 2 of field level implementation |

| | | | |
|--|---|--|---------------------|
| | <p>learning exchanges, newspapers, media, etc., and adapt them to the targeted end users.</p> <p>Facilitate the dissemination of programme results in different fora.</p> <p>Provide relevant communication toolkits and backstopping to the relevant programme staff/partners.</p> | Agroecology...) | |
| Knowledge-based decision-making and policy dialogue | Facilitate the reporting and presentation of lessons learned and good practices for use in policy advocacy and policy dialogue. | Provincial KM Specialist, and relevant technical staff (Social Inclusion, Agroecology...) | Year 3 to 8. |

| Capacity gaps | Capacity gaps and proposed mitigating measures | | Implementation support requirements | | |
|---------------|--|------------------------------------|-------------------------------------|--------------------------------------|--------------------|
| | Staff/persons in need of capacity building | Proposed capacity building measure | Implementation support needed from? | In which specific area is it needed? | When is it needed? |
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Appendices to the PIM

PIM APPENDIX 1: TEMPLATE OF ANNUAL WORK PLAN AND BUDGET (AWPB) 372

PIM APPENDIX 2: LIST OF SELECTED PALIKA AND DETAILED MAPS..... 380

PIM APPENDIX 3: DRAFT M&E MANUAL 388

PIM APPENDIX 4: DRAFT KNOWLEDGE MANAGEMENT PLAN 398

PIM APPENDIX 5: DRAFT FINANCIAL MANAGEMENT MANUAL..... 399

PIM APPENDIX 6: PROCUREMENT MANUAL 464

PIM APPENDIX 6A: DRAFT PROCUREMENT STRATEGY..... 475

PIM APPENDIX 7: TERMS OF REFERENCE 497

PIM APPENDIX 8: R-HVAP GENDER, YOUTH AND SOCIAL INCLUSION STRATEGY 549

PIM APPENDIX 9: SEMLAR OPERATIONAL GUIDELINE AND ACTION PLAN – TABLE OF
CONTENT 573

PIM Appendix 1: Template of Annual Work Plan and Budget (AWPB)

[Annotated template]

Annual Work Plan and Budget

PART I - Narrative

| | |
|---|---|
| Country: | |
| Project Title: | |
| Project Number: | |
| Financial year: | <i>Indicate financial/fiscal year for the proposed budget</i> |
| Planning period: | <i>Indicate which period is covered by the proposed AWP&B (e.g. June 2006/May 2007)</i> |
| Year of implementation | <i>Situate proposed planning period within the overall project duration (e.g. Year 3)</i> |
| Total project budget (in USD): | |
| Total expenditures to date (in USD): | |
| Date of loan effectiveness: | |
| Date of project start: | <i>Indicate date of actual start of project implementation¹¹⁸</i> |
| Project duration: | <i>Indicate number of years for total project duration</i> |
| Date of project closing: | <i>Indicate estimated year of project closing</i> |
| Date of latest Logframe revision | <i>Indicate date of latest <u>approved</u> Logframe revision</i> |
| Date of RIMS benchmark survey: | <i>Indicate date when the initial RIMS baseline survey was carried out</i> |
| Date of RIMS mid-term survey: | <i>Indicate date when the mid-term RIMS survey was (or will be) carried out</i> |
| Date of RIMS completion survey: | <i>Indicate estimated date for carrying out the RIMS completion survey</i> |
| Date of Mid-Term Review | <i>Indicate date when the Mid-Term Review was (or will be) carried out</i> |
| Date of Completion Review | <i>Indicate date when the Completion Review will be carried out</i> |

¹¹⁸ e.g. official date when the PMO was formed or first field activities implemented

A. Background

[This Chapter summarizes the most important external developments with a probable impact of project implementation that are to be expected over the AWP&B period. In particular, this Chapter identifies whether any Logframe assumption is unlikely to hold true.]

The following elements may be discussed, if relevant:

- **Government policies:** Indicate any upcoming change or new policies that will become effective over the AWP&B period and how they may impact on project implementation. Briefly explain the measures planned to mitigate potential negative effects or to take advantage of potential opportunities.
- **Implementation arrangements:** Discuss major changes in initial implementation arrangements or PMO staffing situation that are expected to take place over the next AWP&B period.
- **Target Group:** Indicate any changes that may become effective over the AWP&B period as regards the situation or attitude of the project Target Group (e.g. increasing reluctance of women to attend agricultural training courses). Briefly explain the measures planned to mitigate potential negative effects or to take advantage of potential opportunities.
- **Production factors/local economic context:** Discuss major changes in the external economic context with a probable impact on the sustainability or economic rate of return of project’s investments (e.g. decline in market prices, persistent droughts in target area). Briefly explain the measures planned to mitigate potential negative effects or to take advantage of potential opportunities.

B. Achievements to date and proposed implementation focus for upcoming year

[While the detailed achievements of previous AWP&B period should be detailed in the Annual Progress Report, this Chapter provides a very rapid overview of the status of implementation of the various Logframe Components, as a basis to then justify the choice of objectives and implementation focus for the new AWP&B period. This is done by filling the table below and providing some further textual information]

Table 1 - Summary of main achievements to date

| Components | % of achievement to date (estimation) | Focus for new AWP&B period? (Yes/No) |
|-------------|---------------------------------------|--------------------------------------|
| Component 1 | | |
| Component 2 | | |
| Component 3 | | |
| Etc. | | |

- **Changes in objectives:** Indicate whether there are any substantial changes in objectives and physical targets for the remaining implementation period following a major change in the context or a revision of the project Logframe during the last AWP&B period.

Note: If the Project Logframe has been revised and duly approved, it should be annexed.

- **Changes in implementation strategy:** Briefly indicate any changes in the project implementation strategy as compared to previous year(s). Justify why these changes were required and present what are the expected benefits of this change in strategy.

C. Costs and financing

[This Chapter discusses issues related to project implementation costs and financing.]

- **Costs:** Highlight any major changes in unit costs due to inflation/deflation or changes in design compared to previous years and their probable impact on project budget. Indicate the manner in which these changes are being dealt with in the proposed budget (e.g. budget re-allocation).
- **Financing:** Indicate foreseeable issues related to the flow of funds, to the timeliness of budget approval and funds availability and to disbursement procedures for all project financiers. Suggest measures to overcome these constraints.

D. Annual Procurement

[While a detailed Annual Procurement Plan should be annexed, this Chapter presents any major changes in the overall Procurement Plan, together with justification, and highlights any difficulty that might be anticipated in the area of procurement based on previous experience and identifies mitigating measures].

- **Procurement Plan:** Highlight any major changes in procurement as compared to the overall, agreed Procurement Plan and provide justifications for these changes.
- **Procurement process:** Indicate foreseeable issues related to overly complex procurement methods or delays in tendering and related decision-making processes. Suggest measures to mitigate these constraints.

E. Expected benefits and target group outreach

[With reference to the specific criteria or thresholds¹¹⁹ for target group identification and selection identified in the Appraisal Report, this Chapter provides information on the number of beneficiaries reached so far, by "category", and on the number of new beneficiaries who are planned to be reached this year. This is done by filling up the following table]

Table 3 – Estimated outreach by Target Group "category"

¹¹⁹ For example: the Appraisal Report may specify that the project should target 20% of landless people; 40% of very poor households and 40% of poor households, with "very poor people" being defined as people experiencing at least 4 months food insecurity per year and "poor people" being defined as people experiencing at least 2 months of food insecurity per year.

| Target Group "category" | Total number of people to be reached by the end of project implementation period | Number of people reached so far (cumulative) | | Total number of additional people expected to be reached this year (annual) |
|--|---|---|--------------------|--|
| | | Total number | Of which, women | |
| <i>Example:</i> | | | | |
| <i>Landless rural people</i> | <i>30% total target group</i> | <i>10,000 (34% total)</i> | <i>500</i> | <i>2,500</i> |
| <i>Women heads of households</i> | <i>10% total target group</i> | <i>1,000 (3% total)</i> | <i>1,000</i> | <i>500</i> |
| <i>Farmers owning less than 0.5 ha of land</i> | <i>30% total target group</i> | <i>8,000 (27%)</i> | <i>NA</i> | <i>3,000</i> |
| <i>Farmers from ethnic minority</i> | <i>30% total target group</i> | <i>10,000 (34%)</i> | <i>2,000</i> | <i>2,000</i> |

F. Implementation support needs *[Suggested length 0.5 page maximum]*

[This Chapter presents the principal capacity gaps currently identified among the PMO staff -or any other staff from other implementing agencies- and highlights proposed mitigating measures. For measures that are beyond PMO capacities to implement or finance, the Chapter also identifies the type of implementation support that will be required from the Cooperating Institution or IFAD throughout the AWP&B period, how badly is this support needed and the best period for this support to be provided.]

| Capacity gaps | Capacity gaps and proposed mitigating measures | | Implementation support requirements | | |
|---------------|---|---|---|--|--------------------------|
| | Staff/persons in need of capacity building | Proposed capacity building measure | Implementation support needed from? | In which specific area is it needed? | When is it needed? |
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Summary AWPB template

| Results # | Objectives/Expected Results | Indicators | | Implementation targets | | | | | | Budget | | | | | | Comments | | |
|--|-----------------------------|-------------------|----------------|------------------------|-----------------|------------------|------------------------|---|--------------------|--------|-----------------|-----------------|------------------|---------------------|---|----------|-----------------|---|
| | | Project Indicator | RIMS indicator | Approved (total) | Revised (total) | Planned (annual) | Achieved (cumulative)* | % | Achieved (annual)* | % | Initial (total) | Revised (total) | Planned (annual) | Spent (cumulative)* | % | | Spent (annual)* | % |
| | Project Purpose: | | | | | | | | | | | | | | | | | |
| C1 | Component 1: | | | | | | | | | | | | | | | | | |
| SC 1.1 | Sub-Component 1.1: | | | | | | | | | | | | | | | | | |
| 1.1.1 | Output 1.1.1 | | | | | | | | | | | | | | | | | |
| 1.1.2 | Output 1.1.2 | | | | | | | | | | | | | | | | | |
| 1.1.3 | Output 1.1.3 | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | |
| Total Budget for Sub-Component 1.1: | | | | | | | | | | | | | | | | | | |
| SC 1.2 | Sub-Component 1.2: | | | | | | | | | | | | | | | | | |
| 1.2.1 | Output 1.2.1 | | | | | | | | | | | | | | | | | |
| 1.2.2 | Output 1.2.2 | | | | | | | | | | | | | | | | | |
| 1.2.3 | Output 1.2.3 | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | |
| Total Budget for Sub-Component 1.2: | | | | | | | | | | | | | | | | | | |
| Total Budget for Component 1: | | | | | | | | | | | | | | | | | | |
| C2 | Component 2: | | | | | | | | | | | | | | | | | |
| 2.1 | Output 2.1 | | | | | | | | | | | | | | | | | |
| 2.2 | Output 2.2 | | | | | | | | | | | | | | | | | |
| 2.3 | Output 2.3 | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | |
| Total Budget for Component 2: | | | | | | | | | | | | | | | | | | |
| C3 | Component 3: | | | | | | | | | | | | | | | | | |
| SC 3.1 | Sub-Component 3.1: | | | | | | | | | | | | | | | | | |
| 3.1.1 | Output 3.1.1 | | | | | | | | | | | | | | | | | |
| 3.1.2 | Output 3.1.2 | | | | | | | | | | | | | | | | | |
| 3.1.3 | Output 3.1.3 | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | |
| Total Budget for Sub-Component 3.1: | | | | | | | | | | | | | | | | | | |

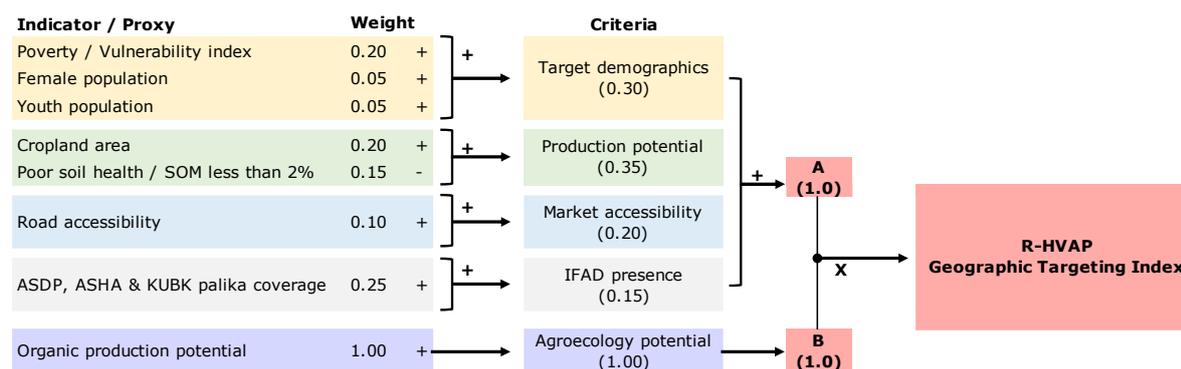
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| | Etc. | | | | | | | | | | | | | | | | | | |
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* Columns to be filled up at the end of the year

PIM Appendix 2: List of selected Palika and detailed maps

Geographic targeting. R-HVAP will adopt an agroecological cluster-based approach for geographic targeting. A Geographic Targeting Index was developed for the selection of Palikas that combines the following selection criteria: (i) presence of target groups (poor and vulnerable communities, women and youth); (ii) production potential; (iii) market accessibility; (iv) presence of ongoing or recently completed IFAD-financed projects (ASDP, ASHA, and KUBK) and (v) agroecology potential. Relevant indicators and proxies were identified for the set of criteria within the targeting framework. Data was acquired from well-established and reputable sources. Figure 1. presents the indicators used, and Table 1. presents the data sources and descriptions of the indicators.

Figure 1. R-HVAP geographic targeting framework and equations.



Equation 1. Weighted Indicator 1 = Indicator Value 1 x Weight 1

Equation 2. Index = A (Weighted Indicator 1 + Weighted Indicator 2 + ...) x B

Table 1. Indicator descriptions and data sources.

| Indicator / Proxy | Description | Data source | Date |
|-------------------------------------|--|-----------------------|------|
| Poverty / Vulnerability index | Combination of hazard sensitivity and lack of adaptive capacity. | MOFE | 2021 |
| Female population | Population of female of reproductive age (15-49yrs). | Meta | 2018 |
| Youth population | Population of technologically aware youth (15-24yrs). | Meta | 2018 |
| Cropland area | Cropland percentage of palika land area. | MOFE | 2019 |
| Poor soil health / SOM less than 2% | Area of cropland with less than 2% soil organic matter (SOM). | NARC | 2022 |
| Road accessibility | Percentage of population living within 2km of all-season roads. | WFP / Meta | 2018 |
| ASDP, ASHA & KUBK palika coverage | Percentage of wards within each palika covered by ASDP, ASHA & KUBK. | IFAD | 2023 |
| Organic production potential | Potential for organic production within the programme period. | IFAD / MOLMAC Karnali | 2023 |

Geographic Targeting Index. GIS and statistical methods were used for data processing, including calculation of absolute to relative numbers and zonal statistics for converting gridded datasets to the palika level. The datasets were then normalized using the linear min-max method, bringing all values to a range between zero and one. Indicators contributing negatively to the targeting framework (i.e. poor soil health) were inverted during the normalization process. The indicators were weighted and calculated (Equation 1), and the geographic targeting index was calculated for each palika using the weighted values based on additive and multiplicative aggregation (Equation 2).

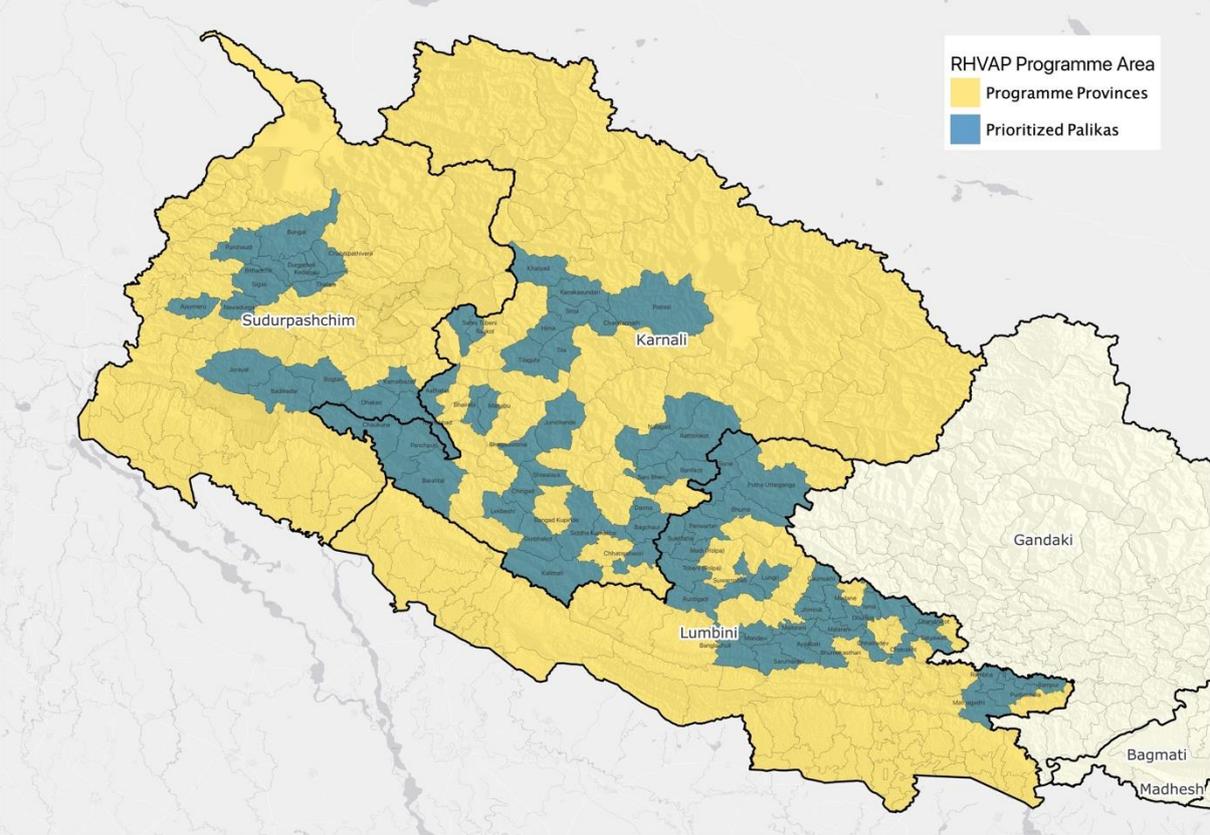
Palika Selection. Palikas with the highest scores were identified based on the Geographic Targeting Index. Palikas with lesser scores but adjacent to Palikas with high index scores were also prioritized as a means to create a contiguous agroecological cluster. High hill palikas with high index scores but without current road access will be revisited for implementation after roads have been constructed and market accessibility is ensured. Based on the above, a total of 80 Palikas have been prioritized for

implementation (Lumbini 31, Karnali 32, Sudurpashchim 21, presented in Table 2), to be validated at programme start-up in consultation with the respective provincial governments.

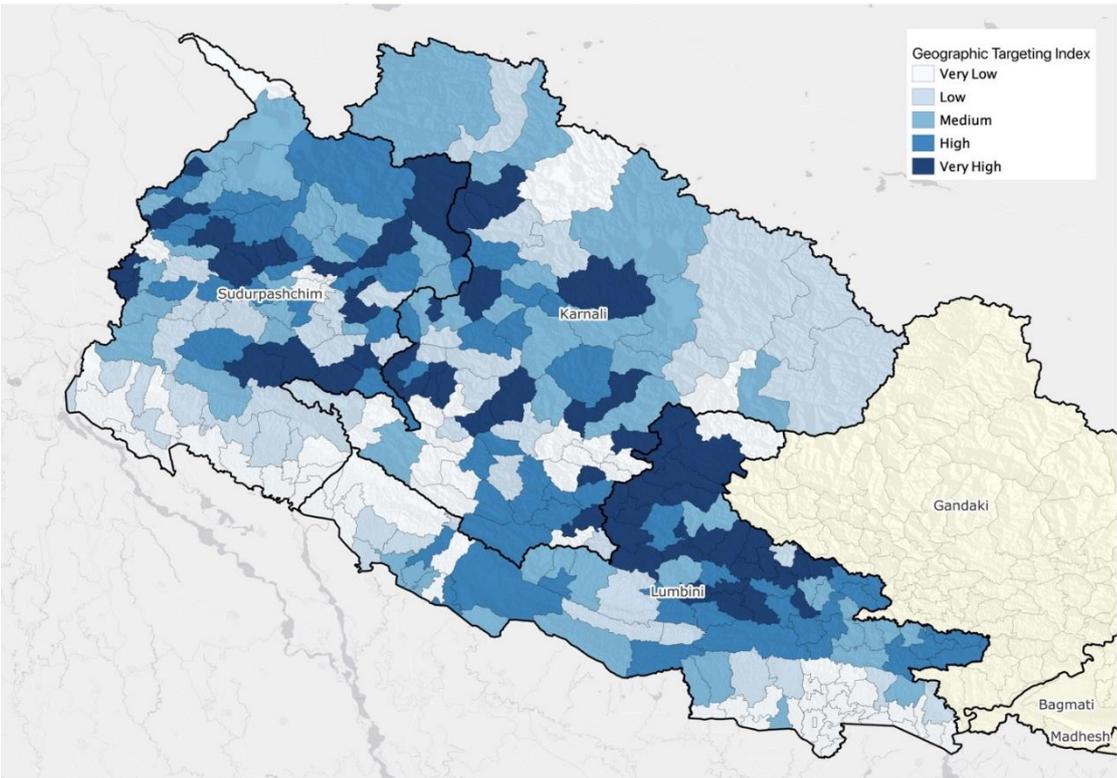
Table 2. List of palikas prioritized for R-HVAP implementation.

| SN | PROVINCE | DISTRICT | PALIKA | SN | PROVINCE | DISTRICT | PALIKA |
|----|-----------------|--------------|------------------|----|---------------------|------------|-----------------|
| 1 | Karnali Pradesh | Dailekh | Aathabis | 64 | Sudurpashchim Prade | Achham | Dhakari |
| 2 | Karnali Pradesh | Dailekh | Bhagawatimai | 65 | Sudurpashchim Prade | Achham | Kamalbazar |
| 3 | Karnali Pradesh | Dailekh | Bhairabi | 66 | Sudurpashchim Prade | Achham | Mellekh |
| 4 | Karnali Pradesh | Dailekh | Mahabu | 67 | Sudurpashchim Prade | Achham | Turmakhad |
| 5 | Karnali Pradesh | Jajarkot | Junichande | 68 | Sudurpashchim Prade | Baitadi | Purchaudi |
| 6 | Karnali Pradesh | Jajarkot | Nalagad | 69 | Sudurpashchim Prade | Baitadi | Sigas |
| 7 | Karnali Pradesh | Jajarkot | Shiwalaya | 70 | Sudurpashchim Prade | Bajhang | Bitheadchir |
| 8 | Karnali Pradesh | Jumla | Chandannath | 71 | Sudurpashchim Prade | Bajhang | Bungal |
| 9 | Karnali Pradesh | Jumla | Hima | 72 | Sudurpashchim Prade | Bajhang | Chabispathivera |
| 10 | Karnali Pradesh | Jumla | Kanakasundari | 73 | Sudurpashchim Prade | Bajhang | Durgathali |
| 11 | Karnali Pradesh | Jumla | Patrasi | 74 | Sudurpashchim Prade | Bajhang | Kedarseu |
| 12 | Karnali Pradesh | Jumla | Sinja | 75 | Sudurpashchim Prade | Bajhang | Thalara |
| 13 | Karnali Pradesh | Jumla | Tila | 76 | Sudurpashchim Prade | Dadeldhura | Ajaymeru |
| 14 | Karnali Pradesh | Kalikot | Raskot | 77 | Sudurpashchim Prade | Dadeldhura | Nawadurga |
| 15 | Karnali Pradesh | Kalikot | Sanni Tribeni | 78 | Sudurpashchim Prade | Doti | Badikedar |
| 16 | Karnali Pradesh | Kalikot | Tilagufa | 79 | Sudurpashchim Prade | Doti | Bogtan |
| 17 | Karnali Pradesh | Mugu | Khatyad | 80 | Sudurpashchim Prade | Doti | Jorayal |
| 18 | Karnali Pradesh | Rukum West | Aathbiskot | | | | |
| 19 | Karnali Pradesh | Rukum West | Banfikot | | | | |
| 20 | Karnali Pradesh | Rukum West | Sani Bheri | | | | |
| 21 | Karnali Pradesh | Salyan | Bagchaur | | | | |
| 22 | Karnali Pradesh | Salyan | Bangad Kupinde | | | | |
| 23 | Karnali Pradesh | Salyan | Chhatreshwori | | | | |
| 24 | Karnali Pradesh | Salyan | Darma | | | | |
| 25 | Karnali Pradesh | Salyan | Kalimati | | | | |
| 26 | Karnali Pradesh | Salyan | Siddha Kumakha | | | | |
| 27 | Karnali Pradesh | Surkhet | Barahtal | | | | |
| 28 | Karnali Pradesh | Surkhet | Chaukune | | | | |
| 29 | Karnali Pradesh | Surkhet | Chingad | | | | |
| 30 | Karnali Pradesh | Surkhet | Gurbhakot | | | | |
| 31 | Karnali Pradesh | Surkhet | Lekbeshi | | | | |
| 32 | Karnali Pradesh | Surkhet | Panchpuri | | | | |
| 33 | Lumbini Pradesh | Arghakhanchi | Bhumekasthan | | | | |
| 34 | Lumbini Pradesh | Arghakhanchi | Chhatradev | | | | |
| 35 | Lumbini Pradesh | Arghakhanchi | Malarani | | | | |
| 36 | Lumbini Pradesh | Dang | Banglachuli | | | | |
| 37 | Lumbini Pradesh | Gulmi | Chandrakot | | | | |
| 38 | Lumbini Pradesh | Gulmi | Chatrakot | | | | |
| 39 | Lumbini Pradesh | Gulmi | Dhurkot | | | | |
| 40 | Lumbini Pradesh | Gulmi | Isma | | | | |
| 41 | Lumbini Pradesh | Gulmi | Madane | | | | |
| 42 | Lumbini Pradesh | Gulmi | Musikot (Gulmi) | | | | |
| 43 | Lumbini Pradesh | Gulmi | Satyawati | | | | |
| 44 | Lumbini Pradesh | Palpa | Mathagadhi | | | | |
| 45 | Lumbini Pradesh | Palpa | Purbakhola | | | | |
| 46 | Lumbini Pradesh | Palpa | Rambha | | | | |
| 47 | Lumbini Pradesh | Palpa | Rampur | | | | |
| 48 | Lumbini Pradesh | Pyuthan | Ayirabati | | | | |
| 49 | Lumbini Pradesh | Pyuthan | Gaumukhi | | | | |
| 50 | Lumbini Pradesh | Pyuthan | Jhimruk | | | | |
| 51 | Lumbini Pradesh | Pyuthan | Mallarani | | | | |
| 52 | Lumbini Pradesh | Pyuthan | Mandavi | | | | |
| 53 | Lumbini Pradesh | Pyuthan | Sarumarani | | | | |
| 54 | Lumbini Pradesh | Rolpa | Lungri | | | | |
| 55 | Lumbini Pradesh | Rolpa | Madi (Rolpa) | | | | |
| 56 | Lumbini Pradesh | Rolpa | Pariwartan | | | | |
| 57 | Lumbini Pradesh | Rolpa | Runtigadi | | | | |
| 58 | Lumbini Pradesh | Rolpa | Sukidaha | | | | |
| 59 | Lumbini Pradesh | Rolpa | Suwarnabati | | | | |
| 60 | Lumbini Pradesh | Rolpa | Tribeni (Rolpa) | | | | |
| 61 | Lumbini Pradesh | Rukum East | Bhume | | | | |
| 62 | Lumbini Pradesh | Rukum East | Putha Uttarganga | | | | |
| 63 | Lumbini Pradesh | Rukum East | Sisne | | | | |

Map 1. Priority palikas for R-HVAP implementation.

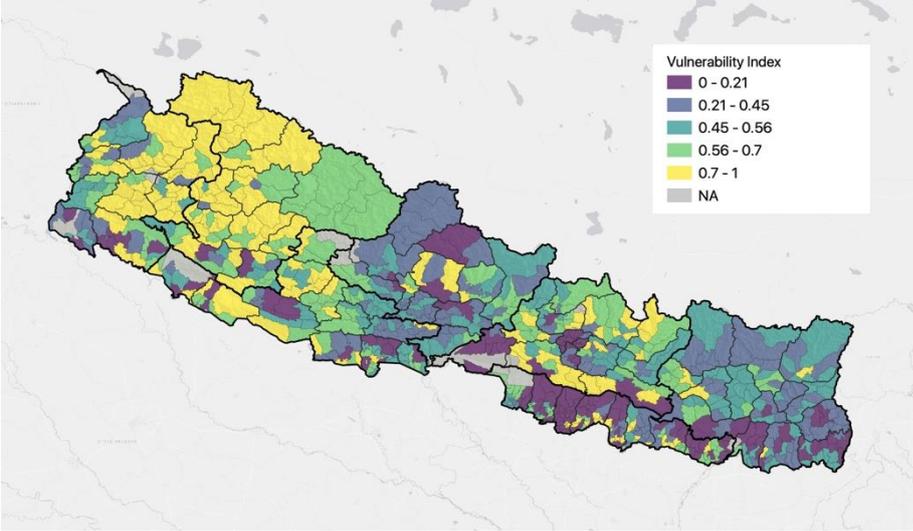


Map 2. R-HVAP geographic targeting index.

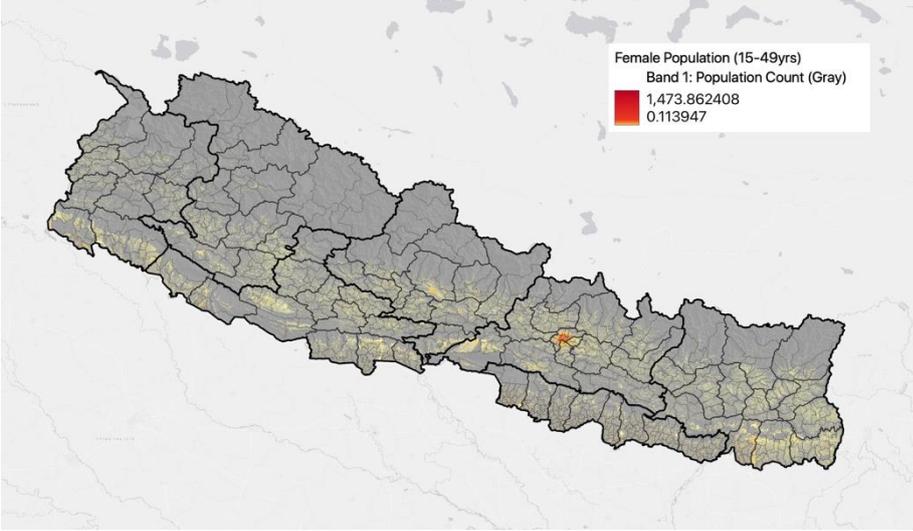


Supporting maps of individual indicators

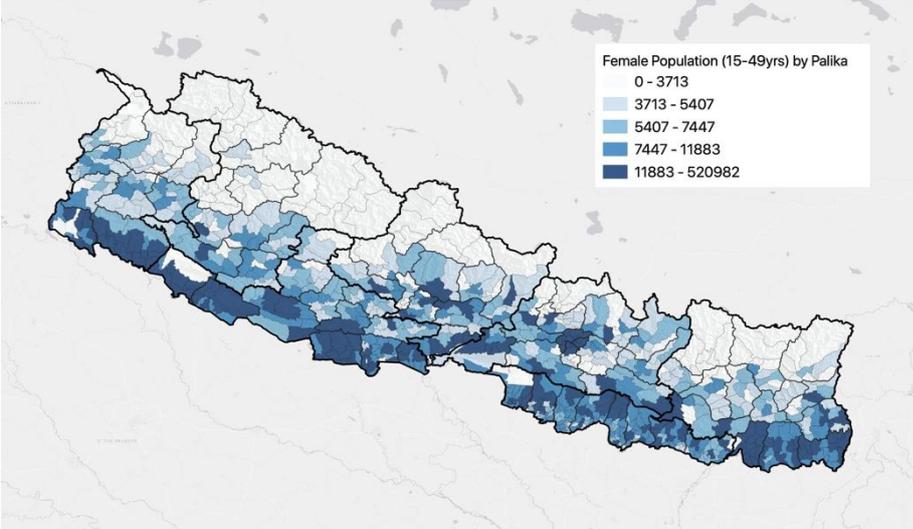
Map 3. Vulnerability Index.



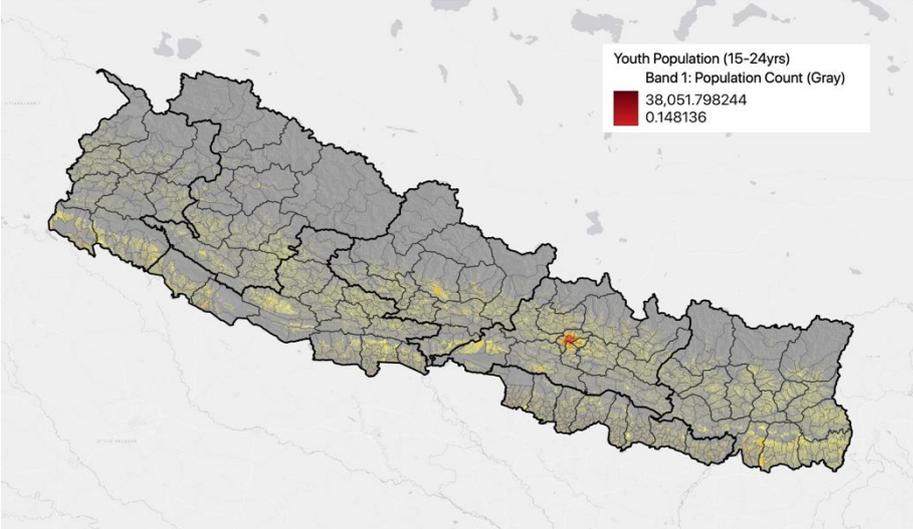
Map 4. Population of female of reproductive age (15-49yrs).



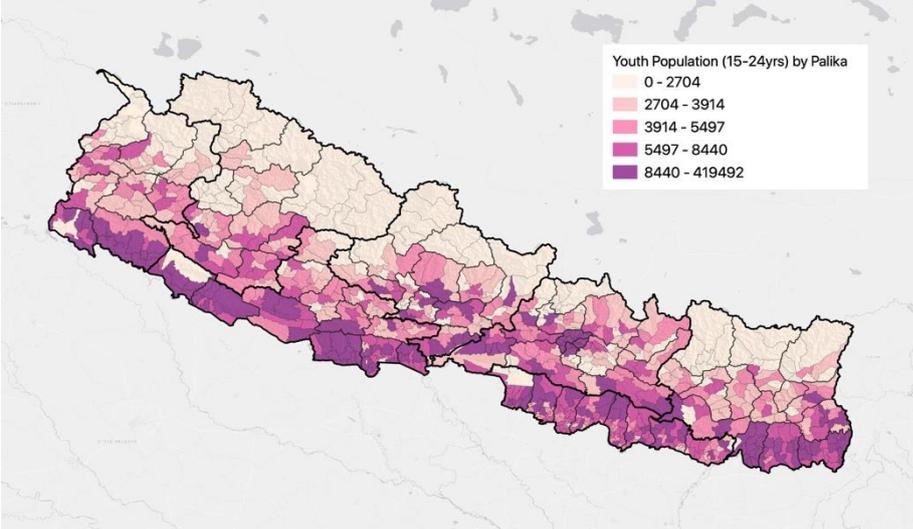
Map 5. Population of female of reproductive age (15-49yrs) by palika.



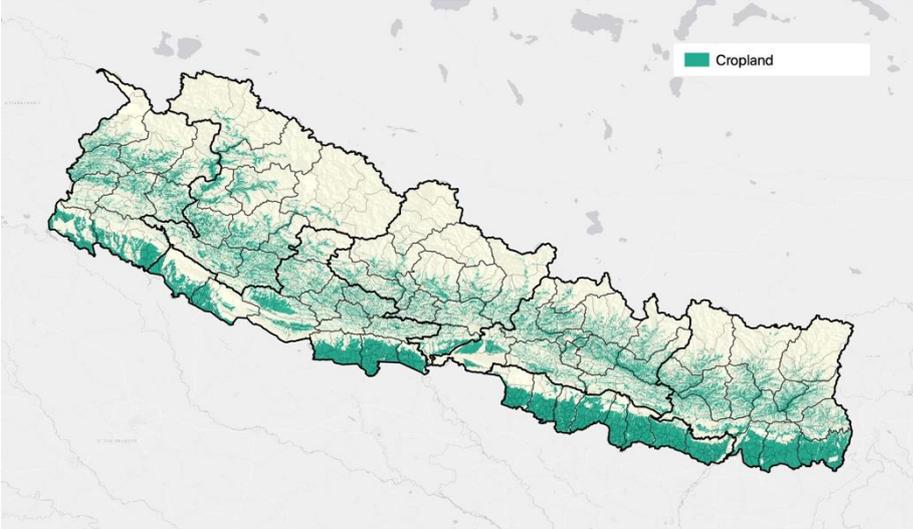
Map 6. Population of technologically aware youth (15-24yrs).



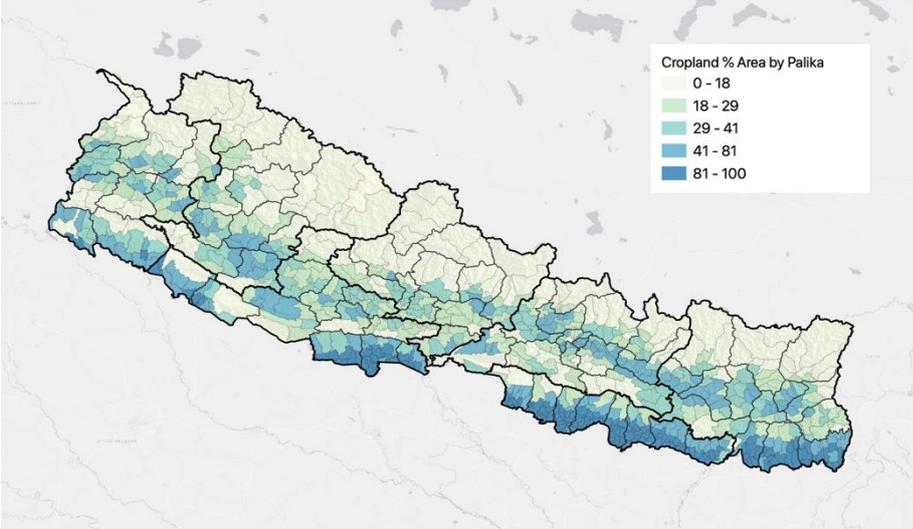
Map 7. Population of technologically aware youth (15-24yrs) by palika.



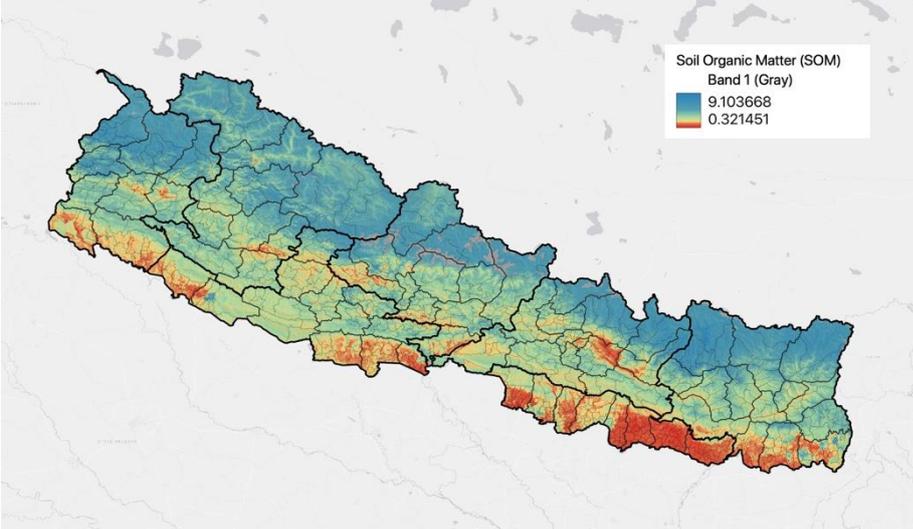
Map 8. Cropland.



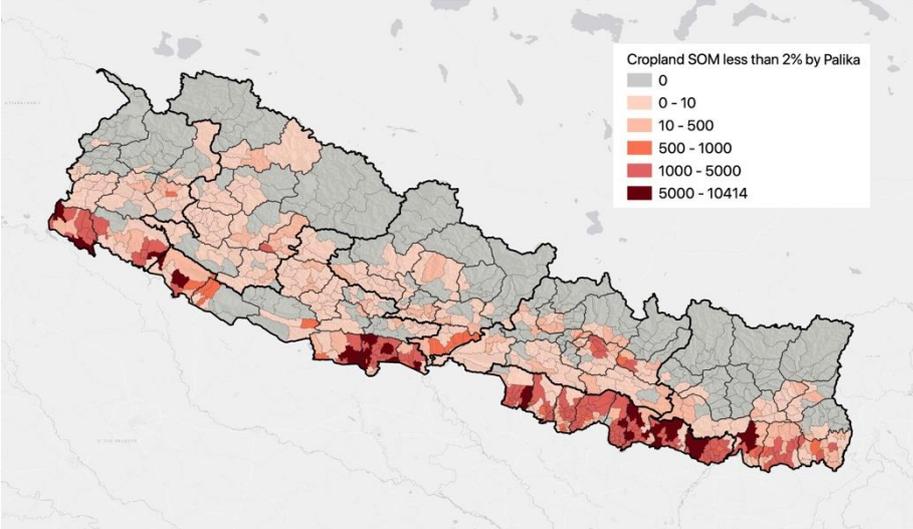
Map 9. Cropland percentage of palika land area.



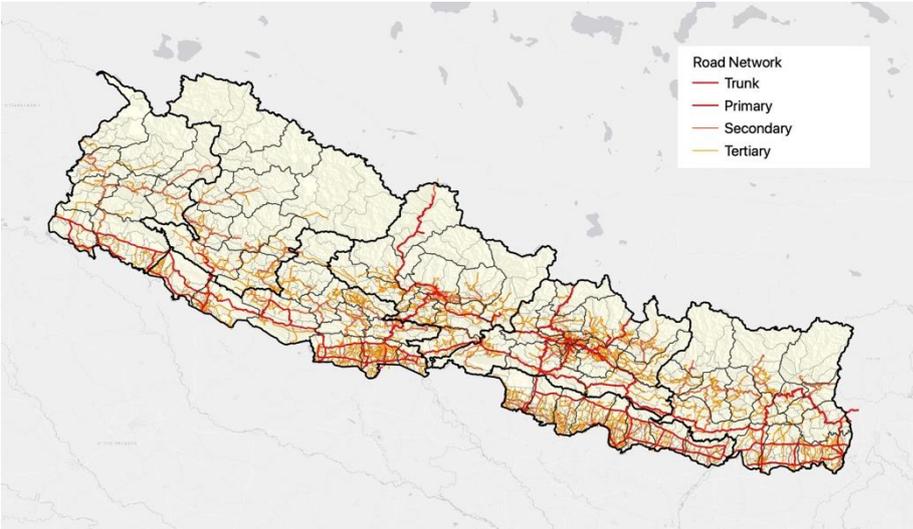
Map 10. Soil organic matter percentage (SOM).



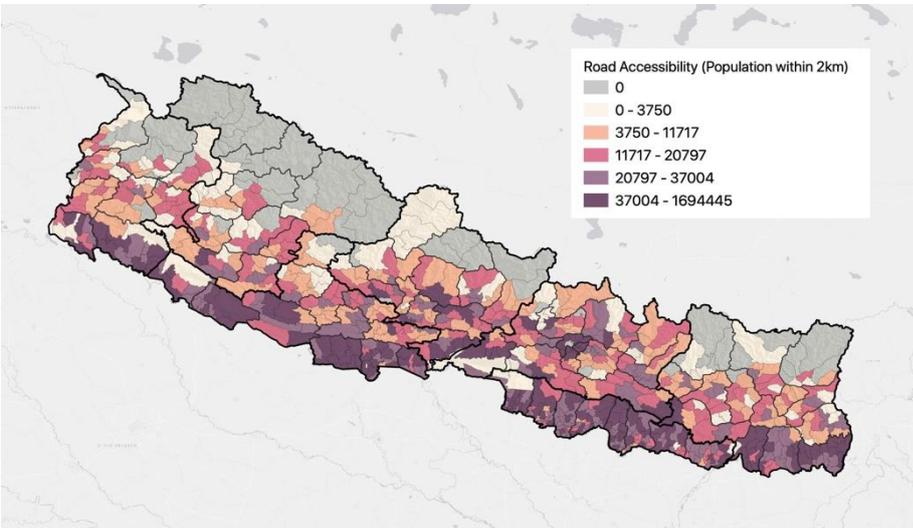
Map 11. Cropland (ha) with less than 2% soil organic matter (SOM).



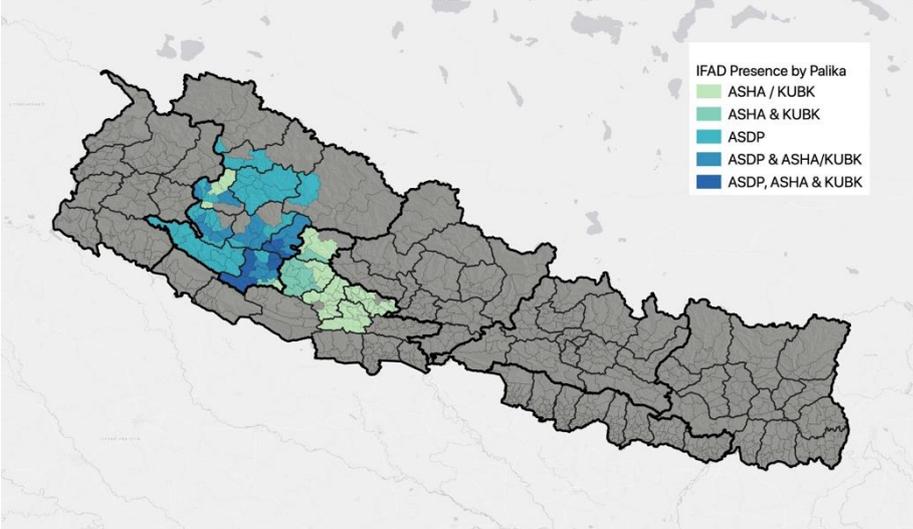
Map 12. Major road network.



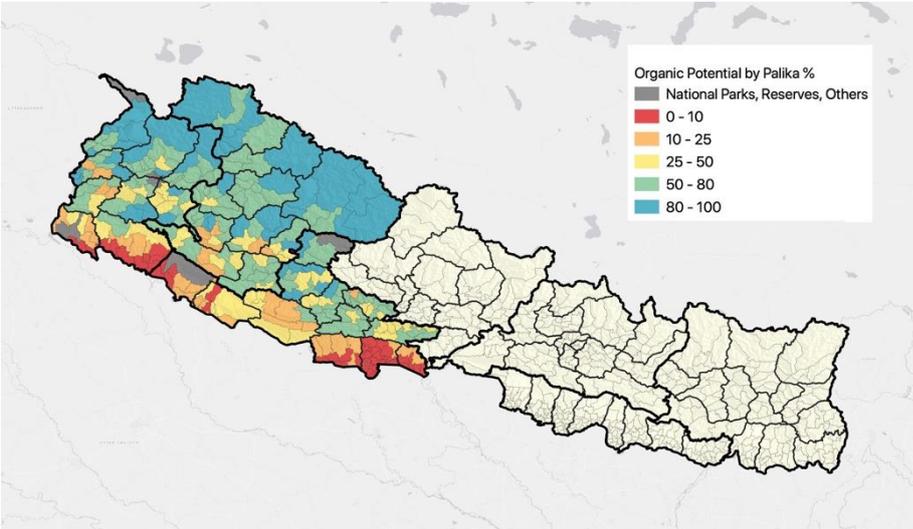
Map 13. Population living within 2km of all-season roads.



Map 14. Palika coverage of ASDP, ASHA & KUBK.



Map 15. Potential for organic production within the programme period (2031).



PIM Appendix 3: Draft M&E manual

A. Key Terms and Definitions

- **Accountability:** Obligation to demonstrate that work has been conducted and resources spent in compliance with agreed rules and standards or to report fairly and accurately on performance results *vis à vis* mandated roles and/or plans.
- **Activity:** Action taken, or work performed, through which inputs such as funds, technical assistance and other types of resources, are mobilized to produce specific outputs.
- **Assumptions:** Hypotheses about external factors that may influence the progress or success of a development intervention.
- **Attribution:** The ascription of a causal link between observed changes (or changes expected to be observed) and a specific intervention.
- **Baseline study:** Quantitative survey or analysis describing the situation prior to a development intervention, against which progress can be measured at programme completion.
- **Efficiency:** Extent to which resources (funds, expertise, time, etc.) are converted into results in an efficient way.
- **Effectiveness:** Extent to which the objectives of an intervention/programme have been/are being achieved, as measured by concrete development results.
- **Evaluation:** Process of reflection and analysis in order to assess if the human, technical, legal, administrative and financial resources mobilized by a development programme have produced the desired results and achieved agreed objectives. The assessment usually focuses on determining the relevance, efficiency, effectiveness and sustainability of programme interventions and aims at the generation of lessons learned.
- **Impacts:** Long-term effects or changes, positive and negative, intended or not, produced by a development intervention, directly or indirectly.
- **Indicator:** Quantitative or qualitative factor or variable that provides a simple and reliable means to measure the outcomes of an intervention or to monitor implementation performance and success.
- **Lessons learned:** Generalizations based on experience and learning that can be applied in the design of new programmes with similar objectives or circumstances, or to improve the approaches followed by an on-going programme. Frequently, lessons learnt relate to design or implementation features that have ensured success, or explain failure, and to the factors that have influenced performance or results.
- **Logical Framework Matrix (Logframe):** Matrix developed during the design of a development programme in order to succinctly present: (i) the expected programme results (impact, outcomes, outputs), (ii) performance indicators used to measure if expected results were reached; (iii) sources of information or data collection methods for performance indicators; and (iv) external factors (risks) that may affect the success of interventions. It is a results-based management tool that is the foundation of the programme M&E system and serves as an accountability framework.
- **Monitoring:** The continuous process of collecting and processing information that relates to implementation processes. This is an internal function that supports programme management and aims at the continuous assessment of implementation performance and results through the systematic collection and analysis of data.
- **Outputs:** The capital goods and services resulting from a development intervention and delivered to targeted programme participants.
- **Outreach:** An activity of providing services to any populations who might not otherwise have access to those services; or the number of programme participants effectively reached by a development programme.

- **Outcomes:** Immediate effects or results of a development intervention in terms of short-term changes induced in programme participants' behaviours (e.g. improved capacities, adoption of new practices) or in the opportunities available to them (e.g. improved access to water).
- **Performance Indicator:** Indicator relevant to measure performance in attaining planned targets or results.
- **Performance monitoring:** The continuous collection and analysis of information and data aiming at the assessment of implementation progress and the measurement of results achieved against set targets or agreed standards.
- **Programme participants:** The individuals, groups, or organizations that benefit from the development intervention. Direct programme participants are those specifically targeted and reached by the programme, but they may also include some individuals not specifically targeted but still benefiting directly from programme interventions (e.g. non-targeted households who will benefit from a new irrigation system constructed by the programme for targeted households).
- **Results-based Management (RBM):** Management approach primarily concerned with the regular measurement of performance and results as a basis for informed decision-making and implementation guidance.
- **Results:** The outputs, outcomes or impacts (intended or unintended, positive and / or negative) of a development intervention.
- **Results chain:** Suite of causal relationships between activities and development results. The results' chain starts with activities that will lead to the realization of outputs, these outputs themselves leading to a series of outcomes and impacts.
- **Stakeholders:** Agencies, organizations, groups or individuals who have a direct or indirect interest in the development intervention or its evaluation.
- **Target group:** The specific individuals or groups whom/which the programme aims to support and for the benefit of whom/which the development intervention was designed.
- **Theory of change:** Comprehensive description and illustration of how and why a desired change is expected to happen in a particular context. It is essentially the logic behind an intervention, showing how inputs and activities are linked to a chain of intended, observable outcomes towards the achievement of longer-term goals. It also helps identify the assumptions that underly the design hypothesis and logic.

B. Purpose of the M&E System

The main purpose of the M&E system is to provide the coordination and management teams, and key stakeholders (IFAD, MoALD, MoICS, MoF) with a sound basis for decision-making for adaptive management, with the regular collection and analysis of data that will help monitor implementation progress, identify potential bottlenecks and measure programme results and impact.

More precisely, the M&E System aims to support programme stakeholders in the tracking of progress achieved in the field and in understanding if implementation is going on as planned, or if corrective actions are required. An important function of the system is the provision of early warnings of implementation problems, so that these can be mitigated in a timely and efficient manner. The system will also help measure development results and impact on targeted programme participants, and to ensure that the intended target groups are effectively reached. M&E activities and regular reporting will also enhance the transparency of implementation processes and provide a clear accountability framework for all implementation actors.

Ultimately, the system will also contribute to the generation of useful implementation lessons, by processing information on best practices - or failure - and transforming this

information into knowledge material that can be disseminated to a wider audience of policy makers and strategic development partners.

C. M&E System Overview

The M&E system will cover two distinct, yet inter-linked, aspects: (i) the monitoring of programme implementation performance (or the execution of activities described in the AWPB) and outreach (or effectiveness of targeting strategy); and (ii) the measurement of programme results (outputs, outcomes and impact).

In the initial first or second year of programme implementation, M&E activities will naturally focus on the first dimension, as outcomes and impact will not be immediately measurable. The quality of delivered outputs and the level of programme participants' satisfaction shall be a constant concern during this initial phase of M&E work. The measurement of early programme results will become possible as soon as a large enough number of programme participants have been reached and at least one full agricultural season has been completed for each programme participant.

During programme implementation, the AWPB developed each year for the programming of activities will be the main reference for the monitoring of implementation performance, while the programme Logframe and its performance targets will be the main reference for the measurement of outcomes and impact. An overview of the M&E system is provided in the next chapters.

i. Monitoring of implementation performance and outreach

Monitoring of implementation performance. The monitoring of programme execution will focus on assessing the extent to which the various activities planned in the AWPB are being conducted on time and with the expected scale and are delivering the expected outputs. To this end, activity and output data will be collected regularly by the various M&E actors and will be analysed by comparing achieved physical targets with planned targets. Reasons for discrepancies or delays should be reflected upon and necessary corrective measures taken so that, at the end of each year, all physical targets are successfully met. The focus on assessing the quality of implementation processes should be a constant, important concern.

More precisely, the monitoring of implementation progress will focus on the following:

- Tracking the actual implementation pace and physical delivery rate, by comparing delivered outputs against planned targets.
- Assessing quality of implementation processes and outputs.
- Ensuring that the intended target groups (smallholder households, women, youth, *janajati*¹²⁰ and *dalit*¹²¹) have been reached.
- Comparing actual disbursements against budget estimates.
- Assessing if implementation progress is within schedule and according to the agreed calendar.

The collection of the required M&E data and information will be done using the tools, and according to the processes, described in Section B. The data collected will also be used for the preparation of various progress reports described in Chapter 3. The proper functioning of the entire system will largely depend on the rigor and discipline with which all M&E stakeholders and implementation partners will collect and submit the expected data at agreed-upon intervals.

¹²⁰ Indigenous people

¹²¹ A marginalized community in Nepal

Outreach monitoring. For each key output, as and when they will be delivered, the M&E system shall track the number of direct programme participants. In so doing, the M&E system will help monitor the extent to which intended programme participants, in particular young smallholder farmers, poor women and marginalized groups, are actually being reached, helping thus track targeting performance. This means that, each time a specific programme output is delivered, the specific implementer shall collect information on the number of programme participants, their gender, age and if they belong to the janajati or dalit community. The table below summarizes the key outreach data that will need to be monitored.

Table 3. Outreach targets

| Programme participants | Mid-term | End Target |
|-------------------------------|-----------------|-------------------|
| Total | 36,000 | 60,000 |
| Women | 18,000 | 30,000 |
| Youth | 14,400 | 24,000 |
| Janajati | 7,200 | 12,000 |
| Dalit | To be monitored | To be monitored |
| Women-headed households | 5,400 | 9,000 |
| Number of households | 36,000 | 60,000 |

ii. Measuring outcomes and impact

The M&E system should also enable the systematic and objective assessment of the immediate effects (outcomes) and longer-term impact of programme interventions on targeted programme participant households, in order to determine if R-HVAP has achieved – or is achieving - its objectives. The aim is also to assess the extent to which the activities planned at the time of programme design remain relevant to the needs of targeted programme participants in an environment that may evolve.

The key reference for the assessment of programme results will be the Logframe outcome and impact indicators and related targets. The objective will be to verify, at regular intervals, that the outputs delivered under all Components are leading to the expected results in terms of increased production and marketing of selected commodities and increased farming incomes. In essence, M&E activities will help monitor the implicit theory of change underlying programme design and document programme results (see Annex 2).

In order to measure outcomes and impact, two types of tools will be used: self-assessments and independent assessments. The detailed tools to be used for the collection of reliable information and data on programme results (or outcomes and impact) are presented in the M&E Matrix in Annex 2 (to be developed) and will involve the following:

Independent assessments. Three major quantitative surveys using a representative sample of programme participants will be conducted at programme start (baseline survey), mid-term and completion (in order to measure changes since programme start). The baseline, mid-term, and completion surveys will be conducted by an external service provider that will be selected through a competitive bidding process. It is recommended that the same service provider is contracted both the subsequent mid-term and completion surveys, subject to satisfactory performance. Attention will be given to consistently collect baseline, mid-term and completion data on all performance indicators as noted in the Logical Framework, including IFAD’s core output and outcome indicators as described by IFAD’s Core Indicators (CI) Framework. The same questionnaire and methodology will be used at baseline, mid-term and completion. A resilience matrix and scorecard will be developed to measure household resilience, based on the IFAD Resilience Design and Monitoring Tool (RDMT). In addition to the Logical Framework indicators, baseline, mid-term and end line data will also be collected on Multidimensional

Poverty Index (MPI), soil organic matter (SOM) and Minimum Dietary Diversity for Women (MDDW). Some qualitative data will also be collected during these quantitative surveys through key informants' interviews in order to provide additional insights useful to interpret the results of the quantitative survey (see Annex 16 and 17 for sample interview guides).

Self-assessments and other surveys. In order to collect essential data on farmers' incomes, production, profits, and poverty status, the PCO will use the following tools.

- **Longitudinal studies to assess change in income and production.** Key production, income and profit data will be regularly collected from all supported farmers at the end of each agricultural season of the concerned commodity by FEBL Facilitators, using the information maintained by programme participants using their Farm/MSME Business Diaries (see Chapter B_). In addition, a more detailed set of data will be collected from lead farmers of demonstration farms and those engaged in agroecology research. Once collected, these data will be analysed in order to understand major trends by value chain, commodity, cluster, corridor, and province in terms of increase in production, incomes, resource efficiencies, drudgery/return on labour and net profits, among others, for supported smallholder farmers. For each farmer, the first data thus collected will serve as a baseline. Overtime, the longitudinal data recorded in the MIS will enable the PCO to track and quantify the changes in programme participants' farming incomes and profits, as well as a means to identify highly successful farmers and least successful farmers for the preparation of thematic case studies. At mid-term and completion, this data will also be used to cross-reference with the results of independent quantitative surveys.
- **Annual Cluster Tracking Surveys (ACTS).** From Year 2 onwards, ACTS will be conducted to collect the key qualitative and quantitative information necessary to understand programme impact on production, farm incomes and profits, and more generally on the progress and performance of each supported value chain and cluster. ACTS will also be used to regularly assess the level of satisfaction of programme participants.

These tools and others, are further described in Chapter B_.

iii. Risk monitoring

Several assumptions were made while designing the programme and key assumptions are identified in the Logframe. These are the critical success factors in the external programme environment that, if not realized, may compromise programme success. They will thus need to be monitored as part of a risk management strategy and will be included in the risk management matrix to be developed upon programme start.

In addition, the PCO will need to monitor the key social and environmental risks that have been identified at design stage in the _ (Annex_), such as the following:

- Environmental risks:
- Social risks:
- Climate change:
- Economic:

For each key risk, the ESCMP matrix identifies at least one key indicator. Such indicators will be included in the M&E Matrix (See Annex 3) and will be periodically measured and analysed.

iv. Performance targets and indicators

The programme Logframe (see Annex _) will serve as the main reference for the monitoring and measurement of programme results, and will be the key reference for IFAD implementation support and supervision missions. The Logframe is also the reference against which service providers' performance will be assessed. The contracts of major service providers will therefore need to include in annex a clear results' framework connected directly to Logframe indicators and targets, that clearly spell out and quantify all expected outputs and intended outcomes.

M&E activities will aim at collecting the primary data that will help measure all Logframe indicators. The type of primary data required, and the methods and frequency of data collection, are summarized in the M&E matrix presented in Annex 3. While output indicators will be measured on a rolling basis through routine M&E activities, outcome indicators will be measured annually after the 2nd year of field level implementation. As for impact indicators, they will be measured at mid-term and completion, and compared with baseline data.

Quantitative targets have been assigned to key impact and outcome-level indicators. These targets will be the reference against which programme overall performance will be assessed at completion. Key impact-level indicators are summarized in the following table (see Logframe in Annex 1 for the complete list):

Table 4. R-HVAP Goal and Development Objective performance indicators.

| | Indicator | Mid-Term | End Target |
|--|---|-----------------|-------------------|
| Project Goal Reduced poverty and improved resilience of smallholder households. | Smallholder households with improved resilience | | |
| | Women-headed households - Households | 1620 | 6300 |
| | Indigenous households - Households | 2160 | 8400 |
| | Households - Households | 10800 | 42000 |
| | Households (%) - Percentage (%) | 30 | 70 |
| | Household members - Number of people | 46440 | 180600 |
| Development Objective Transition smallholder agriculture towards sustainable food systems that are profitable, inclusive and agroecological. | Households receiving full programme services achieving return on labour of >125% of the official minimum wage | | |
| | Women-headed households - Households | 1620 | 5400 |
| | Indigenous households - Households | 2160 | 7200 |
| | Households - Households | 10800 | 36000 |
| | Households (%) - Percentage (%) | 30 | 60 |
| | Household members - Number of people | 46440 | 154800 |
| | IE.2.1 Individuals demonstrating an improvement in empowerment | | |
| | Indigenous people - Percentage (%) | 25 | 60 |
| | Indigenous people - Indigenous people | 1800 | 7200 |
| | Young - Percentage (%) | 25 | 60 |
| | Young - Young people | 3600 | 14400 |
| | Total persons - Percentage (%) | 30 | 70 |
| | Total persons - Number of people | 10800 | 42000 |
| | Females - Percentage (%) | 25 | 60 |
| | Females - Females | 4500 | 18000 |
| | Males - Percentage (%) | 35 | 80 |
| | Males - Males | 6300 | 24000 |

v. IFAD ORMS

Since 2005, IFAD has adopted an Operational Results Management System (ORMS) that aims to aggregate the results achieved across programmes and countries and to report them to IFAD's constituency. Measurement and reporting concerns only two levels of results: outputs and outcomes. The system defines a list of standard indicators¹²² which need to be included in programmes' Log frames and M&E systems, when relevant, and against which annual targets and achievements need to be reported annually by all on-going projects.

Relevant ORMS indicators were included in R-HVAP's Logframe and are summarized in Annex 9. Each year, the PCO will be responsible to prepare and submit to IFAD updated ORMS data (annual targets and actual achievements; overall targets and cumulative achievements to date) using the template provided in Annex 11. In Year 1 and Year 2, reporting will be limited to output indicators, while starting Year 2 or Year 3, ORMS outcome indicators will also be reported upon.

vi. Key M&E actors

M&E is the responsibility of all programme members. Considering data entry into the MIS will be a requirement for disbursement, The following actors will play a major role in M&E activities:

- **Individual farmers:** Farmers will be trained to maintain Farm Business Diaries, with the twin objective of building their business management capacities and recording information that will help monitor programme outcomes and impact (e.g. data on production, sales, incomes, profits).
- **Farmers groups:** Through their records (membership records, meeting attendance sheets, collective sales' records, animal insurance records, etc.), supported farmers' groups will collect key data that will also be used to monitor programme outreach and groups' institutional maturity.
- **Community Mobilizers and FEBL Facilitators:** Local resource persons such as Community Mobilizers and FEBL Facilitators will play an essential role in the collection of primary data from Farm Business Diaries or during the conduct of various surveys. To this end, FEBL Facilitators will receive specific training and will be equipped with electronic tablets so that captured data is immediately uploaded into the MIS. They will be paid on a task-wise basis to collect and enter the required data.
- **Service Providers:** Major service providers (e.g. market oriented agroecology, PO graduation) and programme implementing partners will have the direct responsibility of collecting, compiling and recording data on activities and outreach, and of preparing periodic activity reports.
- **Contractors:** The private companies selected under Component 2 and 3 for the construction or rehabilitation of climate resilient infrastructure will be to record and compile data on activities and work progress, and to submit periodic activity reports.
- **PCO, P-PMO and Corridor Offices:** The Programme Coordinator and Province Managers will be responsible to use M&E findings to take informed decisions and steer programme implementation. In addition, the technical staff will be required to keep proper records for the monitoring of all the activities under their respective responsibility. For these activities, they will also be responsible to ensure that implementation pace is according to schedule and outputs timely delivered. They will be responsible for verifying the data submitted by the various service providers, before this data is entered in the MIS or submitted to the M&E Specialist for consolidation. In particular, implementation teams within the P-PMO and Corridor Offices will play a prominent role in programme monitoring, being

¹²² See IFAD website for ORMS guidelines and indicator definitions:
<https://webapps.ifad.org/members/ec/96/docs/EC-2017-96-W-P-7.pdf>.

responsible for the co-investment application processes. They will receive specific training to ensure that co-investment applications of R-HVAP programme participants are properly filled so that the profile can be adequately monitored. Further, the PCO and P-PMO teams will play the leading role in consolidating reports from all corridors for preparing province-specific and programme-wide reports.

- **PCO Planning and M&E Coordinator:** The PM&E Coordinator will be ultimately responsible of the quality and efficiency of the programme M&E system, ensuring that it delivers reliable and timely information on implementation performance, results and impact. With active support from provincial technical staff (Planning and M&E Specialists, MIS Specialist, Data Management Officers), the PM&E Coordinator will also be responsible to verify the reliability of the data provided from the various actors through periodic field visits and random verification.
- **P-PMO Engineer:** The Engineer will be responsible for maintaining proper records related to infrastructure works (contracts, activity reports, georeference etc.) that will help monitor the performance of each service provider/contractors, their compliance with contracts' provisions (quality norms, bills of quantities, etc.) and with agreed calendar of activities. He/she will be responsible for verifying the data submitted by contractors through their activity reports before this data is entered in the MIS.
- **Karnali KM and Communication Specialist:** The KM and Communication Specialist of the Karnali P-PMO will actively support the transformation of programme-wide M&E findings into practical knowledge, while supporting the design of qualitative surveys or case studies to document lessons learned or in order to understand key success factors or reasons for failure of certain approaches. In particular, guided by the Agroecology Analytical Framework, the Specialist will work closely with the Agroecology Service Provider, NARC, lead farmers and PhD candidates to develop relevant knowledge and policy documents.
- **Karnali Social Inclusion Specialist:** The Social Inclusion Specialist of the Karnali P-PMO will support the PM&E Coordinator in the design and conduct of specific studies aimed at an in-depth at assessing the manner in which programme activities may have contributed to the socio-economic empowerment of women and the youth. Also, he/she will play a role in ensuring that the intended target groups are being effectively reached by the programme in the manner intended, through the regular analysis of outreach data.

D. Information Management and Reporting

The following chapters present the detailed data requirements for the proper monitoring of programme execution and the measurement of outcomes and impact (i.e. the information that will need to be tracked by the M&E system and recorded by the PCO MIS). The M&E Matrix presented in Annex 3 further describes the detailed tools and responsibilities for data collection, consolidation and use, as well as the frequency for data collection.

- Data table for the monitoring of programme execution
- Data table for the measurement of outcomes and impact
- Data table for the measurement of farm profitability
- Data table for the measurement of programme outcomes and impact
- Data table for monitoring agroecology innovations and best practices
- (to be developed)

E. Management Information System (MIS)

A key focus for the R-HVAP M&E System will be to operate a highly effective georeferenced MIS (online and offline, internet and mobile devices) that provides programme managers and teams with timely and reliable information to support adaptive

programme management. The MIS will be used to manage, process, archive and analyse the data on activities, outputs, outreach and results generated by M&E activities. MIS data-entry will be made mandatory for the disbursement of co-investment packages and funds.

A foundation MIS will be developed for R-HVAP in cooperation with ASDP prior to start-up. The Programme will adapt and improve on this foundation MIS using lessons from ASDP, ASHA and RERP. The MIS will be configured to meet the specific information requirements of the M&E system and to generate a set of pre-defined consolidated tables or reports that allow the proper monitoring of AWPB and overall implementation progress. The MIS will be web-based, with most of the data being entered remotely by local resource persons via electronic tablets or mobile phones. This MIS will be also be fed with the information submitted by all service providers and programme implementers, through their activity reports.

In particular, the MIS will integrate the following:

- Tracking and recording of all activities defined in the detailed AWPB
- Tracking of outreach (number of programme participants and their sex, age, poverty status, and if janajatis or dalit)
- Tracking of all activities benefiting each individual programme participant, producer organization and MSME
- Tracking of farm-level data production, sales and profit data for all programme participants
- Data disaggregation by province, commodity, corridor, cluster
- Monitoring of all Logframe detailed output-level indicators and targets
- Generation of performance tables/dashboards and standard reports
- Georeferencing of productive infrastructure
- Tracking of select outcomes such as increase in net income, employment status, PO and MSP activity status, and others.
- Tracking of VITA or other lending activities to Programme participants.

Unique ID will be provided to each programme participant and household, similar to the ASDP and ASHA MIS, to enhance transparency of investments, prevent duplication, and track change over time. The same shall apply for the farmers' groups and MSMEs supported, and will be provided a unique PO or MSME ID. The unique IDs will be linked to every delivery of service to this programme participant or group. Similarly, each cluster formed and supported will also receive a unique cluster number, and will be linked to a specific province, commodity and corridor

A coding system will be developed for the standardized generation of unique IDs (potential system TBD). Such coding system will allow the MIS to produce trends and tables disaggregated by province, commodity, corridor, cluster and farmers' groups.

Logframe

PIM Appendix 4: Draft Knowledge Management Plan

PIM Appendix 5: Draft Financial Management manual

Resilient High Value Agricultural Programme (R-HVAP)

Financial Management Manual

(Draft Version 1.0)

DRAFT

Acronyms

AWPB= Annual Work Plan and Budget

CB = Central Bank

FA= Financing Agreement

AC = Accounts Officer (PCO)

IFAD = International Fund for Agricultural development

LPA = Lead project Agency

SDR = Special Drawing Rights

MFI = Microfinance Institutions

MOALD = Ministry of Agriculture and Livestock Development

MOF = Ministry of Finance

PD= Project Director

PIM=Project Implementation Manual

PCO = Programme Coordination Unit

PPMO= Provincial Programme Management Unit

WA = Withdrawal Application

1. Introduction

The following manual outlines the financial procedures to be followed by the Project Implementation Unit (PCO) during the following stages of the project cycle: i) preparation and planning, ii) implementation and iii) completion of the project. The manual aims to describe in detail the necessary steps to be undertaken by the relevant project staff and the Finance Consultants (FCs) in particular, when undertaking actions related to a) planning and budgeting, b) accounting, c) records management, d) internal controls, e) flow of funds, f) withdrawal of financing proceeds, g) processing of payments, h) financial reporting, i) fixed asset management, j) audit arrangements, k) supervision by IFAD and l) project completion and loan closure.

This manual is to be considered a living document and it is to be reviewed and updated regularly as necessary. It is to be read together with the Project Implementation Manual. It is also important to note this manual makes references to the following IFAD key documents: Financing Agreement, IFAD General Conditions, Financial Management and Financial Control letter (FMFCL), IFAD Guidelines on Project Audits, as well as the Project Financial Management and Financial Control – Handbook for Borrowers. Therefore, it is fundamental that the project staff, especially the Project Director and the Finance Consultants master these documents before the implementation of the project begins.

1.1 The Project

The International Fund for Agricultural development (IFAD) has agreed to provide the Borrower on the terms and conditions set forth in the Financing Agreement, the amount of USD 63 900 000 to implement the Resilient High Value Agricultural Programme (R-HVAP) project (here after referred to as "the Project"). The Programme will consist of the following components/Sub-components as outlined in schedule 1 of the financing agreement:

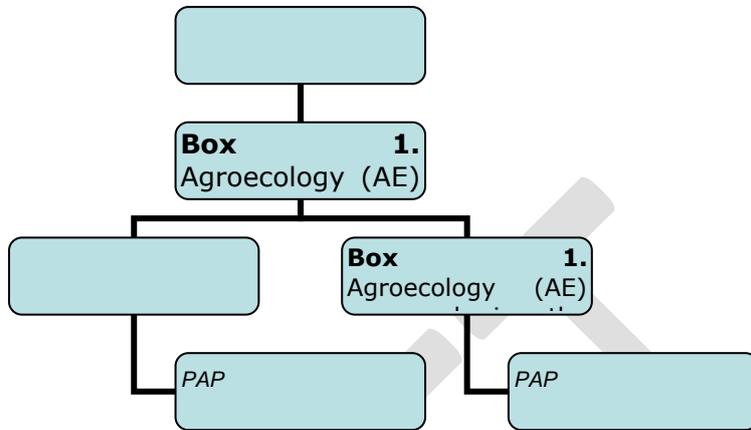
- (1) Enhanced capacities for transitioning to market oriented agroecological production systems;
- (2) Improved access to climate resilient productive infrastructure;
- (3) Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets; and
- (4) Strengthened policies, regulations and institutions for smallholder agroecological production and trade.
- (5) Project management, M&E, knowledge management and learning

The total cost of the programme is estimated at US\$ 120.9 million. The financiers and contributions are the following: (i) IFAD loan US\$ 70.9 million (58.6%); (ii) Federal Government of Nepal US\$ 24.6 million (20.3%) comprising of (a) US\$ 19.6 million (16.2%) covering duties, taxes, salary and operational cost of deputed staff, and (b) US\$ 5.0 million (4.1%) cash contribution for the Semlar wholesale market; (iii) provincial government US\$ 0.5 million (0.4%); (iv) local government / Palikas US\$ 1.52 million (1.3%), (v) Producers Organizations-Households US\$ 20.87 million (17.3%), and (vi) MSMEs US\$ 2.56 million (2.1%).

1.2 The Project Implementation Unit

The Programme Coordination Unit (PCO) is responsible for implementing the project and its different components. The PCO will be operating under the Ministry of Agriculture and Livestock Development (hereafter referred to as the Lead Project Agency – LPA). The

PCO will be located in the facilities of the LPA in the capital. In addition, 3 PPMOs will be located in the project provinces and decentralised cluster offices will be established to better serve the more remote areas.

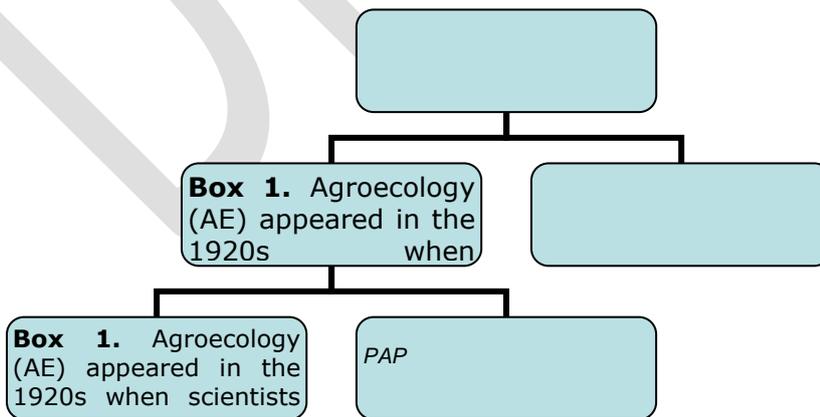


(Chart 1: organogram of the project implementation arrangements)

To implement the project and its components, the PCO and PPMOs will receive fund allocations via Central Government Treasury (IFAD and the government financing) , which will be channelled through local treasury offices and project accounts to cover project expenditures, in accordance to the Annual Work Plan and Budget (AWPB) and the expenditure categories as per the schedule 2 of the FA.

(Chart 2: The Financial operations environment of the PCO)

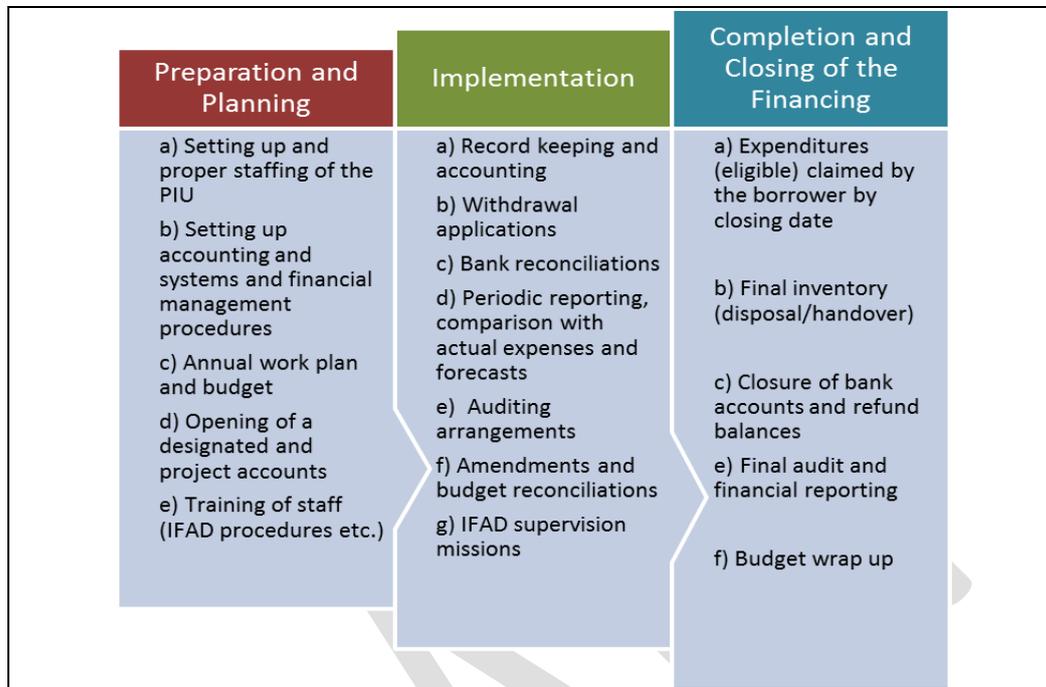
The Project and the PCO will be managed by the Project Director who is responsible for setting up the PCO and the proper staffing of it. The project funds will be managed by the Accounts Officer (PCO) with support of two finance consultants and an administrative assistant under the direct supervision of the Project Director.



(Chart 3: Organogram of the PCO staff involved in financial operations)

In order to ensure that the financing proceeds are used for the intended purpose and as efficiently as possible, it is essential that the Accounts Officer sets up and maintains

adequate financial management arrangements in each stage of the project cycle: i) preparation and planning, ii) implementation as well as iii) completion and closing, as illustrated in the chart below.



(Chart 4: Financial management arrangements in the different stages of the project cycle)

Given the importance and complexity of managing the PCO, it is essential that the PCO is staffed with qualified and motivated staff. The staff will be managed in accordance with the HR manual of the PCO. Equally it is important that the skills of the PCO staff are developed to meet the changing environment of the project. It is the Accounts Officers and the HR focal points responsibility to make sure the training needs are identified and that a staff development plan is included in the Annual Work Plan and Budget .



Sample Job descriptions for the Project director, Accounts Officer and Finance consultants, Administrative Assistant is provided in annex I. A sample staff development plan is provided in annex II: Table 6 of the AWPB.

1.3 Anticorruption policy

The management of the project funds shall be sufficiently rigorous to safeguard against Fraud and Corruption. Fraud and corruption include, but are not limited to:

- corrupt practice - offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party
- fraudulent practice - any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation
- collusive practice - an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party

- coercive practice - impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party

IFAD applies a zero-tolerance policy towards fraudulent, corrupt, collusive or coercive actions in projects financed through its loans and grants. 'Zero tolerance' means that IFAD will pursue all allegations falling under the scope of this policy and that appropriate sanctions will be applied where the allegations are substantiated. IFAD takes all possible actions to protect individuals who submit allegations of fraudulent or corrupt practices in its activities from reprisal. The IFAD anticorruption policy is available on IFAD website at www.ifad.org/governance/anticorruption/index.htm). The IFAD website also provides instructions on how to report any alleged wrongdoing to the Office of Audit and Oversight (<http://www.ifad.org/governance/anticorruption/how.htm>).



It is the Project Director's and the Accounts Officer's (PCO) responsibility to make sure that all PCO staff including the financial department are aware of IFADs and the lead project agency's anticorruption policy and whistle blowing procedures.

2. Budgeting and Planning

The PCO is responsible for developing an Annual Work Plan and Budget (AWPB). The AWPB is expected to contain several key elements such as:

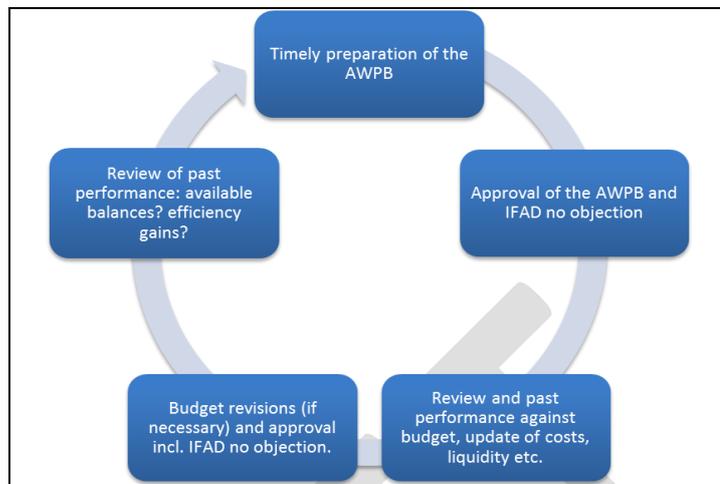
- i) Introduction and brief background;
- ii) Strategic focus and outputs;
- iii) Major risks and mitigation actions;
- iv) Budget and Financing plan;
- v) Procurement plan;
- vi) Training and technical assistance schedule and,
- vii) PCO staff development plan

The budget and financing plan can be described as a detailed statement of the expected resources available to the project and the planned use of those resources for the upcoming project year. The AWPB and especially the budget and financing plan is an important tool for managing the financial performance of the project and to ensure sufficient cash flow .

The budgeting and planning process comprises of the following parts :

- Preparation of annual, semi-annual, quarterly and even monthly financial plans including procurement, receipts, expenditures and cash flows.
- Review of past performance against budgets and the procurement plan, to promote an understanding of the project cost base;
- Identification of potential efficiency savings; and

- Review of the main expenditure headings in light of the project implementation plan, procurement plan, and expected variations in cost e.g. pay increases, inflation and other anticipated changes.



(Chart 5: The project budget cycle)

2.1 Development of the AWPB

Before the beginning of each fiscal year for the project, the Accounts Officer (PCO) should in consultancy with other project staff, PPMOs and stakeholders, prepare the AWPB for the next year reflecting any updates to the project cost tables detailed in the project design. The budget and financing plan should be prepared and presented on a quarterly basis. The data on the number of activities to be implemented in the coming year and the estimates of the total funds needed to finance them should be presented by component and sub-component, by expenditure category as well as by financier. The estimates should be based on the project's (up to date) cost tables. In addition to the financial information described above, the budget should also take into account the physical outreach of the project (number of farmer's to be trained etc.).

When preparing the AWPB the following aspects should be taken into consideration:

- Consistency with other financial reports: It is practical to prepare the budget and financing plan in the same format as the periodic (financial) progress reports and the project financial statements of the project.
- Contingency provisions (physical and price) and allocation of funds from the unallocated expenditure category.
- Post implementation activities e.g. arrangements for after life of project, disposal of project assets (computers, vehicles etc.), future repair and maintenance.
- Availability for funds and arrangements for all audits.

After preparing the draft AWPB, the Accounts Officer (PCO) will send it to the Project Director and Steering Committee/LPA for review and clearance/approval before sending it to IFAD for no objection. In accordance with the FA, a draft AWPB has to be submitted to IFAD no later than 60 days before the beginning of the relevant fiscal year of the project. If required the PCO/LPA could propose adjustments in the AWPB during the relevant project year, which would become effective after IFAD' approval.

The AWPB must be accompanied by a procurement plan prepared by the Procurement Officer. The first Procurement plan should cover the first 18 months of the project lifecycle while the subsequent procurement plans should cover 12 months of the project lifecycle.



A sample of a budget and financing plan, procurement plan as well as a staff development plan is provided in Annex II.

2.2 Review of the AWPB

Every quarter, the Accounts Officer (PCO) should review the costs incurred during this time period. In case of differences between the planned and actual costs presented in the Annual Budget, the Accounts Officer (PCO) should identify the reasons for those differences and detail them in the periodic Financial Reports presented to IFAD. In case of internal problems identified during the costs review, the Accounts Officer (PCO) should take the necessary steps to eliminate them. Otherwise, the budget for the next quarters should be readjusted to reflect the difference between actual and planned figures.

3. Accounting system

The majority of project activities result in the receipt, commitment or expenditure of funds. The accounting system records, processes and organises this data in order to produce useful financial information in form of AWPB, Financial Reports, Withdrawal Applications, Financial Statements etc. needed by the Project Financiers (IFAD, Government, Beneficiaries) as well as the PCO management. The accounting system should reflect the project's needs and be designed to provide the financial information required by all interested parties (PCO, PPMOs, LPA and IFAD). It should also fulfil all the legal and regulatory requirements of the borrower. The accounting system is a critical part of the project's financial management system and its design.

The Accounts Officer (PCO) is responsible for the following key areas related to the accounting system of the project:

- Designing the accounting system of the project
- Selection and maintenance of an accounting software.
- Development of an accounting manual

3.1 Designing the project accounting system.

When designing the accounting system of the project the Accounts Officer (PCO) must undertake the following steps:

Step one: Identify the different kind of reports the system is expected to generate, based on the different stakeholders' requirements. - What information and in what format needs to be produced by the PCO? As a minimum requirement the Accounting system will need to produce the following reports:

- Statement of cash receipts and payments (by category and by financier),
- Statement of cash receipts and payments (by component),
- Statement of comparative budget and actual amount by component,
- Statement of Designated Account movements,
- Statement of Designated Account Reconciliations,
- SOE-Withdrawal Application Statement.
- Cash Flow forecasts for the next two quarters
- Statement of sources and uses of funds

Step two: List the transactions and activities, which the system must account for. As a minimum requirement the accounting system must include:

- a) Purchase orders, receipts, check books and other similar documents evidencing receipt, commitment or expenditure of funds.
- b) A journal for primary entry of all transactions, including adjustments, destined to be posted to the ledger.
- c) A petty cash book (PCB) for small cash expenditures below a certain low threshold. The credit side of the PCB should be analysed into columns, one for each project component, The totals to be posted to ledger accounts monthly.
- d) A bank cash book (one for each source of financing). The credit side should also be analysed into columns, one for each project component (like PCB). Total of these columns should be posted to their respective ledger accounts monthly.
- e) A ledger containing separate ledger accounts for each project component. The debit side of each ledger account should be analysed into the expenditure categories defined in the IFAD Financing Agreement ((i) Works, (ii) Goods, Services and Inputs, (iii) Training and (iv) Operating costs). The ledger accounts should be closed and trial balance prepared at the end of each month.
- f) Fixed asset register to record location, price and date of acquisition (or completion) of all buildings, vehicles, computers, printers, major equipment and furniture. There register should have a separate section for each type of fixed asset.

Step Three: Design the specific accounting books, including a chart of accounts and records to be maintained, the transactions to be recorded therein and the precise accounting entries on the occasion of each transaction.

Step Four: Incorporate the systemic accounting issues as agreed with IFAD and the government including the used accounting standards and valuation criteria. - In accordance with the project design document, all project accounts will be kept on a double entry system and the used accounting standards will be NEPAL National Accounting Standards.

Step Five: Resolve accounting issues (if any) rising from the fact that the project is being implemented and expenditures are being incurred in different locations (HQ vs. provincial and cluster PPMOs). - The provincial and cluster PPMOs are to maintain their accounting records in their respective Centralised Government Accounting Software (CGAS) modules.

Step Six: Determine a tentative list of users and user rights for PCO and each PMO staff member in line with their terms of reference in order to maintain a proper level of security.

3.2 The Selection of an Accounting Software

The accounting software of the Project is an important tool for collecting, analysing, storing, and disseminating information that is vital for decision making. In addition, it enhances transparency and accountability of the project activities, provides timely reports, helps detecting errors and shortfalls during project implementation and indicates necessary corrections.

The PCO and all PPMOs will use Centralized Government Accounting Software (CGAS) for accounting record keeping and financial reporting. However, CGAS does not generate IFAD-required IFRs and can't consolidate financial reports for all PPMOs and PCO. Therefore, Project will work with the FCGO to customize CGAS to generate IFRs and automatically consolidate IFRs at the PCO level.

3.3 Accounting Manual

The accounting manual is an integral part of the financial management manual of the project. It is to be prepared by the Accounts Officer (PCO) and the finance consultant and will become effective after it has been approved by the Steering Committee of the project. The accounting manual is to be reviewed and updated when needed.

When developing the accounting manual, it is essential that the Accounts Officer (PCO) and the finance consultant are familiar with the following:

- National legislation and IFAD Financing agreement including the reporting requirements
- Nepal National Accounting Standards
- The features and user manual of the procured accounting software.

The accounting manual should as a minimum address the following subtopics:

Used accounting standards:

- Nepal National Accounting Standards

Chart of Accounts

The Chart of Accounts is used to: (i) capture the financial data under the appropriate headings and (ii) classify and group financial data for the various financial reports. The structure of the Chart of Accounts caters data to be captured by: (i) the Project components, sub-components, activities (ii) expenditure items under each component and sub-component, (iii) The IFAD expenditures categories for the Project, and (iv) sources of funding. Expenditure categories may also be recorded by using "cost centre" functionality which is commonly available in accounting software's.

The structure of the Chart of Accounts should conform closely to the project cost tables (as presented in the project design report) to enable comparison of actual project costs during implementation with those estimated during the project preparation.



A sample of a chart of account is provided in annex III

Budgeting and budgetary control

The project budget will be recorded in the budget module of the accounting software. Budgeting is discussed more in detail in section 2 of this manual.

Recording and processing of transactions

Whenever a transaction takes place under the Project, it should be recorded and processed using the accounting software that meets the project's specific accounting requirements. Processing of payments is discussed in detail in section 8 of this manual.

The recording of transactions under the Project follows the Nepal National Accounting Standards which allows for the recognition of cash inflows in the period they are received and the reporting of expenses in the period those expenditures are paid.

Individual records of transactions are treated as source documents. For the project accounting purposes, the following source documents are considered:

- Purchase orders/ Contracts
- Purchase invoices
- Service invoices
- Consultants/engineers' reports

All transactions occurred should be registered in the accounting software in accordance

with the date of occurrence and under the form of journals. The journal should contain sufficient and detailed information about the date of the transaction, its type, amount and reference to the source document. All the transactions should be entered on the accounting software using the principle of double entry, which means that each transaction should be recorded twice, once on the debit side of the transaction and once on the credit side of the transaction. The accounting software will automatically process those transactions and post them to the ledger accounts, which are accounts where all transactions of similar type are recorded. This processing of transactions also allows for the production of timely reports.

The finance consultant should reconcile the project accounts on a monthly basis. In case certain adjustments of entries in the accounting process have to be made, the finance consultant should produce a memorandum in which the reasons and the way in which the adjustment has been made is explained. The memorandum will be authorized by the Project Director after being cleared by the Accounts Officer (PCO).

Petty cash management.

The finance consultant will manage and periodically reconcile the petty cash account. The petty cash account is discussed more in detail in the section 6.2 of this manual.

Bank account reconciliations

The finance consultant will need to perform monthly bank account reconciliations between the different accounts. The reconciliation is discussed more in detail in section 6.3 of this manual.

Withdrawal of funds

The Finance Consultant will be responsible for preparing withdrawal applications to be submitted to IFAD. The necessary procedures are explained in section 7 of this manual and in the IFAD disbursement Handbook.

Financial reporting:

The finance consultant is not only in charge for recording the financial transactions on a daily basis but also for summing up the expenditures made under each component and sub-component and for each activity under those and posting the data on accounting/financial reports on a periodic basis during the reporting periods specified in the FMFCL and in the Financing Agreement. The finance consultant will also need to keep track and report on the availability of project funds in the different accounts (Designated accounts, project accounts and petty cash) as well as the commitments made by the PCO. The produced reports will be approved by the Project Director after being cleared by the Accounts Officer (PCO). The different financial reports are discussed more in detail in section 9 of this manual.

Fixed asset register

The finance consultant needs to maintain a fixed asset register recording all fixed assets in the fixed asset module of the accounting software. Fixed asset management is discussed more in detail in section 8 of this manual.

Period for which records are to be kept

The finance consultant needs to file the original records in an organised way to be maintained by the PCO/LPA for a minimum 10 years after the project completion. Record management is discussed more in detail in section 4 of this manual.

Access Levels

The access to the accounting system should be governed by the privileged metrics defining the levels of access by different users: (i) active use for inputting/editing of data; (ii) read-only use; or (iii) no-access. This would allow a separated and controlled access to the Accounting module (i.e. Journal recording, posting to the General Ledger). Each accounting transaction records the user's ID, preventing unauthorized access to the system and an adequate level of protection against the input of false data or the destruction of the records. At the same time, the data-sharing nature of the system involves a strict coordination and active data exchange among its various users (primarily the PCO). In this respect the system should ensure the reliability in

information storage and fast data processing.
Revision of accounting manual

The accounting manual is to be reviewed and updated regularly.

4. Records Management

Financial records must be created and preserved for every financial transaction performed under the project. Financial records are defined as any financial information including written, computer data, internal forms, e-mails, or any other form of storage information originated from the PCO and PPMOs such as internal forms, journal vouchers financial reports (Monthly & quarterly) copies of checks and withdrawal applications etc. or received by the PCO and PPMOs such as supplier invoices and receipts, bank statements, IFAD documents etc. within the framework of the project's official activities. The objective of this procedure is to preserve the financial records and files for further official use by the LPA, for financial audit and for review by the Fund during the supervision missions. The projects financial records are the property of the LPA/MoALD and cannot be removed or destroyed.



It is important to note that in accordance with the IFAD general conditions, the recipient/borrower has to maintain the original records for a minimum 10 years after the project completion.

4.1 Filing of the financial records

The Finance Consultants are responsible for filing the financial records created or received by the project. To fulfil this responsibility, Finance Consultants must maintain chronological files in which the financial documents have to be filed for future reference. Filing should be performed daily to prevent the accumulation of papers and to ensure that the financial records are maintained in an up-to-date manner at all times. Each financial record should be filed under its code in a chronological order, with a sequential number assigned to every document. Any kind of additions or amendments to the financial document should be filed in a chronological order immediately following the principal document.

4.2 Storage of financial records

The financial records of the project should be stored in the PCO and PPMOs offices for a minimum 10 years after the project completion. The data should be stored within the accounting software, as paper copies, as scanned copies and as computer disc copies. The PCO and PPMOs should allocate an appropriate storage area for the financial records in paper format and maintain them in locked cabinets, safe from water and fire, to which access is controlled and limited. The PCO and PPMOs should also classify the financial records as "Confidential", or "General". All-important correspondences should be filed.

4.3 Archiving of financial records

In order to prevent an unnecessary pile-up of files in a limited office space, the Accounts Officer (PCO and PPMOs) should make sure that the financial records are archived on a regularly basis. Once a year, the Accounts Officer (PCO and PPMOs) should make sure that the completed or inactive files are archived in a manner that will allow for easy retrieval of the files in case they are required at some future date.

4.4 Back- up procedures

To avoid the loss or damage of financial data, the information should be kept in two copies: i) at the computer server of the FCGO and ii) in the locked cabinets of the

PCO/PPMOs offices. Only the Project Director, the Accounts Officer (PCO and PPMOs) and finance consultants are allowed to access the financial records without authorization. The access of external persons is prohibited except for the auditors & IFAD staff.

5 Internal controls

Designing, Installing, and maintaining a system of internal financial control is an integral part of the Financial management function. Internal financial controls aim to ensure i) efficiency, ii) reliability, of financial reports and iii) compliance with applicable laws and regulations including the conditions set forth in the financing agreement. The key features of the internal control system are summarised below:

- Segregation of duties;
- Authorization;
- Reconciliations and checks;
- Restricted access; and
- Monitoring and review.

5.1 Segregation of duties

An important element in any control system is the separation of those duties which would, if combined, enable one individual to record and process a complete transaction. It is the Accounts Officer (PCO)'s responsibility to ensure that the following duties are segregated under the project: preparation, authorisation, execution, custody, recording and the and operation of systems.

Within R-HVAP financial operations, all transactions and financial operations will be initiated by finance consultants, and all approvals, including payment orders and transactions in CGAS should be the responsibility of Accounts Officers. Project Director/Manager will be responsible for signing off WAs, Payment orders and financial reports, etc.

5.2. Authorization

Authorization controls require the certification that a transaction or event is acceptable for further processing. Several types of authorization are in effect at the project, mainly in the procurement cycle, payment cycle, bank and cash management cycle including reconciliation. The Accounts Officer (PCO and PPMOs) should ensure that the authorizations of PCO and PPMOs staff ensure efficient implementation while keeping the risk as low as possible. The authorization of project staff should be in line with their respective job descriptions.

5.3 Reconciliations and Checks

Reconciliations between independent, corresponding sources of data are a key control for identifying errors and discrepancies in balances. The Accounts Officer (PCO and PPMOs) should perform the following reconciliations each month:

- Bank reconciliation
- Reconciliation between system and special account receipts and payments statement
- Any reconciling or balancing amounts should be promptly cleared. Unusual or long outstanding reconciling items must be brought to the attention of the financial

officer. The financial officer will review and sign all reconciliations as evidence of his review.

In addition, physical checks should be performed on assets held and on petty cash.

5.4 Restricted Access

All data, records and assets should be kept in a physically secure environment. This should cover safe keeping of finance records such as official order forms and bank details. In addition, any petty cash should be kept securely. Financial data and other records should also be protected in the form of back up procedures. All work should be regularly backed up and copy records stored securely off site

5.5 Monitoring and Review

As detailed in financial reporting section 9, periodic financial reports must be prepared and submitted to the fund. For the purposes of internal control, the same information should be prepared and monitored by the project Director on a monthly/quarterly basis. The reports should be prepared on a timely basis and should normally be available for distribution two weeks after the end of the reporting period to which they relate. The periodic reports should be reviewed by the finance officer and the project director as a minimum. Where necessary, corrective action should be taken to ensure the authorized budget and procurement plan is not exceeded.

6. Flow of funds, cash and bank account management

The IFAD Loan will be disbursed over eight years. The Loan Closing Date is the eighth anniversary of the date when the project was declared effective. IFAD disbursement procedures and the accompanied forms are outlined in detail in the FMFCL and the Disbursement handbook which should be read in parallel with this manual. Please refer to section 7 of this manual for more detailed information on the IFAD Disbursement procedures.

6.1 Flow of Funds, opening of designated accounts and project accounts

As soon as entry into force, IFAD will open a loan account which will be credited with USD 63 900 000. These funds will be transferred to the project in accordance with the financing agreement and the IFAD's disbursement procedures.

The project will open designated account in USD in the Central Bank of the country and project accounts in local currency for each PCO and PPMOs.

6.3 Bank reconciliation

The Accounts Officer (PCO and PPMOs) must perform monthly reconciliations between project account(s) (treasury) balance recorded on bank statements and local cash book balance, recorded on the system. Performance of the monthly reconciliation should follow the following steps:

- i) Project Account balance recorded on bank statement on reconciliation date is taken as starting figure;
- ii) Add reimbursements/replenishments/other deposits that have been processed and are due to designated account, but not yet recorded on bank statements;
- iii) Subtract undelivered cheques. Any long-outstanding cheques should be identified and investigated
- iv) Following these adjustments, the bank statement and local finance system cash totals should agree. Any remaining difference should be reported and investigated;
- v) The completed bank reconciliation statement should be signed by the Project Director/Manager (for PPMOs); and
- vi) The reconciliation should be reviewed and countersigned by independent finance

team member who understands the reconciliation process.

7. IFAD Disbursement Procedures

The IFAD disbursement procedures are governed by the FMFCL and the Disbursement Handbook, which will be sent to the PCO/LPA upon the project effectiveness. The handbook is also available on the IFAD site <http://www.ifad.org/pub/basic/index.htm>.

Three standard disbursement procedures may be used for withdrawal of financing:

Procedure I

Advance withdrawal (using imprest accounts or revolving funds with replenishment to a bank account(s) designated to receive financing resources in advance). This modality is used to advance and/or replenish funds to a bank account as designated by the borrower. The Fund may place a limit on the amount to be advanced and/or replenished. Relevant details on the modality – which is project specific – are agreed between the borrower and the Fund and detailed in the FMFCL.

Procedure II

Direct payment. This modality is used for eligible project expenditures to be paid directly by IFAD, generally for large contracts, to suppliers, contractors, consultants or third parties, as authorized by the borrower.

Procedure III

Reimbursement. This is applicable when eligible project expenditures, reimbursable under the financing, have been pre-financed by the borrower. Such reimbursements are expected to be claimed no later than 90 calendar days from the date of payment by the borrower.

7.1 Evidence of Authority to Sign Withdrawal Applications

The Fund requires the borrower's (or recipient's) representative, as designated in the financing agreement, to furnish satisfactory evidence of the authority and authenticated specimen signatures of the individuals who will sign WAs on behalf of the borrower. This evidence must reach the Fund before the first WA is presented by the borrower and should be the original (photocopies, facsimiles or other means of transmission are not acceptable). A sample template is provided in annex 1 of the disbursement handbook. Each WA should be signed by such duly authorized individuals, and the Fund must be notified of any change in the signatories authorized to withdraw funds from the loan/grant account.

The Fund must also be notified of the designated signatories for operating any designated and/or programme or other accounts, including changes thereto, whether or not these authorized signatories are included in the financing agreement. Such changes, as effected during the life of the project, must be communicated promptly to the Fund. The borrower, guided by the sample in annex 1 of the disbursement handbook, should provide the names and specimen signatures of the newly appointed signatories and include the date when such change is to take effect. The original of such changed documentary evidence is to be provided to the Fund.

7.2 The Designated Account

The flow of funds for the Project starts with the opening of the project Designated Account (DA), denominated in US Dollars, in the national central bank, in accordance with the Funds requirements identified in the Financing Agreement and the FMFCL. The Accounts Officer (PCO) is responsible for opening and managing the Designated Account

including receiving on a monthly basis the DA Statement of Account from the bank and reconciling it against PCO records. Disbursements from the DA should be recorded in the PCO account records as of the date they are made, that is when the checks are issued.

7.3 Withdrawal of Financing Proceeds and Supporting Documentation

Based on the FMFCL and the Disbursement Handbook, the withdrawal of all Project financing proceeds (direct payments to contractors from IFAD, and to reimbursements and replenishments to the designated account) is done through the use of Withdrawal Applications.

It is the Accounts Officer (PCO)s and the finance consultant's (PCO) responsibility to make sure that the WAs are correctly prepared, the documentation is complete and submitted to IFAD in a timely manner. The necessary forms and supporting documentation to be attached to the WA (form 100) are outlined in detail for each disbursement method in section 3 of the Disbursement Handbook

Upon Project entry into force and after sending to IFAD, the letter designating the two officials authorized to sign Withdrawal Applications (WA) with their names and specimen signatures, the Accounts Officer (PCO) will prepare the first Withdrawal application together with the necessary supporting documentation requesting the IFAD to transfer an initial advance to the designated account up to a ceiling of USD 3 000 000. Disbursement from the DA may then start for eligible expenditures under the Project.

For the subsequent WAs, prepared by the finance consultant, the AO (PCO) ensure that the right supporting documentation is attached to the WAs before providing clearance. When submitted supporting documentation to IFAD, they should be copies while the original documentation is to be retained by the PCO/LPA and securely located to enable inspection by IFAD representatives and auditors for a period of at least 10 after the project completion date in accordance with the IFAD General conditions.

The following are the list of supporting documents for all payments (Works, goods, consultants' and other services):

- a) The signed contract or confirmed purchase order (Showing the specified amount that is due paid
- b) The bank guarantee for advance payment, as specified in the contract documents
- c) The bank guarantee for performance, as specified in the contract documents
- d) Copies of communications sent by the IFAD country programme manager to the lead project agency (LPA) providing the IFAD's no objection (post or Prior) to the contract award, and
- e) Evidence of payment.

For payments of goods, in addition to a-e:

- f) Supplier's invoice duly certified for payment by the project director – specifying the goods, their quantities and prices
- g) Bills of lading or similar documents; and
- h) As appropriate, the certificate of delivery (to include condition of goods to delivery)

For Payments of Consultants' and other services, in addition to a-e:

- i) The supplier's or consultant's claim, duly certified for payment by the project director and showing sufficient detail. If such Services relate to the importation of goods (for example, freight and insurance payments), adequate reference should be given to enable IFAD to relate each of these items to specific goods whose cost has been or is to be financed by the financing closing date; and
- j) As an appropriate, a certificate of delivery of satisfactory services

For progress and retention payments of civil works in addition a-e:

- k) the claim if the contractor, including a financial progress report, stating the work performed and the amount due;
- l) A certificate signed by the project consultants or owner's representative, if any, or by the borrower's chief engineering officer or resident supervising engineer assigned to the project, to the effect that the work performed is satisfactory and the payment claimed is due in accordance with the terms of the contract, and
- m) A copy of the contract payment monitoring form signed in original by the certifying officer.

Together with each WA received for replenishment to the designated account, the project must submit the most recent IFRs, the designated account reconciliation Statement, prepared by the finance consultant (PCO) for the same reporting period in which the eligible expenditures are being claimed. This form needs to be accompanied by bank statements of the designated account and that of any other operating, district, project accounts ensuring that the closing bank balances for all these accounts correspond to the balances at the end of the same reporting period as indicated in the WA period.

In order to minimize transaction costs, the Accounts Officer (PCO) must make sure that withdrawals from the loan and/or grant account shall be made in amounts of no less than US\$ 200,000 or its equivalent, or such other amount as IFAD may designate in an advice to the borrower from time to time.

8. Processing of payments

The Project will mainly finance, small works (rural roads, irrigation infrastructure etc.), consultants' services (design, supervision and studies), goods (office supplies, computers, cars), microfinance in the form of grants and credit as well as PCO operating costs (salaries, travel expenditures etc.). Last section outlined how the PCO will receive funds from IFAD to cover the incurred expenditures related. This section will outline the different steps involved in the outflow of funds from the PCO to the Contractors, Suppliers, Consultants etc. The procurement process of these items, including the hiring process for consultants is detailed in the project procurement manual.

8.1 General instructions

For all payments, the Accounts Officer (PCO and PPMOs) should ensure that the following steps are performed:

- i) Preparation of Payment request voucher. A payment request voucher should be prepared for each payment.
- ii) Validation of invoice. The following validation checks should be performed by the Accounts Officer (PCO) on invoice:
 - Invoice arithmetically correct; and
 - Quantity and price recorded on invoice should be checked back to contract, order, certification of completion/delivery

If there is any discrepancy identified, it should be raised with the vendor prior to proceeding with invoice processing,

- iii) Supporting documentation: the following documents should be attached to the payment voucher to support validation:
 - Copy of invoice;

- Copy of letter of approval from technical committee or the specialist, minister;
- Copy of purchase order, goods received note and contract if applicable; and
- Copy of required guarantees

All vouchers are authorized by the Project Director/Manager after signatures of the Accounts Officer (PCO).

8.2 Processing of payments for Civil Works and Goods

Project will incur expenditures related to works in the form of rural roads, irrigation infrastructure etc. and goods in the form of seeds, computers, cars etc.

The Expenditure Cycle for works and goods is detailed in the following chart:

Before releasing the payment to the contractor or supplier, the Accounts Officer (PCO and PPMOs) will make sure the following processes are followed:

- A. The quantity of goods is checked back to the purchase order and to contract and bid award letter (if applicable). The committee members, assigned by steering committee/LPA after being assured that quality of goods is compliant with the contract conditions deliver an accepted delivery sheet or a compliant report to the Procurement Officer. The Accounts Officer (PCO and PPMOs) will ensure that the Procurement Officer provides all the necessary documents including the invoice and the acceptance/compliant report before proceeding with the payment.
- B. The condition of the goods are reviewed for any damage or impairments. Damaged goods are to be identified and returned to the supplier/replaced. If any goods are rejected or returned to the supplier because they are not as ordered or are of sub-standard quality, the Accounts Officer (PCO and PPMOs) should be notified. Accounts Officer (PCO and PPMOs) must keep a central record of all goods returned to suppliers and maintain a separate record of all goods and equipment delivered by suppliers by contracts funded by the IFAD financing.
- C. All the works, are to be monitored by an architect or engineer. It is good practise to assign the architect/engineer responsible for the design to monitor and assess the works of the contractor. The architect or engineer is responsible for sending compliant reports/certificate of completion to the Procurement Officer in the PCO and PPMOs, which includes the percentage of completion of the construction and if the construction materials are compliant with the contract conditions and specifications. A request for payment is prepared by the Procurement Officer to be send to the Accounts Officer (PCO and PPMOs). The Accounts Officer (PCO and PPMOs) will ensure that the payment request includes all the necessary documents including the invoice and the compliant reports/certificate of completion before proceeding with the payment to the contractor for the completed phase.

8.3 Processing of payments for Consultants' Services

Under the Project there are two types of consultants' services; a) Consultants with a lump sum contract, and b) Consultants with a time based contract. For type (a) consultants, payments will be made against the delivery of outputs as detailed in their contracts. For type (b) consultants, payments will be made against the submission of a time sheet and a summary of activities performed. PCO and PPMOs members will be paid against the submission of a monthly time sheet. The Expenditure Cycle for type (a) consultants is detailed in the following chart:

Before releasing the payment to the consultant (firms), the Accounts Officer (PCO and PPMOs) will undertake the following steps:

- A) The consulting services reports are monitored by technical committees, assigned by the steering committee/LPA for the purpose of evaluating the deliverables submitted by the consultant (firms). Therefore, the Accounts Officer (PCO and PPMOs) will ensure that no payment to the consultant is prepared unless an approved committee report or letter of approval received from the committee assures that the deliverable submitted by the consultant is compliant with the contract conditions, these documents should be passed first through the Procurement Officer.

- B) The consulting services reports are monitored by the specialist responsible for the activity for the purpose of evaluating the deliverables submitted by the consultant (Individual Consultant). Therefore, the Accounts Officer (PCO and PPMOs) will ensure that no payment to the consultant is prepared unless an approved report received from the specialist assures that this report is compliant with the contract terms and conditions, these documents should be passed first through the procurement officer. All Supporting Documents and Internal Forms must be retained at the PCO and PPMOs Offices and must be maintained and archived in accordance with the maintenance of records section of this manual.

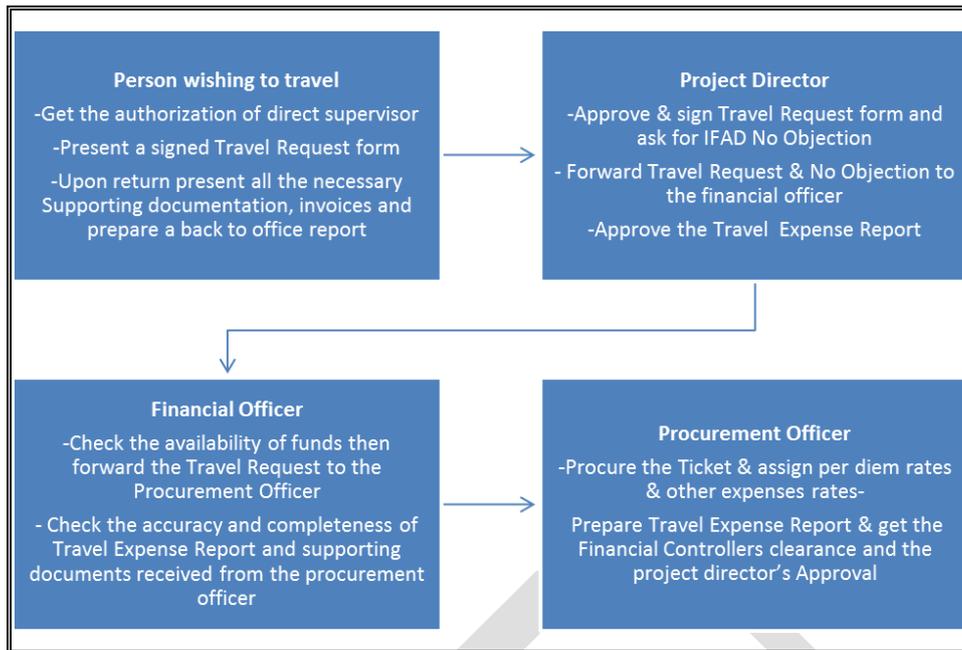
8.4. Processing of Payments for Office Supplies and Other Operating Costs

The payment for office supplies and operating cost will be against the preparation by the procurement officer of a serially numbered checklist evidencing the receipt of office supplies, and the presentation of the Purchase order and supplier invoice. The Accounts Officer (PCO and PPMOs) will compare the information on the checklist to the purchase order and supplier invoice, then sign the checklist. The payment for services is against the presentation by the supplier performing the service of a service invoice.

At the end of each month, the Accounts Officer (PCO and PPMOs) will prepare a serially numbered "List of Payments" that detail all the incurred costs for office supplies and operating costs during the month and present it to the project director for review and authorization. After the project director's authorization of the payments, the Accounts Officer (PCO and PPMOs) will prepare the checks and send them to the project director who will prepare an "Internal Memorandum" detailing the check numbers, amounts, suppliers and explanation of payments.

8.6 Travel Arrangements & Processing of Travel Related Expenditures

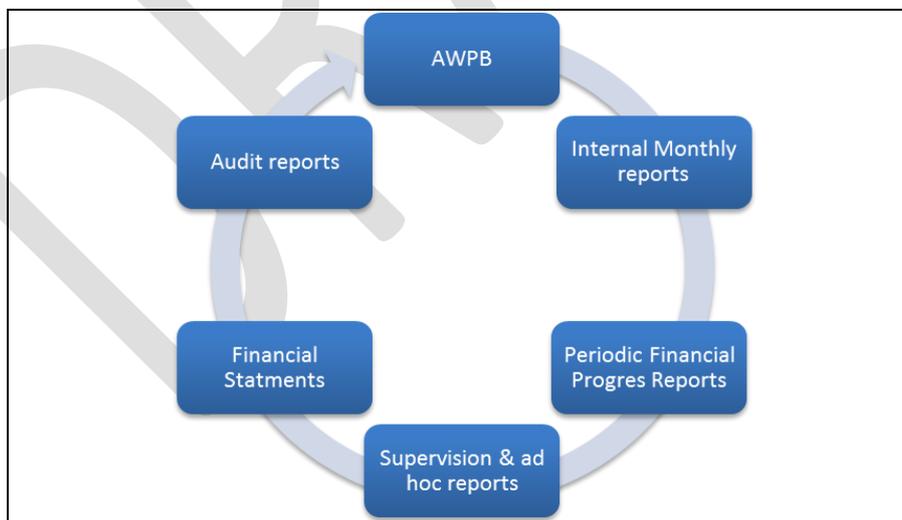
Under the Project there is a budget allocated for workshops and study tours as well as staff training courses. The following chart summarizes the transaction cycle that should be followed to get approval for the travel and the expenditures related to it:



(Chart 16: Processing of Payments for Travel and Training)

9. Financial Reporting

Periodic financial progress reports are a formal requirement of the IFAD Financing Agreement. Sufficient information must be made available about what money is spent on, how much is spent and what the results are. The major financial reports include the following: AWPB, monthly financial reports, periodic financial progress reports, supervision reports, annual financial statements and audit reports.



(Chart 17: Project Financial reporting cycle)

In addition to the AWPB, supervision reports and audit reports (discussed in detail in section 2, 11 and 12 of this manual), the Accounts Officer (PCO) will ensure that the following financial reports are prepared in a timely manner and submitted to IFAD in due time (applicable to reports 2-4 only):

1. Monthly financial reports for PCO internal use only. These reports will be verified during IFAD supervision missions.
2. Periodic (semi-annual) progress reports, to be provided to IFAD within 45 days after the reporting period
3. Annual financial statements, to be provided to IFAD within 4 months after the end of the project fiscal year.
4. Annual financial statements audited by an independent auditor acceptable to the Fund and in accordance with internationally accepted auditing standards and terms of reference cleared by IFAD, to be provided to IFAD within 6 months after the project fiscal year (explained in detail in section 11).

9.1 Monthly Reports

In accordance with best practises, the Accounts Officer (PCO and PPMOs) will prepare monthly financial reports based on the accounting system to aid management decision and control. The monthly management accounts will include the following.

- Monthly Budget Execution Report, summarising the budget-actual comparison of the expenditures incurred, component-wise and category-wise. The report will also include a list of commitments entered into and still to be paid, by component and by category.
- Bank Reconciliation Statement (please refer to annex XIII or form 104 of the Disbursement handbook)

9.2 Periodic Progress Reports

Semi-annual progress reports should be submitted to IFAD no later than 45 days after the end of reporting period during the programme implementation period.

The importance of the periodic progress reports lies in the fact that they provide IFAD with sufficient information to determine whether the funds disbursed to the project are being used as intended, the project implementation is on track and the budgeted costs will not be exceeded. The financial information should be linked to the information on physical progress and procurement to give assurance that the financial and physical progress are consistent.

The Periodic Progress Reports include the following:

Project Statement of Cash Receipts and Payments by Category: This report summarizes the sources of project financing, with the uses of funds in accordance with the disbursement categories foreseen in the Financing agreement with the Fund. This report also states the cumulative expenditures from the start of the project until the date of the report as well as the cash flow forecast for the following semi-annual period.



The standard format for the presentation of this report is provided in Annex VI: Table 1.

- Uses of Funds by Project category: This report details the project expenditures by each expenditure category or sub category and by financier.



A sample of a Uses of Funds by Project category is provided in Annex VI: Table 2

- Uses of Funds by Project Activity: This report details the project expenditures by each component or sub-component consistent with those foreseen in the Financing Agreement. The total planned, actual and cumulative expenditures in this report should correspond to those mentioned in the uses of funds section of the "Sources and Uses of Funds" report presented above.



A sample format for this report is provided in Annex VI: Table 3

- **Cash flow forecast:** This report summarizes the cash inflow and outflow for the following semi-annual period and is explained in detail in section 9.3. See sample IFRs.

- **Designated Account Reconciliation Statement**



Please refer to annex XIII (also form 104 of the Disbursement handbook) for a standard Designated Account Reconciliation Statement.

- **Withdrawal Application Statement:** This report summarizes the claimed and received WA from IFAD during the reporting period.



• A sample of a WA statement is provided in Annex VI: Table 5

-**Contract Expenditures:** This report details all the contracts signed and amounts paid during the quarter by category.



A sample format for this report is provided in Annex VI: Table 6

• **Physical progress report:** This report summarizes the quantitative physical progress made in achieving overall objectives and links them to project expenditures by component and by category. This report should also contain a narrative part on the strategic direction for the next planning cycle as well as the main financial problems encountered.



A sample format for this report is provided in Annex VI: Table 7

9.3 Cash Flow Forecast

Preparing periodic cash flow forecasts is essential to ensure the project has sufficient funds to meet its commitments (expenditures to contractors, service providers, suppliers of goods, salaries of the PCO staff, operating and maintenance cost of the PCO and PPMOs such as rent, electricity, internet etc.) as they fall due. It is the Accounts Officer (PCO and PPMOs) responsibility to prepare periodic cash flow forecasts by undertaking the following steps:

1. Determining the opening balance of the time period
2. Determine (as accurately as possible) all the cash inflow already secured from different sources during the time period on a monthly basis.
3. Determine (as accurately as possible) all the payments due during the time period on a monthly basis.
4. Based on the calculation (steps 1-3) determine the estimated cash need for time period in question.

When preparing the cash-flow analysis, key sources for information include the AWPB (up-to-date), the procurement plan (up-to-date), disbursement timetable of all signed contracts and historic expense reports for PCO and PPMOs' management costs as these can be assumed to stay relatively constant over the implementation period.

Based on the estimated cash flow needs, the Accounts Officer (PCO) in consultation with the Project Director will prepare an submit for approval the required withdrawal applications in a timely manner in order to ensure sufficient liquidity and avoid any delays to the project implementation.



Sample of a cash flow forecast is provided in annex XV (IFRs)

9.4 Annual Financial Statements and Audit Reports

IFAD requires that the financial statements are prepared in accordance with acceptable accounting standards. (National Standards are also acceptable as long as they meet the minimum requirements) and that the annual statements are provided to IFAD within four months after the end of the fiscal year. In accordance with the Project Design Report, the project will prepare its financial statements in accordance with Nepal National Accounting standards.

The project interim un-audited financial report (IFRs) should include the following information:

- Project Information and performance,
 - Statement of project management responsibilities,
 - Cash flow forecast
 - Sources and Uses of Funds (by component),
 - Sources and Uses of Funds (by category)
 - Statement of comparative budget and actual amount,
 - Statement of Designated Account movements,
 - Statement of Designated Account Reconciliations,
 - Withdrawal Application Statement and Notes to the Financial Statements.



A sample of financial statements are provided in annex XV .

It is important to note that IFAD financing proceeds should be disclosed separately from the other financiers (donors, government, beneficiaries etc.). It is also important to note that where the project consists of more than one entity the lead-PCO must provide consolidated financial statements.

The most recent IFRs should be attached to each WA to be submitted to IFAD.

10. Fixed Asset Management

Fixed asset management is an important process that seeks to track fixed assets for the purposes of financial accounting and to ensure preventive maintenance, and theft deterrence. Adequate Fixed asset maintenance also increases the sustainability of the project.

There are three elements in fixed asset management that require the attention of the Accounts Officer (PCO and PPMOs)

- Purchase of equipment
- Setting up and maintaining an asset register including verification
- Setting up a plan for disposal and/or handover of the asset once the project is completed

10.1 Purchase of Equipment

All procurement and payments for project equipment will be processed in line with the guidance provided in the procurement section of the PIM. The finance consultant financial officer should assign a unique, sequential asset number to all furniture and equipment items purchased (excluding minor items such as stationary). This must be clearly labelled on each item. Each item of equipment must be recorded in the fixed asset register

10.2 Asset Register

The finance consultant must maintain a register of all (material) project equipment. This will be recorded on the asset management module of the accounting software. The asset register should record the following information for each individual piece of equipment: 1) Asset description, 2) Asset number, 3) Serial number of the item, 4) Officer responsible for asset, 5) Funding of asset (IFAD, government etc.), 6) Location; Date of purchase; and 7) Estimated life. The



A sample of a fixed asset register is provided in annex VII.

10.3 Asset Verification Review

The Accounts Officer (PCO and PPMOs) must ensure that a verification count of all equipment recorded in the fixed asset register is performed at least once a year. This should include the following checks:

- Verify that all equipment is still held in the location recorded on the register; and
- Check that equipment is still in a reasonable state of repair.
- Discrepancies between the verification exercise and the fixed asset register should be investigated. Where assets are missing or seriously damaged, they should be removed from the asset register. The removal should be formally documented and approved by the Accounts officer (PCO and PPMOs) and by the LPA.

The verification review must be performed by different staff from those who use the equipment, to ensure adequate segregation of duty.

10.4 Vehicle Maintenance and Fuel

The drivers are required to record all trips and fuel refills in a logbook and collect all the supporting documentation (invoices etc.). The vehicle logbook provides control over the use of the cars as well as fuel consumption. Fuel distribution is handled by the finance consultant. Fuel is purchased on an as-needed basis by giving coupons to the drivers who must use the selected fuel station. The PCO is billed by the station twice a month. Unused coupons are kept in the office safe in the custody of the Finance consultant. For official missions, a special cash provision is given to mission leaders to allow them to purchase fuel (at reputable gas stations) during the trip.

The safety of cars is the responsibility of the recipient staff members and drivers assigned to the vehicles. Consequently, they must ensure that the cars are parked in a secure area when not in use or outside working hours. The drivers are required to monitor the maintenance of their assigned vehicles under the supervision of the PCO and PPMOs. The drivers must notify the PCO and PPMOs of maintenance needs so that the cars can be serviced on a timely basis. The cars must always be taken to the selected PCO and PPMOs garage for repairs and maintenance

The finance consultant should on a monthly basis review the mileage and fuel usage as well as any undertaken service as reported in the log book of each car and compare these with the official invoices and travel authorizations etc. to make sure the numbers are accurate.

An insurance policy must be taken by the PCO and PPMOs to ensure all cars and passengers against all risks, including damage, theft, fire, as well as injury and property damage to third parties. The insurance must also cover the same risks when the cars are used by the recipient staff members outside of normal working hours.



A sample of a vehicle log and vehicle history record log is provided in annex IX A & B.

11. Audit Arrangements

The project audit is an ex-post review of financial statements, records of transactions & financial systems; It examines the adequacy of accounting systems & procedures, capacity to maintain appropriate accounts & documentation of the project/grant expenditures. The objective of the project audit is to provide credibility and assurance of accountability.



The Audited financial statements need to be sent to IFAD no later than 6 months after the end of the fiscal year. The detailed instruction regarding project audit are outlined in the IFAD guidelines for project audits available in IFAD Handbook for Financial Reporting and Auditing of IFAD-financed projects.

11.1 The Audit Cycle and Appointing the Auditor

The complete audit cycle can be divided into the three main roles carried out by the Accounts Officer (PCO)/PCO, the Auditor and IFAD.

The PCO and the accounts officer will:

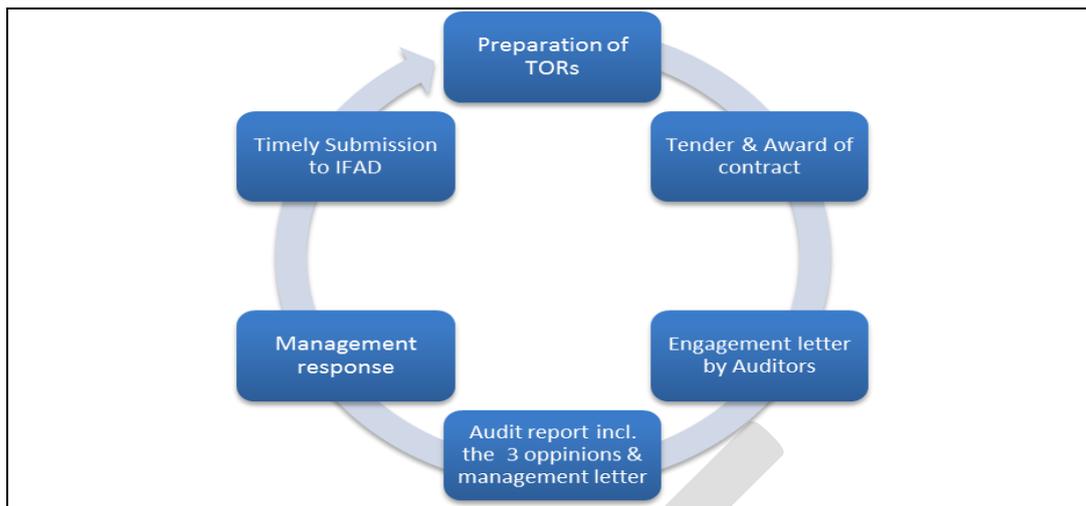
- Timely prepare TORs of the Audit and submit these to the Fund for no objection,
- manage the selection process of the auditor (if relevant)
- and appoints the auditor.
- Prepare the financial statements for reporting period
- Make available all the financial information necessary to the auditors.
- PCO/PPMOs should respond to the audit findings and recommendations.
- Submit the audit report to the fund no later than 6 months after the end of the project fiscal year.

The Auditor will:

- perform the audit work
- Indicate any ineligible expenditures
- Provide a management letter.

The Fund will:

- Provide a non-objection to the auditors TORs
- Monitor timely submission and review of audit reports
- Follow up on remedial action\apply sanction and /or remedies if relevant including suspension of disbursement and or cancellation of loan balance (Legal Notice is sent to the LPA after 3 months of delay. Suspension of disbursement to the project after 6 months delay.)



(Chart 18: Project Audit cycle)

When appointing the auditor, the Accounts officer will need to ensure that the following steps are followed:

- a) Accounts Officer/PCO prepares TORs for the auditor and sends it to IFAD for review and no-objection.
- b) IFAD communicates "no objection" to borrower.
- c) Accounts Officer/PCO initiates the procurement process using the agreed TORs.
- d) Accounts Officer/PCO informs IFAD of the name of proposed auditor and the procurement process followed for the selection.
- e) IFAD communicates "no objection" to borrower on the selection of proposed auditor upon performance of the necessary due diligence.
- f) Accounts Officer/PCO appoints the auditor.
- g) The auditor appointed normally issues a formal engagement letter

11.2. TORs of the Auditors and the Engagement letter

When preparing auditors TORs, the Accounts officer (PCO) should address the point outlined below:

- a) Description of the employing project authority or entity;
- b) Term of the auditor's engagement, namely whether it is for a fiscal year or some other period;
- c) Description and the timing of the financial statements and other material to be provided by project management for the audit;
- d) Terms for delivery of the audit report;
- e) Specification that the audit be carried out in accordance with internationally accepted auditing standards;
- f) Provision of a management letter;
- g) Statement of access to project records, documents and personnel available to the auditor;
- h) Details regarding submission of a proposal and work plan by the auditor.

Furthermore, the contents of the TORS should include:

- a) A description in the TORs of the entity engaging the auditor and whether it is acting on behalf of or is a constituent part of a larger entity

- b) Legal and general descriptions of the project and the LPA, in sufficient detail to enable the auditor to understand their nature, objectives and activities.

The following additional information should also be considered:

- c) Organizational charts;
- d) Names and titles of senior managers;
- e) Names and qualifications of officers responsible for financial management, accounting and internal audit;
- f) Description of information technology facilities and computer systems in use; and
- g) Copies of the latest financial statements, financing agreement, minutes of financing negotiations, project design document, and annual work programme and budget, if it is available.

The auditors are required to provide a formal engagement letter confirming their acceptance of the appointment and outlining the methodology, scope and responsibilities under the audit. The borrower's representative will sign and return a copy of the letter to the auditor.

11.3 The Audit Report

The Audit Report must include the following elements which should also be reflected in the auditor's TORs:

- An opinion on the Project's financial statements
- A separate opinion on the eligibility of expenditures included in the WA /Statement of Expenditure procedure
- A separate opinion if the use of the Special Account/Designated Account is in compliance with the financing agreement
- In addition to the audit report, the independent auditor will prepare a management letter. This will include comment and recommendations on the adequacy of the financial management system, and on the system of internal control. The management letter should also include a follow up section on the status of implementation of previous years recommendations

12. IFAD Supervision

The project will be subject to extensive supervision from IFAD during the whole implementation period to ensure that the PCO fiduciary requirements are completed on time and to minimise the project's fiduciary risk.

If financial arrangements of the PCO and PPMOs are deemed acceptable, IFAD will rely on them to provide assurance that the financing proceeds are being used for the intended purposes. In the case that IFAD identifies weaknesses in the financial arrangements, it will require the PCO/LPA to take the appropriate measures to mitigate those risks e.g. changing the design and operation of internal control processes or modifying the disbursement arrangements for an operation.

The IFAD supervision of the project includes the following measures:

- Monitor of timely submission of audit reports and review of these reports

- Verify compliance to audit recommendations and recommendations made by past supervision missions.
- Monitor the submission of timely periodic financial reports, IFRs and review of these reports
- Monitor disbursements rate and the quality of the received Withdrawal Applications
- Annual or semi-annual financial management supervision missions.

12.1 Supervision missions by the Fund

Throughout project implementation, IFAD will conduct annual financial supervisory missions to develop financial management ratings and ensure compliance with the IFAD's requirements. During the supervisory missions, IFAD will assess and monitor the adequacy of the PCO/LPA financial management arrangements such as accounting, budgeting, internal controls, flow of funds, financial reporting and the auditing practices. The key findings and recommendations of the mission will be captured in the Aid Memoire.

When preparing for and during an IFAD supervisions mission, the necessary supporting actions by the Accounts Officer (PCO) will include the following:

- Update and make available for the mission, the project financial information and especially the incurred expenditures by component, by category and by financier as of the last day of the preceding month.



Please refer to annex XI for the financial tables required for the aide memoire

- Update and make available reports on the status of counterpart funding (has the Borrower/Lead Project Agency made available financing proceeds to the Project as planned?)
- Provide a walkthrough of the existing accounting system including its main modules, budgeting, accounting, financial reports, fixed asset register as well as the security settings in use.
- Facilitate checking of the internal controls, by system "walk through" to ensure that approved procedures are consistently being followed.
- Make available Withdrawal Applications to facilitate the verifying of adequacy, completeness and validity of claims.
- Make available evidence of qualifications and educational background of the financial staff including, organogram of the PCO, CVs, TORs of each position and PCO training plan.
- Update and make available a complete a fixed asset register and facilitate sample test check of physical existence of the asset.
- Make available written procedures regarding financial operations such as processing of transactions, financial administration manual, accounting manual, fixed asset maintenance and records management as well as the lead project agency's anticorruption policy and whistle blowing procedures.

- Prepare and make available the updated bank account reconciliation statement and bank account statements for all designated and project accounts.
- Arrange meeting with the auditors and any other selected party requested by the mission.
- Make available all necessary documentation and contracts regarding procurement not subject to prior review.
- Provide an update on the actions taken regarding past audit recommendations as well as action points outlined in the past aide memoires.
- Make available the most recent AWPBs, annual and semi-annual reports
- Participate in report writing if necessary.

13. Loan completion and Closing

The closing of the loan/grant is due six months after the project completion date. Both the completion and the closing date of the loan have financial implications on the project management such as: development and submission of a recovery plan, ensuring eligibility of expenditures and submission of the necessary documents outlined below. Please also refer to section 1.3 of the Disbursement Handbook.

13.1 Recovery plan

To ensure that the designated account is completely and timely justified, the financial officer/PCO has to develop and submit to the Fund a so called recovery plan outlining the percentages per withdrawal application that will be recovered and paid respectively. The recovery plan should be submitted to the fund around 6 months before the completion date or when the outstanding balance (amount still undisbursed by IFAD is less than the double of the authorized allocation).



Please refer to annex XII for a sample recovery plan.

13.2 Loan Completion

As defined in the Financing agreement the completion date of the loan is its 8th anniversary; that is eight years after it entered into force. By the completion date all the project activities must have been finalised. The payments can be done also after the completion date, as long as the commitments/ contracts are signed prior to the completion date. Activities that have continued after the completion date are not considered as eligible expenditures and can therefore not be financed by the IFAD funds.

After the completion date but no later than the closing date (six months after the completion date) the PCO can still incur expenditures related to so called winding up expenditures e.g. Final Audit, Project completion report, Project staff salaries involved in the winding up activities, PCO maintenance cost, project completion workshop.

13.3 Loan Closure

The Fund requires the following to be provided by the PCO in order to close the loan:

- Confirmation of last withdrawal application

- Submission of final audit report
- Submission of project completion report



The Final Audit Report has to cover, the final project year up to the final expenditures and it can be paid from the loan available balance by using for example direct payment or Reimbursement of pre financed expenditures.

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Annex I: Sample Job descriptions related to Financial Management and Administration

Project Director

Responsible for all aspects of IFAD projects implementation under direct supervision of the Steering Committee and the Lead Project Agency. Specific duties:

- Plan, organize and coordinate project implementation in line with rules and regulations and provisions of the loan/grant agreements.
- Elaborate and review project documents as well as IFAD standard procurement and disbursement documents.
- Organize, coordinate, monitor, and control the work plan, budget and procurement plan to ensure delivery of project outputs.
- Ensure the efficient management of project resources in a transparent manner.
- Supervise project disbursement, accounting and financial management and ensure eligibility of funds use in accordance with the loan/grant agreements.
- Ensure that procurement of goods, services and works is carried out according to project design and IFAD procedures.
- Manage the PCO staff to ensure efficiency, including appraising their performance annually.
- Communicate the projects' objectives and components, to target groups including stakeholders to ensure sustainability and ownership of the project.
- Assess qualifications and pre-qualifications of implementing partners, consultants, and contractors that may be selected for project implementation.
- Negotiate contractual arrangements with various implementing partners and contractors.
- Evaluate performance of implementation by governmental and non-governmental implementing partners, consultants and contractors.
- Prepare agreements with beneficiaries, stipulating the conditions of their participation.
- Ensure a close cooperation and coordination with other national and international development partners at national and district level.
- Update the Project Implementation Manual if and when necessary,
- Prepare quarterly and annual reports to IFAD, the steering committee and LPA as well as other stakeholders (if any).
- Develop and maintain a M&E and MIS to monitor project progress and performance.
- Ensure full compliance with directives issued by the Project Steering Committee and the LPA .

Accounts Officer (PCO and PPMOs)

Under the direct supervision of the Project director , and within the framework of projects appraisal reports and loan/grant agreements, responsible for the financial and administrative management of the PCO , including Accounting, Budgeting , financial reporting, internal controls, auditing arrangement, flow of funds and the efficient management of projects resources. Specific duties:

- Prepare together with the Project director the Annual work plan and budget and the budget and financing plan in particular.
- Master IFAD key documents such as, the disbursement handbook, procurement guidelines and handbook, IFAD guidelines for project audits, the Financing Agreement (FA) and the FMFCL (LTB).

- Develop and maintain an efficient accounting system and reliable internal control procedures and guidelines for financial reporting and recordkeeping.
- Responsible for the preparation, review and monitoring of projects budgets including financing plan, procurement plan (together with the Procurement Officer), and staff development plan (together with the training focal point)
- Prepare/verify all withdrawal applications for submission to IFAD, and ensure the availability of funds for all planned activities. Manage the projects bank accounts, approve and co-signs all payments.
- Responsible for all project procurement, either directly or by delegation.
- Prepare and provide financial reports including the sources and uses of funds statement, incurred expenditures by component, expenditure category and financier, designated account reconciliation statement, fixed asset list and cash flow forecast etc. for submission to the Project steering committee, LPA and IFAD on a semi and annual basis, and maintain all records in a form appropriate for audit.
- Develop and maintain a system of financial control over all expenditure incurred by implementing partners.
- Responsible for developing and managing an effective and performance based human resources management system.
- Supervise and coordinate the work of staff placed under his/her direct authority.
- Review and regularly update the Financial and Administrative Manual of the PCO.
- Develop together with the Financial finance consultant the Accounting manual of the PCO.
- Responsible for the organization and supervision of the PCO office, assets, logistics, and all administrative matters.
- Undertake any other activities assigned by the Project Director.

Finance consultant

Under the direct supervision of the Accounts Officer (PCO); specific duties include:

- Assist the Accounts Officer (PCO) in the implementation of a sound financial management system.
- Prepare financial reports, including monthly funds reconciliation, and monthly, quarterly, semi-annual and annual expenditure statements;
- Prepare transaction vouchers, and input all transactions into the PCO accounting system before submission to the Accounts Officer (PCO) for approval;
- Process all payments, ensuring that PCO procedures are strictly adhered to;
- Process monthly payroll, payment of salaries to staff and project contributions;
- Manage and report on the use of Petty Cash in accordance with the approved procedures;
- Assist the Accounts Officer (PCO) in the preparation of withdrawal applications;
- Prepare cash flow forecasts as required;
- Monitor financial returns from Implementing Partners, including periodic visits to their offices;
- Assist in the preparation and monitoring of annual operational budgets
- Functional supervision and training of Accounts & Administrative Assistants in PCO.
- Maintenance of a well-organized and up-to-date filing system for accounting and financial records as well as an fixed asset tagging system;
- Perform physical inventory of project assets each year;
- Assist the Accounts Officer (PCO) in the preparation of the accounting manual of the PCO
- Undertake any other activities assigned by PCO management.

Administrative Assistant

Under the direct supervision of the Accounts Officer (PCO). Specific duties include:

- Assist the Financial Finance consultant in the implementation of a sound financial management system.
- Assist the Financial Finance consultant in preparing financial reports, including monthly funds reconciliation, and monthly expenditure statements;
- Assist the FA in prepare transaction vouchers, and input all transactions into the PCO accounting system before submission to the Accounts Officer (PCO) for approval;
- Assist the FA in process all payments, ensuring that PCO procedures are strictly adhered to;
- Assist the FA in process monthly payroll, payment of salaries to staff and Project contributions;
- Assist the Financial Finance consultant and Accounts Officer (PCO) in the preparation of withdrawal applications;
- Assist the FA and FC in prepare cash flow forecasts as required;
- Assist in reviewing and monitor financial returns from Implementing Partners, including periodic visits to their offices;
- Assist in the preparation and monitoring of annual operational budgets
- Collate data received from colleagues into the system.
- Manage a well-organized and up-to-date filing system for accounting and financial records;
- Undertake any other activities assigned by PCO management.
- Supervise the driver(s) and office attendant.
- Perform secretarial duties, including maintenance of a well-organized filing system.
- Collect and review financial reports from implementing partners at district level.

Annex II: Sample Annual Work Plan and Budget

Table 1-4: Sample Budget and Financing Plan

Summary table 1: Planned Project Expenditures by Component and Financier

| Component | Total | | Financing Source | | | | Beneficiaries |
|--|-------|-----|------------------|------------|---------------------|------------------|---------------|
| | Local | USD | IFAD Loan | IFAD Grant | Government (Budget) | Government (Tax) | |
| Component 1: Resilience of smallholder value chains enhanced. b. Component 2: MSME ecosystem for agricultural service market strengthened. c. Component 3: Enabling environment for smallholder agroecological production strengthened. d. Programme Management | | | | | | | |
| Total | | | | | | | |

Summary table 2: Planned Project Expenditures by Expenditure Category and Financier

| Category | Total | | Financing Source | | | | Beneficiaries |
|--------------------------------|-------|-----|------------------|------------|---------------------|------------------|---------------|
| | Local | USD | IFAD Loan | IFAD Grant | Government (Budget) | Government (Tax) | |
| I. Works | | | | | | | |
| II. Goods, Services and Inputs | | | | | | | |
| III. Training | | | | | | | |
| IV. Operating Costs | | | | | | | |
| Total | | | | | | | |

Summary table 3: Planned Project Expenditures by Component and Expenditure Category

| Component | 1. Rural Market Development | 1 a. Rural Market innovation strategy | 1b. Rural Market infrastructure | 1c. Women Capacity Building | 2. Irrigation Infrastructure | 3. Rural Finance | 4. Programme Management | Total |
|--------------------------------|-----------------------------|---------------------------------------|---------------------------------|-----------------------------|------------------------------|------------------|-------------------------|-------|
| I. Works | | | | | | | | |
| II. Goods, Services and Inputs | | | | | | | | |
| III. Training | | | | | | | | |
| IV. Operating Costs | | | | | | | | |
| Total | | | | | | | | |

Table 4: Detailed Tables per Component, Expenditure Category and Financier

| Category | Description of activity by Component/subcomponent | Items | | | | Physical Outreach | Timeline | | | | | Financing Source | | | | | |
|----------|---|-------|-----------|----------|-------|-------------------|-----------|-----------|-----------|-----------|-------|------------------|------------|---------------|------------|--------|--|
| | | Unit | Unit cost | Quantity | Total | | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 | Total | IFAD Loan | IFAD Grant | Gov. (Budget) | Gov. (Tax) | Benef. | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

Table 6: Sample Staff Development Plan

| Table 6: Staff Development Plan | | | | | | | | |
|---------------------------------|-------------------------|-------------------------------------|----------------------------------|---------------------------------------|-----------------------------------|---|--|------------------|
| Category | Component | Name and description of person(s) | Description of training activity | Proposed trainer/training institution | Loaction of the training activity | Estimated cost of the training activity (USD) | Additional costs (e.g. travel, accomondation. DSA) | Financing source |
| IV. Training and Workshops | 4. Programme Management | Financial controller of the PIU | Financial Management Course | ITC/ILO | Turin Italy | 4 000 | 3 500 | IFAD Loan |
| IV. Training and Workshops | 4. Programme Management | Administrative assistant of the PIU | advanced course in English | Professional Language Institute | Local | 2000 | na | IFAD Loan |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Annex III: Sample chart of account

Chart of Accounts

| <u>Account code</u> | <u>Account name</u> |
|----------------------------|--|
| 1-00-0-0 | Establishment of a Macro-Fiscal Analysis Unit |
| 1-01-0-0 | International Advisory Services |
| 1-01-0-1 | Macroeconomic Analysis & Modelling Advisor |
| 1-02-0-0 | Local Advisory Services |
| 1-02-0-1 | Full-Time Macroeconomic Analysis & Modelling Advisor |
| 1-02-0-2 | Fiscal Team Support Advisor |
| 1-02-0-3 | Public Enterprise Coverage Advisor |
| 2-00-0-0 | Public Expenditure Management |
| 2-10-0-0 | Cross-Cutting Issues |
| 2-11-0-0 | International Advisory Services |
| 2-11-0-1 | Legal Consistency Advisor |
| 2-11-0-1 | Senior Advisor PIP/ Loi-Programme |
| 2-20-0-0 | Expenditure Planning & Budget Formulation |
| 2-21-0-0 | International Advisory Services |
| 2-21-0-1 | Resident Budget Planning Advisor |
| 2-21-0-2 | Visiting Budget/ Sectoral MTEF Advisor |
| 2-21-0-3 | High-Level Review of BC / CoA Advisor |
| 2-22-0-0 | Local Advisory Services |
| 2-22-0-1 | Budget Preparation Advisor |
| 2-22-0-2 | Sectoral Economist A |
| 2-22-0-3 | Sectoral Economist B |
| 2-22-0-4 | Review of BC / CoA Advisor |
| 2-30-0-0 | Budget Execution, Monitoring & Audit |
| 2-31-0-0 | International Advisory Services |
| 2-31-0-1 | Senior Public Audit Expert |
| 2-31-0-2 | Treasury Management Strengthening Advisor |
| 2-31-0-3 | Budget Execution System Diagnostic & Solutions Advisor |
| 2-32-0-0 | Local Advisory Services |

- 2-32-0-1 Treasury Management Strengthening Advisor
- 2-32-0-2 Development of a Cash Forecasting Tool (Software Development)
- 2-32-0-3 Budget Execution System Diagnostic Advisor

3-00-0-0 Debt Management

3-01-0-0 International Advisory Services

- 3-01-0-1 Debt Strategy Formulation Advisor
- 3-01-0-2 Cost Risk Analysis Advisor
- 3-01-0-3 Debt Strategy Implementation Advisor
- 3-01-0-4 Data & Debt Recording Advisor

3-02-0-0 Local Advisory Services

- 3-02-0-1 Debt Management Advisor
- 3-02-0-2 Legal Advisor

4-00-0-0 Aid Coordination & Management

4-01-0-0 International Advisory Services

- 4-01-0-1 Resident Aid Coordination & Management Advisor

4-02-0-0 Local Advisory Services

- 4-02-0-1 Aid Coordination & Management Advisor

4-03-0-0 Miscellaneous Expenses

- 4-03-0-1 Representation at Donor Meetings

5-00-0-0 Training & Capacity Building

5-01-0-0 International Advisory Services

- 5-01-0-1 Training Design & Implementation Advisor

5-02-0-0 Local Advisory Services

- 5-02-0-1 Training Coordinator

5-03-0-0 Miscellaneous Expenses

- 5-03-0-1 Workshops
- 5-03-0-2 Study Tours

6-00-0-0 Project Management

6-01-0-0 Local Advisory Services

- 6-01-0-1 Project Manager
- 6-01-0-2 Financial Management Specialist

6-01-0-3 Procurement Specialist

6-02-0-0 Miscellaneous Expenses

6-02-1-0 Operating Costs

6-02-1-1 Accounting Software

6-02-1-2 Office Equipment

6-02-1-3 Office Equipment Maintenance Expense

6-02-1-4 Stationary & Office Supplies

6-02-1-5 Advertising Expense

6-02-1-6 Post Expense

6-02-1-7 Translation Expense

6-02-1-8 Printing Expense

6-02-1-9 Bank Charges

6-02-2-0 Project Audit

7-00-0-0 A/C Payables

8-00-0-0 Bank & Related Accounts

8-01-0-0 BDL Designated Account

8-02-0-0 IFAD Account

8-03-0-0 Foreign Exchange Difference

Annex V: Sample Monthly Budget Execution Report

| 6. Monthly Budget Execution Report | | | | | | | | | | | | |
|---|----------------------------------|-------------------|-----------------|--------------|--------------------|------------------|--------------|--------------------|-----------------|--------------|--------------------|--|
| | | | ACTUAL | | | Planned/Budgeted | | | Variance | | | Commitments Entered (not paid) To - Date |
| | | | Current Quarter | Year-To Date | Cumulative To-Date | Current Quarter | Year-To Date | Cumulative To-Date | Current Quarter | Year-To Date | Cumulative To-Date | |
| Cash Payments per Component | | | | | | | | | | | | |
| 1- | Component 1 | | | | | | | | | | | |
| | | Sub Component 1.1 | | | | | | | | | | |
| | | Sub Component 1.2 | | | | | | | | | | |
| | | Sub Component 1.3 | | | | | | | | | | |
| 2- | Component 2 | | | | | | | | | | | |
| 3- | Component 3 | | | | | | | | | | | |
| 4- | Component 4 | | | | | | | | | | | |
| Total | | | | | | | | | | | | |
| Cash Payments per Expenditure category | | | | | | | | | | | | |
| | Category 1: Works | | | | | | | | | | | |
| | Category 2: Goods | | | | | | | | | | | |
| | Category 3: Consultancy Services | | | | | | | | | | | |
| | Category 4: Credit line | | | | | | | | | | | |
| | Category 5: PIU cost | | | | | | | | | | | |
| Total | | | | | | | | | | | | |

Annex VI: Sample Periodic Financial Progress Report

Table 1: Sample Statement of Cash Receipts and Payments by Category

| 1 . Statement of Cash Receipts and Payments by Category (all financiers) | | | |
|---|---|--|--|
| | Reporting Period (Quarterly/Semi- annually) | Cumulative | Forecast: next 6 months |
| | US\$ | US\$ | US\$ |
| Receipts | | | |
| IFAD Loan Designated Account | R | R[^] | R[*] |
| IFAD Loan Direct payments | S | S[^] | S[*] |
| IFAD Grant Designated Account | T | T[^] | T[*] |
| IFAD Direct payment | U | U[^] | U[*] |
| Government Funds | V | V[^] | V[*] |
| Beneficiary Funds | Y | Y[^] | Y[*] |
| Total Receipts | P=R+S+T+U+Z+V+Y | P[^]=R[^]+S[^]+T[^]+U[^]+Z[^]+V[^]+Y[^] | P[*]=R[*]+S[*]+T[*]+U[*]+Z[*]+V[*]+Y[*] |
| I. Civil Works | a | a [^] | e |
| II. Equipment, Goods and vehicles | b | b [^] | f |
| III. Technical assistance and Studies | c | c [^] | g |
| IV. Training and Workshops | d | d [^] | h |
| V. Credit line | f | f [^] | j |
| VI. Incremental Operating Costs | g | g [^] | k |
| Total Payments | O=a+b+c+d+f+g | O[^]=a[^]+b[^]+c[^]+d[^]+f[^]+g[^] | W=e+f+g+h+j+k |
| Foreign Exchange difference | X | X[^] | |
| Receipts less Expenditures | =P-O+X | =P[^]-O[^]+X[^] | "=P[*]-W" |
| Opening Cash Balance | L | L[^] | G |
| Comprising | | | |
| IFAD Loan Designated Account | | | |
| IFAD Loan Direct payments | | | |
| IFAD Grant Designated Account | | | |
| IFAD Direct payment | | | |
| Project Account | | | |
| Counterpart Accounts (for government and beneficiary funds) | | | |
| Closing Cash Balances | =L+P-O+X | =L[^]+P[^]-O[^] | =G+P[*]-W |

Table 5: Withdrawal Application Statement

| 5. Withdrawal Application Statement | | | | | | |
|---|----------------------|--------|--------|--------|--------|-------|
| By category of Expenditures in Local Currency | | | | | | |
| WA submitted to IFAD | | WA n.. | WA n.. | WA n.. | WA n.. | Total |
| Category | Category Description | | | | | |
| 1 | AAAA | xx | xx | xx | xx | xx |
| 2 | BBBB | xx | xx | xx | xx | xx |
| 3 | CCCC | xx | xx | xx | xx | xx |
| <i>Total</i> | | xx | xx | xx | xx | |
| In USD equiv/ | | xx | xx | xx | xx | |
| Rejected from IFAD | | xx | xx | xx | xx | |
| <i>Net Reimbursed</i> | | xx | xx | xx | xx | |
| WA pending submission to IFAD | | | | | | |
| | | WA n.. | WA n.. | WA n.. | WA n.. | |
| Category | Category Description | | | | | |
| 1 | AAAA | xx | xx | xx | xx | |
| 2 | BBBB | xx | xx | xx | xx | |
| 3 | CCCC | xx | xx | xx | xx | |
| <i>Total</i> | | xx | xx | xx | xx | |

Withdrawal applications are submitted for reimbursement to IFAD using the historical exchange rate of the transfers to the Operating Account.

Expenditures partially or totally rejected by IFAD (if any) should be detailed here.

This statement should be reconciled with the Statement of Receipts and Payments

Table 6: Signed Contract Listing

| 6. Signed Contract Listing | | | | | | | | | |
|--|----------------------|----------------------|--------------|---------------------------|--------------|----------------------|--|-----------------------------|--------------------------|
| Reporting period: | | Contract Information | | | | | | | |
| Disbursement Category | Contract Description | Contract Start | Contract End | Supplier/ Contractor Name | Contract No. | Total Contract Value | Total Contract Amount Invoiced to date | Total Disbursed on Contract | Total Undisbursed Amount |
| Description | | | | | | | | | |
| Category 1: Works | | | | | | | | | |
| Category 2: Goods, Services and Inputs | | | | | | | | | |
| Category 3: Training | | | | | | | | | |
| Category 4 Operating expenses | | | | | | | | | |
| Total | | | | | | | | | |

Table 7: Physical Progress Report

| Table 7: Physical Progress Report | | | | | | | | | | |
|-----------------------------------|---|---------------------------|---------|--------------|---------|---------------------|--------------------|-----------------|------------|-----------------|
| Description of activities | | Progress and Cost | | | | | Plan to completion | | | |
| Category | Project activity by component/Sub-component | Physical Progress to date | | Cost to date | | | Revised | | Original | |
| | | Actual | Planned | Actual | Planned | Actual as % of Plan | Total cost | Completion date | Total cost | Completion date |
| | | | | | | | | | | |

Annex VIII A: Petty Cash Request Form

Date: _____

Requested by : _____

Name

Mode of payment

Signature

✘ Reimbursement

✘ Advance

| Description of purchases (goods/services) | Unit price | Quantity | Total cost** | Budget/ Activity code | Explanation / Comments |
|---|------------|----------|--------------|-----------------------|------------------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| TOTAL AMOUNT* | | | | | |

Approved by

Processed by

Payment received by

Accounts Officer (PCO)

Finance consultant

* Total amount cannot exceed xxxxx.

** Attach supporting document (invoice, receipt, etc.).

Annex VIII B: Petty Cash Reconciliation Form

Project _____ Date of reconciliation _____

Part i. Petty cash reconciliation

Petty cash balance brought forward (a) _____

Replenishments during the current month (b) _____

Total petty cash balance (c = a + b) _____

Disbursements during the current month (d) _____

Petty cash book balance (e = c - d) _____

Cash count balance (f) – see part ii. below _____

Difference (G = E - F) _____

Explanation Of Difference_____
_____**Part ii - Cash Count**

| Description | Quantity | Total amount |
|--------------------------------|----------|--------------|
| bank notes | | |
| 500 | | |
| 1 000 | | |
| 2 000 | | |
| coins | | |
| 10 | | |
| 20 | | |
| 50 | | |
| total in local currency | | |

Counted/reconciled by (Finance consultant) _____ Reviewed by _____ (FC)

Date _____

Annex IX B: Vehicle History Record

Vehicle registration number _____

Assigned driver _____

| Date | Repairs | | | Service & maintenance | | | Insurance | | | Fitness tests | |
|------|-----------------------|--------|------|-----------------------|-----------|------|-----------|----------------|------|---------------|------|
| | Description of repair | Garage | Cost | Description service | of Garage | Cost | Type | Period covered | Cost | Checked by | Cost |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Report accidents in the space below, providing all relevant details for each occurrence:

Date: _____
 Place: _____
 Name _____ of _____ driver: _____
 Circumstances: _____
 Damage _____ to _____ PCO other _____ vehicle: _____
 Damage _____ to _____ other _____ vehicles: _____
 Injuries _____ (indicate name of victims and describe injuries): _____
 Insurance settlement: _____

Annex X : Sample Terms of Reference for the Audit of Project XXXX

The following are the terms of reference ('ToR') on which **the LPA** agrees to engage **audit firm** 'the Auditor' to perform an Audit and to report in connection with the Agreement with the International Fund for Agricultural Development (IFAD) concerning **the project XXX** where in these ToRs the 'Contracting Authority' is mentioned this refers to **IFAD** which has signed the Agreement with the **Recipient/Borrower** and finances the services. The Contracting Authority is not a party to this engagement.

1.1 Responsibilities of the Parties to the Engagement

Recipient/Borrower refers to the entity that provides the services and that has signed the Agreement with the Contracting Authority.

- The PCO/LPA is responsible for providing a Financial Statements for the services financed by the Loan/ Grant and for ensuring that these Financial Statements can be properly reconciled to the PCO/LPA records and accounts in respect of these services.
- The PCO/LPA accepts that the ability of the Auditor to perform the procedures required by this engagement effectively depends upon the PCO/LPA providing full and free access to its staff and records and accounts.
- The PCO/LPA shall provide the auditors with all the necessary documentation to perform the assignment properly; in particular the following information shall be provided to the auditors before the beginning of the assignment:
 - a) Project Agreement;
 - b) Annual Progress Report;
 - c) Project Implementation Manual;
 - d) Financial Management Manual;
 - e) Organizational charts along with names and titles of senior managers;
 - f) Names and qualifications of officers responsible for financial management, accounting and internal audit.
 - g) Description of information technology facilities and computer systems in use and
 - h) Copies of the minutes of negotiations, the project design document, the annual work programme and budget and the FMFCL if available.

'**The Auditor**' refers to the Auditor who is responsible for performing the agreed-upon procedures as specified in these ToR, and for submitting a report of factual findings to the PCO/LPA.

The Auditor shall provide:

- **A separate opinion on Project Financial Statements (PFS)**

Minimum content of the PFS:

- a) Yearly and cumulative statements of sources and application of funds, which should disclose separately IFAD's funds, other donors' funds and beneficiaries' funds;
- b) Statement of sources and application of funds.
- c) Yearly and cumulative withdrawal application and category of expenditures; reconciliation of the DA.
- d) Reconciliation between the amounts shown as received by the project and those shown as being disbursed by IFAD should be attached as an annex to the PFS. As part of that reconciliation the auditor will indicate the procedure

- used for disbursement (DA funds, letters of credit, special commitments, reimbursement or direct payment)
- e) Notes accompanying the Financial statements
 - f) Cumulative status of funds by category
 - g) A statement of comparison between the actual expenditures and the budget estimates
 - h) Full disclosure of cash balances and
 - i) Other statements or disclosures relevant to the project .e.g. financial monitoring reports, credit lines etc.
- **A separate opinion on the use of the Designated Accounts/Special Accounts (DA/SA);** The auditor is also required to audit the activities of the DA/SA associated with the project including the initial advance, replenishments, interest that may accrue on the outstanding balances, and the year-end balances. The auditor must form an opinion as to the degree of compliance with IFAD procedures and the balance of the DA/SA at year end. The audit should examine: (i) the eligibility of withdrawals from the DA/SA during the period under review; (ii) the operation of the DA/SA in accordance with the relevant financing agreement; (iii) the adequacy of internal controls within the project appropriate for this disbursement mechanism; and (iv) the use of correct exchange rate(s) to convert local currency expenditures to United States dollars.
 - **A separate opinion on Withdrawal Application Statement;** the audit will include a review of SOEs used as the basis for submitting withdrawal applications. The auditor will carry out tests and reviews as necessary and relevant to the circumstances. SOE expenditures will be carefully compared for eligibility with relevant financial agreements, and the disbursement letter, and with reference to the project appraisal report for guidance when necessary. Where ineligible expenditures are identified as having been included in withdrawal applications and reimbursed, auditors will note these separately. A schedule listing individual SOEs withdrawal applications by reference number and amount should be attached to the PFS. The total withdrawals under the SOE procedure should be part of the overall reconciliation of IFAD disbursements described above. The auditor's opinion should deal with the adequacy of the procedures used by the project for preparing SOEs and should include a statement that amounts withdrawn from the project account on the basis of such SOEs were used for the purposes intended under the agreement.
 - **A separate management letter addressing the adequacy of the accounting and internal control systems of the Programme, including compliance with IFAD's Procurement Guidelines and such other matters as IFAD may notify the PCO/LPA to include in the audit.**
- The auditor is requested to:
- a) Comment on economy, efficiency and effectiveness in the use of project resources;
 - b) Comment on achievement of planned project results;
 - c) Comment on legal and financial obligations and commitments of the project and the extent of compliance or non-compliance thereof;
 - d) Comment on systems and procedures such as improvements in accounting, information technology or computer systems, and operations that may be under development, on which the auditor's comments are necessary to ensure effective controls;

- e) Comment on other activities on which an auditor may consider it appropriate to report

- **Auditors shall certify :**

- a) Whether the PFS are drawn up in conformity with international accepted accounting standards (IFRS or IPSAS)
- b) Whether the PFS are accurate and are drawn up from the books of accounts maintained by the Project.
- c) Whether the provisions of the Project Agreement are adhered to.
- d) Whether Procurement has been undertaken by the Project in accordance with **Article VI** of the Project Agreement,, IFAD's Procurement Guidelines
- e) Carry out a physical verification of any significant assets purchased and confirm their existence and use for project purposes.
- f) Whether the project has an effective system of financial supervision or internal audit at all levels.
- g) Whether the expenditure claimed through SOEs are properly approved, classified and supported by adequate documentation.
- h) The Auditor is a member of the International Federation of Finance consultants (IFAC).

1.2 Subject of the Engagement

The subject of this engagement is the financial statements of the years **20XX, 20XY, and 20XV** for the **IFAD Loan XXX and Grant XXX..** The information, both financial and non-financial, which is subject to verification by the Auditor, is all information which makes it possible to verify that the expenditures claimed by the **PCO/LPA** in Financial statements have occurred, and are accurate and eligible.

1.3 Reason for the Engagement

The **PCO/LPA** Service Provider is required to submit to the Contracting Authority an Audit report.

1.4 Engagement Type and Objective

This constitutes an engagement to perform specific agreed-upon procedures following the IFAD Guidelines on Project Audits provided to the Auditors by the **PCO/LPA** in Annex 1 of these TOR. The objective of this audit is for the Auditor to verify that the expenditures claimed by the **PCO/LPA** in the financial statements for the services covered by the Agreement have occurred ('reality'), are accurate ('exact') and eligible and to submit to the **PCO/LPA** a report of factual findings with regard to the agreed-upon procedures performed. Eligibility means that expenditure have been incurred in accordance with the terms and conditions of the Agreement.

1.5 Scope of Work

1.5.1 The Auditor shall undertake this engagement in accordance with these Terms of Reference and:

- in accordance with the International Standard on Audit (ISA) to perform Agreed-upon Procedures regarding Financial Information as promulgated by the IFAC;
- In compliance with the Code of Ethics for Professional Finance consultants issued by the IFAC. Although ISRS 4400 provides that independence is not a requirement for

agreed-upon procedures engagements, the Contracting Authority requires that the auditor also complies with the independence requirements of the Code of Ethics for Professional Finance consultants.

- In accordance with International Standards on Auditing and in line with IFAD's Guidelines for Project Audits.

1.5.2 The Terms and Conditions of the Agreement

The Auditor verifies that the funds provided by the Agreement were spent in accordance with the terms and conditions of the Agreement.

1.5.3 Planning, procedures, documentation and evidence

The Auditor should plan the work so that effective audit can be performed. For this purpose, he performs the procedures specified the IFAD Guidelines on Project Audits and he uses the evidence obtained from these procedures as the basis for the report of factual findings. The Auditor should document matters which are important in providing evidence to support the report of factual findings, and evidence that the work was carried out in accordance with ISA and these ToR.

1.6 Reporting

The report on this audit should describe the purpose and the agreed-upon procedures of the engagement in sufficient detail in order to enable the **PCO/LPA** and the Contracting Authority to understand the nature and extent of the procedures performed by the Auditor. Use of the financial and audit reporting is compulsory.

1.6.1 Periods covered

The reports on this audit should cover the following:

- a) **IFAD Loan XXX and Grant XXX** for the years 20XX
- b) **IFAD Loan XXX and Grant XXX** for the years 20XY
- c) **IFAD Loan XXX and Grant XXX** for the years 20XV

Reports covering items **a** must be delivered no later than 120 calendar days as of the date of signing the agreement.

Reports covering items **b and c** must be delivered within months after the end of the respective fiscal year .

Annex XI: Required Aide Memoire tables for IFAD Supervision missions**Table 1: Cumulative expenditures by component and Financier -as at DD/MM/YYYY (USD '000)**

| | IFAD Loan | IFAD Grant | Benef. | Government | Total |
|-------------------------|-----------|------------|--------|------------|-------|
| Component A | | | | | |
| Component B | | | | | |
| Component C | | | | | |
| 4. Programme Management | | | | | |
| Total | | | | | |

Table 2: Budgeted Expenditures and Performance against previous year's AWPB (USD '000)

| | IFAD Loan | IFAD Grant | Benef. | Government | Total | Financial Performance (%) |
|-------------------------|-----------|------------|--------|------------|-------|---------------------------|
| Component A | | | | | | |
| Component B | | | | | | |
| Component C | | | | | | |
| 4. Programme Management | | | | | | |
| Total | | | | | | |

Table 3A: Financial performance by financier - as at DD/MM/YYYY

| Financier | Approval (USD '000) | Current (USD '000) | Disbursements (USD '000) | Per cent disbursed |
|---------------|---------------------------|--------------------------|-----------------------------|-----------------------|
| IFAD loan | | | | |
| IFAD grant | | | | |
| Government | | | | |
| Beneficiaries | | | | |
| Total | | | | |

Table 3 B. Financial performance by financier by component - as at DD/MM/YYYY (USD)

| | IFAD Loan | | | IFAD Grant | | | Government | | | Beneficiaries | | | Total | | |
|--------------|-----------|------------|---|------------|--------|---|------------|------------|---|---------------|------------|---|-----------|------------|---|
| | App r. | Actu al | % | App r. | Actual | % | App r. | Actu al | % | App r. | Actu al | % | App r. | Actu al | % |
| | | | | | | | | | | | | | | | |
| TOTAL | | | | | | | | | | | | | | | |

TABLE 3 C: Expenditures by category - as at DD/MM/YYYY (USD)

| Category description | Original Allocation | Revised Allocation | Expenditures | W/A pending | Balance | Per cent Spent |
|--------------------------------|---------------------|--------------------|--------------|-------------|---------|----------------|
| I. Works | | | | | | |
| II. Goods, Services and Inputs | | | | | | |
| III. Training | | | | | | |
| IV Operating expenses | | | | | | |
| Total | | | | | | |

DRAFT

Annex XII: Sample recovery plan

| Recovery Plan | | | | | | | | |
|--|--------|------------|-------------------------|--------------------------|---------------------|------------------------------|-----------------------------------|---------------------------------------|
| Designated Account | | | | | | | | |
| IFAD Loan No.: | | | IFAD Loan Amount (SDR) | | | 20 000 000.00 | | |
| Project Completion Date: | | | 31-Dec-12 | | | Loan Closing Date: 30-Jun-13 | | |
| Particulars Reporting Period | WA No. | Date | US \$ | EUR | SDR | Unjustified balance USD SDR | | |
| Authorized Allocation | 1 | 18/01/2006 | \$ 250 000.00 | € - | 172 648.51 | 0.00 | | (77 351.49) |
| | | | | € - | 172 648.51 | | | |
| | | | | | 0.00 | | | |
| Exchange Rate: | | | | | | | | |
| Justification: | | | | | | | | |
| Ref. No. | WA No. | Date | Estimated WA value (SP) | Estimated WA value (USD) | Proposed Recovery % | Recovery Amount (USD) | Commulative Recovery Amount (USD) | Commulative Unjustified balance (USD) |
| 1 | 40 | 21-Feb-12 | | 111 832.56 | 45% | 50 324.65 | 50 324.65 | (50 324.65) |
| 2 | 41 | 3-Mar-12 | | 72 685.11 | 35% | 25 439.79 | 75 764.44 | (75 764.44) |
| 3 | 42 | 5-May-12 | | 74 685.11 | 35% | 26 139.79 | 101 904.23 | (101 904.23) |
| 4 | 43 | 7-Jul-12 | | 70 885.11 | 42% | 29 771.75 | 131 675.98 | (131 675.98) |
| 5 | 44 | 5-Sep-12 | | 64 885.11 | 40% | 25 954.04 | 157 630.02 | (157 630.02) |
| 6 | 45 | 31-Dec-12 | | 82 627.66 | 80% | 66 102.13 | 223 732.15 | (223 732.15) |
| 7 | 46 | 10-Jun-13 | | 26 065.11 | 100% | 26 267.85 | 250 000.00 | (250 000.00) |
| 8 | | | | | | | | |
| | | | | TOTAL | | 503 665.77 USD | 250 000.00 USD | |
| In accordance with IFAD procedures, any amount unjustified at the time of loan closing date will be promptly refunded to IFAD. | | | | | | | | |
| Prepared by: | | | | | | 15-Oct-11 | | |
| | | | | | | Date | | |
| Confirmed by: | | | | | | | | |
| | | | | | | Date | | |

Annex XIII: Designated account reconciliation statement (Imprest account)

5 A. Designated Account Reconciliation Statement (imprest account)

Designated Account No: _____

Bank Name: _____

1. Total Advanced by IFAD USD _____
 2. Less total amount recovered by IFAD USD _____
 3. Equals present outstanding amount advanced to the designated account (line 1 less line 2) USD _____

4. Balance of designated account per attached bank statements as of (Date: day/month/year) USD _____
 5. Plus balance of the project account(s) (listed separately) USD _____
 Plus, balance of sub accounts (listed separately) USD _____
 Plus, balance of Cash in Hand USD _____

Total of Bank Balances (designated A/C, PA, SUB accounts& cash in hand balance) (line 4+line 5) USD _____

6. Plus total amount claimed in this WA no. USD _____

7. Plus total amount withdrawn from the designated/PA/Grant account and not yet claimed for replenishment) or WAs pending submission USD _____

8. Plus amounts claimed in previous applications but not yet created at the date of bank statement and/or claimed after date of bank statement USD _____

| Application No. | Date | USD | Amount |
|-----------------|------|-----|--------|
| | | \$ | |
| | | \$ | |
| | | \$ | |

9. Minus Interest earned (to be completed. If zero, please enter zero) USD _____

10. Total Advance accounted for (line 5 through line 9) USD _____

11. Explanation of any difference between the totals appearing in Lines 3 and 10 USD _____

e.g. Non eligible amount to be refunded to the designated account USD _____
 e.g. calculation errors in application of percentage financing counterpart financial resources to be reimbursed USD _____
 e.g. cheques not yet cleared/presented to Bank USD _____
 e.g. Bank USD _____

12 DATE _____ SIGNATURE _____
Name in full _____
Title in Full _____

Annex XV: Sample Interim Unaudited Financial Reports (IFRs)

Report I: AWPB and Cash Forecast for next 2 quarters

Country _____
 Name of the Project: _____
 IFAD Instrument number: _____
 List other instruments if applicable _____
 Expressed in Designated Account Denomination Currency _____ Currency: _____
 For the Period: _____ Starting Date _____ To _____ End Date _____

| | IFAD Instrument n. (add more columns for other instruments) | | | | | | |
|--|---|--------------------|--|----------------|----------------------------|---------------------------------|--|
| | Ref. | Annual Allocations | Actual cash outflow as of (current. Qtr. End)... | Annual Balance | Cash Forecast Next Quarter | Cash Forecast Following Quarter | Total Cash Forecast for the two quarters |
| | | A | B | C = A-B | D | E | F = D+E |
| Category: | | | | | | | |
| 1 Category 1 | | | | | | | |
| 2 Category 2 | | | | | | | |
| 3 Category 3 | | | | | | | |
| 4 Category 4 | | | | | | | |
| 5 Category 5 | | | | | | | |
| Total | I | - | - | - | - | - | - |
| Component: | | | | | | | |
| 1 Component 1 | | | | | | | - |
| 2 Component 2 | | | | | | | - |
| 3 Component 3 | | | | | | | - |
| 4 Component 4 | | | | | | | - |
| Total | II | | | | | | - |
| Total Cash Forecast Expenditure | III | | | | | | - |
| Less: Planned Direct Payments/Reimbursements | IV | | | | | | - |
| Net forecast expenditure from DA | V=III-IV | | | | | | - |
| Opening balance available funds (DA+Project Banks +petty) | VI | | | | | | Match figure in Report II Ref. I |
| Forecast: DA Replenishments (After reducing Advance Re) | VII | | | | | | |
| Projected closing balance | VIII=VI-V+VII | | | | | | - |

Note 1: (VII) may be higher than (V) when there is need to have an extra amount in the DA to cover potential delays in future disbursements
 Note 2: The AWPB data covers Project Financial Year. Please note that Cash forecasts are rolling for next 2 quarters, which may not be within the same Financial Year for the 1st and 4th quarter.
 Note 3: In Role VII, if a part of the advance is to be recovered in the period prior to Project Completion, reduce the recovery amount proposed.

Date _____ Approver Name _____ Approver Signature _____

Report II: Summary of Sources and Uses of Funds - DA Account

| | | | | | |
|--|----------------------|--|--------------------------------|--|----------|
| Country | | | | | |
| Name of the Project: | | | | | |
| IFAD Instrument number: | | | | | |
| List other instruments if applicable | | | | | |
| For the Period: | | <u>Starting Date</u> | To | <u>End Date</u> | |
| Currency: | | | | | |
| | Ref. | IFAD Instrument n. (add more columns for other instruments) | | | |
| Opening Balance Reporting Quarter: DA | | | | | |
| Opening balance Operating / Project account(s) | | | | | |
| Opening Balance Petty cash | | | | | |
| Opening Balance Total Funds available | | | | | I |
| Funds Received | | | | | II |
| Total Funds Available | | | | | III=I+II |
| Uses of Funds by Category: | | | | | |
| | | Actual expenditures Quarter | Actual expenditures YTD | Actual expenditures Inception To Date | |
| Category 1 | | - | - | - | |
| Category 2 | | - | - | - | |
| Category 3 | | - | - | - | |
| Category 4 | | - | - | - | |
| Category 5 | | - | - | - | |
| Category not yet identified/advance | | - | - | - | |
| Total Funds Used | | | | | IV |
| Funds Closing Balance (I minus II): | | | | | V=III-IV |
| Represented by: | | | | | |
| DA Closing Balance | | | | | |
| Operating account Closing Balance | | | | | |
| Petty cash Closing Balance | | | | | |
| Uses of Funds by Component | | | | | |
| | | Actual expenditures Quarter | Actual expenditures YTD | Actual expenditures Inception TD | |
| Component 1 | | - | - | - | |
| Component 2 | | - | - | - | |
| Component 3 | | - | - | - | |
| Total Funds Used (must equal II) | | | | | VI |
| <p>Note 1: this Form to include IFAD Financing & Other Financing that is administered by IFAD</p> <p>Note 2: Total IV must equal Total II</p> <p>Note 3: If figures are stated in the functional / reporting currency that is different from DA currency, please show equivalent figures in DA currency in additional columns, using forex rates applied on FIFO basis as disclosed.</p> | | | | | |
| Date | Approver Name | | | Approver Signature | |

| Report III: Designated Account Activity Statement | | |
|--|---------------|--|
| Country | | |
| Name of the Project: | | |
| IFAD Instrument number: | | |
| List other instruments if applicable | | |
| For the Period: | Starting Date | To End Date |
| Expressed in Designated Account Denomination Currency | | |
| | | Notes |
| PART I (Advances and Expenditure) | | |
| 1. Cumulative Advances by IFAD to the end of current Reporting period / quarter | | Total advances received from IFAD (into the DA or equivalent in Govt. Treasury) to the end of current reporting period / Quarter. State last WA Number and Date through which advance was received |
| 2. Cumulative Expenditure justified by IFAD since project start till the beginning of Reporting Quarter | | Total Amount of eligible Project expenditure justified / Reported in IFRs till previous quarter end. This should <u>not</u> include direct payments / reimbursements to other accounts if any |
| 3. Outstanding Advances to be accounted for (Line 1 minus Line 2) | | This balancing figure should be matched to IFAD's Loan Account record |
| PART II (Designated Account - DA - Activity) | | |
| 4. DA balance at beginning of Reporting Quarter | | Match to Report II (Ref. I) |
| 5a. Advances disbursed by IFAD during the Reporting Quarter | | To support this figure, please attach a List of WAs processed by IFAD. |
| 5b. Add/Subtract cumulative adjustments, if any | | This may be reconciling items, e.g. funds recalled or any refund of ineligible expenditures during the quarter, if any. |
| 5c. Total amount of Advances received during current reporting Quarter, net of adjustments (Line 5 plus Line 5b) | | |
| 6. Outstanding Advances to be accounted for (Line 4 plus Line 5c) | | This is the total amount to be justified / accounted for. This should normally be same as Line 3. If not, difference to be explained in notes below |
| 7. DA balance at end of Reporting Quarter | | Match to Report II (Ref. I) |
| 8a. Expenditure incurred during the Reporting Quarter | | Match to Report II (Ref. II) |
| 8b. Add/Less Adjustments, if any | | This may be reconciling items, e.g. WAs submitted but not yet justified / recorded by IFAD at quarter-end. Adjustment details to be noted below |
| 8c. Total expenditure reported (net of adjustments) Expenditure (Line 8a plus 8b) | | Match to Report II (Ref. II) |
| 9. Total Advance accounted for: Add Line 7 and Line 8c | | This should normally be same as Line 3 and Line 6. If not, difference to be explained in notes below |
| 10. Difference if any (Line 6 minus Line 9) | | This represents advance that has not yet been explained. This should ideally be zero. If not, explain reconciliation in note below |
| PART III (CASH FORECASTS and REPLENISHMENT REQUIREMENT) | | |
| 11. Net Forecast Spend from Designated Account | | Match all figures to Report I Figures from Report I (REF V). This excludes planned direct payments and Reimbursements) |
| 12. Replenishment Requirement for Subsequent 2 Reporting Quarters | | Figures from Report Ref VII |
| 13. Advance Recovery, if any | | Recovery will be processed during the 6 months preceding the Completion Date |
| 14. Disbursement requested this quarter | | Give WA Reference Number |
| NOTES | | |
| Explanation for item 5b (if not zero): | | IFR, WA Ref |
| Explanation for item 8b (if not zero): | | IFR, WA Ref |
| Explanation for item 10 (if not zero): | | IFR, WA Ref |
| Note 1: IF the Reports II and II are in functional currency other than the DA currency, equivalent amounts in DA currence in this report and Report I should be prepared using forex rates on a FIFO basis | | |
| Date | | Approver Name |

Report IV: Variance Analysis of Use of Funds by Quarter

| | | | | |
|---|--|--|--|--|
| Country | | | | |
| Name of the Project: | | | | |
| IFAD Instrument number: | | | | |
| List other instruments if applicable | | | | |
| Reporting period: | | | | |
| Currency | | | | |

| | | IFAD Instrument (add more columns for other instruments) | | | |
|-----------------------------------|-------------|---|--------|-----------|-----------|
| | | Planned (AWPB) | Actual | Variance* | |
| | | A | B | C = A-B | D=C/A (%) |
| Expenditure by Categories: | | | | | |
| | Category 1 | | | | |
| | Category 2 | | | | |
| | Category 3 | | | | |
| | Category 4 | | | | |
| TOTAL | I | | | | |
| Expenditure by Components: | | | | | |
| | Component 1 | | | | |
| | Component 2 | | | | |
| | Component 3 | | | | |
| | Component 4 | | | | |
| TOTAL | II | | | | |

* Note 1: Provide reasons if the quarterly variances are equal to or more than 10%

Note 2: Figures in column B (Actuals) should match corresponding figures in Report II and III

Report V: Variance Analysis of Use of Funds - FY

| | | | | |
|--------------------------------------|--|--|--|--|
| Country | | | | |
| Name of the Project: | | | | |
| IFAD Instrument number: | | | | |
| List other instruments if applicable | | | | |
| Reporting period: | | | | |
| Currency | | | | |

| | | IFAD Instrument (add more columns for other instruments) | | | |
|-----------------------------------|-------------|--|--------|-----------|-----------|
| | | Planned (AWPB) | Actual | Variance* | |
| | | A | B | C = A-B | D=C/A (%) |
| Expenditure by Categories: | | | | | |
| | Category 2 | | | | |
| | Category 3 | | | | |
| | Category 4 | | | | |
| | Category 5 | | | | |
| TOTAL | I | | | | |
| Expenditure by Components: | | | | | |
| | Component 2 | | | | |
| | Component 3 | | | | |
| | Component 4 | | | | |
| TOTAL | II | | | | |

* Note: Provide reasons if the variances are equal to or more than 10%

Note 2: Figures in column B (Actuals) should match corresponding figures in Report II and III

Note 3: Planned figures in Column A should be adjusted for phasing up to the reported quarter

PIM Appendix 6: Procurement manual

Procurement Procedure

Procurement of goods, works and services under R-HVAP financed from resources provided or administered by IFAD will be undertaken in accordance with the provision of the Public Procurement Act (PPA), 2007 and associated regulations, the Public Procurement Regulation (PPR), 2007 as amended from time to time to the extent they are consistent with the provisions of IFAD's Procurement Guidelines and Handbook (dated September 2010) and as amended from time to time.

To assist in mitigating the lack of capacity of the newly formed institutions the PCO/PPMOs/SIU will have dedicated Expert staff focused on financial, contracts and procurement management. During the Programme start up, PCO level consultants will prepare AWPB and other procurement documents for the initial year of project activities.

Procurement Planning

R-HVAP will prepare the Procurement Plan using currently launched IFAD's OPEN online procurement End to End System, each year synchronised with the AWPB during the implementation. Each Annual Work Plan and Budget (AWPB) will contain a Procurement Plan, identifying procurement to be undertaken by the Programme, endorsed by PSC and to IFAD for review and no objection. The procurement plans, will include as a minimum:

- a) A brief description of each procurement activity to be undertaken during the period by each and every Programme Party;
- b) The established value of each procurement activity;
- c) The method of procurement or selection to be adopted for each activity; and
- d) An indication as to whether IFAD shall carry out prior or post review in respect of each and every procurement activity.

Any amendments to the procurement plan are subject to the IFAD No Objection.

The application of different methods of procurement for goods, works and consulting services will be in accordance with the methods of procurement for goods, works and consulting services as established and approved in the Procurement Plan or in the Program Procurement Arrangement (PPA) letter.

Method of procurement for goods/ works and services

Methods for procurement of goods/works and services (non-consulting) as per thresholds and other Procurement Methods or Arrangements will be established as follows:

- a. Works and works-related Non-Consulting Services:
 - (i) International Competitive Bidding (ICB): This procurement method applies to contracts estimated to cost US\$ [4 000 000] or more. Under ICB, the borrower/recipient may apply a margin of domestic preference to local contractors of 5% excluding industrial plants;

(ii) National Competitive Bidding (NCB): might be applied to contracts estimated to cost less than US\$ [4 000 000]. A waiver for the use of this method beyond this threshold can be requested for individual activities with proper justification;

(iii) Shopping: might be applied to contracts estimated to cost US\$ [40 000] or less. A waiver for the use of this method beyond this threshold can be requested for individual activities with proper justification; and

(iv) Direct Contracting: applies to the indicated contracts in the Procurement Plan with due justification (as mentioned in the Handbook) subject to IFAD's NO under prior review¹²³ or alternatively without prior IFAD's NO for low-value unforeseen purchases with estimated cost per each purchase of US\$ [5 000] or less up to an aggregate amount of US\$ [400 000] per annum.

b. Goods and Goods-related Non-Consulting Services

(i) International Competitive Bidding (ICB): This procurement method applies to contracts estimated to cost US\$ [2 000 000] or more. Under ICB, the borrower/recipient may apply a margin of domestic preference of 15%;

(ii) National Competitive Bidding (NCB): might be applied to contracts estimated to cost less than US\$ [2 000 000]. A waiver for the use of this method beyond this threshold can be requested for individual activities with proper justification;

(iii) Shopping: might be applied to contracts estimated to cost US\$ [40 000] or less. A waiver for the use of this method beyond this threshold can be requested for individual activities with proper justification; and

(iv) Direct Contracting: applies to the indicated contracts in the Procurement Plan with due justification (as mentioned in the Handbook) subject to IFAD NO under prior review¹²⁴ or alternatively without prior IFAD's NO for low-value unforeseen purchases with estimated cost of US\$ [5 000] or less per purchase up to an aggregate amount of US\$ [200 000] per annum.

c. Consulting Services and related Non-Consulting Services

(i) Quality and Cost Based Selection (QCBS): This selection method is the default for contracts with firms estimated to cost US\$ [500 000] or more; International Advertisement is mandatory for consultancy contracts estimated to cost US\$ [1 500 000] or more, regardless of the selection method;

¹²³ A sufficiently detailed justification shall be submitted to IFAD to obtain its NO and shall include the rationale for the choice of direct contracting instead of competitive procurement and the basis for recommending a particular contractor/service provider in all such cases. Direct contracting could be justified under any of the circumstances listed in section 6, Module F1: Procurement Methods for Goods, Works and Non-consulting Services of the IFAD Procurement Handbook;

¹²⁴ A sufficiently detailed justification shall be submitted to IFAD to obtain its NO and shall include the rationale for the choice of direct contracting instead of competitive procurement and the basis for recommending a particular supplier/service provider in all such cases. Direct contracting could be justified under any of the circumstances listed in section 6, Module F1: Procurement Methods for Goods, Works and Non-consulting Services of the IFAD Procurement Handbook

(ii) Quality Based Selection (QBS): might be applied to contracts of any value if a proper justification is provided;

(iii) Fixed Budget Selection (FBS), or Least Cost Selection (LCS)¹²⁵ : might be applied to contracts with firms estimated to cost less than US\$ [500 000]. A waiver for the use of this method beyond this threshold can be requested for individual activities with proper justification;

(iv) Consultants Qualification Selection (CQS): might be applied to contracts with firms estimated to cost US\$ [150 000] or less. A waiver for the use of this method beyond this threshold can be requested for individual activities with proper justification;

(v) Individual Consultants Selection (ICS): applies to contracts with individuals regardless of the value;

(vi) Shortlisting following a Request for Expression of Interest is mandatory for all CQS and ICS procedures. In addition, Shortlisting is mandatory for all consulting services contracts estimated to cost US\$ [20 000] or more;

(vii) Sole/Single Source Selection (SSS): applies to contracts with firms designated under SSS in the Procurement Plan with due justification (as mentioned in the Handbook) subject to prior review¹²⁶ and/or contracts estimated to cost US\$ [5 000] or less, up to an aggregate amount of US\$ [200 000] per annum; and

(viii) Sole/Single Source Selection (SSS): applies to contracts with individuals designated under SSS in the Procurement Plan with due justification (as mentioned in the Handbook) subject to prior review¹²⁷ and/or estimated to cost US\$ [5 000] or less and with a contract duration of three months or less and up to an aggregate amount of US\$ [100 000] per annum.

d. Other Procurement Methods or Arrangements:

(i) The use of Force Account is not allowed.

(ii) Extensions of contracts funded by IFAD for Goods, Works or related Non-Consulting Services to cover items of similar nature not listed in the original contract may not exceed 10% of the contract value and require IFAD's No Objection (such extension shall be considered as Direct Contracting). However, extensions of existing contracts, issued in order to increase/decrease items already listed in the original contract as a result of evolutionary changes during

¹²⁵ The choice among QBS, FBS and LCS shall be made by the borrower/recipient in the Procurement Plan based on the nature and circumstances of the relevant procurement activity following the guidance of the IFAD Procurement Handbook.

¹²⁶ Any request for SSS by the borrower/recipient must be accompanied by a detailed justification, which will be carefully examined by IFAD to ensure that no alternative selection methods can be used. To receive IFAD's NO, it must be demonstrated that there is a clear advantage to SSS over competitive selection. Examples of such circumstances are listed in Section 6, Module F2: Selection Methods for Consulting Services of the IFAD Procurement Handbook.

¹²⁷ Any request for SSS by a borrower/recipient must be accompanied by a detailed justification, which will be carefully examined by IFAD to ensure that no alternative selection methods can be used. To receive IFAD's NO, it must be demonstrated that there is a clear advantage to SSS over competitive selection. Examples of such circumstances are listed in Section 7, Module F2: Selection Methods for Consulting Services of the IFAD Procurement Handbook

contract execution and subject to the contractual clauses governing such change may exceed 10%. In this case, the extension is subject to IFAD's No Objection.

(iii) Procurement with Community Participation is allowed¹²⁸.

(iv) Investment co-financing proposals exceeding US\$ [50 000] (equivalent in co-financing award from the program) should be referred to IFAD's NO under prior review. This is to ensure the proposals meet the requirement as outlined in the PIM and that this investment identified a value for money and linked to target beneficiaries.

(v) Procurement from United Nations Agencies is allowed¹²⁹.

(vi) Secondary Procurement (orders against existing Long-term Agreements, national e-catalogues etc.) follows the regulations and applicable thresholds of the national legislation. The prior review threshold of the respective procurement category (goods, works, consulting services and related non-consulting services) applies.

(vii) The borrower/recipient shall adopt and use the Standard Procurement Documents issued by IFAD (for ICB and (if applicable) for consulting services) and the ones issued by National Authorities for other methods as long as the latter are supplemented/adapted to meet IFAD's SECAP standards and grievance mechanisms and the IFAD's Project Procurement Guidelines and IFAD Procurement Handbook. This includes adding the IFAD self-certification form at bidding and at contract stage.

Consultancy service Selection Process:

Consultancy services, will be selected in accordance with any one of the selection methods as per the IFAD project Procurement Guidelines and its Project Procurement Handbook as listed below:

- (a) Quality and Cost Based Selection (QCBS)
- (b) Fixed Budget Selection (FBS)
- (c) Least Cost Selection (LCS)
- (d) Selection based on Consultants Qualification (CQS)

Selection of Individual Consultants: Individual consultants will be selected on the basis of their qualifications for the assignment of at least three candidates among those who have expressed interest in the assignment or have been approached directly by the PCO/PPMOs/SIU. Individuals employed by the PCO/PPMOs/SIU, will meet all relevant qualifications and shall be fully capable of carrying out the assignment. Capability is judged on the basis of academic background, experience and, as appropriate, knowledge of the local conditions, such as local language, culture, administrative system, and government organization.

¹²⁸ If the Project Design has provisioned for the involvement of communities of the borrower/recipient in the regions where the project is to be implemented in the procurement activities and has analyzed the regulatory environment, organizational capacity, skills, etc. of such communities, then community participation can be allowed for particular activities as outlined in the Project Design and details will be included here in the Procurement Arrangements.

¹²⁹ If the Project Design has provisioned for the procurement from United Nations Agencies (See IFAD Procurement Handbook Module F1, Section 9) then this can be allowed for particular activities as outlined in the Project Design.

Individual consultants or consultancy firms may be selected on a sole-source basis with due justification in exceptional cases such as: (a) tasks that are a continuation of previous work that the consultant has carried out and for which the consultant was selected competitively; (b) assignment lasting less than six months; (c) emergency situations resulting from natural disasters; and (d) when the individual consultant is the only consultant qualified for the assignment.

Procurement of Vehicles and Equipment

The vehicles, motorcycles, desktop computers, laptops, multimedia projectors, furniture, other office equipment and materials etc. will be procured through competitive bidding process. The procurement method will be proposed in respective year's annual procurement plan considering the budget allocation of the year and estimated amount of each packages. Procurement of goods and services will be carried out by the PCO/PPMOs/SIU by bulking into sizeable bid packages to attract national competitive bidding, in exception of stationeries, fuel items, small maintenance works, beneficiaries training and material.

Procurement of studies, survey, and other specialized services

A number of studies, survey and other specialized services like institutional development and delivery of specialized trainings will be implemented by contracting outside organizations. These tasks include baseline surveys, market assessment, IFAD RIMS surveys, project completion surveys, impact studies, specialized training, recruiting services, etc. Procurement of consultants/service providers to carry out those tasks will follow the Request for Proposals (RFP) method, with either QCBS or FBS or LCS or CQS to select successful bidder. FBS (Selection under Fixed Budget) may be useful for studies, surveys and trainings where the scope and costs are well defined – and the competition is for the firm who can make the best technical proposal within the fixed amount. In some cases, Single Source Selection (SSS) may also be used if the tasks that are a continuation of previous work that the consultant has carried out and for which the consultant was selected competitively, if the topic is highly specialized and there is only a single qualified bidder. Based on the nature of services/studies the PCO/PPMOs/SIU will select appropriate procurement method and proposed in the procurement plan for IFAD review and no objection.

Recruitment of Contract positions: Recruitment of contracted staff for PCO/PPMOs/SIU/COs, will be carried out by an external recruitment agency. The selection of recruitment agency will be based on the **Recruitment Guideline** prepared by ASDP. The guideline will come into effective only after receiving **No Objection** from IFAD and approved by the PSC. Appropriate method of selection will be applied as per the approved recruiting guidelines.

Written exam and oral presentation of the candidates will be conducted by the contracted recruiting agency independently. The highest scoring candidates (up to 3) in each position will be invited for interview. The Joint Secretary of MoALD will chair the interview panel and the PMO chief will be the member-secretary; the rest of the members will be as per recruitment guideline. The combined (written exam, oral presentation and interview) highest scoring candidate will be selected and recommended to the PCO/PPMOs/SIU for appointment.

Review of Procurement Decisions

IFAD will undertake review of the provisions for the procurement of goods, works and services to ensure that the procurement process is carried out in conformity with its procurement guidelines.

In accordance with paragraphs 49, 66 and 67 of the IFAD Project Procurement Guidelines and IFAD's Procurement Handbook, the following will be subject to prior review by IFAD and requires IFAD's No Objection:

| | |
|----|--|
| 1 | Procurement Plans submitted as part of Annual Work Plans and Budget and any subsequent amendment of these plans; |
| 2 | General Procurement Notices |
| 3 | The TOR (Job Description), Advertisement and selection proceedings for the hiring of any staff responsible for carrying out or administering procurement processes as part of the project |
| 4 | Award of any Memorandum of Agreement irrespective of its value |
| 5 | Award of any contract for goods and goods-related non-consulting services estimated to cost US\$ [150 000] or more; |
| 6 | Award of any contract for works and works-related non-consulting services estimated to cost US\$ [200 000] or more; |
| 7 | Award of any contract for consulting services provided by firms estimated to cost US\$ [100 000] or more; |
| 8 | Award of any contract for individual consulting services estimated to cost US\$ [30 000] or more; |
| 9 | Award of any contract via Direct Contracting for Goods and related Non-Consulting Services above the low-value threshold specified in paragraph method of procurement for goods/ works and services b) iv) above. Any contract below this low-value threshold does not need N.O. as long as the cumulative value of such low-value contracts does not exceed the cumulative threshold stated in paragraph 6 b) iv) in the current fiscal year; |
| 10 | Award of any contract via Direct Contracting for Works above the low-value threshold specified in paragraph method of procurement for goods/ works and services a) iv) above. Any contract below this threshold does not need N.O. as long as the cumulative value of such low-value contracts does not exceed the cumulative threshold stated in the same paragraph; |
| 11 | Award of any contract via Single/Sole Source Selection of Consulting Services to firms above the threshold specified in paragraph method of procurement for goods/ works and services c) vii) above. Any contract below this threshold does not need N.O. as long as the cumulative value of such low-value contracts does not exceed the cumulative threshold stated in the same paragraph; |
| 12 | Award of any contract via Single/Sole Source Selection to individuals above the threshold specified in paragraph method of procurement for goods/ works and services c) viii) above. Any contract below this threshold does not need N.O. as long as the cumulative threshold stated in the same paragraph is not exceeded and the |

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| | contract duration is three months or less. |
|--|--|

In addition, the following interim steps of the procurement process for Goods/Works/Services also require IFAD's No Objection for contracts designated for "prior review" in the project's procurement plan. No downstream procurement action by the Borrower/Recipient can proceed until prior NO is issued by IFAD as to the propriety and compliance of the undermentioned steps with the IFAD PPF:

| | Activity / Step of the procurement process for Prior Review Contracts | IFAD "NO" is required |
|----|--|---|
| 1 | Call/Request for Prequalification document and related advertisement | Yes |
| 2 | REOI (Request for Expression of Interest) document for consultancy services and related advertisement | Yes |
| 3 | Terms of Reference for consultancy services and related non-consulting services | Yes, usually as part of NO request for issue of the RFP (step 9 below) |
| 4 | Technical Specifications for Goods/Works/NCS | Yes, usually as part of NO request for issue of the bid docs (step 9 below) |
| 5 | Composition of evaluation committees | No |
| 6 | Prequalification report for Goods/Works/NCS | Yes |
| 7 | Shortlisting report for consultants' selection | Yes |
| 8 | The use of "prior lists" for shortlisting consultants | Yes |
| 9 | Complete Bidding Documents and RFPs and CfPs and related advertisement if applicable | Yes |
| 10 | Use of a Performance Guarantee template if other than unconditional, irrevocable and on-demand guarantee | Yes |
| 11 | Amendments to the Bidding Documents and RFPs, CfPs | Yes |
| 12 | Opening bids/quotes/proposals that are less than 3 (excluding DC/SSS) | Yes |
| 13 | Technical evaluation report (in two envelope procedures) | Yes |
| 14 | The combined evaluation report (in two envelope procedures) | Yes |

| | | |
|----|--|--|
| 15 | The single evaluation report (in one envelope procedures) for Goods/Works/NCS/Consulting Services (SSS) | Yes |
| 16 | Decisions concerning abnormally low bids | Yes |
| 17 | Draft contract | Yes |
| 18 | Minutes of negotiation at award for consultancy services (where applicable) or when using DC for Goods/Works/NCS | Yes |
| 19 | Rejection of all bids/proposals and cancellation of the procurement procedure | Yes |
| 20 | Failure of negotiations and proceeding to next ranked consultant | Yes |
| 21 | Proceeding to next ranked bidder if top ranked fails to sign the contract in Goods/Works/NCS | Yes |
| 22 | Determination to reject a bid/proposal because of cross-debarment | Yes, usually as part of steps 13, 14 or 15 |
| 23 | Amendments to contracts exceeding 10% in value (increase/decrease in quantities as a result of evolutionary changes). Additional unforeseen new items exceeding 10% of the contract value is a new procurement subject to Single Source/DC conditions. | Yes |
| 24 | Extension of time to contracts exceeding 25% of the original contractual duration in Goods/Works/NC Services/Consulting Services | Yes |
| 25 | Termination of a contract in Goods/Works/NC Services/Consulting Services | Yes |

The aforementioned thresholds may be modified upon approval from IFAD during the course of Programme implementation.

Monitoring of procurement activities: For successful implementation of the procurement plan, the strong procurement monitoring systems need to be established in the Programme. The monitoring system will focus in two key areas, tracking status of implementation and monitoring the process of each implementation.

Tracking status of procurement activities will be compared with the approved procurement plan. This includes comparisons of cost, procurement method, deadline for preparation of bid documents, bid invitation, bid opening, bid evaluation, award of contract and contract signing etc.

The process monitoring will focus on ensuring compliance with applicable regulations, rules, policies, procedures and guidelines of GON and IFAD. Such monitoring will take place in each quarter by Procurement expert, Accounts Officer and Fund & Financial

Management Expert (FFME). They will prepare and deliver a detail monitoring report to Programme Coordinator that includes recommendations and action plan for improvement/correction and future strategy. A copy of such report (respective section only) will be sent to the concerned PCO/PMO/SIU/CO.

Contract Management and Documentation: Contract management and administration refers to all actions undertaken after the award of a contract relating to the administrative aspects of the contract, such as contract amendment, contract closure, record retention, maintenance of the contract file, and handling of security instruments (e.g., performance security). Contract administration is the responsibility of the procurement expert, with involvement of the Accounts officers, and PMO/SIU/CO, as required. Being a big-ticket contract for Semlar Wholesale market, Butwal, Procurement expert including account officer engaged in SIU need to pay special attention on this.

The period for active contract management usually starts at the moment the contract is signed and ends when the final completion certificate, including defects liability or warranty period as applicable, is issued. The task of contract monitoring is to ensure that both parties to the contract perform in accordance with that contract agreement and to take action as required to address any problems or delays, whether actual or anticipated. On the contract of supply of goods and materials, the monitoring process ensuring that goods are delivered on time, are acceptable to the Programme in terms of quantity, quality and supporting documentation. When contracting services, the Procurement expert must monitor the performance of the contractor by ensuring timely receipt and acceptance of the deliverables specified in the contract (e.g., inception reports, progress reports, reports from workshops or training sessions etc.).

Maintenance of Records and files: The Programme must establish a procurement file for each procurement process/activity. In addition to information documentation of the procurement process (cost estimate to contract signing), the file must include all information required to successfully administer the contract. Any issues of clarification or change of the contract must be fully documented in this file. In order to provide their input throughout the contract administration phase, the procurement unit will normally have a separate file with a copy of the contract as part of each procurement activity. Special attention needs to pay for the proper maintenance of records and file for Semlar Wholesale Market, Butwal.

The Programme should maintain all documents and records related to the bid and contract for seven years after the completion of the bid or contract as specified in PPR 2007 clause149 (3)/ Section 7.05, clause b (ii) of IFAD General Condition for Agricultural Development Financing (as amended September 2010).

| Biodiversity conservation | Risk Rating | Consequence | Guidance for SPOs |
|---|--------------------|--|--|
| 1.8 Could the project involve or lead to procurement through primary suppliers of natural resource materials? | Moderate | <p>Minor</p> <p>Project may possibly require procurement of natural resources through primary suppliers, and resource extraction is tightly regulated. Alternatives to procurement of natural resources</p> | <p>Bidding documents to consider eco-label specification as "minimum specification" or alternatively grant technical weight in bid evaluation for eco-labelled products whenever possible.</p> <p>Include in Bid Document construction materials should be sourced from Government approved supplier and</p> |

| | | | |
|--|--------------------|---|---|
| | | through primary suppliers exists. | sites |
| Resource Efficiency and Pollution Prevention | Risk Rating | Consequence | Guidance for SPOs |
| 2.1 Could the project involve or lead to the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts? | Moderate | Moderate Pollutants may possibly be released, either routinely or by accident, but treatment systems are proven and verified. Receiving environment is highly sensitive. | Waste management companies hiring as per EIA provision |
| 2.4 Could the project involve or lead to significant consumption of raw materials, energy, and/or water? | Moderate | Minor The project will require consumption of raw materials, energy, and/or water, but this will be a small component of the project, and impacts can be appropriately managed. | Bid evaluation criteria to favour ethical and efficient use of raw materials, energy and water when feasible. |
| Community Health, Safety and Security | Risk Rating | Consequence | Guidance for SPOs |
| 6.3 Is there a possibility of harm or losses due to failure of structural elements of the project (e.g. collapse of buildings or infrastructure)? | Moderate | Moderate The project has significant reliance on buildings or infrastructure. Risk of failure is unlikely to lead to loss of life or significant environmental damage. The structural integrity of the required infrastructure has been independently verified. | Ensure relevant safety measures and emergency preparedness against natural or human hazards is included in the procurement documents. Bid and contract requires contractor to erect adequate warning signage's and also take up 3 rd party insurance and construction insurance. Independent assessment of structural integrity would be undertaken by government during construction. |
| 6.7 Could the project lead to the potential for gender-based violence, including sexual harassment, exploitation and abuse, as a result of labour influx, land redistribution, or other actions that alter community dynamics? | Moderate | Moderate Moderate changes to community dynamics may result in increased potential for gender-based violence or sexual exploitation. Gender-based violence interventions are integrated into project design. | Include in the general clauses of the bidding documents of suppliers, subcontractors and service providers compliance with IFAD's policy on preventing and responding to sexual harassment, exploitation and sexual abuse and mandatory references to security policies will be included in tender documents and concluded contracts. For Component 3 we will use IFAD SBD and for all other Components, |

| | | | |
|--|--------------------|--|--|
| | | | National Bid Document, IFAD self-certification checklist and provision would be included in the bid document. |
| 6.8 Could the project lead to increases in traffic or alteration in traffic flow? | Moderate | Minor The project will result in minor increases to traffic volume. Only minor increase in risk of injury or death. | Applicable traffic rules and road safety measures in the rural road network will need to be adhered to and road signs installed as needed according to the national regulations. |
| 6.9 Could the project lead to an influx of project workers? | Moderate | Minor The project requires the employment of new labour, but workers can be sourced from local communities, and so influx is kept to a minimum, and risks are effectively managed. | Bid evaluation criteria to favour sourcing workers from the local communities whenever feasible for high value construction based on type of construction and required skill sets. Will include provision in the bid and contract, contractor will be asked to hire skilled and unskilled workers from the local area based on availability of this skilled or unskilled worker in the local areas. |
| 6.10 Could the project involve or lead to the engagement of security personnel to protect facilities and property or to support project activities? | Moderate | Minor A small number of security personnel are required, but they are well trained, and protocols are in place. | Periodic reporting of accidents and infringements to be included in contract conditions. Clauses to be included in the contract during pre-construction and construction stages. Post construction after hand over and operationalisation this would be managed by Market Management Firm. |
| Physical and economic resettlement | Risk Rating | Consequence | Guidance for SPOs |
| 7.4 Could the project result in impacts on or changes to land tenure arrangements and/or community-based property rights/customary rights to land, territories and/or resources? | Moderate | Moderate The project will result in moderate changes to land tenure arrangements and/or community-based property rights/customary rights. Legal recourse and other forms of arbitration/conflict resolution are available. | Ensure consent of affected populations is obtained prior to any interventions impacting land tenure or property rights/customary rights to land, territories and/or resources. As part of prior review process, before start of bidding process for market infrastructure and other infrastructure. |

PIM Appendix 6a: Draft Procurement Strategy

1. INTRODUCTION

The majority of the procurement activities under this program are envisaged to be simple medium to low value contracts except expert oriented regional wholesale market at Semlar, Butwal, Lumbini. Based upon the Technical and Financial Feasibility Study Report of Royal Haskoning DHV(RHDHV), the Netherlands, total construction cost for Semlar wholesale market is about euro 32.1 million equivalent to NRs 4.6 billion. On simple medium to low value procurement for goods, works/renewable energy technologies (RET) procurement activities envisioned by the project in Lumbini, Karnali and Sudurpashchim province are: (a) construction/rehabilitation of water related infrastructure (irrigation infrastructures) like canals, ponds, pipe network, storage tanks, MUS; productive infrastructure such as solar-lift pumps, drinking water, water ponds, conservation/protective works, and aggregation and storage facilities (both establishment of new units and upgrading of existing ones); soil and water conservation infrastructure like gabions, rip rap, sediment traps, weirs, and groundwater recharges structures (b) Implementation of renewable energy technologies (RETs) at various levels for different end-use activities such as solar micro-grids; cooperative-level solar powered dryers and mini-cold storage units; mini-slaughterhouses with biogas units; solar pumps for lift irrigation; solar poultry incubators; installation of solar PV panels on the rooftops of Semlar wholesale market as power backup system including development of biogas digesters (c) regular office logistics such as supply of office vehicles, motorbikes, scooters, computers, tablets, furniture etc. required at the initial stage and during implementation of project implementation and on services (d) consulting services to provide technical assistance (TA) on the wholesale market construction to the sub-project implementation unit at Lumbini province.

Procurement of Goods

Under this category it is envisioned to procure regular office logistics such as supply of office vehicles, motorbikes, scooters, computers, tablets, furniture etc. including other items required at the initial stage of project start-up i.e. during the first 18 months and implementation of renewable energy technologies (RETs) at various levels for different end-use activities such as: cooperative-level solar powered dryers and solar pumps for lift irrigation, solar poultry incubators, installation of solar PV panels on the rooftops of Semlar wholesale market as power backup system. However, the exact number of all goods/RET contracts will be ascertained at a later stage as the implementation proceeds ahead, as it is difficult to foresee at the present stage. Nevertheless, it is clear that the contract packages will be from medium to small in size.

Regarding the expert oriented regional wholesale market at Semlar, Butwal, as the contract value is estimated about euro 32.1 million equivalent to NRs 4.6 billion (as per Royal Haskoning DHV(RHDHV, the Netherlands) which is within the threshold for domestic bidders (i.e., < NRs 5 billion) (PPR clause 31), a single national contract package for the overall construction of the wholesale market infrastructure and for cold storage & sorting, grading and packaging equipment has been recommended. However, Royal HaskoningDHV, the Netherlands has proposed a separate international contract package for cold storage and sorting, grading & packaging equipment and domestic contract package for the overall construction of the wholesale market & infrastructure.

Procurement of consulting services

Under this category one contract package of value about NRs 86.4 million (Technical and Financial Feasibility Report of Royal HaskoningDHV) for providing technical assistance to the sub-project implementation unit (a dedicated sub-project implementation unit to be established in MOLMAC Lumbini for the contract administration/management of Semlar regional wholesale market) is envisaged. The estimated contract value falls within the

threshold limit for national consulting firms as provisioned in the PPR clause 70 (i.e. < NRs 150 million).

Hence, the contract packages under R-HVAP can broadly categorized as:

(a) Medium to small size contract for goods/civil work/service packages for community infrastructures/RET activities and for initial 18 months PP activities.

(b) Big ticket contract for expert oriented regional wholesale market at Semlar, Butwal.

2. OVERVIEW OF COUNTRY, BORROWER AND MARKET PLACE

2.1 Operational context

2.1.1 Governance.

Subsequent to the new constitution that came to force in 2015, Nepal now operates as a federal structure. At the sub-national level, funds, functions and functionaries hitherto managed by the central, district and village authorities are moving to the seven new provinces and 753 local governments (LGs) for which new legislation, institutions and administrative procedures are being formalized as constitutionally prescribed. Meanwhile, the central level authority is being streamlined with a focus on oversight. The new Constitution envisages local (and provincial) governments as meaningful contributors to and drivers of the local planning process. With successful local elections after two decades in the country's seven provinces, hopes are high that local governments will deliver on their mandates. However, the transition to a federal structure is still evolving and poses challenges in the local government's capacity to carry out their project related functions effectively.

With the assistance of an IDA Grant and the cooperation of other international aid agencies in Nepal, GON promulgated its Public Procurement Act and related Regulations in 2007. The Law was drafted based on internationally accepted practices. Under this Act, the Public Procurement Monitoring Office (PPMO) has been set up with the primary responsibility of preparing guidelines and standard bidding documents, manuals/directives for implementing the Act and is successfully operating a national online e-procurement system called e-GP system in the country. This e-GP system is being used for all donor funded projects under national competitive procedure.

However, since its initial promulgation, there have been frequent amendments to the Regulation with the recent ones (11th and 12th) adding provisions mainly on, construction company (either J/V or single) are allowed to have maximum 5 contract agreements; threshold for the domestic bidders for works has been increase to NRs 5 billion from NRs 3 billion; authority of estimate/bid approval for goods, works and consultancy services of the government officers has been increased; threshold for direct purchasing (National Shopping) for goods and works has been increased to NRs one million from NRs 0.5 million etc.

Key Procurement arrangement under PPA/PPR, 2007:

Accountability, competition, fairness, transparency, efficiency, effectiveness, economy and value for money are the PPA/PPR's principles. Based upon those principles, PPMO has prepared standard contract document for ICB, NCB, sealed quotation and direct purchase for goods and works and REOI template, SRFP for Lump Sum and Time-based Contracts for consultancy services including directives. However, in spite of continuous effort to develop guidelines and manuals they are not being able publish those documents officially to date. National SBDs cover on safety, security & protection of the environment; spells on non-discrimination & equal opportunity including no use of child/force labour . However, it does not cover on climate change and SH/SEA provisions equivalent to those in IFAD's SBDs. Nevertheless, there is separate national Act on

environmental protection. Further, there have been clearly mentioned in the national SBDs on fraud, corruption and other prohibited practices where the definitions are consistent with IFAD's SDBs. In case of disputes resolution between parties, there have been made some provisions in PPR (clause 129-135) and more elaboration has been made as condition of contract in the national SBDs. In spite of all those, there is a necessity of developing procurement manual/guide on goods, work including consultancy services and training as well by the PPMO.

PPR has provisioned advertising rules and time limits for goods/works/consultancy services for ICB, NCB contracts, sealed quotation, direct contracts in detail. Submission, receipt and opening of tenders are generally done by the respective offices in time as mentioned in the notice. During the opening of the tender, representatives from the bidder side, project side and office of the comptroller General are invited. Minutes of bid opening is prepared. However, There is no practice of making available bid opening minutes to the bidder/consultants. Bidders' qualification criteria are pass/fail and are defined prior to the advertisement of procurement opportunities. and related to deliver the specific contract.

PPR requires that selection of consultancy services be made using Quality and Cost Based Selection (QCBS), Fixed Budget Selection (FBS), Least Cost Selection (LCS), Selection Based on Consultants Qualification (QBS) methods. However, QCBS method are mostly used. Individual consultants are selected on the basis of their qualifications for the assignment of at least three candidates among those who have expressed interest for the assignment.

To promote local resources, the PPR gave construction authority of small infrastructures to user committees (UCs) for up to NPR 10 million.

PPA/PPR do not exclude foreign bidders based on nationality or unnecessary national requirements. However as per PPR (12th Amendment) the threshold of domestic bidder (NCB) for works has been increased to NRs 5 billion from 3 billion. Beyond that threshold there is a need for ICB contract. Domestic preference of 5% has been provisioned to all the domestic bidders for the international bidding. If there is J/V of international bidder with local bidder (having share > 25%), they are also eligible obtaining domestic preference of 5% and for the international bidding amounting up to NRs 10000 million on works, there is a mandatory provision of J/V with domestic bidder.

Provision for bidders' qualifications criteria is based upon the score obtained by the bidders that are mainly based upon the general, specific experience, financial capability and equipment in hand of the bidder. Basic guide line on this has been mentioned in PPR and details of that has been developed by PPMO. There are provisions made in PPR for exclusion in case of convictions related to criminal or corrupt activities and for administrative debarment under the national law. Further, PPR requires that Bid evaluation process is confidential and bid evaluation criteria are objective, relevant to the subject matter of the contract as outlined and bid evaluation criteria need to be specified in advance in the procurement documents.

PPA/PPR requires a permanent evaluation committee in every office headed by (i) the chief or a senior officer (as far as possible technical person), (ii) Chief of accounts section, (iii) subject matter specialist, and (iv) legal officer (if a post exists in the office). However, experts are invited for evaluation based on the necessity of technical experts. Evaluation committee formed by the project evaluates the document on the basis of approved criteria.

Public procurement Act 2007 provides opportunity for complaint to the Public Entity (PE) within 7 days of publication of Letter of Intent to Award and the PE to respond within 5 days. If the bidder is not satisfied with the response or no response is provided by the PE, then the bidder may complain to the review committee within 7 days of the PE's

response or no response. The Review Committee is headed by either judge/ex judge of high court or ex secretary of Government of Nepal. However, complaints cannot be lodged to the Review Committee for procurement valued at less than NPR 20 million.

The national framework makes reference to sustainability but does not prescribe a SPP plan. It includes dedicated guidelines for application of sustainability criteria to ensure value for money. at all stages in public procurement. There are obligations from the international organizations for sustainable development of the country.

There exists government institution in charge of the normative/regulatory function like PPMO, Office of the Comptroller General(OCG), Office of the Auditor General (OAG). One of the responsibilities of the Office of the Comptroller General is the treasury operation of the Government of Nepal. It releases and controls the fund to the office and does internal audit whether the procurement process adopted are in line with provision made in the PPA/PPR. It also evaluates the work performance of the account officials. Office of the Auditor General (OAG) is a constitutional body and the supreme audit institution of Nepal who conducts final audit after the end of every fiscal year. The PPR, 2007 (Clause 149) prescribes a separate provision of record keeping (covering the entire procurement process) and securely stored of procurement document for at least 7 years after completing the project activity.

There is a provision for debarment that ensures due process and procedures which is well defined in the PPA/PPR 2007. Penalties are well defined. The PPMO's website contains information on blacklisted or debarred firms and individuals with names, grounds for debarment, and duration of debarment.

Civil society and stakeholders' organizations in Nepal remain weak due to a variety of constraints and are largely excluded from public consultation and monitoring. There is a need to introduce necessary provision in PPA/PPR in order to increase direct engagement of civil society.

There are sufficient other provisions of procurement proceedings in the PPA/PPR 2007 which is being amended from time to time to meet the national as well as international obligations in order to undertake public procurement activities of the nation.

2.1.2 Economic Aspects

There are adequate number of national contractors (333 numbers Class A, 277 on class B, 1071 on class C and 13365 on class D contractors - based on the information provided by the federation of contractors associations of Nepal), suppliers and consulting firms willing to participate in bidding for most of the procurement needs under the program like infrastructure, consulting services, furniture, office consumables, office equipment such as computers, vehicles, minor etc. however a few/reasonable numbers of qualified/capable contractors for big value contracts like export-oriented wholesale market. Nevertheless, present scenario of country's symptom of economic recession after the COVID-19 pandemic may cause difficulties in procurement environment. Also, there have been numerous cases reported, of poor performance – especially in works contracts where instances of sub-standard work and/or time and cost over-runs have occurred.

2.1.3. Sustainability aspects

Except the export-oriented wholesale market, at Semlar, R-HVAP does not have any large value construction activities that trigger social, environmental or health and hazard issues in wider scale. However, to address any environmental, social, climate change and health and disaster risks, all infrastructure activities under component 1, adequate provision to mitigate the risk shall be provisioned at all stage of procurement (bidding document, specification, contract clause, O&M and self-deceleration form) so that climate adaptive interventions are in place at each step of the implementation process. In

addition, sexual harassment(SH) and sexual exploitation and abuse(SEA) will be stated to address the issues.

2.1.4. Technological aspects.

After the promulgation of the national Public Procurement Act and Regulations, and roll out of the first phase of the e-GP system, it has now been upgraded to second phase of the GP2 system. This e-GP-2 allows for online entry of procurement plan, invitation of bids, downloading bid documents and uploading completed bids and submission of bid security electronically verified by banks, downloading of submitted bids, uploading minutes of public bid opening, online evaluation and upload signed evaluation reports. Thus, the country's procurement environment has become more stable and reliable, and has encouraged increased bidder participation and competition. However, many federal level agencies do not appear to use the full range of features available with eGP2.

Internet services are available in most reaches of the country, and mobile phone coverage is nationwide. The implementing agencies at the federal and provincial levels will need to obtain training on using currently launched IFAD's OPEN online procurement End to End System to manage procurement activities.

2.2. IA's Internal Capacity Assessment

2.2.1. Experience

MOALD's Experience: The lead implementing agency is MOALD. It has experience of implementing IFAD funded projects like (HVAP) and currently it is implementing Agriculture Sector Development Programme (ASDP) in the same geographic region i.e. Karnali province (one of the provinces of RHVAP) within the framework of Nepal's Federal States Governance System and IFAD's project procurement framework (PPF). The program activities are mainly rural agricultural development in nature which are being implemented in remote and inaccessible areas and the size of the procurement is generally small/medium.

Key lessons on procurement in IFAD Country Portfolio: Performance reviews of IFAD Programmes in Nepal identify weaknesses in Programme procurement performance, primarily associated with non-compliances and weaknesses in the preparation of bid documentation, technical specifications, evaluation of bids, contract management and performance assessments. These weaknesses are further aggravated due to the lack and delay recruitment of adequately qualified and trained procurement staff and weakness in procurement record keeping.

R-HVAP implementation arrangements: For the smooth implementation of R-HVAP following implementation arrangements have been proposed:

- (i) a Programme Coordination Unit (PCO) at federal level, hosted by MoALD,
- (ii) three Programme Management Units (PMO) in the three provincial capitals of Lumbini, Karnali and Sudurpashchim. and
- (iii) three Corridor Offices (CO) will be established in strategic locations;

At PMO level, in each of the three provinces, a Programme Manager along with an account officer, and Accounting/Bookkeeping personnel including other officers has been proposed from the govt side and at local level, in each of the 6 Corridor Offices (CO), an accountant and sub accountant from the Provincial Government side.

PMO's/CO's Experience: All proposed 3 PPMOs for implementation will be new entities that will be established under the related provincial level Ministry of Land Management, Agriculture and Cooperatives (MOLMAC) with no experience of implementing IFAD funded

procurement procedures. In the current evolving federal system, there is a lack of adequate manpower with sufficient skill, experience and knowledge to carry out and supervise fiduciary functions including public procurement and management at the provincial level. Frequent transfer of government officers including account officer (who looks for the procurement from the govt. side) is the current scenario of all MOLMACs. Therefore, the procurement capacity in the current scenario can be considered as weak which necessitates the strengthening of procurement capacity of PPMOs/COs along with early deputation of skill, experience and knowledgeable staffs including account officer from the govt side as well. Moreover, frequent transfer of government staffs including account officer should be stopped in order to have successful implementation of RHVAP.

2.2.2 Strengthening Procurement Capacity

- Procurement expertise in the PPMOs will be required for timely award of the contracts, its execution and monitoring for the success of the program. Given the inadequate procurement capacity at the PMO and the volume of activities, as early as the PMO will be established, an account officer from within MOALD or on deputation from the office of controller general (OCG) and a procurement expert with proven experience on conducting public procurement following national and IFAD procedures should be staffed on fair and open competition basis. Likewise, one government accountant for each CO needs to be deployed from provincial government or from district office of comptroller general, as soon as COs are established, to handle small value contract (like procurement of stationary, furniture etc.) to run the COs. All procurement related personnel need to provide procurement related trainings, support, guidance at program start up and during program implementation on the preparation of bid documentation, technical specifications, evaluation of bids, monitoring of contracts including short-term capacity building procurement trainings on IFAD's OPEN online procurement End to End System. In addition, the procurement staff of this project will be enrolled in IFAD BUILD PROC (procurement capacity building program) to further strengthen procurement capacity. The govt account officer and procurement expert will support the PMO offices in preparing procurement documents (bid documents/EoI/RFP) and assist in evaluation, negotiation, contract award, contract management and monitoring etc.
- Given the scale and complexity of wholesale market, a dedicated sub-project implementation unit (SIU) will need to be established in MOLMAC comprising of a FDIC certified engineer, procurement specialist, financing officer and community liaison officer. In addition, in order to ensure the construction and procurement quality, as provisioned in the technical and financial feasibility study report of Semlar wholesale market, one quality control engineer and one procurement expert for IFAD Country office, Nepal has been proposed. Negotiations are on-going between MOALD, and IFAD on detailing the financing, implementation, and market management modalities. One consulting firm for providing technical assistance on the construction of wholesale market to the sub-project implementation unit (SIU) will also be procured.
- Provision of adequate financial allocations (salaries, running expenses and per-diems etc.) and other resources (vehicles, office working area, equipment and tools etc.) needed by the PPMOs, SIU and CO to deliver its tasks has been proposed. Strengthening the procurement capacity of PPMOs, SIU & COs will ensure timely authorization and actual processing of due payments to vendors .

Procurement under R-HVAP on goods works and services financed from resources provided or administered by IFAD will be undertaken in accordance with the provision of the PPA/PPR 2007 as amended from time to time to the extent they are consistent with the provisions of IFAD's Procurement Guidelines and Handbook (dated September 2010) and as amended from time to time as per the issued Project Procurement Arrangement (PPA) letter.

2.2.3 Procurement processes and delegation of authority:

PPR 2007 (11th amendment) has clearly defined the responsibilities and formal powers of the office in-charge for estimate approval and tender approval for goods, works and others as up to NRs 100 million and up to NRs 200 million respectively which allows the PMO chief to work freely on most of the procurement processing/approval and subsequent payments to vendors.

2.2.4 Contract Management Capability and Capacity:

Due to lack of experienced account officer who is familiar in procurement business in the GON, the contract management capacity is poor. Having a full time Procurement expert in the PMO/SIU will help addressing this and mitigate contract implementation delays, associated cost over-runs, and enhance contract administration and management capacity of the project. Having a big-ticket contract for Semlar wholesale market in the sub-project implementation unit under MOLMAC Lumbini, special attention on contract administration, management and record keeping should be given by the govt account officer and procurement expert as well.

2.2.5 Complaints management and dispute resolution systems:

National procurement procedures as described in the Public Procurement Act (PPA) 2007 (clauses 47 to 51) and the Public Procurement Regulations (PPR) 2007 (Clauses 100 to 108) with subsequent amendments, include a review mechanism for applications on procurement related error or decision made by a Public Entity. Clear complaints handling mechanisms are provided in the PPA/PPR for contract award, with provision of requirement to issue Letter of Intent to award giving 7 days period for lodging complaints against intended contract award, and further complaint review by the Review Committee. These provisions are applicable for procurements using national procurement procedures and are included in the National procurement documents.

Key Conclusions: There are sufficient mechanisms to solve the problems of procurement proceedings in national procurement procedure. Together with: (i) the use of procurement documents and procedures that fulfil IFAD requirements and/or approval (ii) the inclusion of an experienced procurement staff in each PMO/CO and (iii) A Project Implementation manual that shall also include a detailed section on project procurement procedures.

2.3 Market Analysis

Market sounding and market consultation was carried for the following contract packages at 30-03-2023 and other dates in Kathmandu:

- a. Medium to small size contract for goods/civil work/service packages for community infrastructures/RET activities and for initial 18 months PP activities;
- b. Big ticket contract for expert oriented regional wholesale market at Semlar, Butwal.

During the market analysis, Supply Positioning and Supplier Preferencing tools have been used.

Findings of the market study are presented below

2.3.1 Supply Positioning Tool:

- a. Medium to small size contract for goods/civil work/consultancy packages for community infrastructures/RET contract packages and for initial 18 months PP activities.

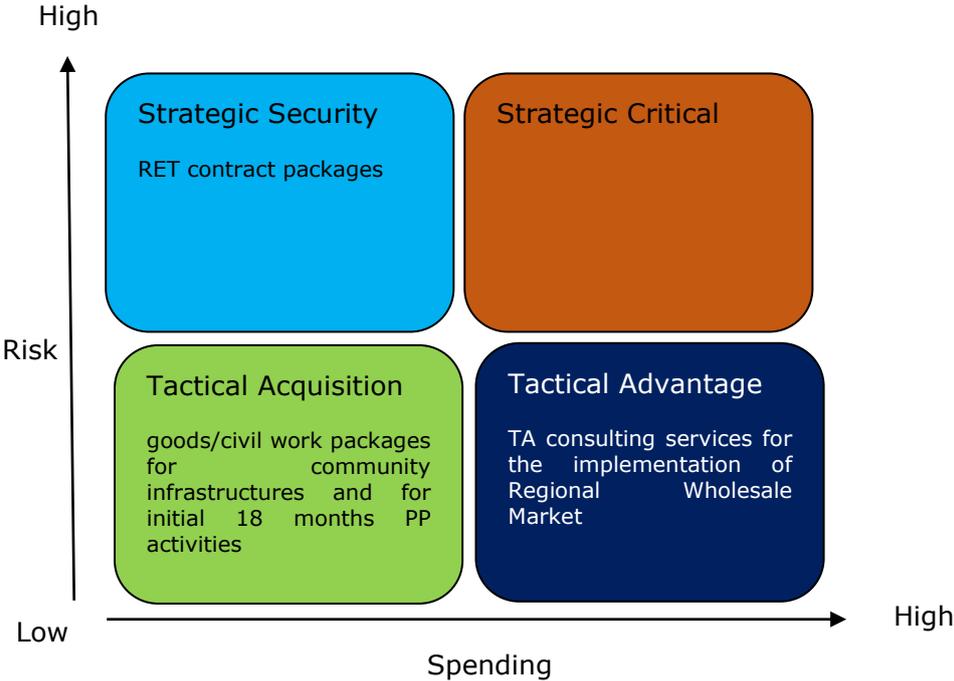
The purchaser’s viewpoint regarding the criticality and risk for the various procurement activities of the overall project procurement is presented in figure below. Since the contract packages (goods and works) under consideration have the following features;

- Low level of supply risk(easy work and numerus contractors are available in the market) and low cost(<NRs 20 million);
- Low impact on project objectives/service delivery;
- Requires proportionately less research and analysis;
- IA needs to simplify and automate the procurement process (many contract packages of similar type)

The contract packages under consideration falls within the Tactical Acquisition quadrant as shown in the figure below.

Regarding TA consulting services for the implementation of regional wholesale market at Semlar, being relatively high value contract (>NRs 80 million), numerus consultants are available in the market and requires proportionately less research and analysis; it falls on tactical Advantage quadrant as presented in the figure below

However, in case of the RET contract packages, even if being low contract value there are a smaller number of contractors available in the market and requires proportionately more research and analysis. Hence, those packages fall within the Strategic Security quadrant as presented in the figure below:



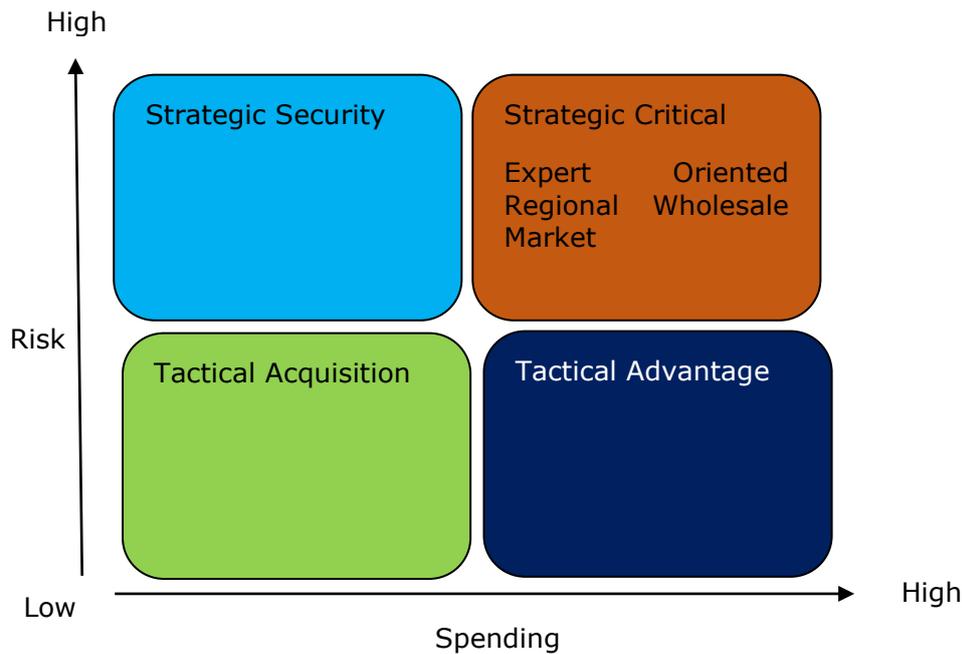
b. Big ticket contract for expert oriented regional wholesale market at Semlar, Butwal

The purchaser’s viewpoint regarding the criticality and risk for this contract package of the project procurement is presented in figure below. Since the contract packages under consideration have the following features;

- High level of supply risk (difficult work and a few contractors are available in the market) and high value(>NRs 4000 million);

- High impact on project objectives/service delivery;
- Strategic items where supply risk and impact on project objectives/service provision are high;
- Requires proportionately high level of analysis, due diligence, and effort to be invested in the acquisition process;
- Price constitutes a significant portion of the project’s procurement cost

The contract packages under consideration falls within the Strategic Critical quadrant as shown in the figure below:



3.2 Supplier Preferencing Tool

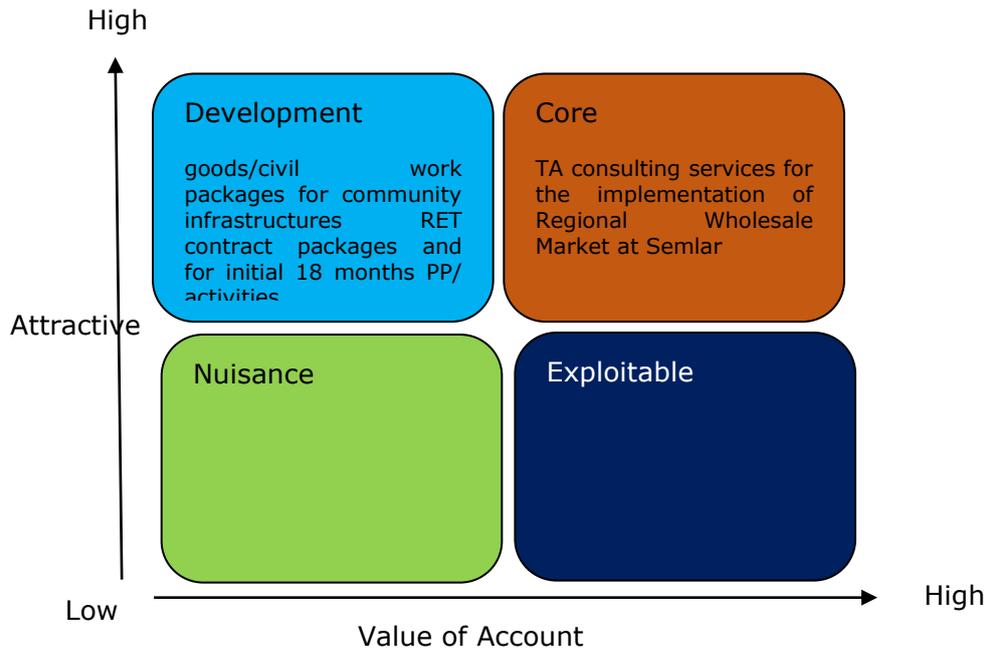
- Medium to small size contract for goods/civil work/service packages for community infrastructures/RET activities and for initial 18 months PP activities;

An assessment of potential supplier’s viewpoint based on the attractiveness and size of the various packages(goods and works) is presented in Figure below. Since the contract packages under consideration have the following features;

- Low value(<NRs 20 million);
- Still attractive contract package;
- Contractor/Supplier wants to get further business

The contract packages under consideration falls within the Development quadrant as shown in the figure below.

Regarding TA consulting services for the implementation of Regional Wholesale Market at Semlar, being relatively high value contract (>NRs 80 million), numerus consultants are available in the market and requires proportionately less research and analysis; it falls on core quadrant as presented in the figure below.

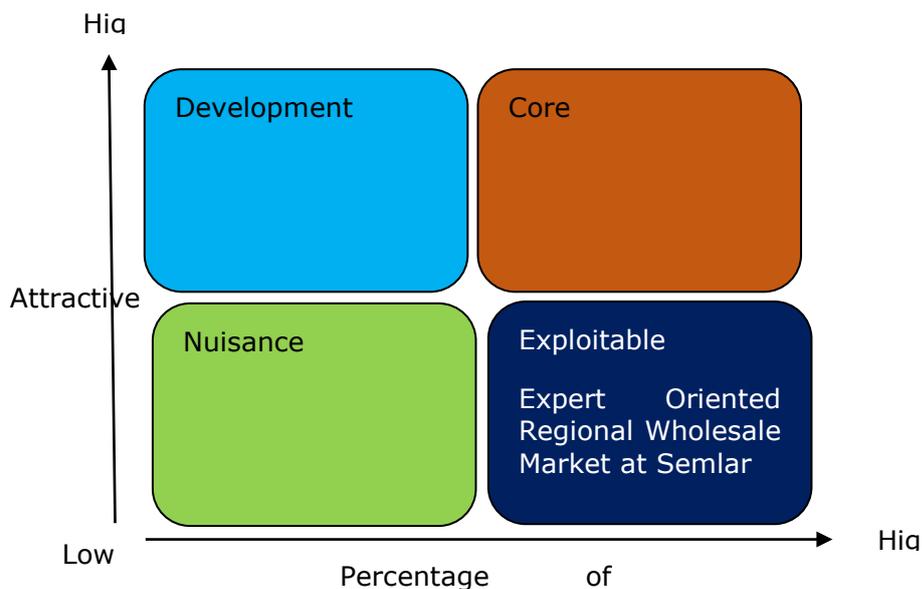


b. Big ticket contract for expert oriented regional wholesale market at Semlar, Butwal

An assessment of potential supplier's viewpoint based on the attractiveness and size of this package is presented in Figure below. Since the contract packages under consideration have the following features;

- High value(>NRs 4000 million);
- Not so attractive contract package;
- Contractor/Supplier wants to maximize the profit

The contract packages under consideration falls within the Exploitable quadrant as shown in the figure below:



2.3.3 Market sector dynamics

Market sector survey revealed the following findings;

In case of medium to small value contracts including routine items such as vehicles, office equipment, furniture etc. and TA consultancy contracts, local contractors, suppliers and consulting firms are willing to participate competitively in IFAD funded projects as they are assured regarding the availability of funds with the buyer, and because of the fairness of the conditions in the procurement documents used. Regarding RET contract packages, even being low contract value that requires proportionately more research and analysis and there are a smaller number of contractors available in the market.

Regarding big ticket contract like export-oriented regional wholesale market at Semlar, contract value of which is just within the threshold limit for domestic bidder i.e. < NRs 5 billion, out of total 333 'A' class contractor available within the country, only a few are expected to be qualified from the pre-qualifying process since many of them may not have the required specific experience on such infrastructure construction.

Prices for common items can be estimated with fair accuracy through past experience, physical market survey, and in the case of computers etc. through a search of online retailers. However, due to the symptom of economic recession because of the effect of COVID-19 pandemic currently, a good number of businesses are either closed or operating with very limited resources and manpower.

2.3.4 Option Analysis

Option analysis for expert oriented regional wholesale market at Semlar, Butwal on type of contract has been carried out as follows:

Option 1: Construction contracts based on the Employer's Detailed Engineering Designs (DED).

| Advantages | Disadvantage |
|--|---|
| <ul style="list-style-type: none"> The market analysis showed that most of the works in Nepal are being carried out through construction contracts. In addition, MOALD and the contractors are familiar with construction contract modalities in the past. With the Employer's design, the sub-project implementation unit (SIU) will have full control on engineering solutions. The construction contract will be an admeasurement contract, and the employer may have better control on quality of design. | <ul style="list-style-type: none"> Construction contracts based on the Employer's DED will offer less flexibility to contractors for innovative design; The SIU do not have enough technical people which may lead to delay in procurement and compromise the efficiency. |

Option 2: Design & Build (or EPC) contracts

| Advantages | Disadvantage |
|--|--|
| <ul style="list-style-type: none"> Construction through single EPC contract will be led to faster implementation and easy in contract administration and management instead of managing | <ul style="list-style-type: none"> The SIU will not have full control on engineering solutions; |

| | |
|--|---|
| <p>different firms;</p> <ul style="list-style-type: none"> • No problem of contract interfacing; • Value would be gained by lower bids due to flexibility offered in doing design by contractors in Design & Build (or EPC) contracts; • Reduced project duration; • All liabilities at one Contractor; • Small project team of MOALD required to manage the project; | <ul style="list-style-type: none"> • There may not be many capable contractors to do Design & Build (or EPC) contracts in Nepal. So, there is a chance of less competition |
|--|---|

Option selected: Considering that only a Basis of Design is available to provide ready-to-tender documents (by Royal HaskoningDHV), it would be rational to adopt for an EPC contract in which the basic design, detailed design, interface management and construction will be undertaken by one single EPC contractor. So, option 1- Design & Build (or EPC) contracts option is recommended.

Key conclusions: For contracts for common items under goods and services like, vehicles, office equipment, furniture etc., and TA consultancy service that need to be procured for this program, there exists a competitive with adequate contractors/suppliers/firms willing to participate in the bidding procedures. Such procurement for goods and services can be done through National Competitive Process (NCB) using national SBDs as provisioned in PPR (Clause 31-68) as agreed with IFAD. For contract packages on RET for solar micro-grids, cooperative-level solar powered dryers and mini-cold storage units, mini-slaughterhouses with biogas units, solar pumps for lift irrigation; solar poultry incubators, installation of solar PV panels on the rooftops of Semlar wholesale market including biogas digesters need to be implemented by suppliers accredited by the Alternate Energy Promotion Center (AEPC) through National Competitive Process (NCB) using national SBDs. In case of procurement of TA consultancy service, Quality Cost-Based Selection (QCBS) method will be used for the selection of best consulting firm using national standard EoI and RFP documents. The national SBDs/RFP documents should be used with necessary addendums (as defined in the PIM) for the compliance with IFAD PPF and IFAD's policies, including SECAP. Regarding items under works like irrigation infrastructures, productive infrastructure, soil and water conservation infrastructure being the contract size for these activities within NRs 10 million they will be implemented through community group as provisioned in the Public Procurement Regulations (PPR) 2007 clauses 97, since they fall within their threshold (i.e. up to NRs 10 million).

For the contract package of expert oriented regional wholesale market at Semlar, Butwal, based upon the provision made in the PPA/PPR of Nepal for domestic contractor (up to NRs 5 billion), internal capacity of MOALD/SIU, market survey and option analysis, it is recommended to adopt design & built (EPC) contract type for the National contractors following national procedures using standard IFAD documents.

The Project Implementation Manual (PIM) shall define the process and procedures on the procurement of goods, works and services (non-consulting) using National Competitive Bidding (NCB), Shopping and Direct Contracting including details of selection method to

be applied in case of consultancies services such as Quality and Cost Based Selection (QCBS), Fixed Budget Selection(FBS), Least Cost Selection(LCS), Consultants Qualification Selection (CQS) and Single Source Selection (SSS). The PIM would also outline the procedures for the selection of individual consultants and individual service providers.

3. PROCUREMENT RISK ANALYSIS

Procurement risk analysis/ for above mentioned both contract packages has been presented in the following table:

a. Medium to small size contract for goods/civil work/service packages for community infrastructures/RET activities and for initial 18 months PP activities

Risk Assessment Table

| Risk Description | A | B | Overall Risk Score AxB | Assessed Inherent Risk | Proposed Mitigation Measure/s throughout the Procurement Process | Net Risk (assuming full functioning of the mitigation measure/s) |
|---|--------------------------|------------------------|---------------------------|--|--|--|
| | Likelihood of Occurrence | Impact upon Occurrence | | | | |
| a) Project Planning and Design Stage | | | | | | |
| Inadequate and poor technical inputs (upstream activities) such as design, drawing, bill of quantity, specifications often lead to complication during the contract implementation. | L | M | L | This results in time and cost overrun, substandard output and dispute between the parties. | Ensure design, drawing, bill of quantity, specifications are prepared properly. | Less possibility of time and cost overrun, substandard output and dispute between the parties. |
| The engineer/officer working on this project/contract may not have the necessary qualification and practical experience. | L | M | L | May result in unsatisfactory quality of outcomes. | Recruit qualified, experienced and dedicated officials to ensure efficient implementation of the project activities. | Less possibility of inefficient implementation of the project activities. |
| b) Project Procurement stage | | | | | | |
| Risk of less competition due to the preparation bid documents | L | L | L | May lead to re-tendering | Prepare bid document and specification only after the | Less chances of cancellation of whole |

| | | | | | | |
|--|----------|---|---|---|---|--|
| and specifications without market survey | | | | | proper market survey | tendering process. |
| Risk of abnormally low bid prices. Due to high competition. | M | M | M | In case of abnormally low bid, it increases the risk of contract failure and low-quality output. | Include the relevant provisions in the bidding document to deal with abnormally low bids like seeking higher performance security, provision of frequent site supervision, written warning and demolition of work at site, if found not as per the given specification. | Possibility of bid submission with rational bid price. |
| Risk of substantially high bid prices | L | M | L | In case of substantially high bid price IA may (i) cancel the whole bidding process or (ii) pay high price compromising the value for money | Include relevant provision in the bidding document on-the acceptance or cancellation of bids mentioning the threshold value considering the value for money | Less chances of bidding high price |
| Risk of non-formation of capable evaluation committee with proper composition of committee members | M | M | M | May lead to delay in evaluation and improper selection of bidder | Formation of capable evaluation committee with proper composition of committee members | Less chances of delay in evaluation and improper selection of bidder |
| c) Contract administration and Management Stage | | | | | | |
| Risk of slow in work progress/delay in implementation. | L | M | M | Results in time and cost overrun. | Prepare realistic contract management plan and close monitoring of the contract execution. Use early warning clause in contracts. | Less possibility of slow in work progress/delay in implementation |

| | | | | | | |
|---|---|---|---|--|---|--|
| Risk of low-quality work performance | S | s | S | Increase risk of non-payment of work done, disputes among two parties. | Include the provision of (i) timely and proper quality control measure (ii) close supervision of work during construction (iii) dismantling of low-quality work instantly at site after giving warning to the contractor etc. in the contract document. | Results good quality work |
| Risk of failure of contractors due to the contractors' changed cash flow situation. | L | M | L | Increases risk of contract failure. Results in time overrun as well as cost overrun. | Add a requirement of bank credit lines specifically for the contract in the evaluation and qualification criteria. Provision for advance payment in instalment and provision of payment against plant and materials. Monitor the contractor's performance closely and take necessary action as early as possible. | Less chances of contract failure and time and cost overrun. |
| Risk of improper record keeping of necessary documents | M | S | S | May led to problem in time extension, price escalation, variation, claim and dispute settlement. | Keep the contractual record/documents properly | May not led to the problem for time extension, price escalation, variation, claim and dispute settlement |

4. PROCUREMENT OBJECTIVES

Programme procurement objectives are: by procuring a good contractor/supplier/firm for the supply of goods and construction of irrigation, soil and water conservation, RT infrastructures including regional wholesale market at Semlar of Lumbini, Karnali and

Sudurpashchim provinces transform smallholder agriculture in target provinces into inclusive, agroecological and profitable agri-food systems by 2034.

5. RECOMMENDED PROCUREMENT APPROACH

a. Recommended procurement approach for medium to small size contract for goods/civil work/service packages for community infrastructures/RET activities and for initial 18 months PP activities

| Attribute | Selected arrangement | Justification Summary/Logic |
|---|---|---|
| Specifications (SECAP compliance) | Conformance | Need to mention the requirement in the PIM for the incorporation to ensure this is addressed by the borrower/recipient when procurement is undertaken. |
| Sustainability Requirements | Yes | Need to mention the requirement in the PIM for the incorporation in each procurement cycle (bidding document, specification, evaluation criteria) to ensure this is addressed by the borrower/recipient when procurement is undertaken. |
| Contract Type | Traditional based on IA's design | competitive |
| Pricing and costing mechanism | Schedule of Rates | |
| Supplier Relationship | Collaborative | |
| Price Adjustments | None, fixed price | Contract will be of fixed priced |
| Form of Contract (Terms and Conditions) | State any special conditions of contract | In the bidding document there will be a separate section of Special Condition of Contract (SCC) |
| Selection Method | Requests for Bids (RFB)/ Request for Quotations (RFQ)/ Direct contract (DC) | PPA/PPR requires national competitive bidding (NCB) from NPR 2 million to 5billion, sealed quotation from NPR 1 million to NPR 2 million, from NPR 0.1 million to 1 million with 3 quotation and below NPR 0.1 million direct contract. |
| Selection Arrangement | Commercial practices | Competitive method |
| Market Approach | <p>A. Type of Competition National</p> <p>B. Number of Envelopes/Stages Single Envelope</p> | PPA/PPR requires national competition for up to NRs 5 billion. Hence, work packages under this contract category are NCB. There is a provision of single envelop up to NRs 20 million and beyond that it is double envelop. |

| | | |
|---|---|---|
| Pre / Post Qualification | Post-Qualification | Most of the packages under this contract category may fall under post qualification (as per PPR, NRs <20 million). If the package goes beyond the given threshold, then double envelopes/prequalification need to be adopted. |
| Consultant Selection & Evaluation Method | Quality Cost Based Selection (QCBS) | Up to NRs 2 million, QCBS method without EoI and beyond that with EoI will be adopted. |
| Evaluation of Costs | <p>A. Adjusted Bid Price (corrected for a bidder's minor deviations)</p> <p>B. Life-Cycle Costs</p> | |
| <ul style="list-style-type: none"> Domestic Preference | No | Being within the given threshold of NRs 5 billion, NCB will be used. |
| <ul style="list-style-type: none"> Rated Criteria | List the type of criteria to be used (mandatory/desired) | |

b. Recommended procurement approach for big ticket contract for expert oriented regional wholesale market at Semlar, Butwal

| Attribute | Selected arrangement | Justification Summary/Logic |
|-----------------------------------|----------------------|---|
| Specifications (SECAP compliance) | Conformance | As the ESIA study is being carried out by Invest International, the Netherlands, compliance to SEC requirements need to be addressed based on the ESIA report. However, they need to be mentioned the requirement in the PIM to ensure this is addressed by the borrower/recipient when procurement is undertaken. |
| Sustainability Requirements | Yes | As the ESIA study is being carried out by Invest International, the Netherlands, compliance to SEC requirements need to be addressed based on the ESIA report. However, they need to be mentioned the requirement in the PIM for the incorporation in each procurement cycle (bidding document, specification, evaluation criteria) to ensure this is addressed by the Borrower/Recipient when procurement is undertaken. |

| | | |
|--|--|---|
| Contract Type | Design and Build | Considering that only a Basis of Design is available to provide ready-to-tender documents (by Royal HaskoningDHV), it would be rational to adopt Design and Build (EPC) contract in which the basic design, detailed design, interface management and construction will be undertaken by one single EPC contractor. |
| Pricing and costing mechanism | Schedule of Rates | Being the construction work complex in nature where unforeseen activities may be encountered during construction, there is a need of making provision of PS and contingency items to overcome such circumstances. |
| Supplier Relationship | Collaborative | |
| Price Adjustments | None, Fixed Price | |
| Form of Contract (Terms and Conditions) | State any special conditions of contract | In the bidding document there will be a separate section of Special Condition of Contract (SCC) |
| Selection Method | Requests for Bids (RFB)/NCB | PPA/PPR requires national competition for up to NRs 5 billion. Hence, work packages under this contract category are NCB. However, it is recommended to use IFAD/FIDIC contract document. |
| Selection Arrangement | Commercial Practices | Competitive method |
| Market Approach | Type of Competition National Number of Envelopes/Stages Multi Stage | PPA/PPR requires national competition for up to NRs 5 billion. Hence, work packages under this contract category is NCB. However, it is recommended to use standard IFAD contract document. There is a provision of double envelop beyond NRs 20 million. |
| Pre / Post Qualification | Pre-Qualification | Since the contract package goes beyond the given threshold, NRs 20 million double envelopes/prequalification need to be adopted. |
| Consultant Selection & Evaluation Method | | Up to NRs 2 million, QCBS method without EoI and beyond that with EoI will be adopted. |

| | | |
|-----------------------|--|--|
| Evaluation of Costs | Adjusted Bid Price (corrected for a bidder's minor deviations) Life-Cycle Costs | |
| • Domestic Preference | No | Being within the given threshold of NRs 5 billion, NCB will be used. |
| • Rated Criteria | List the type of criteria to be used (mandatory/desired) | |

6. SECAP INTEGRATION

SECAP Risks and Procurement Actions;

a. Medium to small size contract for goods/civil work/service packages for community infrastructures/RET activities and for initial 18 months PP activities;

| S. No | Risks identified by the SECAP specialist | Level of risk | Mitigation measures | Remarks |
|-------|--|---------------|--|---|
| 1 | Impacts of climate change: Flood and landslides | High | i) Proper site and activities selection to avoid the impact of flood and landslides, ii) site assessment considering flood and landslide during the prefeasibility study and include recommendation of climate proofing measures, iii) prepare sub project specific ESCMP including adaptation and mitigation measures to integrate in sub project design and include it as an annex of bidding document, iv) provision of maintenance | Need to mention the requirement in the PIM for the incorporation in each procurement cycle (bidding document, specification, evaluation criteria) to ensure this is addressed by the Borrower/Recipient when procurement is undertaken. |
| 2 | Over extraction of water | Moderate | i) provision of source protection, ii) proper water distribution mechanism, iii) support to water efficient use technologies | -do- |
| 3 | Waste management | Moderate | i) provision of solid and liquid waste management in collection, processing, and market structures ii) adequately integrate into the design and allocate sufficient budget | -do- |

| | | | | |
|---|--|-----|--|------|
| 4 | RET: Battery management after their lifespan | Low | i)adequate provision of battery management after its use | -do- |
|---|--|-----|--|------|

b. Big ticket contract for expert oriented regional wholesale market at Semlar, Butwal

For this, currently ESIA study is being carried out by Invest International, the Netherlands; compliance to SEC requirements need to be addressed based upon the final ESIA report.

| Biodiversity conservation | Risk Rating | Consequence | Guidance for SPOs |
|---|-------------|---|---|
| 1.8 Could the project involve or lead to procurement through primary suppliers of natural resource materials? | Moderate | Minor Project may possibly require procurement of natural resources through primary suppliers, and resource extraction is tightly regulated. Alternatives to procurement of natural resources through primary suppliers exists. | Bidding documents to consider eco-label specification as "minimum specification" or alternatively grant technical weight in bid evaluation for eco-labelled products whenever possible. Include in Bid Document construction materials should be sourced from Government approved supplier and sites |
| Resource Efficiency and Pollution Prevention | Risk Rating | Consequence | Guidance for SPOs |
| 2.1 Could the project involve or lead to the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts? | Moderate | Moderate Pollutants may possibly be released, either routinely or by accident, but treatment systems are proven and verified. Receiving environment is highly sensitive. | Waste management companies hiring as per EIA provision |
| 2.4 Could the project involve or lead to significant consumption of raw materials, energy, and/or water? | Moderate | Minor The project will require consumption of raw materials, energy, and/or water, but this will be a small component of the project, and impacts can be appropriately | Bid evaluation criteria to favour ethical and efficient use of raw materials, energy and water when feasible. |

| | | | |
|--|--------------------|---|---|
| | | managed. | |
| Community Health, Safety and Security | Risk Rating | Consequence | Guidance for SPOs |
| 6.3 Is there a possibility of harm or losses due to failure of structural elements of the project (e.g. collapse of buildings or infrastructure)? | Moderate | Moderate The project has significant reliance on buildings or infrastructure. Risk of failure is unlikely to lead to loss of life or significant environmental damage. The structural integrity of the required infrastructure has been independently verified. | Ensure relevant safety measures and emergency preparedness against natural or human hazards is included in the procurement documents. Bid and contract requires contractor to erect adequate warning signage's and also take up 3 rd party insurance and construction insurance. Independent assessment of structural integrity would be undertaken by government during construction. |
| 6.7 Could the project lead to the potential for gender-based violence, including sexual harassment, exploitation and abuse, as a result of labour influx, land redistribution, or other actions that alter community dynamics? | Moderate | Moderate Moderate changes to community dynamics may result in increased potential for gender-based violence or sexual exploitation. Gender-based violence interventions are integrated into project design. | Include in the general clauses of the bidding documents of suppliers, subcontractors and service providers compliance with IFAD's policy on preventing and responding to sexual harassment, exploitation and sexual abuse and mandatory references to security policies will be included in tender documents and concluded contracts. For Component 3 we will use IFAD SBD and for all other Components, National Bid Document, IFAD self-certification checklist and provision would be included in the bid document. |
| 6.8 Could the project lead to increases in traffic or alteration in traffic flow? | Moderate | Minor The project will result in minor increases to traffic volume. Only minor increase in risk of injury or death. | Applicable traffic rules and road safety measures in the rural road network will need to be adhered to and road signs installed as needed according to the national regulations. |
| 6.9 Could the project lead to an influx of project workers? | Moderate | Minor The project requires the employment of new labour, but workers can be sourced from local communities, and so influx is kept to a minimum, and risks are | Bid evaluation criteria to favour sourcing workers from the local communities whenever feasible for high value construction based on type of construction and required skill sets. Will included provision in the bid and contract, contractor will be asked to |

| | | | |
|--|--------------------|--|--|
| | | effectively managed. | hire skill and unskilled workers from the local area based on availability of this skilled or unskilled worker in the local areas. |
| 6.10 Could the project involve or lead to the engagement of security personnel to protect facilities and property or to support project activities? | Moderate | Minor A small number of security personnel are required, but they are well trained, and protocols are in place. | Periodic reporting of accidents and infringements to be included in contract conditions. Clauses to the included in the contract during pre-construction and construction stages. Post construction after hand over and operationalization this would be managed by Market Management Firm. |
| Physical and economic resettlement | Risk Rating | Consequence | Guidance for SPOs |
| 7.4 Could the project result in impacts on or changes to land tenure arrangements and/or community-based property rights/customary rights to land, territories and/or resources? | Moderate | Moderate The project will result in moderate changes to land tenure arrangements and/or community-based property rights/customary rights. Legal recourse and other forms of arbitration/conflict resolution are available. | Ensure consent of affected populations is obtained prior to any interventions impacting land tenure or property rights/customary rights to land, territories and/or resources. As part of prior review process, before start of bidding process for market infrastructure and other infrastructure. |

PIM Appendix 7: Terms of Reference

This appendix contains Terms of Reference (ToR) for key positions in the Project; describing the roles of both deputed government staff as well as hired project employees. When using these ToRs in procurement of services and other processes requiring external communication, they will be preceded by a brief description of the Project and its organization structure, as well as – if required – by additional information on remuneration, job conditions and assignment duration. All positions are for national staff, unless specifically mentioned otherwise.

List of Terms of Reference for Staff Provisioned in RHVAP

Contents

1..... Terms of Reference (ToR) for Planning, Monitoring & Evaluation Coordinator (PM&EC) **502**

2..... Terms of Reference (ToR) for Planning, Monitoring & Evaluation Specialist **504**

3..... Terms of Reference (ToR) for MEAL Officer **505**

4..... Terms of Reference (ToR) for Data Management Officer (DMO) **507**

5..... Terms of Reference (ToR) for Knowledge Management Officer **508**

6..... Terms of Reference (ToR) for Financial Management Specialist (FMS) **509**

7..... Terms of Reference (ToR) for Fund and Financial Management Officer (FFMO) **511**

8..... Terms of Reference for Financial Management Assistants **513**

9..... Terms of Reference for Environment and Social Safeguard Specialist **514**

10..... Terms of Reference for Procurement Officer **516**

11..... Terms of Reference (ToR) of Engineer **520**

12..... Terms of Reference (ToR) for Sub- engineers/Overseers **521**

13..... Terms of Reference (ToR) for Assistant Sub-engineers/Sub-Overseers **523**

14..... Terms of Reference (ToR) for Gender Social Inclusion and Targeting Specialist **525**

15..... Terms of Reference (ToR) for Value Chain and Business Development Specialist **529**

16..... Terms of Reference (ToR) for Business Development Officer **530**

17..... ToR for Producer Groups Strengthening Officer (PGSO) **532**

18..... Terms of Reference for Rural Finance Officer **533**

19..... Terms of Reference for Agro-ecology Specialist (AECS) **534**

20..... Terms of Reference for Agro-ecology crop officer (AECO) **536**

21..... Terms of Reference for Agro-ecology Livestock officer (AELO) **537**

22..... Terms of Reference for Agriculture Technician (AT) **539**

23..... Terms of Reference for Community Mobiliser (CM) **540**

24..... Terms of Reference for Coordinator - Service Provider **545**

25..... Terms of Reference for Administration & Finance Officer (AFO) **547**

Proposed Human Resources in R-HVAP by Component /Subcomponent

Table 54: Proposed Human Resources in R-HVAP by Component /Subcomponent

| | SC | Position | Type | Unit | No | PCO | Semlar SPIU | PPMO-3 | CO-3 | Remarks | ToR |
|---|----------|--------------------------------------|---------------|--------|----|-----|-------------|--------|------|---|-----|
| Component 1: Enhanced capacities for transitioning to market oriented agroecological production systems. | | | | | | | | | | | |
| 1. | 1.3 /1.4 | VC & Business Development Specialist | Contracted | Person | 3 | | | 3 | | | Y |
| 2. | 1.3/1.4 | Rural Finance Officer | Contracted | Person | 3 | | | 3 | | | Y |
| 3. | 1.2 | POs strengthening Officer | Contracted | Person | 3 | | | 3 | | | Y |
| 4. | 1.1 | Agro ecology Specialist | Contracted | person | 3 | | | 3 | | | Y |
| 5. | 1.3 | GESI and Targeting Specialist | Contracted | person | 1 | | | 1 | | Karnali PMO | Y |
| 6. | 1.2 | Coordinator - SP1 | Contracted SP | Person | 1 | | | 1 | | Karnali PMO | Y |
| 7. | 1.2 | Admin and finance officer | Contracted SP | Person | 1 | | | 1 | | Karnali PMO | Y |
| 8. | 1.2 | Agroecology Crops Officer | Contracted SP | person | 6 | | | 3 | 3 | | Y |
| 9. | 1.2 | Agroecology Livestock Officers | Contracted SP | person | 6 | | | 3 | 3 | | Y |
| 10. | 1.3/1.4 | Business Development Officer | Contracted SP | Person | 6 | | | 3 | 3 | | Y |
| 11. | 1.2 | Community Mobilization Officer | Contracted SP | Person | 6 | | | 3 | 3 | Unless POs strengthening officers are mobilized | |
| 12. | 1.2 | Knowledge Management Officers | Contracted SP | person | 3 | | | 3 | | | Y |
| 13. | 1.2 | Agricultural Technicians / JTA | Contracted SP | person | 80 | | | 40 | 40 | Per Palika | Y |
| 14. | 1.3/1.4 | Community Mobilizer | Contracted SP | Person | 80 | | | 40 | 40 | Per Palika | Y |
| Component 2: Improved access to climate resilient productive Infrastructure | | | | | | | | | | | |
| 15. | | Engineer | Contracted | | 3 | | | 3 | | | Y |
| 16. | | Sub-engineer / Overseer | Contracted | person | 3 | | | | 3 | | Y |

| | SC | Position | Type | Unit | No | PCO | Semlar SPIU | PPMO-3 | CO-3 | Remarks | ToR |
|--|----|---|-----------------------------|--------|----|-----|-------------|--------|------|---------|-----|
| 17. | | Asst Sub-engineer / Sub-Overseer | Contracted | person | 6 | | | 3 | 3 | | Y |
| Component 3: Semlar Agriculture Regional Wholesale Market (PIU) | | | | | | | | | | | |
| 18. | | Project Manager (Senior Engineer, Class II) | <i>GoN Deputed</i> | Person | | | 1 | | | | |
| 19. | | Deputy Project Manager, MoLMAC | <i>GoN Deputed</i> | Person | | | 1 | | | | |
| 20. | | Civil Engineer (Palika) | <i>GoN Deputed</i> | Person | | | 1 | | | | |
| 21. | | Account Officer | <i>GoN Deputed</i> | Person | | | 1 | | | | |
| 22. | | Accountant | <i>GoN Deputed</i> | Person | | | 1 | | | | |
| 23. | | Admin Asst | <i>GoN Deputed</i> | Person | | | 1 | | | | |
| 24. | | FIDIC Certified Engineer | <i>Contracted</i> | Person | | | 1 | | | | |
| 25. | | Env & Social Safeguard Specialist | <i>Contracted</i> | Person | | | 1 | | | | |
| 26. | | Procurement Officer | <i>Contracted</i> | Person | | | 1 | | | | |
| 27. | | Project & Construction Management | <i>Contracted – TA firm</i> | Person | | | 1 | | | | |
| 28. | | Civil Engineer | <i>Contracted – TA firm</i> | Person | | | 1 | | | | |
| 29. | | Electro-mechanical Engineer | <i>Contracted – TA firm</i> | Person | | | 1 | | | | |
| 30. | | Structural Engineer | <i>Contracted – TA firm</i> | Person | | | 1 | | | | |
| Technical / Management team | | | | | | | | | | | |
| 31. | | Financial Management Specialist | Contracted | Person | 1 | 1 | | | | PCO | Y |
| 32. | | Fund and Financial Management Officer | Contracted | Person | 3 | | 3 | | | | Y |
| 33. | | Financial Management Assistant | Contracted | Person | 3 | | | 3 | | | Y |
| 34. | | Procurement Officer | Contracted | Person | 4 | 1 | | 3 | | PCO | Y |
| Planning, Monitoring and KM | | | | | | | | | | | |
| 35. | | PME Coordinator | Contracted | Person | 1 | 1 | | | | PCO | Y |

| | SC | Position | Type | Unit | No | PCO | Semlar SPIU | PPMO-3 | CO-3 | Remarks | ToR |
|--|----|--|-----------------------|---------------|----------|----------|-------------|--------|------|--------------|-----|
| 36. | | PME Specialist | Contracted | Person | 3 | | 3 | | | | Y |
| 37. | | MEAL Officer | Contracted | Person | 3 | | | 3 | | | Y |
| 38. | | MIS & Data Management Officer | Contracted | | 3 | | 3 | | | Karnali PPMO | Y |
| Programme Coordination Unit (PCO) | | | | | | | | | | | |
| 39. | | Programme Coordinator (1 st Class) | GoN Deputed | Person | 1 | 1 | | | | | |
| 40. | | Deputy Programme Coordinator (Class II) | GoN Deputed | Person | 1 | 1 | | | | | |
| 41. | | Account Officer | GoN Deputed | Person | 1 | 1 | | | | | |
| 42. | | Admin assistant (GoN) | GoN Deputed | Person | 1 | 1 | | | | | |
| 43. | | <i>Driver</i> | <i>GoN Contracted</i> | <i>Person</i> | <i>1</i> | <i>1</i> | | | | | |
| 44. | | <i>Support Staff</i> | <i>GoN Contracted</i> | <i>Person</i> | <i>1</i> | <i>1</i> | | | | | |
| 45. | | <i>Sweeper</i> | <i>GoN Contracted</i> | <i>Person</i> | <i>1</i> | <i>1</i> | | | | | |
| 46. | | <i>Guard</i> | <i>GoN Contracted</i> | <i>Person</i> | <i>2</i> | <i>1</i> | | | | | |
| Provincial Programme Management Units (3 PPMO) in Karnali/Lumbini/Sudurpashchim Provinces | | | | | | | | | | | |
| 47. | | Senior Agriculture Officer /Provincial Programme Coordinator | GoN Deputed | Person | 3 | | | 3 | | | |
| 48. | | Planning and Monitoring Officer | GoN Deputed | Person | 3 | | | 3 | | | |
| 49. | | Account Officer | GoN Deputed | Person | 3 | | | 3 | | | |
| 50. | | Ranger | GoN Deputed | Person | 3 | | | 3 | | | |
| 51. | | Account Assistant | GoN Deputed | Person | 3 | | | 3 | | | |
| 52. | | Admin Assistant | GoN Deputed | Person | 3 | | | 3 | | | |
| 53. | | Junior Technical / Technical Assistant | GoN Deputed | Person | 3 | | | 3 | | | |
| 54. | | Driver | GoN Contracted | Person | 3 | | | 3 | | | |

| | SC | Position | Type | Unit | No | PCO | Semlar SPIU | PPMO-3 | CO-3 | Remarks | ToR |
|--|----|--|-----------------------|---------------|----------|-----|-------------|--------|----------|---------|-----|
| 55. | | Support Staff | GoN Contracted | Person | 3 | | | 3 | | | |
| 56. | | Sweeper | GoN Contracted | Person | 3 | | | 3 | | | |
| 57. | | Guard | GoN Contracted | Person | 6 | | | 3 | | | |
| Cluster/Corridor Offices (COs) – Karnali-2: Lumbini-1 | | | | | | | | | | | |
| 58. | | Agriculture Officer / Corridor Coordinator | GoN Deputed | Person | 3 | | | | 3 | | |
| 59. | | Accountant | GoN Deputed | Person | 3 | | | | 3 | | |
| 60. | | Admin Assistant | GoN Deputed | Person | 3 | | | | 3 | | |
| 61. | | Junior Technical / Technical Assistant | GoN Deputed | Person | 3 | | | | 3 | | |
| 62. | | <i>Driver</i> | <i>GoN Contracted</i> | <i>Person</i> | <i>3</i> | | | | <i>3</i> | | |
| 63. | | <i>Support Staff</i> | <i>GoN Contracted</i> | <i>Person</i> | <i>3</i> | | | | <i>3</i> | | |
| 64. | | <i>Sweeper</i> | <i>GoN Contracted</i> | <i>Person</i> | <i>3</i> | | | | <i>3</i> | | |
| 65. | | <i>Guard</i> | <i>GoN Contracted</i> | <i>Person</i> | <i>6</i> | | | | <i>3</i> | | |
| | | Total | | | | | | | | | |

1. Terms of Reference (ToR) for Planning, Monitoring & Evaluation Coordinator (PM&EC)

| | |
|-----------------------|--|
| Position: | Planning, Monitoring and Evaluation Coordinator |
| No of Positions | 1 |
| Reports to: | Programme Coordinator |
| Supervises: | PME staffs |
| Duty station: | PCO |
| Summary of role: | The PM&E coordinator is overall responsible for planning and setting up the M&E systems based on the log-frame within the Programme including providing timely and relevant information to PCO and Programme stakeholders. S/he is also responsible for implementation of M&E strategy and M&E plan and conduct regular evidence-based review of progress and decision making, including using data and analysis generated from the programme M&E, MIS and knowledge activities. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to end of Programme based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <p>Planning:</p> <ul style="list-style-type: none"> • Prepare Annual Work Plan and Budget (AWPB) in consultation with the Province and Corridor team ensuring alignment with Programme strategy and ensure regular analysis on AWPB implementation, project performance, outcomes, and impact. • Collect and Consolidate the AWPB of Provincial, Corridor and Semlar Project Implementation unit as single RHVAP AWPB and facilitate PC to get no objection from IFAD and approval from PSC, and subsequent entry in LMBIS and SUTRA. • Organize review workshops at different levels to get feedback for planning to the next cycle and also organize planning workshops for the endorsement of the plans prepared. <p>M&E:</p> <ul style="list-style-type: none"> • Develop and maintain a comprehensive M&E system to be fully described in a comprehensive M&E Manual (as part of the PIM), including detailed methodologies, tools (standard data collection forms and analysis tables), processes and responsibilities for the monitoring of Programme implementation (activities, outputs) and the measurement of results (outcomes and impact). • Help develop and maintain a Management Information System (MIS) for the recording of M&E data and the preparation of standard consolidates tables for the tracking of activities, outputs and outreach. • Prepare the TOR for the baseline, mid-term and completion surveys and provide the appropriate guidance to the selected service providers in order to ensure timely and reliable survey reports. • Design and conduct periodic qualitative outcome surveys, including Annual Cluster Tracking Surveys (in close consultation with PPMO) in order to collect data and evidence of early outcomes or feedback from beneficiaries. • Provide the necessary initial training and continuous guidance and technical support to all staff and grassroots implementers in charge |

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| | <p>of data collection in order to ensure data quality and reliability.</p> <ul style="list-style-type: none"> • Organize systematic process for routine field visits and verification of the accuracy, validity and completeness of M&E data; and collect formal and informal feedback from programme beneficiaries on their satisfaction with project activities. • Prepare quarterly, half-yearly and annual progress reports, thematic survey reports, and ad-hoc technical reports in accordance with approved reporting formats and ensure their timely submission to IFAD and Government of Nepal (GoN). • Prepare consolidated ORMS tables and other data tables, and regular update of Log frame indicators to be submitted annually to IFAD. • Ensure MIS are up to date with data from all components/subcomponents on regular basis and review the quality of existing data and take measures as needed and ensure data generated from the MIS are linked with project log frame and IFAD operational Result Management System (ORMS). • Identify implementation problems, bottlenecks or delays and inform Programme Management about the need for corrective actions. <p>Knowledge management:</p> <ul style="list-style-type: none"> • Prepare a KM strategy and Plan identifying the key knowledge areas, tools and processes for the collection of required data, information and evidence and sharing of knowledge, lessons learned and best practices. • Ensure that lessons learned, and best practices are properly identified and documented through various means (studies, videos, case studies, print and web articles) and that they are regularly shared to the relevant audience (Programme partners, policy makers, development partners) through appropriate means (including the participation in relevant meetings and events). • Regularly maintain and update information of programme activities and progress on website and regional knowledge platform (IFAD Asia blog) and social media etc. to communicate about programme as well as sharing news and success cases. • Organize and facilitate knowledge sharing workshops and events. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Masters' degree in development, communication or equivalent with at least 10 years of professional experience in development field • At least 7 years of experience in Programme planning and operation of M&E systems of development Programmes. • Sound Knowledge of M&E and KM methods and approaches including quantitative, qualitative, and participatory approaches • Experienced in M&E development and implementation and/or facilitating learning-oriented analysis sessions of M&E data and KM with multiple stakeholders, data management and information analysis. • Computer literacy, with proficiency in Word, Excel, Power Point and data management software (Access, SPMS) • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. <p>Preferences given to:</p> |

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| | <ul style="list-style-type: none"> • Experience in working with agriculture Programme and data management through MIS operations. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

2. Terms of Reference (ToR) for Planning, Monitoring & Evaluation Specialist

| | |
|------------------------------|---|
| Position: | Monitoring and Evaluation Specialist |
| No of Positions | 3 |
| Reports to: | Provincial Programme Coordinator /PME coordinator |
| Supervises: | MEAL Officer |
| Duty station: | Respective Provincial Programme Management Unit (PPMO) |
| Summary of role: | M&E Specialist is responsible for implementation of M & E strategy within the Programme including providing timely and relevant information to PCO, PMO and Programme stakeholders. S/he is also responsible for implementation of M&E plan efficiently and effectively. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to end of Programme based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Support the PM&E Coordinator to develop and maintain a comprehensive M&E system for the monitoring of Programme implementation (activities, outputs) and the measurement of results (outcomes and impact). • Support the PM&E coordinator in preparing Provincial level annual work plan and budget (AWPB) in line with the Agro-ecological cluster plan with support of corridor office, relevant stakeholders and the team. • Help develop and maintain Management Information System (MIS) at PMO for the recording of M&E data and the preparation of standard consolidates tables for the tracking of activities, outputs and outreach. • Organize periodic field visits to verify the quality and validity of M&E data submitted by POs and partners. and collect formal and informal feedback from Programme beneficiaries on their satisfaction with Programme activities in the respective Province. • Prepare regular analysis on Provincial AWPB implementation, Programme performance and outcomes and impact. • Support PM&E Coordinator to prepare the TOR for the baseline, mid-term and completion surveys and provide the appropriate guidance to the selected service providers in order to ensure timely and reliable survey reports. • Support PM&E coordinator to design and conduct periodic qualitative outcome surveys, including Annual Cluster Tracking Surveys (in close consultation with PMO & CO staff) to collect data and evidence of early outcomes or feedback from beneficiaries. • Provide the training, and continuous guidance/support to PMO / CO staff and service Provider in charge of data collection in order to ensure data quality and reliability. • Prepare quarterly, half-yearly and annual progress reports for submission |

| | |
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| | <p>to PCO in timely manner.</p> <ul style="list-style-type: none"> • Prepare consolidated ORMS tables and other data tables, and regular update of Logframe indicators within the province, to be submitted annually to IFAD. • Identify implementation problems, bottlenecks or delays and inform Management about the need for corrective actions. <p>Knowledge management:</p> <ul style="list-style-type: none"> • Facilitate and Support in implementation of KM strategy and Plan for the documentation and sharing of knowledge, lessons learned and best practices. • Ensure that lessons learned, and best practices are properly identified and documented through various means (studies, videos, case studies, print and web articles) and regularly shared to the relevant audience through appropriate means (including the participation in relevant meetings and events). • Organize and facilitate knowledge sharing workshops and events in the Province and cluster. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • University degree (economics, humanities, rural development, or equivalent) • At least 5 years of experience in the operation of M&E systems of development Programmes • Computer literacy, with proficiency in Word, Excel, PowerPoint and data management software • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good inter-personal skills and capacity to work effectively with a range of institutions. <p>Preferences given to:</p> <ul style="list-style-type: none"> • Experience in working with agriculture Programme and data management through MIS operations. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

3. Terms of Reference (ToR) for MEAL Officer

| | |
|------------------|---|
| Position: | Monitoring, Evaluation and Learning (MEAL) Officer |
| No of Positions | 1 |
| Reports to: | PME Coordinator/Monitoring & Evaluation Specialist |
| Supervises: | Social Mobilization Team |
| Duty station: | PMO/ Corridor Office |
| Summary of role: | MEAL Officer at the Corridor Offices is responsible for Programme implementation at the corridor level and maintaining the records |

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| | /measuring the achievements from the implementation of the plan. The PM&E officer collects data and information on a regular basis, and feeds the M&E system of the Project. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to end of Programme based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • M&E: • Support the PM&E Specialist in preparing AWPB and implementation of M & E strategy and plan for monitoring the project activities at Corridor level • Support PME team conducting baseline study, identify sources of data, collection methods, who collects data, how often, cost of collection and who analyses it, with strong verification mechanisms. • Organize Corridor Level annual planning and periodic review meeting ensuring the involvement of concerned Palikas. collect feedback for further improvement in the process. • Prepare trimester, annual and periodic progress report emphasizing on results and impacts. • Identify best practices, lessons generated through implementation. capture, distil and produce various types of KM products • Undertake regular field visits to support implementation of M&E and to identify where consolidations might be needed. • Work closely with PM&E Specialist and the Data Management Officer to execute GIS-based mobile M&E and MIS System at the Corridor Level • Any other tasks as directed by the M & E Specialist and Corridor Coordinator <p>Knowledge management:</p> <ul style="list-style-type: none"> • Support in implementation of KM strategy and action Plan • Facilitate the processes for the documentation and sharing of knowledge, lessons learned and best practices. • Organize and facilitate knowledge sharing workshops and events. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Masters' degree in monitoring and evaluation, development studies, management or related discipline • At least 5 years' of professional work experiences with years' in the field of P M&E • Proven ability of development and implementation and/or facilitating learning-oriented analysis of M&E data. • Proven capacity to use Computer based data processing and information analysis. • Willingness to undertake regular field visits and interact with different stakeholders, especially primary stakeholders. • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good inter-personal skills and capacity to work effectively with a range of institutions. <p>Preferences given to:</p> <ul style="list-style-type: none"> • Experience in working with agriculture Programme and data |

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| | management through MIS operations. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

4. Terms of Reference (ToR) for Data Management Officer (DMO)

| | |
|-----------------------------|---|
| Position: | Data Management Officer |
| No of Positions | 3 |
| Reports to: | PC & M&E Specialist |
| Supervises: | n/a |
| Duty station: | PMO with frequent visits to Programme districts |
| Summary of role: | The Data Management officer work closely with M&E and KM specialist and in coordination with RHVAP thematic team for developing the GIS in-built Programme Management Information System (MIS) system and its operation as required. S/he is also responsible to ensure quality of data collection and data entry as stipulated in the M&E Plan in timely manner. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to end of Programme based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Support the M&E Specialist to establish the project MIS and GIS systems (MIS) as per the M & E Plan. • Manage the MIS system within the PMO including that of the corridor teams. • Suggest from time-to-time improvements in the MIS system if deemed necessary. • Prepare the specification of the IT software and hardware required for smooth operation of the IT system within the programme and assist the Procurement officer in procuring these goods and services. • Extend support to the team members to install navigate through the MIS system and feed in necessary data to the MIS database. • Ensure the regular operation of the IT equipment's and IT system including maintenance and repairing as required. • Facilitate and support in identifying potential competent website developer in developing programme website's and maintain the website of the programme working with M&E specialist. • Prepare the TORs for external service providers providing services in the field of IT, be in touch with such service providers and ensure that their service is as per the expectation of the programme. • Undertake any other works as assigned by the M&E and KM Specialist and the Programme Coordinator. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Bachelor's degree in information management, Computer Software Application, Computer Engineering or any other field related to Information Technology with at least five years' proven experiences in database management or Masters' in above mentioned subject with three years' experience. • Experience in handling MIS of development programmes. knowledge to |

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| | <p>handle MySQL and PHP server.</p> <ul style="list-style-type: none"> • Working knowledge of hardware and software systems and ability to design database management software. • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good inter-personal skills and capacity to work effectively with a range of institutions. <p>Preferences given to:</p> <ul style="list-style-type: none"> • Ability to troubleshoot the general hardware and software problem. • Understanding of the Results and Impact Management System (RIMS), and Annual Outcome Survey and Programme Completion Survey programmes. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

5. Terms of Reference (ToR) for Knowledge Management Officer

| | |
|-----------------------|---|
| Position: | Knowledge Management Officer (KMO) |
| No of Positions | 3 |
| Reports to: | Coordinator- Partner Service Provider & Monitoring & KM Specialist |
| Supervises: | n/a |
| Duty station: | Respective Provincial Management Office (PMO) |
| Summary of role: | Under the guidance of M & E Specialist, Knowledge Management Officer (KMO) will be responsible for implementing the Programme Knowledge Management Strategy and action plans. S/he will work closely with all the thematic team to for collecting, capturing, and communicating best practices, lesson learned, and success stories related to Programme activities and their dissemination. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to end of Programme based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Facilitate and Support in implementation of KM strategy and Plan for the documentation and sharing of knowledge, lessons learned and best practices. • Coordinate with thematic team in implementing knowledge management and outreach strategy and action plans to identify, analyse, document and disseminate lessons learned of Programme activities in particular market oriented agro-ecological farming practices and related participatory research and development. • Systematically document evidence-based knowledge and its learnings generated over the years showcasing the Programme's contribution to impacts and RHVAP outcomes; • Consolidate a culture of lessons learned in the Programme outcome and results in poverty reduction, improved agriculture technologies, effective production and marketing services, fund management |

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| | <p>through POs, and local bodies;</p> <ul style="list-style-type: none"> • Assist M&E team in developing knowledge sharing and learning infrastructure and foster partnerships for broader knowledge-networking. • Ensure the use of knowledge in evidence-based advocacy and in the development and application of contextualised solutions. • Prepare and publish quality newsletters, leaflets, blogs, success stories, practice brief, audio -visual materials and lesson learned on agro-ecological farming system, value chain development, community infrastructure, FEBL, including decentralized Planning Process • Ensure that lessons learned, and best practices are properly identified and documented through various means (studies, videos, case studies, print and web articles) and regularly shared to the relevant audience through appropriate means including social media. • Organize and facilitate knowledge sharing workshops and events in the Province and cluster. • Maintain and update information on programme website and regional knowledge platform. • Undertake any other duties as requested by Coordinator. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Master degree in journalism or mass communication or social science with at least three years of experience in communications and knowledge products development; Demonstrated experience with writing articles and text for professional publications, development of audio-visuals, web-based and other social media outreach. • Experience on knowledge management, developing best practices and dissemination for wider policy influence. • Good command in English and Nepali language, both written and spoken; • Good interpersonal skills and the ability to work effectively with a range of institutions including government, I/NGOs and private sector; • Motivated, and capable of working under pressure. <p>Preferences will be given to:</p> <ul style="list-style-type: none"> • Working experience with agriculture projects preferably sustainable agriculture and agriculture value chain development. • Understanding of the planning and reporting system and procedures of IFAD |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

6. Terms of Reference (ToR) for Financial Management Specialist (FMS)

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| Position: | Financial Management Specialist (FFMS) |
| No of Positions | 1 |
| Reports to: | Programme Coordinator |

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| Supervises: | n/a |
| Duty station: | PMO with frequent visits to Programme districts |
| Summary of role: | The Financial Management Officer will be responsible to streamline the financial flow, financial reporting in meeting the standards of both Government of Nepal as well as those of IFAD. S/he is also responsible for collection of required financial information, consolidate them, prepare withdrawal applications and Programme financial statements/reports for submission to IFAD for reimbursement. S/he is expected to work closely with the government deputed Accounts Officer and ensure that the seamless flow of Programme resources and timely execution of Programme activities. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to end of Programme based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Assist the PMT in preparing the Annual Work plan and Budget • Prepare annual Fund flow plan based on the annual work plan and budget, get it approved from Accounts Chief, PM and intimate the same to IFAD. • Guide the Programme team in preparing the annual fund requirement for their activities as per the Annual Work plan • In close consultation and under the guidance of the Account Officer and the PC, assess the necessary accounting and management report requirements including trial balance, bank reconciliation (cash flow statements), withdrawal applications as per IFAD needs and identify the accounting software capable of meeting these needs. • Assist the Account officer in installing and operationalization of a Programme wide accounting software that will be capable of Programme expenditure by category, by component and activity and the MIS requirement • Maintain essential financial recording, stock management and reporting system as per the PIM. • Assist the Programme Manager and the Account Officer in timely withdrawal applications at least once in each trimester for replenishment of Designated Accounts in USD or reimbursement in GON treasury and ensure that correct supporting documents are submitted. currency conversions are done in accordance with IFAD requirement and sent to IFAD within the agreed time schedules. • Ensure that all program consolidated reports are prepared and sent to IFAD and meet the IFAD reporting requirement and deadline. • Ensure that flow of funds from IFAD to PMO, as well as from PMO to district program offices and other line agencies are disbursed in accordance with the approved AWPB. • Ensure that the budget as well as the actual expenditure are in accordance with the IFAD Financing Agreement. • Ensure that the Programme accounts are audited in time by the Auditor General's Office and audit reports are sent to IFAD by mid-January each year. • Ensure that consolidated Log of Audit Observations and Table of Summary Report of Audit Observations are prepared and maintained of and followed up on a regular basis for their settlement. • Participate in the preparation and maintenance of consolidated program Log of Audit Observation and Table of Summary Report of Audit Observations |

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| | <ul style="list-style-type: none"> • Assist corridor and district program accountants in the preparation of statements of accounts for regular reporting and auditing, and in the speedy resolution of audit objections and observations. (Monthly) • Ensure collection of timely statements from the province and corridor teams • Work with the PM&E team in setting up the mechanism that allows the measuring the extent of financial fund flow too various Programme activities. • Provide orientation and necessary training to the Corridor Admin & Finance Officer and other staff involved in program financial management. • Prepare financial reports to be submitted to the GON and IFAD • Conduct periodic visits to the corridor and ascertain that the activities are undertaken as per the normal financial rules and report the discrepancies if any. • Undertake any other duties as requested as directed by Programme Coordinator. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Master’s degree or higher in finance, Financial Accounting, economics, business administration, or equivalent. Chartered Accountant will be preferable. • At least seven years of experience working with financial operations and contract management positions. • Practical experiences of preparing withdrawal applications, programme financial statements and other periodic financial reports of donor funded project/programme. • Sound Knowledge of Nepalese and International Accounting Standards, MS Office suite including MS Excel and computerised accounting software including ERP software. • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good interpersonal skills and the ability to work effectively with a range of institutions. <p>Preferences given to:</p> <ul style="list-style-type: none"> • Candidate with experience in managing financial/contract aspects within development project/programme funded by donor agencies preferably by the multilateral financial organizations. • Understanding of the financial rules and procedures followed by IFAD. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

7. Terms of Reference (ToR) for Fund and Financial Management Officer (FFMO)

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| Position: | Fund and Financial Management Officer (FFMO) |
| No of Positions | 3 |

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| Reports to: | Provincial Programme Coordinator /Financial Management Specialist |
| Supervises: | Admin & Finance Officer (SP)/ Accounting Assistant |
| Duty station: | PMO with frequent visits to Programme districts |
| Summary of role: | The Fund and Financial Management Officer (FFMO) will be responsible for effective management of RHVAP's various investments funds and contracts with programme beneficiaries including financial and all procurement activities in coordination with programme management team. S/he is expected to work closely with the government deputed Accounts Officer at Province in coordination with FMS and ensure that the seamless flow of programme resources and timely execution of programme activities. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to end of Programme based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Overall responsible for setting up criteria, procedures, and processes for effective operation & management of programme co-investment funds in line with the programme stipulated objectives. • Facilitate and support Programme team in processing and evaluation of sub project co-investment proposals and business plan including monitoring of fund utilization and assessment of outputs and impact. • Facilitate and support Programme Management on drawing up and advertising tender documents, ensuring the rigorousness of tender evaluation, prepare contract documents and monitoring of the contract adherence. • Supporting the Programme Coordinator and Accounts Officer at Province in financial management and procurement including development of procurement plan and follow up, financial management procedures and information flows. • Work in close consultation with Accounts Officer and Programme Coordinator to establish and maintain essential financial recording, stock management and reporting systems for Programme operations according to the Programme Implementation Manual. • Support FMS in preparing and submission Withdrawal Applications (WA) for replenishment in Designated Accounts in USD or reimbursement in GON treasury. • Ensure that all programme consolidated reports are prepared and sent to PCO so as to meet the IFAD reporting requirement and deadline. • Assist the Province and corridor office Team with the preparation of Results-Based Annual Work Plan and Budget (RB-AWPB) • Ensure that the budget as well as the actual expenditure are in accordance with the Financing Agreement between the GON and IFAD. • Check and ensure all procurement functions are in accordance with IFAD/Government of Nepal procurement guidelines and procedures for implementation of proposed activities. • Develop Procurement plan, execute, review as required and update according to the progress. • Provide orientation and necessary training to the Corridor and service providers' Accountants' and the staff involved in Project financial management. • Undertake any other duties as requested as directed by Provincial |

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| | Programme Coordinator |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Master's degree or higher in finance, Financial Accounting, economics, business administration, or equivalent. • At least five years of experience working with financial operations and contract management positions. • Sound Knowledge of Nepalese and International Accounting Standards, MS Office suite including MS Excel and computerised accounting software including ERP software. • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good interpersonal skills and the ability to work effectively with a range of institutions. <p>Preferences given to:</p> <ul style="list-style-type: none"> • Candidate with experience in managing financial/contract aspects within development project/programme funded by donor agencies preferably by the multilateral financial organizations. • Understanding of the financial rules and procedures followed by IFAD |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

8. Terms of Reference for Financial Management Assistants

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| Position: | Financial Management Assistants (FMA) |
| No of Position | 6 |
| Reports to: | Accounts Officer & FFMS |
| Supervises: | n/a |
| Duty station: | Corridor Offices |
| Summary of role: | Ensuring overall financial management, administration and reporting of the programme under the guidance of Finance/Account Section. s/he will ensure the rapid and efficient functioning of data entry including the quality assurance and control procedures related with finance and account. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The contract will be extendable annually up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Checking supporting documents of the Programme expenditures and advance. • Preparing payment and adjustment vouchers. • Maintaining the Programme accounts as per requirement of the Programme. • Preparing monthly bank reconciliation statements of the designated and Programme bank accounts. • Preparing monthly financial report with the actual and budgeted figures for each activity and the variance thereof. |

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| | <ul style="list-style-type: none"> • Making timely payment of expenditures incurred for Programme activities and advances. • Following up with the implementation partners and Programme staff to ensure that they submit their monthly statements within the stipulated time. • Preparing the financial statements in the format required for preparation of the withdrawal application for submission to PMO. • Support to prepare or prepare Contract Register in the format prescribed by IFAD. • Providing accounts, statements and other documents as may be required by the Statutory/ Internal Auditor to ensure the timely completion of their assignment. • Maintaining the record of fixed assets, contract register and contract monitoring forms. • Conduct physical verification of fixed assets. • Perform any other day-to-day finance and bookkeeping works as instructed by Finance/Account Section • Other office related function as assigned by Finance/Account Section. |
| Experience & qualifications | <p>Qualification:</p> <ul style="list-style-type: none"> • Post-graduate degree in Commerce and Accounting/business management with minimum 2 years of experience in financial accounting of Programme/company. • Computer literacy and proficiency in accounting software and use of spread sheets. • Good knowledge of accounting. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

9. Terms of Reference for Environment and Social Safeguard Specialist

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| Position: | Environmental and Social Safeguards Specialist |
| No of Positions | 1 |
| Reports to: | Semlar Project Implement Unit Coordinator |
| Supervises: | Contractor climate, environmental, and social safeguards team, and M&E team |
| Duty station: | Semlar SPIU |
| Summary of role: | Environmental and Social Safeguards Specialist is responsible for implementation of SECAP requirements, including ESCMP, in wholesale market pre-construction, construction and operation phases and providing timely and relevant information to SPIU, PPMO and Programme stakeholders. S/he is responsible for supervise contractors' safeguards team for quality implementation of Safeguards related activities. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to end of Programme based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main | <ul style="list-style-type: none"> • Provide technical support to SPIU in all aspects of social, climate, and environmental safeguards and risk management, including guidance to |

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| responsibilities | <p>SPIU team on Safeguards issues, documentation, and quality assurance.</p> <ul style="list-style-type: none"> • Overall lead on implementation and monitoring of ESCMP and all SECAP requirements. • Supervise and assess performance of contractors in terms of implementation of ESCMP and EIA recommended mitigation measures including the implementation of stakeholder engagement, and grievance redress mechanism. • Inclusion of ESCMP in bidding documents and other applicable contracts. • Ensure recommendation from flood risk assessment and ESCMP mitigation measures are well integrated into the market design, • Facilitate SPIU on compensation plantation and supervise on its management. • Technically support contractor’s Safeguards teams on identification of issues and mitigation measures, and quality integration them on regular activities. • As needed, conduct the social and environmental assessment and prepare relevant social and environmental safeguards instruments (applicable mainly under contexts requiring simple safeguards instruments during the early stages of project implementation), in close consultation with SPIU. • Monitor the implementation of Safeguards Related Technical Assistance and studies including social baselines, application of simple and practical implementation tools such as checklists, standard operating procedures, codes of practice; and others; • Support the preparation and implementation of the Social and Environmental Safeguard Training Program for the Project as needed. • Be responsible for the social and environmental safeguards aspects of the reports and provide inputs to the Environmental and Social Monitoring reports, including timely information on the implementation of relevant social and environmental safeguard instruments, and status of analytical work; Coordinate with the M&E staff and consultants in the respective member on monitoring the specific gender commitments under the Project; • Ensure that considerations must be given to compliance with local and national labour laws and relevant core labour standards where different populations are inducted into the workforce by civil works contractors, and subcontractors. • Prepare the report, reporting procedures and template; • Organize and participate in Project-related missions and workshops, and ensure that IFAD recommendations are integrated in the implementation of social and environmental safeguards; • Implement additional environmental mitigation measures, and social issue as necessary. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • University degree (social and environmental science, climate change, or related field) • Familiarity with Government of Nepal’s safeguards policies; and |

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| | <p>IFAD and IFC's social and environmental safeguards policy, as well as their climate change adaptation and resilience mainstreaming standards.</p> <ul style="list-style-type: none"> • At least 7 years' experiences in supporting safeguards in the context of infrastructure projects, • Experience in mentoring, providing on-the-job training, and professional support; • Capability to work effectively with international and other national staff, and communicate effectively with relevant government officials and community members, to balance diverse tasks and priorities simultaneously; • Strong English language skills, and evidence of report writing ability and communication skills are essential; • Good communication and interpersonal skill with gender sensitivity, respect for local culture and results oriented attitude; • Reliable, independent and dynamic worker with high social competency and good team spirit; and • Willingness and ability to travel to the Project sites. • |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

10. Terms of Reference for Procurement Officer

| Position | Procurement Officer |
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| No of Position | 1 |
| Reports to: | Programme Coordinator |
| Supervises: | FFMS |
| Duty station: | PCO |
| Summary of role: | The Procurement Officer (PO) streamlines the procurement process by ensuring the procurement rules, regulations, and procedures of the GON and IFAD for the procurement goods and services by the programme. S/he works in direct guidance of the Programme Manager and works closely with the staff members charged with administration and financial management functions of the Programme. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Review the procurement Procedures laid out in the PIM and suggest necessary changes, if any, to the PM in order to ensure cost effective and transparent procurement system in the Programme. • Prepare the procurement plan for the Programme, facilitate PM to get no objection from IFAD and approval from PSC and update it periodically for no objection from IFAD. • Prepare required documents for the procurement of goods, works, and services including drafting of tender/bids notices, contract documents (Terms of References, Expressions of Interests, Requests for Proposals, Request for Quotations etc.), specifications, |

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| | <p>bill of quantities, cost estimates, work schedules, evaluation criteria etc. with required inputs from the technical experts in the PPMO.</p> <ul style="list-style-type: none"> • Provide support to procurement & evaluation committee at PCO & PPMO level for pre-qualification, short-listing, organization of pre-bid meetings, preparing answers/clarifications/modifications and bid opening. • Examine bids/proposals. (i) organize technical evaluation committees meeting and participate as appropriate. and (ii) prepare evaluation reports. • Identify the potential members of the external evaluation panel of bids and proposals, if so required. • Act as Secretary of the evaluation committee and minute the decisions of the meeting. • Assist in organizing negotiation meetings, negotiating with bidders, as and when required, and prepare contract documents, for approval by the concerned authority and the IFAD. • Ensure that all decisions on procurement of goods, works and services or the awarding of competitive or partial grants are fully documented and made available, as requested, through annual reports or such other format as may be deemed appropriate. • Conduct periodic monitoring visit of Province and Corridor Offices and implementing partners as well as the service providers to track the progress and procedures as agreed on approved procurement plan. • Update consolidated register of contracts and monitor contracts on regular basis. • Support PPMO in contract management. • Prepare the table of milestones for ensuring the timely delivery on each procurement and monitor it regularly. • Actively monitor and manage the progress of procurements against the applicable Procurement Plan. • Any other tasks as directed by the PC. |
| <p>Experience & qualifications</p> | <ul style="list-style-type: none"> • Required • Postgraduate (Masters') or higher degree in Engineering, Procurement management, Law or Financial management • Seven years of professional work experiences with development programs/projects with at least five years' experiences of handling procurement activities • Sound knowledge of Government of Nepal's Public Procurement Act, Rules and Policies • Excellent communication skills and ability to work in a multi-disciplinary team • Knowledge of procurement processes of the bi-lateral or multilateral donor agencies • Excellent working knowledge of MS Office suite • Fluency in spoken and written and English and Nepali <p>Preferences will be given to</p> <ul style="list-style-type: none"> • Experiences of handling procurement work in a development project. Knowledge of World Bank, ADB, UN procurement rules and procedures will be an added advantage. |
| <p>Salary and Benefits</p> | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines |

Additional considerations for Terms of Reference (ToR) for Procurement Expert

Position: Procurement Expert (PE)

Duration: Programme Period

Duty station: Programme Coordination Unit (PCO) at federal level

Report to: Programme Coordinator (PC)

Mode of Contract: Rolling annual contract with a probation period of six months. The contract will be extendable annually up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme.

Roles and purpose of the assignment

The Procurement Expert (PE) is responsible to streamline the procurement process by ensuring the procurement rules, regulations and procedures of the GoN and IFAD. S/he works under the direct guidance of the Programme Coordinator in close coordination with the staff members charged with administration and financial management functions of the Programme. S/he is responsible for imparting training to the relevant staffs and the staff members of the implementing partners and the service providers. S/he is also responsible to ensure quality of goods and services procured by the Programme.

Key responsibilities and duties

- Review the procurement procedures laid out in the Programme Implementation Manual (PIM) and suggest necessary changes, if any, to the PC in order to ensure cost effective and transparent procurement system in the Programme;
- Assist the PC and Planning team in preparing the Annual Work plan and Budget (AWBP);
- Prepare, upgrade and update of Procurement Plan on IFAD's OPEN online procurement End to End System including updating of contractual data in the system;
- Prepare the procurement plan for the Programme, facilitate PC to get no objection from IFAD and approval from PSC and update it periodically for no objection from IFAD;
- Prepare required documents for the procurement of goods, works, and services including drafting of tender invitations/bids notices, contract documents (Terms of References, Expressions of Interests, Requests for Proposals, Request for Quotations etc.), specifications, bill of quantities, cost estimates, work schedules, evaluation criteria etc. with required inputs from the technical Officers in the PCO;
- Participate in/Provide support to procurement & evaluation committee for pre-qualification, short-listing, organization of pre-bid meetings, preparing answers/clarifications/modifications and bid opening.
- Examine bids/proposals; (i) organize technical evaluation committees meeting and participate as appropriate; and (ii) prepare evaluation reports;

- Conduct due diligence for the winning bidder by undertaking background/reference/credit checks to determine financial and operational capacity to perform the scope of work
- Identify the potential members of the external evaluation panel of bids and proposals, if so required, get necessary approvals and provide the necessary support to the external evaluation panel, maintain minutes of the panel meetings;
- Assist in organizing negotiation meetings, negotiating with bidders, as and when required, and prepare contract documents, for approval by the concerned authority and the IFAD;
- Manage procurements which are subject to prior review and approval by IFAD's. Support the PCO to ensure the IFAD No Objection is obtained;
- Ensure that all decisions on procurement of goods, works and services or the awarding of competitive or partial grants are fully documented and made available, as requested, through annual reports or such other format as may be deemed appropriate;
- Support Programme team in adhering GoN and IFAD rules, regulation and procedures for the value chain co-financing and infrastructure development activities.
- Update consolidated register of contracts and monitor contract on regular basis and Support PCO in contract management;
- Ensure adherence to laws, rules, procedures, decisions of the PSC and IFAD joint missions as well as directives of the government and IFAD
- Support the Programme in following up on any issues related to Procurement, identified in the Supervision Mission Report and Audit Report.
- Actively monitor and ensure the progress of procurements against the applicable Procurement Plan;
- Assist the MoALD on the issues related to procurement as required.
- Professionally discharge other tasks as directed by Programme Coordinator and PCO.

Qualification, experience and competencies

- Masters or higher degree in engineering, procurement management, business management, economics, law or financial management with more than 7 years of professional work experiences in procurement of goods, works and services with development projects/Programmes;
- Sound knowledge of Government of Nepal's Public Procurement Act, Rules and Policies

- Good interpersonal skills, networking and ability to work in a multi-disciplinary team and facilitate the working of other team members;
- Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills;
- Proficiency with Microsoft Office Suite; and computerized accounting software

Preferences will be given to

- Candidate having experiences of handling procurement work in a development project. Knowledge of IFAD, World Bank, ADB and UN procurement rules and procedures will be highly preferred.

11. Terms of Reference (ToR) of Engineer

| Position: | Engineer |
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| No of Position | 1 (one) |
| Reports to: | Provincial Programme Manager |
| Supervises: | Infrastructure team deputed at Corridor Offices |
| Duty station: | PPMO with considerable visits to Programme Districts. |
| Summary of role: | The Engineer is responsible for overall planning, implementation, monitoring and reporting of Programme infrastructures activities. S/he will work closely with programme staff and with concerned Palikas within Province for selection of sub- project, as identified in the Agro-ecological cluster plans and ensure the quality of the constructed infrastructures are fully adequate and met requirements to attain the objective set out by the programme. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Develop standard and guidelines for quality assurance check and quality control system for infrastructures construction, aligning with the existing ones and support for its implementation. • Take overall responsibility for detail design, construction, supervision, and quality control of the infrastructures works supported within the programme. • Supervise the work of the Corridor team and guide them to develop detailed drawings, specifications, and bill of quantities (BoQ) of community & market-led infrastructures. • Monitor and supervise the construction of infrastructures constructed under programme support to ensure compliance with the drawings and specifications ensuring quality and required standard. • Ensure all sub-project designs and implement reflect appropriate climate smart design principles. • Ensure sustainable operation and maintenance plans are in place prior to final approval of sub-projects, including institutional, technical and financial aspects. • Review and recommend for approval the agreements for each sub-project, including verifiable payment milestones. • Supervise and verify completion of the approved works by the sub- |

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| | <p>project implementers, including via the Sub-Engineers and Asst. sub - engineers</p> <ul style="list-style-type: none"> • Verify progress of each sub-project against payment milestones and recommend release of payments as contracted where such payment milestones have been met • Provide technical assistance and capacity building as required to Corridor team and sub-project implementers. • Accomplish other task related to engineering/technical aspect as per need of the programme as assigned by the Programme Coordinator. |
| Experience & qualifications | <p>Required:</p> <ul style="list-style-type: none"> • Master’s degree in civil engineering with at least 5 years of professional experience in designing, construction, supervision & monitoring of civil engineering works in particular irrigation infrastructures. • Capability in developing infrastructures section criteria and quality assurance and quality control guidelines and procedures during construction and completion. • Sound knowledge in designing drawings in Auto CAD format, Bill of quantities in Excel and reports and specifications in Word. • Experiences that demonstrate high quality attributes on leadership, facilitations and coaching and innovativeness • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good inter-personal skills and capacity to work effectively with a range of institutions. <p>Preference given to:</p> <ul style="list-style-type: none"> • Candidate having experience in working with local and federal governments and projects/programmes supported by international development partners in implementing infrastructure projects |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

12. Terms of Reference (ToR) for Sub- engineers/Overseers

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| Position: | Sub-engineers/Overseers |
| No of Position | 3 (one) |
| Reports to | Engineer |
| Supervises | n/a |
| Duty station | Corridor Offices |

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| Summary of role | Under the supervision of Engineer, Sub-engineer is responsible for detail design, construction, supervision, and quality control of the infrastructures works supported within the Corridor. S/he will work closely with programme staff and with concerned Palikas within Corridor office for selection of sub-project, as identified in the Agro-ecological cluster plans and ensure the quality of the constructed infrastructures are fully adequate and met requirements to attain the objective set out by the programme. |
| Mode of contract | Rolling annual contract with a probation period of six months. The annual contract will be extendable based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Prefeasibility and feasibility study of physical infrastructural activities based on the Agroecological clusters plans to be supported through project. • Monitor and supervise the construction of infrastructures constructed under programme in corridor to ensure compliance with the drawings and specifications ensuring quality and required standard. • Ensure all sub-project designs and implement reflect appropriate climate smart design principles. • Review and recommend for approval the agreements for each sub-project, including verifiable payment milestones in Corridor office. • On-site inspection and verification of works completed under approved sub-projects ensure works completed as approved. • Ensure quality of construction materials procured/collected and provide adequate support during construction of the physical infrastructure. • Provide technical support and backstopping to the participating beneficiaries in providing services/support on preparing feasible investment sub-projects, design and estimate of physical infrastructural activities based on their business plans. • Verify progress of each sub-project against payment milestones and recommend release of payments as contracted where such payment milestones have been met. • Advise participating beneficiaries for the effective implementation of physical infrastructure activities. • Assist and work closely with the other team members in overall implementation. • Monitor, supervise, quality check-up, verify physical infrastructural activities, which are supported from project funds. • On monthly basis report the Progress, work to the Project Engineer. • Perform other jobs as directed by the Project Engineer and designated Corridor Coordinator |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Diploma or equivalent in civil engineering with at least five (5) years' experience in rural infrastructure works. • Sound knowledge in designing drawings in Auto CAD format, Bill of quantities in Excel and reports and specifications in Word. • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good interpersonal skills and the ability to work effectively in the fields. |

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| | <p>Preferences given to</p> <ul style="list-style-type: none"> • Prior experience as an Inspector of Works or similar. • Experience of climate smart design in rural infrastructure |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

13. Terms of Reference (ToR) for Assistant Sub-engineers/Sub-Overseers

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| Position: | Sub-overseer |
| No of Positions | 6 |
| Reports to: | Engineers and Sub-engineers |
| Supervises: | n/a |
| Duty station: | PPMO /Corridor Offices |
| Summary of role: | Responsible for conducting Prefeasibility and feasibility study of physical infrastructural activities and \on-site supervision of all infrastructure sub-projects approved under the Programme. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Prefeasibility and feasibility study of physical infrastructural activities based on the Agroecological clusters plans to be supported through project. • Provide technical support and backstopping to the participating beneficiaries in providing services/support on preparing feasible investment sub-projects, design and estimate of physical infrastructural activities based on their business plans. • Facilitate the participating beneficiaries in procurement/collection of quality construction materials and support them for the timely and effective implementation of physical infrastructure activities. • Provide adequate support to the individual/group/cooperative implementing the physical infrastructure sub-projects and ensure quality of the construction work during construction monitoring. • Ensure all sub-project designs and implement reflect appropriate climate smart design principles. • Review and recommend for approval the agreements for each sub-project, including verifiable payment milestones in Corridor office. • Assist and work closely with the other team members, who are deployed in the field, in overall implementation. • Monitor, supervise, quality check-up, verify physical infrastructural activities, which are supported from project funds. • Perform other jobs as directed by the Project Engineer/Sub-engineers. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • TSLC or equivalent in civil engineering with at least three (3) years' experience in rural infrastructure works. • Good interpersonal skills and the ability to work effectively in the fields. |

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| | <p>Preferences given to</p> <ul style="list-style-type: none"> • Prior experience as an Inspector of Works or similar. • Experience of climate smart design in rural infrastructure |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

14. Terms of Reference (ToR) for Gender Social Inclusion and Targeting Specialist

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| Position | Gender, Social Inclusion and Targeting Specialist |
| No of Positions | 1 |
| Reports to | Provincial Programme Coordinator |
| Supervises | Technical supervision/backstopping of Social Mobilization team at PPMO and corridor offices |
| Duty station | PPMO (Karnali Province) |
| Summary of role | GeSI and Targeting Specialist will be responsible for mainstreaming, operationalising and budgeting gender, youth, social inclusion and targeting across the programme components and activities. |
| Mode of contract | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to end of Programme based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Lead the development of gender and social inclusion strategy and action plan for the programme including designing gender audits, gender response mechanisms, gender analysis/ mapping/ planning and gender profiling. • Coordinate and lead the targeting process with appropriate guidance and process to reach the vulnerable, poor, women, youth and other priority disadvantage groups in the Programme and ensure their meaningful participation and share of benefits from Programme interventions. • Monitor progress in such areas and ensure evidence on progress is regularly reported to the Programme Coordinator and Provincial Programme Coordinator of all three Provinces. • Facilitating the implementation of group development activities and responsibility for overseeing the implementation of POs graduation and Strengthening subcomponent. • Lead the designing and development of comprehensive package of business skills training incorporating aspects of the Gender action learning system (GALS 'Lite') in addition to Financial knowledge, Business Skills, and digital agriculture and finance with pictorial and reading text considering pedagogy in coordination with other thematic specialists. • Facilitate in implementation of the business skills and GALS lite package and facilitate to enhance financial access, production of marketable produce and market linkages of the participated small holder farmers. • Support Programme Monitoring and Evaluation (M&E) team to establish gender, youth and inclusion baselines for the M&E system, design of farm/enterprise diary and result measurements, and reporting of the supported supply chains. • Provide strategic support to Programme team for inclusion of poorer and vulnerable households' participation in respective co- investment proposals and producer organisations. • Contribute to the knowledge development by generating lessons/cases studies in respective areas and facilitate knowledge exchanges on targeting, gender and inclusion and others. • Responsible for the overall content and the links with other external knowledge on targeting, gender and inclusion. • Provide technical backstopping support to the social mobilization team |

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| | <p>regarding mobilization, gender, youth and targeting.</p> <ul style="list-style-type: none"> • Together with M&E and knowledge management staff, establish an M&E system that captures data and analyses disaggregated data on gender, youth, socio-ethnicity, poverty status, indigenous people etc • Perform other tasks as directed by the Programme Coordinator. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • At least 7 years' work experience in the development sectors and with demonstrated results on socio-economic mobilization, gender, youth, nutrition, and social inclusion issues. • Experiences in capacity building on gender, youth, mobilization, business skills and financial access, market linkages. • Experience in projects integrating targeting and social inclusion considerations across components/activities and M&E. • Good interpersonal skills and capacity to work effectively as part of a team. • Highly motivated and committed to poverty alleviation and gender and social inclusion. <p>Preferences given to</p> <ul style="list-style-type: none"> • Experience in working with projects dealing with agriculture supply chains, and service market development. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

Additional considerations for the ToR of GESI

General scope of the position: Operationalisation of gender mainstreaming, youth mainstreaming and social inclusion strategies lies with the gender and social inclusion expert at PPMO (Province) level. The position is full time for the all duration of the project. The GESI expert will also act as nutrition focal point.

More specifically, the Gender and Social Inclusion (GESI) Specialist is responsible for targeting, gender equality, youth mainstreaming and social inclusion aspects of the programme. S/he guides, mentors and monitors the work of other specialists (e.g. the Household Methodology Specialist and GESI focal points at all levels) and provides necessary guidance and training to community mobilisers and GESI focal points and other relevant project staff at cluster level. S/he is particularly responsible for attaining the Programme targets on targeting, gender, youth, social inclusion, nutrition and household methodologies.

As gender and social inclusion is a cross-cutting issue, s/he works closely with all the Programme staff members and reports directly to the Programme Manager. S/he also serves as a channel of communications between the Programme and others working on gender issues in government, implementing agencies, other development projects, and IFAD.

Main tasks and responsibilities

Among others, the GESI Specialist will perform the following main functions:

- Lead and coordinate all gender, youth and nutrition mainstreaming activities in coordination with relevant specialists at PPMO and GESI focal points at cluster level.
- Prepare a social inclusion strategy and action plan with key targets and indicators aligned to R-HVAP for disadvantaged socio-economic categories;
- Prepare a gender and youth strategy and action plan with key targets and indicators aligned to R-HVAP for women and youth inclusion;
- Prepare a nutrition mainstreaming plan with key targets and indicators aligned to R-HVAP for Nutrition mainstreaming;
- Work with the M&E Specialist to ensure that the M&E, Logframe and MIS is gender, youth and nutrition sensitive and reflective of the real-time situation. Integrate relevant empowerment indicators in the information system and follow up on the monitoring of WEAI, including work of service provider responsible for baseline, mid-term and final evaluation;
- Work to sensitize all Programme staff and partners that Programme outcomes should be achieved with respect for the principle of gender equity, inclusion, diversity and women's empowerment;
- Review programme plans and budgets to ensure that adequate attention is paid (and resources allocated) to support practical and strategic support to women, and to influence the wider policy/decision-making community to protect and promote equity;
- Work with Business development specialist for the ToR development and recruitment of service providers to implement youth related activities under component 2 and supervise activities performance;
- Provide overall guidance, training support to community mobilisers and facilitators to organize separate consultation with women and vulnerable categories as part of mobilisation/consultation activities as well as for validation of PAPs and (ii) participate in key field activities;
- Draft specific ToRs as required for community facilitators (e.g. gender, nutrition, social inclusion) working at village level, including training if any capacity gap is assessed;
- Draft Specific ToR for GALS/ Household methodology expert and supervise the activities performed;
- Lead and conduct key training/workshop for gender and youth mainstreaming, including preparation of all relevant training materials for the ToT (e.g. women and youth leadership training for community mobilisers);
- Provide training support to Community Mobilisers to conduct the wealth ranking exercise and targeting of ultra-poor HHs at community level (ToT);
- Provide support and prepare training on nutrition for community nutrition facilitators and supervise activities;
- Provide checklist to community mobilisers to ensure that participatory planning process comply with gender and social inclusion principles of the project;
- Form and lead a small appraisal team to conduct monitoring of PAPs planning process to ensure gender and social inclusion have been considered and (ii) draw lessons to improve the process;
- Conduct constant review of project implementation processes on how to achieve the best possible project outcomes with respect to targeting, gender equality, women's empowerment and social inclusion with key focus on youth and vulnerable categories;
- Coordinate capacity building and training sessions on gender-sensitive and youth sensitive interventions for project staff, implementers as relevant. The training should also include specific information on safeguard instruments for avoiding GBV, SEA and key information about GRM.

Expected outputs:

- Gender and social inclusion (GESI) strategy, plan and contents for gender-awareness messages;

- Nutrition Mainstreaming strategy and plan;
- Delivery of AWPB, progress reports, project documentation related to gender, youth, nutrition and Social Inclusion issues and activities;
- Prepare ToRs for community mobilisers/facilitators responsible for GESI related activities;
- Finalisation of ToRs for Service Provider (SP) to deliver youth activities (enterprise development and employment);
- Finalisation of ToRs for Nutrition Facilitators;
- Training materials for community facilitators finalized and ToT delivered (e.g. leadership trainings, community engagement, targeting for the poorest including Wealth Ranking Exercise, Nutrition, GALS "lite");
- Appropriated social safeguard instruments into operations are set.

Qualification, Experience and Competency

Education: Advance University Degree (Master's Degree or equivalent) in gender studies, or sociology, social work or rural development and other social science with experience in gender and development;

Experience:

- At least 7 years of relevant experience in programming with at least 4 years of relevant experience at national level geared to support large scale multi-sectoral agriculture development and empowerment programs;
- A proven track record in managing and monitoring results-based and rights-based national programming is required, including in-depth knowledge of results-based management approaches;
- Demonstrated knowledge of programming issues within the field of agriculture, and women's economic empowerment;
- Working experience and knowledge of programming and procedures of the government system and/or donor agencies will be an advantage;
- Motivated, and capable of working under pressure

Competencies

- Be familiar with gender mainstreaming policies including any national policies, policies of ministries, implementing institutions and financing agencies, including IFIs;
- Sound understanding and awareness of issues relating to gender and women's issues
- Strong analytical and problem solving skills and is creative, innovative, persistent and resourceful;
- Excellent oral and written communication skills – both in Nepali and English;
- Ability and sensitivity to work with a wide cross-section of partners, including government, NGOs and private sector;
- Excellent interpersonal skills, proven networking, team-building, decision making, organizational and communication skills;
- Displays cultural, gender, religion, race, nationality and age sensitivity and adaptability
- Experience in developing strategies for agriculture and community lead economic development programs is highly desirable;

Additional considerations:

- Qualified Women and people from disadvantaged and minority groups are especially encouraged.
- Candidates working with IFAD projects/programmes in the past in the similar capacity will be given due preference.

15. Terms of Reference (ToR) for Value Chain and Business Development Specialist

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| Position: | Value Chain and Business Development Specialist (VCBDS) |
| No of Positions | 3 |
| Reports to: | Provincial Programme Coordinator |
| Supervises: | Business Development Officer & Social Mobilization Team |
| Duty station: | Provincial Programme Management Unit (PPMO) |
| Summary of role: | The VCBDS is particularly responsible for overall planning, implementation, monitoring and reporting of value chain development activities in tandem with other sub-components within Programme to facilitate and support POs & MSMEs in strengthening linkages, business planning, investment analysis and other areas that lead to improved performance of the value chain system. S/he will particularly focus on strengthening business relationship and trust among the value chain actors and also with service providers. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Take overall leadership for planning, implementation, monitoring and reporting of Sub component 1.3 for identifying critical interventions for specific value chain in a multi-stakeholder consultation process (MSP) within the programme and being accountable for targets as set in programme logical framework in close coordination with other thematic team. • Lead/Support to conduct MSPs at various level, identify potential investment area within specific value chain through rolling MSP process. facilitate producer's organisation, MSMEs and service provider in jointly developing concept notes and investment/business plans addressing critical constraints & opportunities for specific value chains and ensure its implementation. • Develop training modules /manuals on VCD and MSP and conduct capacity building activities on value chain development and market system facilitation to programme staff at various level. • Provide support to POs, Inputs suppliers and MSMEs to meet market requirements and strengthen financial and business services provision to enhance relationship among each other working together with programme business and financial inclusion team. • Strengthen capacities of programme staff for Brokering "win-win" and trust-based business and/or service relationships among producer's group, MSMEs & service providers. work towards reliable, fair and long-term relationships including contractual arrangements, both formal & informal, supporting overall value chain development and improvement in business enabling environment. • Facilitate and support for setting up criteria, procedures, and processes for effective operation & management of programme co-investment funds in line with the programme stipulated objectives. |

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| | <ul style="list-style-type: none"> • Facilitate and coordinate meetings of investment proposal evaluation committee and support for evaluation and appraisal of co-investment proposals together with other technical teams and management team. • Provide support and guidance for gathering of data and information needed to undertake an effective monitoring and evaluation of all the activities across Corridor offices included in the sub-component. • Provide strategic support to programme team for inclusion of poorer households in developing respective value chains investment proposals. • Coordinate with programme partners and like-minded organizations /projects/programmes working in the Province and private companies within and outside programme districts according to the scope of the value chain for synergy. • Contribute to the knowledge development by generating lessons /cases in respective value chains , facilitate knowledge exchanges on value chain development within the programme team and others. • Undertake any other duties as directed by Programme Coordinator. |
| Experience & qualifications | <p><u>Required</u></p> <ul style="list-style-type: none"> • Master’s degree in business administration, Agribusiness Development, and Economics, Marketing or equivalent with at least 7 years of experience in enterprises promotion, value chain development and private sector strengthening with demonstrable evidence of the results achieved. • Knowledge and experience in building capacity of stakeholders through advisory skills and facilitate multi-stakeholder consultation processes, value chain upgrading workshops and training. • Experiences with management and market analysis, investment plan development, appraisal, monitoring and evaluation, and feasibility analysis. • Experience in developing training courses and facilitating trainings on VCD, business management etc. • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good inter-personal skills and capacity to work effectively with a range of institutions. <p><u>Preferences given to</u></p> <ul style="list-style-type: none"> • Candidate having experience in agriculture value chain upgrading and up-scaling approaches, multi-stakeholder consultation processes (MSP), service market development, and public-private partnership. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

16. Terms of Reference (ToR) for Business Development Officer

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| Position: | Business Development Officer (BDO) |
| No of Positions | 6 |
| Reports to: | Corridor Coordinator / VCBDS |

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| Supervises: | Community Mobiliser |
| Duty station: | PPMO, CO |
| Summary of role: | Under the direct supervision and guidance of VCBDS, Business Development Officer will be responsible for implementation of the Value chain development interventions in the corridor offices and to guide and coach Field staff to facilitate and support Value chain actors in strengthening linkages, business planning, investment analysis and other areas that lead to improved performance of the Value chain system. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Responsible for implementation and supervision of identified critical interventions for investments, enhancement of relationships, development of enabling institutions and services and stimulating actual scaling as part of focused and actor driven project facilitation for the specific Value chains in a continuous multi-stakeholder consultation process (MSP) within the project area. • Facilitate and Support farmers, group, cooperatives, MSMEs, service provider in developing investment/business plans for assessing matching grants /loans within specific value chains. • Facilitate and support producer’s organization and buyers to meet market requirements and strengthening technical, financial and business services provision for specific value chains in coordination with VCBDS and Agro-ecological officer. • Coordinate and facilitate B2B , B2S linkages, contract arrangement and MSPs at cluster as per need in close coordination with Province Office and concerned stakeholders. • Facilitate and support group/cooperatives for collective marketing and operation /strengthening of collection Centre within production clusters involving private sector/Agribusiness. • Provide support and guidance for the gathering of data and information product transaction, value, market outreach, margin distributed along the chain, loss etc. to undertake an effective monitoring and evaluation of value chain development. • Facilitate and support documentation of experiences, lessons learned, good practices, and case studies as part of knowledge development and facilitate exchange of information and knowledge exchange with the support of VCBDS. • Timely and regular reporting to VCBDS as per prescribed format, hard or electronic, or both. • Undertake any other duties as requested as directed by VCBDS and Corridor coordinator. |
| Experience & qualifications | <p><u>Required</u></p> <ul style="list-style-type: none"> • Master’s degree in Agricultural Sciences, business administration, Agribusiness Development, Economics or equivalent with at least 3 year’ experience or bachelor’s degree with 5 years’ experience on Value chain development, business promotion and private sector development. • Sound experience in business development, service provision and value chain development. • Experiences with management and market analysis, grant fund proposal/plan development, appraisal, monitoring and evaluation, and feasibility analysis. • Knowledge and experience in building capacity of stakeholders and |

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| | <p>facilitation of multi-stakeholder consultation workshops and training.</p> <ul style="list-style-type: none"> • Excellent spoken and written English. • Good inter-personal skills and capacity to work effectively as part of a team. <p><u>Preferences given to</u></p> <ul style="list-style-type: none"> • Candidate having experience in Value chains /value chain upgrading and up-scaling approaches, multi-stakeholder consultation processes, service market development and grant fund proposal/plan development. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

17.ToR for Producer Groups Strengthening Officer (PGSO)

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| Position: | Producer Groups Strengthening Officer (PGSO) |
| No of Position | 1 |
| Reports to: | Provincial Programme Coordinator |
| Supervises: | Social Mobilization Team |
| Duty station: | Provincial Programme Management Unit (PPMO) |
| Summary of role: | The Producer Groups Strengthening Officer is responsible to develop strategy and manuals, coach and mentor field staff, and devise strategies and action plans for Producers organization categorization and graduation support. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Take overall responsibility and leadership for planning, implementation and monitoring of the Producer organization graduation activities in accordance with the approved annual work plans in close coordination with programme staff. • Develop POs graduation Strategy for strengthening the capacities /capabilities of producer group/cooperatives to function as inclusive, self-reliant, and autonomous organisations and Municipal Authorities staff and working closely with Programme and Partner SP for effective implementation of the strategy and action plans. • Develop comprehensive manuals and training materials covering various aspects of POs graduation as well as facilitate ToT for programme / Service Provider staff for leadership development, community mobilisation and group development. • Provide ongoing mentoring and coaching to field staff to enhance their skills and competencies in delivering effective capacity building trainings. • Facilitate and support to conduct capacity assessment and support implementation of capacity development plans of Producer groups/cooperatives according to the requirements in the market/business relationships and agro-ecological transformation. • Coordinate with Business Development Officers to facilitate producer's group linkages with agribusiness & service providers and work towards reliable, fair and long-term relationships including contractual arrangements supporting overall agricultural commodities value chain development. |

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| | <ul style="list-style-type: none"> • Provide strategic support to Partner SP /Social Mobilizer on social mobilization methods that support & ensure the inclusion of poorer households in Programme value chain opportunities. • Provide technical backstopping to SP/SM if required, to enable the timely collection of data for the MIS and liaise with M&E team to ensure optimal operation of MIS towards Programme objectives. • Timely and regular field data collection from SPs, analysis, and reporting to coordinator as per prescribed format, hard or electronic, or both. • Contribute to the knowledge development and sharing strategy related to institutional development of concerned stakeholders and POs graduation approach. |
| Experience & qualifications | <p><u>Required</u></p> <ul style="list-style-type: none"> • Master’s degree in Social Science, rural development or related subject with at least 5 years’ experience in social mobilization, social inclusion and economic empowerment. • Proven knowledge and professional experience in strategic planning and management including capacity development of public, private and grass roots institutions. • Proven track record in developing training manuals/materials and facilitation trainings at various levels. • Experiences that demonstrate high quality attributes on leadership, facilitations and coaching and mentoring skills. • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good inter-personal skills and capacity to work effectively with a range of institutions. <p><u>Preferences given to</u></p> <ul style="list-style-type: none"> • Candidate with experience of Enterprises promotion, business facilitation, supply chain development and market-oriented Programmes |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

18. Terms of Reference for Rural Finance Officer

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| Position: | Rural Finance Officer |
| No of Position | 3 |
| Reports to: | Provincial Programme Manager & VCBDS |
| Supervises: | n/a |
| Duty station: | Respective Districts/Clusters as designated by the Programme |
| Summary of role: | Rural Finance officer is responsible in facilitating credit access to the Programme beneficiaries for value chain development strengthening. S/he work coordinate with formal financial institutions as well as with the informal financial institutions within the Programme area particularly focussing on the linking the production groups and MSMEs for credit required for investments. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |

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| Main responsibilities | <ul style="list-style-type: none"> • Ensure an assessment of annual credit requirement plans for the VC members and MSMES and facilitate and monitor flow of credit. • Participate in evaluation committee for selection of grant applicants especially Agri businesses and ensure financial services. • Maintain close coordination with banking and financial institutions, insurance companies, private service providers and other stakeholders) and facilitate their linkages with Programme beneficiary's producer organisations/cooperatives/Agribusiness. • Participate in multi-stakeholder consultative platforms (MSP) and understand and address issues related to credit and insurance. • Contribute for the development of courses with pictorial and reading text considering pedagogy related to financial education of FEBL in coordination. • Plan, supervise and monitor the trainings on business and financial literacy trainings for effective results. • Provide support and guidance for the gathering of data and information needed to undertake an effective monitoring and evaluation of financial support services provided under the Programme. • Oversee the design and establishment of channels for regular information dissemination, sharing, and networking among stakeholders including VC members. • Undertake any other duties as directed by Programme Coordinator. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Masters' degree in business administration, finance, or equivalent with five years of professional experience in rural development programs/ formal financial institution with a minimum of three years' experience in access to finance related activities • Good knowledge of the different national banking and financial institutions, insurance companies, concerned with agriculture finance and insurance. • Ability to work in a multi-disciplinary team and facilitate the working of other team members. • Excellent communications skills - spoken and written, both in English and Nepali and possess good report writing skills. • Good inter-personal skills and capacity to work effectively with a range of institutions. • Creative and pragmatic approach to problem solving. Well-organised and well oriented to details. <p>Preferences will be given to:</p> <ul style="list-style-type: none"> • Candidate having experience and proven track record in agriculture value chain finance. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

19. Terms of Reference for Agro-ecology Specialist (AECS)

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| Position | Agroecology Specialist |
| No of Position | 3 |
| Reports to: | Provincial Programme Coordinator |

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| Supervises: | AECO, AELO and Agriculture technicians |
| Duty station: | PPMO |
| Summary of role: | Agro-ecology Specialist will be overall responsible for providing technical guidance in planning, implementation, and supervision of agro-ecological cluster plans and ensure the effective implementation promoting agro-ecology practices. S/he will be overseeing and promoting agro-ecology practices, ensuring sustainable and resilient agricultural systems that integrate ecological principles and maximize resource efficiency within the Programme. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Overall responsible in developing guidelines in identifying Agro-ecological production clusters and support for development of Agro-ecological cluster plans addressing critical constraints for agro-ecological transformation. • Provide technical guidance and support to officers and technicians on agro-ecological principles including sustainable livestock management techniques. • Conduct assessments and analysis of agro-ecosystems to identify opportunities for improvement and sustainable practices. • Develop and deliver training programs, workshops, and extension materials to enhance the capacity of staff and agricultural technicians in adopting agro-ecological practices. • Provide technical guidance and support to establish and manage demonstration farms to showcase the benefits of agro-ecology, promote knowledge exchange, and encourage farmers to adopt sustainable farming methods. • Coordinate and strengthen linkage with relevant Province, local government, private and other stakeholders to procure their support and leverage resources and create synergy in the Programme. • Provide technical support for the development and implementation of evidence based agro-ecology-related policies and programs. • Coordinate and support to maintain project's external relations and visibility, including coordination with like-minded organizations & projects perusing similar objectives and sharing of best practices for wider dissemination. • Provide support and guidance for the gathering of data and information needed to undertake an effective monitoring and evaluation of agro-ecological production system. • Facilitate and support documentation of experiences, lessons learned, good practices on agro-ecology practices, as part of knowledge development and facilitate exchange of information and knowledge. • Other activities as directed by Corridor Manager and Agro-ecological specialist. |
| Experience qualifications & | <p>Required</p> <ul style="list-style-type: none"> • Master's degree or equivalent in agro-ecology, sustainable agriculture, or equivalent with at least 5 years' experience of experience in relevant filed. • Proven knowledge of agro-ecology principles, techniques, and practices. • Strong research and analytical skills to assess the feasibility and effectiveness of different agro-ecological approaches. • Excellent interpersonal skills, proven networking, team building, |

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| | <p>decision making, organizational and communication skills.</p> <ul style="list-style-type: none"> • Good spoken and written skill in both English and Nepali and possess good skills in report writing. • Good computer skills <p>Preferences will be given to:</p> <ul style="list-style-type: none"> • Candidate with experience in agriculture value chain and designing and implementing agro-ecology programmes/projects. • Women candidates & Candidates from ethnic minorities. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

20. Terms of Reference for Agro-ecology crop officer (AECO)

| Position | Agro-ecological Crop Officer |
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| No of Position | 6 |
| Reports to: | Coordinator – Service Provider & Agro-ecology Specialist |
| Supervises: | Agriculture technicians |
| Duty station: | PPMO and Corridor Offices |
| Summary of role: | Agro-ecology crop Officer (AECO) will be responsible to provide technical guidance and support in planning, implementation, and monitoring of agro-ecological cluster plans. S/he will coordinate and support public & private service providers (Lead farmers, VAW, and JTAs) to deliver technical support for implementation of PAP and increased adoption of Agro-ecological farming practices for improved and sustainable crop production in the designated clusters. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Overall responsible to identify potential Agro-ecological production clusters and develop interventions addressing critical constraints for agro-ecological transformation with support of Programme staff. • Provide technical guidance and support to farmers, ATs, and relevant stakeholders on agro-ecological principles, soil fertility management, water conservation, integrated pest management, and support with the bio-inputs and production involving public and private service providers. • Coordinate with private sector/Cooperatives to ensure the supply of bio- inputs to enable the agro-ecological production practices. • Develop and deliver training programs, workshops, and extension materials to enhance the capacity of farmers and agricultural extension officers in adopting agro-ecological practices. • Facilitate and support to establish and manage demonstration farms to showcase the benefits of agro-ecology, promote knowledge exchange, and encourage farmers to adopt sustainable farming methods. • Coordinate and strengthen linkage with relevant local government, private and other stakeholders to procure their support and leverage resources and create synergy in the programme. • Coordinate with Business Development officers to facilitate producer’s group linkages with buyers & service providers and work |

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| | | <p>towards reliable, fair and long-term relationships including contractual arrangements for marketing of products.</p> <ul style="list-style-type: none"> • Guide, monitor, supervise and provide backstopping support to the ATs and Lead Farmers in the Clusters • Coordinate and support to maintain project's external relations and visibility, including coordination with like-minded organizations & projects perusing similar objectives in the target corridor and sharing of best practices for wider dissemination. • Provide support and guidance for the gathering of data and information needed to undertake an effective monitoring and evaluation of agro-ecological production system. • Facilitate and support documentation of experiences, lessons learned, good practices on agro-ecology practices, as part of knowledge development and facilitate exchange of information and knowledge. • Other activities as directed by Corridor Manager and Agro-ecological specialist. |
| Experience qualifications | & | <p>Required</p> <ul style="list-style-type: none"> • Bachelor's degree in agriculture, agronomy, agro-ecology with at least 5 years' experience or Master's degree in agriculture with specialization in Horticulture or Agronomy with at least 3 years of experience in relevant field. • Proven skills in implementing agro-ecological practices, providing technical support to farmers, and working in the field of sustainable agriculture. • Strong research and analytical skills to assess the feasibility and effectiveness of different agro-ecological approaches. • Excellent interpersonal skills, proven networking, team building, decision making, organizational and communication skills. • Good spoken and written skill in both English and Nepali and possess good skills in report writing. • Good computer skills <p>Preferences will be given to:</p> <ul style="list-style-type: none"> • Candidate with experience in agriculture value chain and sustainable farming. • Women candidates & Candidates from ethnic minorities. |
| Salary Benefits | and | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

21. Terms of Reference for Agro-ecology Livestock officer (AELO)

| Position | Agroecology Livestock Officer |
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| No of Position | Coordinator – Service Provider & Agro-ecology Specialist |
| Reports to: | Agriculture technicians |
| Supervises: | PPMO and Corridor Offices |
| Duty station: | Agro-ecological Livestock Officer (AECO) will be responsible to provide technical guidance and support in planning, implementation, and monitoring of agro-ecological cluster plans. S/he will coordinate and support public & private service providers (Lead farmers, VAW, and JTAs) to deliver technical support for implementation of PAP in |

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| | promoting sustainable livestock management practices within the context of agro-ecological systems in the designated clusters. |
| Summary of role: | Coordinator – Service Provider & Agro-ecology Specialist |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Overall responsible to identify potential Agro-ecological production clusters and develop interventions addressing critical constraints for sustainable livestock production with support of other staff. • Provide technical guidance and support to farmers, ATs, and relevant stakeholders and adoption and implementation of agro-ecological practices in livestock production systems and support involving public and private service providers. • Coordinate with private sector/Cooperatives to ensure the supply of bio- inputs to enable the agro-ecological production practices. • Develop and deliver training programs, workshops, and extension materials to enhance the capacity of farmers and agricultural extension officers in adopting agro-ecological livestock management practices. • Facilitate and support in adopting sustainable livestock management techniques to showcase the benefits of agro-ecology and promote knowledge exchange and encourage farmers to adopt such methods. • Coordinate and strengthen linkage with relevant local government, private and other stakeholders to procure their support and leverage resources and create synergy in the Programme. • Coordinate with Business Development officers to facilitate producer’s group linkages with buyers & service providers and work towards reliable, fair and long-term relationships including contractual arrangements for marketing of products. • Guide, monitor, supervise and provide backstopping support to the ATs and Lead Farmers in the Clusters • Coordinate and support to maintain project’s external relations and visibility, including coordination with like-minded organizations & projects perusing similar objectives in the target corridor and sharing of best practices for wider dissemination. • Provide support and guidance for the gathering of data and information needed to undertake an effective monitoring and evaluation of agro-ecological production system. • Facilitate and support documentation of experiences, lessons learned, good practices, and case studies as part of knowledge development and facilitate exchange of information and knowledge. • Other activities as directed by Corridor Manager and PPMO. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Bachelor’s degree in agriculture with specialization in animal science) or Animal Science or Animal Husbandry or Veterinary Science with at least 5 years’ experience or Master’s degree in animal science with at least 3 years of experience in relevant field. • Proven skills in implementing agro-ecological practices and their application in livestock farming. • Understanding of livestock production systems, including breed selection, nutrition, health management, and reproduction. • , Familiarity with sustainable farming practices, organic certification, and animal welfare standards. |

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| | <ul style="list-style-type: none"> • Excellent interpersonal skills, proven networking, team building, decision making, organizational and communication skills. • Good spoken and written skill in both English and Nepali and possess good skills in report writing. • Good computer skills <p>Preferences will be given to:</p> <ul style="list-style-type: none"> • Candidate with experience in agriculture value chain and sustainable livestock techniques. • Women candidates & Candidates from ethnic minorities. |
| Salary and Benefits | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

22. Terms of Reference for Agriculture Technician (AT)

| Position | Agriculture Technician |
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| No of Position | 80 |
| Reports to: | Coordinator - Service Provider and Agro-ecology Officer |
| Supervises: | n/a |
| Duty station: | PPMO and corridor offices |
| Summary of role: | The Agriculture Technician (SM) will work under the PPMO and Corridor offices to mobilize Producers organization for preparation of Agriculture cluster plan and providing technical support for PAP implementation in designated clusters/municipalities. S/He will also work as field facilitator in coordination with various thematic teams at field level under the direct supervision of Agro-ecology Officer. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Support Agro-ecological officers in identifying the Clusters and preparation of Agro-ecological cluster plans. • Identify households interested to join Programme activities, carry out producer group formation i.e. existing or new ones and strengthening. also ensure gender & social inclusion as well as inclusion of poorer households, disadvantaged groups etc. during group formation. • Create awareness among POs about agro-ecology farming system and Agro-ecological cluster plans, conduct needs assessment among groups and facilitate collection of application, Expression of Interest (EOI) for Programme co-investment support. • Mentoring/coaching producer groups/Cooperatives in developing investment plans to carry out interventions promoting agro-ecology practices but not limited to organic farming techniques, crop rotation, pest management, and soil conservation measures. • Facilitate and support producer organizations and participating households to develop market led production plans (Crop calendar) in specific value chains and its implementation. • Support POs for implementation of sub projects by providing technical and extension services, linkages with service providers, regular monitoring, field data entry/management and feedback. • Conduct and facilitate field level training on agro-ecology practices |

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| | | <p>and sustainable agriculture to farmers, Farmer group and cooperatives as per training module prescribed from the Programme including various field survey, monitoring, supervision work undertaken by PCO/PPMO.</p> <ul style="list-style-type: none"> • Facilitate and support FEBL Facilitator linkages with agro-ecological technicians and practitioners to conduct technical session prescribed in the FEBL course and ensure the training is conducted on farm and in effective manner. • Gather and collect information of participating households and update the data and information in the project MIS through tablets and any other measure in coordination with M & E team. • Coordinate with local governments, respective line agencies and seek local contribution in Programme activities. • Take responsibility for field level activities implemented within own command areas. • Other tasks/ activities as directed by Agriculture Officer and R-HVAP PPMO/CO personnel. |
| Experience qualifications | & | <p>Required</p> <ul style="list-style-type: none"> • Diploma in Agriculture/Veterinary Science with two year of proven experience or JTA course in Agriculture/Veterinary Science with minimum 3 years of proven experience in social mobilization, group formation, and agriculture with a focus on sustainable farming practices or agro-ecology. • Demonstrated knowledge in market-oriented production plan, and providing technical training and extension services, coaching and mentoring to POs in production and post-harvest management practices. • Good inter-personal skills, networking and ability to work effectively in rural settings with small-holder's households. • Good computer skills. <p>Preferences will be given to</p> <ul style="list-style-type: none"> • Women candidates & candidates from disadvantaged groups (Dalit, Janjatis /Indigenous, Madhesi, Muslim) • Candidate from R-HVAP districts, for which he/she will have to work. • Candidate with previous experience in mobilization of producer organizations in value chain development and market-oriented projects. |
| Salary Benefits | and | <ul style="list-style-type: none"> • Remuneration will be paid for only 12 months that ranges between NPR. as decided by the Programme Coordinator, RHVAP • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |

23. Terms of Reference for Community Mobiliser (CM)

| Position | Community Mobiliser |
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| No of Position | 80 |
| Reports to: | Coordinator - Service Provider and Business Development Officer |
| Supervises: | n/a |
| Duty station: | PPMO and Corridor Offices |
| Summary of role: | The Community Mobiliser (CM) will be responsible for the implementation of the Agro-ecological cluster plan in particular social mobilization, Producer group graduation, enterprises promotion and linkages with business and service providers to undertake |

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| | sustainable and profitable agroecological farming system in the designated clusters. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Conduct community meetings, orientations, and awareness sessions to explain the objectives and benefits of the programme. • Identify households interested to join Programme activities, carry out producer group formation, and /or strengthening, ensuring inclusion of women, Janjatis and poorer households in the group. • Support POs to prepare Co-investment plans based on their specific needs in line with Agro-ecological cluster plans and facilitate process to assess Programme support packages and services. • Support producer groups/Cooperatives for the implementation of co-investment plan/sub projects through technical assistance, guidance, regular monitoring field data entry/management and feedback. • Facilitate interaction, linkages, and negotiation between Producers groups/Cooperatives with Bio-inputs suppliers /buyers and Technical, Business and Financial service providers. • Facilitate and support producer organizations and participating households to develop market led production plans (Product calendar) in specific high value commodities and its implementation. • Identify, coach and mentor FEBL Facilitator to effectively deliver Financial Education and Business Literacy (FEBL) classes as per training module prescribed by R-HVAP to producer households enhancing farmers' knowledge, skills, and entrepreneurial abilities. • Conduct and facilitate field level training to farmers, Producers organisations as per training module prescribed from the project. • Gather and collect information of participating households and update the data and information in the project MIS. • Timely and regular reporting to Coordinator as per prescribed format, hard or electronic, or both. • Coordinate with local authorities and agencies and ensure their contribution in agro-ecological farming system including the necessary infrastructures, maximizing Programme benefits. • Take responsibility for field level activities implemented within own command areas. • Any other tasks as directed by the Corridor and PPMO personnel. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • 10+2 in any subject with at least 2 years of working experience in social mobilization, preferably in community mobilization, agriculture, rural development, and market led projects. • Sound knowledge of business promotion, market-oriented projects, and enterprises development • Good interpersonal skills and the ability to work effectively with smallholder households and diverse Value chain actors. • Good computer skills (MS Office, internet). <p>Preferences will be given to:</p> <ul style="list-style-type: none"> • Candidates having 15 months TSLC in Social Mobilization Course or Enterprises Development Facilitator under CTEVT. • Women candidates & Candidates from ethnic minorities and R-HVAP project districts. • Candidate having good command in local language. |
| Salary and | • Remuneration will be paid for only 12 months that ranges between NPR. |

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| Benefits | <p>..... as decided by the Programme Coordinator, RHVAP</p> <ul style="list-style-type: none"> • Benefits will be as per the RHVAP Staff Recruitment Guidelines endorsed by PSC upon receiving NoL from IFAD. |
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Additional considerations for ToRs of Community mobilisers on gender and social inclusion.

General scope of the position: Community Mobilisers are overall responsible for community engagement and consultation process. They are key to ensure inclusiveness of disadvantaged social groups and ensure women, youth and disadvantaged categories are properly informed and mobilised to participate in project activities.

Support to be received: The Community Mobilisers will receive the following technical assistance to help prepare them for the community consultation, engagement and support activities:

- 1 day gender, social inclusion and leadership training from GESI expert with periodic refresher training;
- 1 day targeting training to support the selection of the poorest (Ultra Poor HHs) using wealth ranking criteria tools;
- Training materials and pedagogical tools to be used for community sessions especially for conducting FGDs; management of group dynamics;
- Any other operational support that is required.

Main tasks and responsibilities

Community Mobilization and Engagement

- Conduct a series of dialogues with the community members to inform them about project activities ensuring that women, youth and marginalised groups are included in these dialogues in the main group or in separate dialogues;
- Seek community concurrence and feedback about the options offered under R-HVAP and offer them choice to select those most relevant for them and ascertain their interest in participating in the different activities.
- Facilitate a series of dialogues in support of:
 - Identification of community investments as part of the PAPs;
 - Identification of CIGs for ultra-poor households;
 - Identification of poor and vulnerable households (including WHHs, Elders, PWD, Dalits, Janajatis)through the Wealth Ranking Exercise.
- Support the organization of gender and youth related sensitisation events/sessions at community level for institutions and local leaders to create awareness on the importance to have women and youth as part of the economic development of the community. These sessions are preliminary to group formation to ensure women and youth are part of the community planning process and their concern captured during selection of investments.
- Gender Awareness for Community Members: It is key to consider raising the awareness of men leaders and members of CBOs (i.e. including POs) on the manifestations of gender bias (against women) and on the effects of discrimination against women on the personal and interpersonal growth of its leaders and members, as well as on the organizational development of the organisation. The activity will be part of gender awareness session taking place in all targeted clusters.

Participatory Planning Process

- Assist the communities to conduct the 4 steps participatory planning process for the identification of the priorities for PAPs;
- Ensure that women and youth are informed, mobilised and involved in the identification of community level priorities and prepare their development vision and priorities;
- Organize and facilitate specific separate sessions/ Focus Group Discussion (FGD) with women and youth during the engagement process (as needed) and identify women/youth that can play a leadership role for investments prioritisation;
- Provide overall monitoring and reporting of the process, especially in relation to consultation with specific groups such as Indigenous peoples;
- Document the consultation process and any specific consultative session to ensure transparency and accountability.

Women and youth leadership

- Assist women's and youth groups in identification of the community representatives who will be trained to enhance leadership skills to be representatives in CBOs and MSPs;
- Organize the women's and youth leadership trainings and keep track of monitoring of women and youth in leadership positions (30%);
- Train women and youth leaders in gender relations, self-awareness, leadership and accountability, negotiation and conflict management, effective communication;
- Provide trainings on local legislations, roles and responsibilities of local government and constitutional rights to properly inform community representatives about planning processes;
- Support collection of data (quantitative and qualitative) on women and youth participation to ensure that proper M&E data collection is sex and age disaggregated.

Community Nutrition Facilitators

General scope of the position: Community Nutrition Facilitators (CNF) will be responsible for implementing the activities related to nutrition mainstreaming to enhance the nutrition security of vulnerable households and ultra-poor HHs. The CNF (preferably also Community Health Volunteers) will undertake all field level activities for the successful implementation of these activities and of mentoring and tracking households targeted for nutrition improvement in the project area. The project will recruit about 200 CNFs from the project municipalities (two women from each Palika) in which they are expected to work. These field level workers will all be women as they are required to work with women at the community level and track women in households through regular home visits. The CNF will be initially selected using the existing network of community health volunteers at community level when present.

Support to be received:

The community facilitators will receive the following technical assistance to help prepare them for the community nutrition awareness, mentoring and support activities:

- 2 days nutrition training from nutrition focal point (GESI Specialist or specialised TA);
- Protocol on home visits and community interaction;
- Training materials and pedagogical tools to be used for community sessions;

- Support and regular visits from the local FFS facilitator for assistance with the kitchen gardens and livestock production activities;
- Monitoring tools for following up on the progress made by the households;
- Any other operational support that is required.

Main tasks and responsibilities:

- Support community mobilisers in the selection of the vulnerable and ultra-poor households to be included in the nutrition activities;
- Keep records of each of the households involved in their specific locations of responsibility (for example- questionnaires with their demography, any reported health and nutrition related diseases affecting the household etc),
- Provide nutrition training to the one nutrition community group, also defined as CIG (of 15 households) under their responsibility- intensive bi-monthly training for the first six months. (Each group training session will focus on a different nutrition topic which is detailed in the facilitators training modules).
- Work with the FFS facilitator to help the households set up their kitchen gardens, small livestock production activities and undertake food processing;
- Undertake individual household follow up, each month (for at least 6 months) and support the family to continually adopt good food and nutrition practise.
- Periodically follow up on each of the households after the first year of close interaction;

Duration: The Community Nutrition Facilitators will be engaged on a part time basis. For the first six months- each facilitator will offer training to one nutrition group, twice monthly. Each session will be a minimum of one hour and maximum of two hours. The other six months of the year, the facilitator will be expected to visit each household in his/her group (15 households) and assist them in implementing the lessons learned within their households, correct any poor practises and promote good nutrition behaviours for the general household and specific individual members of the household who are at risk of malnutrition. After engaging the group for the first year, the facilitator will make a visit once in two months to selected household for the remaining life of the project.

Qualifications:

- At least a secondary school certificate,
- At least one-year experience in supporting community development activities (preferably in health sectors).

FELB and GALS "lite" Community Facilitators

General scope of the position: FELB Facilitators will be directly hired to conduct finance literacy sessions using also the GALS "lite" methodology. The FELB facilitators will be chosen from among those who have previous experience of teaching and will be trained in the GALS "lite" methodology by the Household Methodology Specialist who will have technical expertise in this approach.

Support to be received:

The FELB facilitators will receive the following technical assistance to help prepare them for activities they are responsible:

- 2 days FELB and GALS “lite” training.
- Training materials and pedagogical tools to properly teach household methodologies (e.g. visioning tools)
- Monitoring tools for following up on the progress made by the households,
- Any other operational support that is required.

Specific duties of Facilitators

- Support the project team in the selection of the candidates to be included in the FELB and GALS Sessions ensuring that the targeted number specified in the PDR and PIM are met;
- Improving members’ awareness and skills about various aspects of the value chain in which they are participating;
- Provide training in basic numeracy and business aspects;
- Conduct the Sessions for a six-month period and hold regular GALS “lite” sessions;
- Maintenance of the attendance of the participants and submit a monthly report on attendance and an annual report on the number of those graduating by sex and age
- Conduct follow up visits at HHs level to check on the implementation of household methodologies tools;
- Organise group experience sharing for participants to discuss about progresses after using the HM approach.
- Support the HM specialist to identify success story for documentation and KM.

Duration: The FELB Facilitators will be engaged on a part time basis. For the first six months- each facilitator will offer FELB training to women’s group in about 45 modules of 3 hours each delivered twice a week. The learning group size will be 25 to 30 to facilitate learning. The facilitator will be expected to visit selected household in his/her group (e.g. 10 households) and assist them in implementing the GALS methodology at household level.

After engaging the group for the first year, the facilitator will make a visit once in two months to selected household for the remaining life of the project.

Qualifications:

- At least a secondary school certificate,
- At least one-year experience in supporting community development activities

24. Terms of Reference for Coordinator - Service Provider

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| Position: | Coordinator, Service Provider POs Graduation |
| No of Position | 1 |
| Reports to: | Provincial Programme Coordinator and Agro-ecology specialist/Business Development Specialist |
| Supervises: | Staff Provisioned under Service Provider |
| Duty station: | PPMO as designated by the Programme |
| Summary of role: | Under the direct supervision of the Provincial Manager and guidance of technical staff, the coordinator will be responsible to ensure smooth, timely support for implementation of Programme activities in the field. S/he will in coordination with PPMO and CO staff, has to make sure that the role and responsibilities of all the staff mobilized |

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| | through the service provider are fulfilled according to their TOR. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The annual contract will be extendable up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme. |
| Main responsibilities | <ul style="list-style-type: none"> • Provide overall team leadership for supervision and coordination of staff activities, including jointly formulating individual work plans consistent with those of the Programme. • Ensure that all staff deliver the specified services according to their TOR and the overall Service Provider TOR; Ensure quality control of the outputs of the team. • Work closely with Programme thematic team and mobilize staff for farmers and farmers group mobilization, provide assistance in the formulation of Palika Agro ecological Cluster plan (PAP), and POs Co-investment plans and overseeing the implementation of Plans. • Coordinate with Business Development Officers to facilitate producer's group linkages with buyers & service providers and work towards reliable, fair and long-term relationships including contractual arrangements supporting overall high value commodities value chain development. • Coordinate and facilitate all the training related to Agriculture production following agro-ecological principles at corridor/PPMO level and support in the delivery of those training with concerned stakeholders. • Liaise and coordinate with municipalities' level agriculture, livestock and forestry technical staff in delivering quality technical services to producer groups as and when required in timely manner in coordination with PPMO and CO. • Assist PPMO and CO for monitoring and supervision of Programme field activities in particular use of Co-investment fund and FEBL classes including data collection and record-keeping. • Facilitate, support and mobilize staffs in providing support to producers group for market led crop plan development in clusters to achieve the perceived volume and quality as demanded by the private sectors /traders. • Provide technical backstopping to Staff if required, to enable the timely collection of data for the MIS and liaise with M&E team to ensure optimal operation of MIS towards Programme objectives. • Mentor Staff in the identification of Business Financial Literacy Facilitators (BFLF), monitor the effectiveness of training and provide feedback to enable capacity building to be optimized. • Assist PPMO/CO to facilitate Municipality level stakeholders & partners/NGOs meeting and also ensure quality implementation of activities planned, regular monitoring and reporting in timely manner. • Facilitate and support documentation of experiences, lessons learned, good practices, case studies as part of knowledge development and facilitate exchange of information among concerned stakeholders. • Prepare periodic progress reports on program implementation, highlighting achievements, challenges, and recommendations for improvement. • Ensure timely submission of reports to the PPMO and CO, following the established reporting guidelines and formats. • Undertake any duties assigned by PPMO/CO. |
| Experience & qualifications | <p>Required</p> <ul style="list-style-type: none"> • Master's degree in social science, Rural Development, Sociology, Development Studies or equivalent with at least 5 years' experience |

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| | <p>in relevant filed.</p> <ul style="list-style-type: none"> • Proven experience in agricultural project management and field implementation, preferably in the context of agro-ecology and value chain development. • Excellent organizational and coordination skills, with the ability to manage multiple tasks and stakeholders simultaneously. • Proficient in monitoring and evaluation methodologies, data collection techniques, and reporting. • Good interpersonal and communication skills, with the ability to work effectively with diverse teams and community stakeholders. • Good spoken and written skill in both English and Nepali and possess good skills in report writing. • Good computer skills <p>Preferences given to</p> <ul style="list-style-type: none"> • Candidate having experience in capacity assessments, strengthening of group/cooperatives and business facilitation, agriculture value chain /Value chain development. |
| Salary and Benefits | <ul style="list-style-type: none"> • Service Provider Staff mobilization policy and as prescribed in MoU between the Programme Management and Selected service Provider. |

25. Terms of Reference for Administration & Finance Officer (AFO)

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| Position: | Admin and Finance Officer (AFO) |
| No of Position | 1 |
| Reports to: | Coordinator - Service Provider and Account Officer, PPMO |
| Supervises: | n/a |
| Duty station: | PPMO |
| Summary of role: | The Admin/Finance Officer (AFO) will be responsible to ensure efficient and effective management of administrative and financial processes of the service Provider firm, selected by RHVAP. S/he works in direct supervision of the coordinator-Service Provider for the administrative matters while performing the duties and responsibilities and guided by the Accounts Officer and the Financial Management Specialist of the PPMO for financial matters. |
| Mode of contract: | Rolling annual contract with a probation period of six months. The contract will be extendable annually up to the Programme period based on satisfactory performance in the preceding contract assessed by the Programme |
| Main responsibilities | <ul style="list-style-type: none"> • Support day-to-day administrative operations on the behalf of the service provider firm. • Assist in the coordination of meetings, workshops, and other events related to the engagement with R-HVAP. • Maintain up-to-date records including office files. attendance, leave and travel records of staff mobilized through SP and submit a report to the PPMO/CO on a monthly basis. • Keep-up all office equipment, vehicles, and other items provided by |

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| | <p>the Programme in a well-functioning condition.</p> <ul style="list-style-type: none"> • Prepare and distribute relevant documents, reports, and correspondence as required. • Assist Coordinator and other staff in the preparation of AWPB and monitoring of the service provider firm's budget expenditure. • Maintain financial records, including invoices, receipts, and financial transactions. • Prepares Statements of Expenditures (SoEs) both in category-wise and component-wise periodically and submits to the Financial Management Officer for preparation of withdrawal application for reimbursement from IFAD. • Support the Corridor – Service Provider in assessing the performance of the staff members • Collaborate with the RHVAP finance team to ensure accurate and timely reporting. • Assist in the preparation of financial audits and provide necessary documentation and information as required. • Regular reporting on administrative and financial matters, as per the established reporting protocols and timelines. • Any other tasks as assigned by the Corridor Coordinator. |
| Experience & qualifications | <p>Qualification:</p> <ul style="list-style-type: none"> • Bachelor's degree in finance, accounting, business administration, or a related field with five years of working experience in Project administrative and financial accounting in Projects/Programmes . • Proven experience in administrative and financial roles, preferably within the agriculture or development sector. • Proficiency in accounting software and financial management systems • Strong communication and interpersonal skills. • Ability to work independently and collaboratively in a team environment. • Proficiency in MS Office applications, including Word, Excel, and PowerPoint. • Fluent in communication: speaking and writing both in English and Nepali <p>Preferences given to</p> <ul style="list-style-type: none"> • Candidate having working experience with Bi-lateral Project/ Programme. |
| Salary and Benefits | <ul style="list-style-type: none"> • Service Provider Staff mobilization policy and as prescribed in MoU between the Programme Management and Selected service Provider. |

PIM Appendix 8: R-HVAP Gender, youth and social inclusion strategy

R-HVAP Gender, youth and social inclusion strategy

1. IFAD will use the following entry points to address mainstreaming themes: (i) improve women's access to viable economic opportunity (on farm and off-farm) as well as social empowerment; (ii) generate economic and professional opportunities for youth (iii) provide nutrition education especially for ultra-poor vulnerable households (iv) engage in strong consultation process to ensure participation and social inclusion of potentially excluded groups (Dalits and Janajatis). Details on activities and implementation arrangements are provided below and ToRs for relevant experts in **Annex I**.
2. **Youth participation:** Youth will be organized in groups (young men and young women) on the basis of their interest and different degrees of participation in the programme; i.e. as existing farmers' producers, agri-entrepreneurs, unskilled young agriculture labours, young returning migrants, thus being organized accordingly and receiving targeted interventions and trainings on the basis of their aspirations and interest in engaging in agricultural activities as well as skills and enterprise development (off farm/ value addition/ service provision).
3. It is expected that 40% of youth (16-40 years) will be part of POs (about 24,000 youth-led HHs engaged in agriculture) receiving project services under **Component 1** (*Resilience of smallholder production enhanced*) and additional 760 youth (50% young women) will be trained as part of a Youth Agriculture Programme (YAP) in skills and enterprise development (e.g. training in non-agricultural activities, micro-entrepreneurs, apprenticeship training and training for youth employment) under **Component 2** (MSME ecosystem for agricultural service market strengthened).
4. These activities will support: (i) enterprise development and self-employment for 400 young entrepreneurs and (ii) employment for 300 youth trained in skills development and able to find employment opportunities including through apprenticeships. Furthermore, through an internship programme a total of 60 students/ undergraduates in agriculture sector will have the opportunity to participate in 6 months internship as part of the programme activities in the field at cluster level and enhance their practical knowledge in agroecology. A specialised service provider will be hired on competitive based to undertake this activity.
5. **Gender:** Women represent at least 50% of project participants (or about 30,000, out of which 30% or 9,000 WHHs). Under component 1 (*Resilience of smallholder production enhanced*) they will be mobilised and organised in groups (mixed POs or women-led POs) to receive specific trainings on the basis of their interests and activities along existing or new opportunities resulting from the agroecology cluster development. Trainings will focus (but not limited to) on improved production and productivity (through FFS), enhanced Financial Education and Business Literacy (FEBL) digital literacy combined with Gender Action Learning System (GALS) as well as leadership. The last being particularly important for women's groups representatives to actively participate in the Multi Stakeholders Platform (MSP), to ensure that women's view and interests are captured in development planning process and key decisions taken at that level during the formulation of the Agroecology Cluster Plan (PAPs).
6. The Community Mobilisers will encourage the participation of women in the identification and planning of the investments and raise awareness regarding the

importance of ensuring that women's priorities are reflected in the choices made. Activities will foster women's participation on equal basis (50 percent) in developing Agroecology Cluster's Plans (PAPs) and be at least 30% active participants in the MSP meetings and boards created for the planning process at all levels (wards, Palika and Province). About 60,000 women will receive FELB training and also Digital literacy training. Detailed activities and implementation arrangements are defined in the sections below.

7. **Approach for gender mainstreaming:** The project's approach to gender mainstreaming will be aimed to:
 - (a) Ensure that women and men have equal access to capacity building, training and productive assets. With this objective, the project will target 50% women (min) as overall direct beneficiaries;
 - (b) Increase women's voice in decision-making at the household and community level. leadership training will also be included. Women will be trained to form groups and their leadership and negotiation skills will be strengthened to enable them to make informed decisions during the cluster planning process (Component 1). It is expected that women in representative position will be 30%. In this respect the project will train 2 women's leader at Palika level (total 200 women).
 - (c) Increase women's access to skills and knowledge: women will be 100 % beneficiaries for the FELB training (about 60,000 women) which include digital literacy, sessions on GALS methodologies and also nutrition education modules. Furthermore, women from POs should be at least 50% beneficiaries of FFS where they will be able to acquire practical knowledge on agroecology and improved production and improvement through FFs and related demonstration sessions. Furthermore, the project will provide livelihood (or start-up package) packages to about 2,000 women from ultra-poor households organised in CiGs. They will also receive specific nutrition education sessions.
 - (d) Develop skills to improve the well-being of women and other family members: with this purpose, nutrition education will be provided at groups level and primary targeting members of ultra-poor HHs through CiGs (and also FFS/ FELB classes when relevant). The training will include training in nutrition/ dietary knowledge, food handling and storage, cooking classes and practical demonstrations on how to prepare a healthy and balanced meal. Attention will be given to Pregnant and Lactating Mothers (PLMs) and families with malnourished children.
8. **Empowering measures and use of household methodologies (GALS):** In addition to developing technical skills through FFS and CiGs trainings in improved agriculture practices and income generation, the project will support women beneficiaries to develop other life skills. Gender awareness trainings will contribute fostering more equitable gender roles and relations at household and group levels. FELB sessions will be used as an entry point to weave into the training, topics such as empowerment of women using gender action learning system (GALS) modules and techniques where appropriate. These sessions will become the basis for a process of learning new words, gaining awareness of what causes underlying problems, and identifying action points and taking them forward. The sessions will also include topics such as nutrition, strategies for empowering women and protecting them from gender-based violence.
9. **Reducing women workload:** The project will also have a strong focus on reducing women's drudgery through introduction of new technologies, specifically renewable energy solutions. Overall, through introduction of such technologies,

women can benefit in terms of reduced work burden (collection of firewood, fodder and water), income and financial access and improved health i.e. reduction in cooking indoors with firewood as they suffer from respiratory diseases and eye infections resulting from an exposure to smoke. Use of firewood also imposes a high drudgery load on women for collecting firewood which may be at an increasing distance from the home.

10. Furthermore, as part of the proposed technologies, some could be of particular relevance for women such as: solar dryers, solar lift irrigation, solar poultry incubators. Improving the accessibility of solar irrigation technologies can help to address some of the challenges, especially those for the poorest and marginalized households. Adoption of solar irrigation can reduce women's burdens, as the technology is easy to operate and less labour-intensive than diesel/electric pumps. The technology also facilitates water access for multiple uses, ranging from agriculture and drinking to sanitation, livestock, and homestead gardening. Unlike diesel pumps, solar pumps don't emit carbon emission and have low maintenance costs; (ii) Solar poultry incubators can support women on Backyard chicken rearing which is primarily a woman's role. This technology can also promote entrepreneurial activities through brooding and sale of eggs.
11. **GESI Specialist at PCO.** A Gender Equality and Social Inclusion (GESI) specialist will be appointed at PCO who will be responsible for ensuring that targeting and gender mainstreaming is applied throughout project activities in accordance with the GESI strategy and action plans. S/he will ensure, in coordination with the Project Coordinator that all terms of reference for service providers include focus on gender and social inclusion as appropriate. S/he will also organise GESI trainings as appropriate for project staff in order to improve project performance towards women and disadvantaged groups.
12. **GESI Strategies:** The Gender Equality and Social Inclusion (GESI) Specialist will be responsible to outline the Gender and Youth Strategy (including a detailed Action Plan for both) of the project during the project inception phase. The overall objective of the GESI strategy will be to ensure that women and youth are equally involved in decision-making and in sharing the benefit of project's interventions and that gender and social inclusion will be mainstreamed throughout all project activities. Each strategy (gender and youth) will have to include the following items:
 - Specific objectives, related to project's components;
 - Specific activities foreseen to reach the objectives and expected outcomes/ outputs;
 - Methodological approach;
 - Knowledge management: the strategy should explain how the knowledge and experience acquired in mainstreaming gender-related issues in on-going projects will be capitalized;
13. The strategy will be prepared, as much as possible, in consultation with GESI focal points of other on-going IFAD projects to incorporate lessons learnt and best practices.
14. **GESI Implementation Action Plan.** In order to develop gender-sensitive and gender-responsive approach in the project activities, the GESI Specialist will prepare GESI action plans. The action plans will be regularly monitored and reported during the annual review and planning exercises. The strategy and action

plans will provide actions and quantified targets and indicators required to improve women's and poorer households' access to and control over capital, land, information, financial and non-financial services. In addition to the quantitative measures, action plans will also emphasize on qualitative analysis of achievements and challenges that need to be considered during project implementation.

15. **GESI Trainings.** The project will train all project staff at cluster level in implementation of the GESI actions in accordance with the gender strategy and action plans. By the end of the training, each cluster staff will have appointed a GESI focal person and review GESI activities within its own programme areas and develop GESI objectives and a mainstreaming plan. Similarly, the GESI Specialist will follow-up on the action plan as per the periodic reporting period and review it bi-annually and provide additional trainings as appropriate intensive in topics such as: participation, group dynamics, leadership, gender sensitization, planning and prioritization of interventions, gender budgeting and so on. The GESI Specialist will provide continuous support to Cluster level GESI focal points.
16. R-HVAP will also conduct GESI trainings for community mobilisers to overcome the social barriers to the inclusion of women and disadvantaged groups in project interventions. The training modules and methods will be reviewed during project start-up and GESI specialist will ensure that the trainings meet the specific requirements of women and disadvantaged groups. As women, Dalits, Janajatis and youth are traditionally excluded, the project will identify appropriate mechanisms, such as groups for women and other groups, secret voting system during community consultations, holding separate meetings with women, etc. to ensure that their voices are taken into consideration. This will be supported by specific activities on leadership training for women and youth representatives.
17. **GESI Monitoring and Evaluation and Knowledge Management.** The M&E officer at PCO level as well as GESI focal points at cluster level will be responsible for ensuring gender and target groups disaggregated data collection and GESI-responsive monitoring and evaluation of project activities. This will allow tracking the progress on inclusion of women and disadvantaged groups (Dalits and Janajatis).
18. This data will be regularly reported through Results and Impact Management System (RIMS), in-country management system and annual performance and status reports. In addition, both M&E officers and KM officers will be responsible for documenting and sharing the achievements, lessons learnt and best practices in the form of M&E products and KM products through various communication tools to stakeholders and project implementers to support regular analysis, improved performance and annual programming of project activities. They will also ensure proper integration of GESI aspects in M&E and KM strategy and manuals in close collaboration with GESI specialist at PCO.
19. **Social Inclusion and Community Mobilisation.** The Community Mobilisers (CM) will be responsible for community mobilisation. They will work in synergy at community level, including the involvement of community-based organizations and local/traditional institutions to mobilize and sensitize communities to get buy in to the Programme and enhance the demand driven nature of the intervention. This activity will be undertaken at the village level and will consist of public consultations with the community as a whole and separate interaction with special groups, such as women and youth but also marginal groups (*Dalits, Janajatis*) and Indigenous Peoples (IPs). A 4 steps process can be followed:

Step 1: Initial Community Consultation at ward level. The first task for field level activities will be to conduct an exploratory visit in the wards within the cluster selected and work with community members and CBOs, including village elders, local leaders, to inform them about the project activities, and seek community concurrence about the relevance of the planned activities and ascertain their interest in participating in the different activities. During this initial phase it will be clarified that the community meetings shall include women, 50% and youth 40% and vulnerable social category such as women head of households (30%) but also marginal groups (Dalits, Janajatis) and Indigenous Peoples where present. This can be done through a start-up workshop or other similar format.

Step 2: Inclusion of Women and Vulnerable Groups. Inclusion and interaction with specific groups, such as women and women head of households, youth, including marginal groups and IPs will also take place. The GESI Specialist and community mobilisers will be directly responsible to facilitate inclusion of (or separate consultation if need be) with those groups and their consequent mobilization within the process. They can be consisted through Focus Groups Discussion (FGDs). They will be mobilized to participate in the broad community meetings, MSP meetings through their representatives, and express their view and interest about planning process and for any package support to be developed by R-HVAP in line with different interests and needs of the target groups.

Step 3: Documenting community meetings at ward level. Community mobilisers and representatives of the PPMO and of the Local administrations, will be able to interact with communities and properly explain/clarify about the project opportunities, terms and conditions and other details (including existence of community feedback mechanism and way to present complaints). In order to ensure transparency of the process, community mobilisers should take records of each consultations held, including attendance list to demonstrate community participation and presence of women and other marginalised groups (Dalits, Janajatis and Indigenous Peoples). Specific focus shall be placed on documenting consultation with Indigenous Peoples when present.

Step 4: Representatives appointed to participate in planning exercise and PAPs development. Group of community representatives (at least 30% women and 30% youth including from vulnerable categories and having representatives from Janajatis and Dalits groups) should be selected to serve as an entry point on behalf of their respective groups to participate in the planning process at all levels. Representatives selected will receive leadership training to better participate in the planning process and be able to train others as needed.

20. **Leadership training for women and youth representatives:** The objective of this activity is to organize leadership training for 200 women and 200 youth representatives (which also will include in POs, MSP and at Palika level for development planning processes).
21. The limited capacity of women to assume leadership roles is often associated to cultural constrains and determining factors which include: (i) low status due to persistent gender discrimination and gender stereotyping, where women are generally viewed to be unfit for leadership, and subsequent lack of support for women's entry to leadership structures; (ii) limited opportunity to engage full time

- in representation activities due to unequal burden of care work that falls upon them; (iii) low self-esteem and inadequate leadership skills and experience as a result of the above factor.
22. Specific youth challenge is their (i) lack of interest for agriculture activities and rural development planning, coupled with (ii) lack of knowledge and access to key information on development planning process and (ii) low representation of youth in boards/committees at Wards and Municipal level during those processes.
 23. In light of the above constrains, the project intends to support women's and women's leaders to increase their awareness about their rights, including right to be involved in the decision making processes of community based organizations and express their opinions and have their voice heard. Specifically, the project will set quotas to ensure a minimum representation of women in decision making and representation positions.
 24. The main objective of the training is to support women and youth from targeted clusters with leadership skills that will enable them to strategically use their strengths and abilities – their competitive edge while participating in key decision-making bodied and processes (i.e. MPS) especially for planning processes for prioritization of investments during PAPs development. The project set quotas for participation of women and youth (30% respectively) in key decision making process and the leadership training is key to ensure that they are capacitated to undertake the role in pro-active manner. To achieve this objective, especially for youth inclusion, it is planned to coordinate (where existing) and also support constitution of **youth panels** operating at ward and palika levels. This activity shall be developed in coordination with National Youth Council (the national level government body which has the policy " Youth Vision 2025"). for its sustainability and alignment.
 25. Trainings for women and youth leaders, targeting at least 2 women and 2 youth representatives per Palika for a total of 200 women and 200 youth across the 100 targeted Palikas (final target to be confirmed during implementation). The objective is preparing women and youth members of producer organizations (POs) and also community members (not in POs) to be leaders and change agents in the local development. They will be provided with sensitization on topics including gender relations, self-awareness, leadership and accountability, negotiation and conflict management, effective communication. The training will specifically include modules about: local legislations, gender responsive budgeting, roles and responsibilities of local government and constitutional rights to be properly informed about planning processes.
 26. **Implementation Arrangements:** Community Mobilisers (CM) will be provided a ToT course at a centralized location (e.g. cluster level) in combination with other training targeting them. The leadership and group organization will be 1 to 2 module, to be attached to existing training course for Community Mobilisers (CM). The training of trainers (ToT) on leadership will be conducted in 1 day (2 sessions in total) at cluster level and possibly as part of a training package for CM. It will be conducted in each Cluster with groups of 15 people in each (or depending on the final number of community mobilisers trained). GESI specialist will be responsible for module development and training of trainers (ToT). Deliverables. Estimated 90 Trainees (Community Mobilisers) trained (15 per cluster, approximately 6 clusters).
 27. The training for women and youth leaders will be done at Palika level (each group with 6 leader participants) and will be one off for 1 day with refresh training every 3

months. Community mobilisers who received the training (as above) will be responsible to support women and youth leaders in formation of groups, engagement with members and support during any decision making process.

Empowering measures and use of household methodologies (GALS): In addition to developing technical skills through FFS and CIGs trainings in improved agriculture practices and income generation, the project will support women beneficiaries to develop other life skills, especially in household nutrition, basic literacy and numeracy, leadership. Gender awareness trainings will contribute fostering more equitable gender roles and relations at household and group levels.

28. To this end R-HVAP will build community capacities through various methodologies, including household methodologies as a successful change behaviour strategy, to change norms and attitudes of the target communities, including husbands, fathers, and boys. The project will scale up the methodology as it exists in the country and has been largely used as part of past and ongoing interventions and recommendations for its replication and scaling up duly reported in the RWEЕ JP GALS qualitative study report (2021).
29. The Joint Program for Accelerating Progress towards Rural Women Economic Empowerment (JP RWEЕ) is a women-centred agriculture-related intervention implemented by the 4 UN agencies, namely IFAD, FAO, UN Women, and WFP. The project was initiated in 2015, and implementation in Sarlahi and Rautahat districts of Nepal began in 2016. Several interventions were put in place to economically empower rural women through (i) improved food security and nutrition, (ii) increased income and sustainable livelihoods, (iii) enhanced leadership and participation in rural institutions, and (iv) a more gender-responsive policy environment.
30. One important intervention of the program was IFAD's Gender Action Learning System (GALS), a specific household methodology, which had been applied in the JP RWEЕ in Nepal since Feb 2019 and aimed at enabling rural women and their family members to work together to improve relations and decision-making. The goal of GALS was to bring about positive behaviour changes from the household level through IFAD's household methodologies. The expected result of this social process was to achieve more equitable workloads and to have an inclusive family vision to strengthen the overall well-being of the household and all its members.
31. IFAD is implementing GALS in collaboration with IFAD-funded Rural Enterprises and Remittances Project (RERP or Samriddhi project), managed by the Government of Nepal. GALS training for RWEЕ groups started at the beginning of 2019, with subsequent follow-ups and facilitation visits as well as trainings through field-based GALS supervisors and GALS champions from RERP. RHVAP will scale up the methodology.
32. Household methodologies involve working with all household members towards achieving a common household vision. Household methodologies have been successfully used as demonstrated above and are appropriate for value chain development projects. The methodology will be implemented at group and HHs level. In farmers empowerment, the methodologies will be used to ensure that organizational goals are inclusive, address issues of power and gender, and strengthen mechanisms for dialogue. Initial skills development at the group level on household methodologies will be replicated at the household level supported by peer group members and trained facilitators. This will ensure that the

empowerment achieved by individual group members is translated at the household level.

33. While R-HVAP will scale up the methodology, will adopt a "lite" version of GALS, using several tools for gender sensitization and awareness creation: The visioning tool, for example, will be used. Once group members have mastered the methodology, they will be encouraged to replicate the visioning exercise at the household level. Group and community facilitators will provide peer support to individual members to address challenges raised at the household level. Other tools will be used to address various gender and socio-economic issues. Such tools will include (but not limited to) the gender balance tree, challenge action tree, livelihood road journey, income and expenditure tree, and will be used flexibly according to the context.
34. **Financial Education and Business Literacy (FEBL):** GALS activities will be combined as part of the Financial Education and Business Literacy (FEBL) sessions. These activities directly contribute to eliminate gender disparities in education, providing opportunities to women to achieve business literacy and ensuring that all learners acquire the knowledge and skills needed to promote sustainable development, gender equality, promotion of a culture of peace and non-violence (SDG 4) and women's full and effective participation and equal opportunities for leadership, giving women equal rights to economic resources, as well as access to ownership and control over productive resources (SDG 5).
35. The expected outcome will be about 60,000 women become more empowered as a result of their participation in the FEBL sessions and the empowering vision and modules that will be especially designed for them through the GALS visioning tools will foster the expected transformation at household level. The target group of this component will be women engaged in agriculture and provide them targeted support to enhance their sense of self-worth, offer them protection and provide them support to enhance food and nutritional security for themselves and their families. The classes aim for improving members' awareness and skills about various aspects of the value chain in which they are participating. Well trained business literacy facilitators, chosen from the community, deliver the training at village level on social dynamics, technical aspects of value chain they are participating in, basic numeracy and business aspects of the commodity (among others). This is resulting in better awareness and skills among the women about the business aspects of the commodity they are producing.
36. As explained, FEBL sessions will be used as an entry point to weave into the training, topics such as empowerment of women using gender action learning system (GALS) modules and techniques where appropriate. These sessions will become the basis for a process of learning new words, gaining awareness of what causes underlying problems, and identifying action points and taking them forward. The sessions will also include topics such as nutrition, strategies for empowering women and protecting them from gender-based violence.
37. The FEBL classes will also provide training on digital literacy for women. There are many reasons for the digital divide. Women earn less than men so are less likely to be able to afford digital devices. Limited educational opportunities for women mean they are more likely to be illiterate, which hampers their use of technology. Low literacy rates also prevent women from comfortably texting on phones and using the internet. In some households, elders or husbands often expect women to seek permission for basic tasks, such as using technology. By limiting their use of technology, women are not able to access the benefits it brings. Using a mobile

phone to seek advice for farming or trade ideas for building a microbusiness can help women secure a better economy. It is expected that such training enables women to set up online businesses, or to use broadband services, such as social networking sites, to enhance their ongoing livelihood and economic activity.

38. **Implementation Arrangements:** Preferability female facilitators who will be provided a ToT course at a centralized location (e.g. cluster level) will be selected. FEBL facilitators will deliver the training to women's group in about 45 modules of 3 hours each delivered twice a week. The learning group size will be 25 to 30 to facilitate learning. The FEBL facilitator will be paid an honorarium for delivering each session. A study to measure the outcomes of the training will be carried out after the initial batch is completed to further improve the content and efficacy of the training.
39. Training of Trainers (ToT) on FEBL: The training of trainers on financial literacy will be tailor and fitted to the needs and capacities of the trainees. This will be conducted for 2 days at cluster level (One additional day may be included as needed for GALS). The objective is to provide trainees with the knowledge and skills to be FEBL Trainers and also GALS champions and as such able to train and guide women and their families on how to manage their production, income, save and invest to achieve their long-term goals and address family and socio-cultural issues that limit women's socio economic empowerment.
40. Training of FEBL trainers and GALS champions will be conducted in each Cluster with groups of 15 people in each. the GESI expert with support from HHS methodology expert will be responsible for module development and training of trainers. Deliverables. 90 Trainers trained (15 per cluster, approximately 6 clusters). Overall responsibilities will be under the GESI person at PPMO (province level). Specific GALS workshops will also be organized as relevant and in line with activity plan developed by the HHs methodology expert.
41. **Youth employment:** In addition to strengthen youth leadership and representation, the project has also designed direct targeted activities for youth employment which will cover: (i) enterprise development for 400 young entrepreneurs (30% women) and (ii) employment for 300 youth trained in skills development and able to find employment opportunities including through apprentices (30% women); 60 students/ undergraduates in agriculture sector having the opportunity to participate in 6 months internship as part of the programme activities (30% women). The objective is to create self-employment through enterprise development and also employment through skills training for young underemployed youth, especially from the poorest categories.
42. The identification of training package for youth will be defined after community meetings/ MSP meetings where the project team along with project participants will have defined best areas for youth investments and trainings across three main areas: enterprise and business development; vocational training, apprenticeship. During that phase also, clear targets will be defined accordingly. At design stage and based on current IFAD interventions (e.g. RERP) the likelihood for youth trainings and targets have been proposed as below (to be refined after consultation and MSP process)
43. **Enterprise development and self-employment for rural young entrepreneurs (target 400 youth self-employed in agri-business sector).**
44. This activity will start with **Identification and targeting of potential young rural entrepreneurs.** During MSP meetings and PAPs development, local

stakeholders and actors involved in the cluster development (including for enterprise development) will identify rural youth willing to set up agri businesses in the target areas based on enterprise potential identified. Youth groups will be mobilised to be part of the MSP and present their view and interests so to identify the potential agriculture entrepreneurs.

45. In addition to MSP meetings, there will also be sessions on **enterprise and business development** which will be held at local level and facilitated by project staff (business and enterprise development experts) and the participation of at least two rural entrepreneurs from relevant agri business sectors. The sessions will provide participants with exposure to the real-life experience of successful rural entrepreneurs of the same area as well as to other relevant information (e.g. basic steps to set up a new enterprise, possible support that could be facilitated by the project as well as possible economic activities to be developed in the area). The contents and the modalities of the sessions will be tailored to homogenous groups of beneficiaries in terms of literacy and numeracy skills as well as business aspirations.
46. At the end of each session project staff (Business and enterprise development expert at corridor level) will screen participants on the basis of a set of criteria including the viability of the participant's business idea and his/her attitude and level of personal motivation. A list of "potential rural youth entrepreneurs" eligible to receive a start-up training package will be created. It is expected a significant drop-out rate during the induction and business motivation sessions and after the final screening.
47. **Start-up training package for potential young entrepreneurs.** For those people selected as "potential young rural entrepreneurs" after enterprise and business motivation sessions the project will develop, with the support of specialised public or private partners, a number of different *enterprise start-up training* packages composed of various modules and designed for three broad business activities: (i) agriculture; (ii) processing/manufacturing; and (iii) services in line with priorities identified in the PAPs. The menu of training modules at design stage include: (i) basic numeracy and financial literacy, (ii) book-keeping, accounting and financial management, (iii) technical skill upgrade; (iv) business planning; (v) product costing and pricing; (vi) basic enterprise-related legal and tax advice, (vii) information about Government enterprise policies and regulations, (viii) information about different types of business models (individual vs. collective enterprises, clusters, sub-contractual arrangements); (ix) market information. More detailed menu of options will be defined during implementation. A more detailed training package will be defined after consultation with youth.
48. The delivery of the training package will be outsourced to a Service Provider (SP). It will be delivered to groups of entrepreneurs, homogenous in terms of literacy, numeracy and business skills as well as business activity and its contents and training modality will be adjusted to the type of audience. It is expected that the large majority of training package will be designed around basic training modules (e.g. technical skill upgrade, basic bookkeeping) and very practical rather than theoretical training approaches. One of the modules of the training will be on business planning. Each trainees will be helped develop his own individual or collective (depending on the business model chosen) BP during the training.
49. **Services provision modalities.** The project-supported services identified in the BP will be delivered with the most effective (i.e. with an adequate mix of theory and practice, taking advantage as much as possible of local expertise) and efficient

(bundling of services for economies of scale) modality. Possible modalities of services provision could include:

- i. group training;
- ii. peer training (entrepreneur to entrepreneur; farmer to farmer);
- iii. demonstration plots and field farmers schools;
- iv. on the job training;
- v. individual technical assistance;
- vi. individual counselling and mentoring;
- vii. individual business coaching.

50. **Number of business and enterprises supported.** The project will provide support to a total number of 400 rural youth enterprises throughout the first 4 years of programme implementation. It is expected a low percentage of drop-out (5%) during the project implementation so that approximately almost all of these REs will be able to complete the process, i.e. getting their Business Plans approved and receive BDS support from the project. The project will be linking them with key financial institutions and also to VITA (in line with finance sub-component of R-HVAP and implementation arrangements).

51. **Implementation arrangements** Services to young entrepreneurs will be procured by the project with assistance from the corridor team along with result-based contracts with service providers, which will define the baseline situation and expected results within a defined timeframe.

Youth Vocational training and apprenticeship (target 300 youth employed).

52. **Vocation Training (target 300 Youth of which 30% women)**

53. The main objective of this sub-component is to promote gainful wage employment for youth, who are either less interested or face greatest challenges in setting up sustainable and profitable self-employment activities (different from the above category of young entrepreneurs seeking for self-employment and interested to run business enterprise). The project will train 300 individuals (of which 30% of women), who will receive a recognised training certificate (either for training or for apprenticeship). It is expected that 70% of them will secure gainful employment and retain their job over at least six months.

54. Activities under this sub-component will be mostly outsourced to experienced public and private SPs which have successfully implemented vocational training and job placement in Nepal. Employment and apprenticeship opportunities as well as potential employers will be identified through job market surveys. As a result, vocational training and apprenticeship packages will be developed in consultation with potential employers and based on the demand from youth originating during SPM and PAP development. The identification and selection of trainees and apprentices will also reflect project targeting criteria, while the delivery of vocational training packages will be based on results-based contracts with service providers.

55. This sub-component is fully aligned with the Nepal national *Technical Education and Vocational Training Policy* (2010) and will contribute to the achievements of its main strategic trusts: (i) to increase the access of the most disadvantaged

economically, socially and geographically citizens to technical education and vocational training (TEVT) programs; (ii) to provide appropriate, contextual and qualitative technical education and vocational training in consonance with the demand of the national employment market; and (iii) to operate the technical education and vocational training in an effective way by establishing a *TEVT Fund* with joint investments of the Government of Nepal and donor agencies. The sub-component is also fully aligned with *Apprenticeship Training Program Guidelines* recently issued by the Council for Technical Education and Vocational Training (CTEVT).

56. **Vocational training, apprenticeship and job placement:** The project will conduct a preliminary overview of possible employment opportunities in specific growing sectors/sub-sectors/trades, geographic areas and different types of enterprises taking into account the priorities and need identified during MSP meetings and PAP development.
57. **Identification and selection of trainees.** A well-defined set of targeting criteria will be applied for the identification and selection of priority beneficiaries under this sub-component. These include inter alia: (i) age 16-40 for women and 16-36 for men; (ii) poverty level; (iii) migrant households and returnees; (iv) unemployed youth (16-24 years); (v) young women and men from disadvantaged groups, which suffer from caste/ ethnic-based discrimination.
58. **Apprenticeship:** For this activity the approach will be similar to that followed for vocational training, i.e. TEVT SPs, selected through competitive bidding, will be responsible for carrying out the Apprenticeship Training Programmes including a detailed identification of enterprises committing to take on apprentices, for advertising the programme and selecting apprentices, jointly with participating enterprises and in coordination with project staff.

Implementation arrangements: The PCO will establish a contract with a Service Provider (SP) for the implementation of this sub-component.

Internship programme for young students and undergraduate to learn agroecology practices supported by R-HVAP (target: 60 youth students acquire knowledge on agroecology and 30% women)

59. This activity offers a 6 months internship for 60 students or undergraduate in agriculture interested to engage deeper in agroecology; increase knowledge and skills in the practice of building soil, growing food, and creating agroecological systems through on the job training and practical experience supporting activities of the IFAD funded R-HVAP.
60. This semester-long internship with will offer training in agroecological farming methods, engagement with community-based participatory methods and at the same time will provide participants with hands-on experience in project management, research, and communication. By working with IFAD and its partners through R-HVAP operation, interns can learn about the challenges facing rural communities in the specific context and collaborate on solutions to improve their livelihoods.
61. The internships are open to students (about to complete their studies) and fresh graduates who are enrolled in or have recently completed a degree program in a relevant field such as agriculture, possibly with a specialization on agroecology or related topic willing to support agroecology activities in the Programme clusters and interested to deeply work at community level.

62. Interns will be provided with a stipend to cover their living expenses and related travel costs. As a part of this internship, candidate will join a cluster team in one of the R-HVAP provinces to support community mobilisation, facilitation as well as supporting FFS (among others).
63. **Implementation arrangements:** The project should enter into partnership through MoU with Agriculture Universities. They will be responsible to advertise the internship opportunity among students and select best candidates in line with internship objectives and outcomes.

Livelihood Resilience and income generation for Ultra Poor Households

64. This sub-set of activities will be designed to help the most poor and vulnerable households (currently not part of POs) to make their livelihoods more resilient and improve nutrition sensitive production and income generation through Common Interest Groups (CIGs). The expected outcome will be increased production and income generation for 2,940 households (or 4.9¹³⁰ percent of the total targeted Households) including those from marginalized groups ranking among the poorest (Dalits and Janajatis are expected to account for majority of CIGs members).
65. The specific outputs under this sub-set of activities will include the provision of (i) livelihood (or start up) packages to 2,940 households (iii) technical support to set up small IGA (iii) and nutrition education. Activities will target 70% percent women, including young women. They will be organized in Common Interest Groups (196 CIG across 100 Palika, counting 15 members each). The selection of households for these activities will be undertaken based on well-established criteria which has been established by previous IFAD funded projects (e.g. wealth ranking based on food consumption patterns) and elaborated in the targeting criteria for the current project.
66. Eligible activities at design stage for CIGs will include (i) home gardening and provision of small agriculture livelihood support kits to restore crop production and generate income. These can also include seed's package for vegetables with high nutritious values, poultry, small-ruminants in areas where feed resources are available.

However, this is not an exhaustive list and other packages can be added based on beneficiary assessment and technical feasibility of some of the other types of support that can assist them in strengthening their livelihoods and household food and nutrition security. Furthermore, the identification of proper IGA will be done in line with development of cluster plans. The start-up package value is approximately 100 USD per HH. It is expected that 20% of the households receiving the start-up package will be able to graduate to POs. Activities will start from Y2. Activities will be supported by a specialized service provider (SP)

Enhancing Nutritional Security through Nutrition Sessions for ultra-poor households.

67. The project will encourage interventions that promote nutritionally diverse and rich foods. The local crop varieties with high nutritional value and benefits will be given higher priority. Project will promote and support the development of post-harvest management, storage and processing technologies at the community and

¹³⁰ The current census has yet released data on poverty and also on ultra-poor HHs. In the meantime, the proxy used (4.9%) correspond to share of population in severe multidimensional poverty (UNDP, 2022).

household level. The Project will also focus on selection of gender responsive and nutrition sensitive value chains, pro-poor investment in sustainable agriculture, maternal education and awareness of optimal nutrition practices and convergence with ongoing nutritional programmes of Government of Nepal. The nutrition education sessions will be designed to enhance awareness about nutrition, change attitudes, behaviours and practices that would improve nutrition outcomes of this target group. As entry point for nutrition education the project will also consider additional modules on nutrition as part of FELB classes.

68. A specific focus on nutrition will be developed for the poorest households (the ultra-poor). The project will provide support for improved family nutrition for the ultra-poor HHs through providing inputs for increasing production of vegetables through kitchen gardens, as well as increased production and consumption of protein rich foods through provision of goats, poultry, small ruminant.
69. The outcome is improved quality of diets and diversity of at least 1,764 ultra-poor households (60% of this specific target group). The expected output is the provision of targeted support to targeted 2,940 ultra HHs households to improve their nutrition. The nutrition education sessions will be designed to enhance awareness about nutrition, change attitudes, behaviours and practices that would improve nutrition outcomes of target groups. The nutrition activities will be implemented with members of CIGs (45 groups each year which will include 15 households per group). The first year will focus on the preparatory activities with field activities starting from Y2.
70. The project will provide support for improved family nutrition through providing inputs for; (a) Increasing production of vegetables through kitchen gardens; (b) Increased production and consumption of protein rich foods through provision of goats, poultry, small ruminant production, subject to availability of rangeland and/or feed resources etc; (c) collaborate with the water infrastructure team, to provide portable water for household use and water for kitchen garden irrigation.
71. **Implementation Arrangements:** Preferability female Community Nutrition Facilitators (CNFs) will be identified among project communities (e.g. and preferably among existing Community Health Volunteers). They are expected to deliver nutrition sessions and demonstrations to groups of ultra-poor organized in CIGs. They will deliver nutrition sessions bi-monthly for the first six months. The community nutrition facilitators will be paid an honorarium for delivering each session.
72. Training of trainers (ToT) for nutrition facilitators: The training of trainers on nutrition will be tailor fitted to the needs and capacities of the trainees. This will be conducted for 2 days at cluster level. Training of nutrition trainers will be conducted in each cluster with groups of 15 people in each. Nutrition training modules are available (e.g. ministry of health/ FAO) and can be adapted to the context. Deliverables. 90 Trainers trained (15 per cluster, approximately 6 clusters). The GESI expert, also Nutrition focal person will be overall responsible for this activity and coordinate with nutrition partners and platform at local level (e.g. province) as required.

Proposed timeframe and sequencing of GESI activities

| Sub-Activities | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 |
|----------------|----|----|----|----|----|----|----|----|
|----------------|----|----|----|----|----|----|----|----|

| Sub-Activities | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Component 1: Resilience of smallholder value chains enhanced | | | | | | | | |
| Sub-Component 1.1: Profitable smallholder agroecological production expanded | | | | | | | | |
| Gender, Targeting, Social Inclusion | | | | | | | | |
| Recruitment of GESI experts PCO level | | | | | | | | |
| Recruitment of Household Methodology (HM) expert | | | | | | | | |
| Recruitment of Community Nutrition facilitators (CNF) | | | | | | | | |
| Identification and appointment of GESI focal point among existing cluster level staff | | | | | | | | |
| GESI ToRs for Community Mobilisers (CM) | | | | | | | | |
| Development of training materials | | | | | | | | |
| Development of training modules for ToTs (gender, empowerment, nutrition, inclusion) | | | | | | | | |
| Delivery of training (ToT) Cluster Level | | | | | | | | |
| Delivery of ToT for community mobilisers to support gender and inclusive consultation | | | | | | | | |
| Delivery of ToT for community mobilisers to conduct leadership trainings | | | | | | | | |
| Provision of ToT for nutrition interventions | | | | | | | | |
| Provision of TOT for FELB/GALS "lite" | | | | | | | | |
| Refresh trainings | | | | | | | | |
| GALS "lite" catalyst workshop (as needed and in coordination with FELB training) | | | | | | | | |
| Community Mobilisation, Consultation and Targeting | | | | | | | | |
| Community mobilisation and consultation | | | | | | | | |
| Identification of HHs participants (including ultra-poor) | | | | | | | | |
| Identification and train women and youth leaders | | | | | | | | |
| FELB/GALS /Nutrition training Community Level | | | | | | | | |
| Implementation of FELB/GALS training | | | | | | | | |
| Implementation of Nutrition activities for ultra-poor HHs | | | | | | | | |
| Component 2: MSME ecosystem for agricultural service market strengthened | | | | | | | | |
| Sub-Component 2.2: MSME service market for post-harvest value addition strengthened | | | | | | | | |

| Sub-Activities | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 |
|---|----|----|----|----|----|----|----|----|
| Youth employment and internship | | | | | | | | |
| Recruitment of qualified SP for youth activities Province level | | | | | | | | |
| Youth enterprise development activities | | | | | | | | |
| Youth employment related activities (e.g. TVET) | | | | | | | | |
| Sign MoU with institutions for Internship programme Federal level | | | | | | | | |
| Implementation of internship Programme | | | | | | | | |

Annex I: Terms of Reference (ToRs)

Gender and Social Inclusion Specialist (GESI)

General scope of the position: Operationalisation of gender mainstreaming, youth mainstreaming and social inclusion strategies lies with the gender and social inclusion expert at PCO level. The position is full time for the all duration of the project. The GESI expert will also act as nutrition focal point.

More specifically, the Gender and Social Inclusion (GESI) Specialist is responsible for targeting, gender equality, youth mainstreaming and social inclusion aspects of the programme. S/he guides, mentors and monitors the work of other specialists (e.g. the Household Methodology Specialist and GESI focal points at all levels) and provides necessary guidance and training to community mobilisers and GESI focal points and other relevant project staff at cluster level. S/he is particularly responsible for attaining the Programme targets on targeting, gender, youth, social inclusion, nutrition and household methodologies.

As gender and social inclusion is a cross-cutting issue, s/he works closely with all the Programme staff members and reports directly to the Programme Manager. S/he also serves as a channel of communications between the Programme and others working on gender issues in government, implementing agencies, other development projects, and IFAD.

Main tasks and responsibilities

Among others, the GESI Specialist will perform the following main functions:

- Lead and coordinate all gender, youth and nutrition mainstreaming activities in coordination with relevant specialists at PPM and GESI focal points at cluster level.
- Prepare a social inclusion strategy and action plan with key targets and indicators aligned to R-HVAP for disadvantaged socio-economic categories;

- Prepare a gender and youth strategy and action plan with key targets and indicators aligned to R-HVAP for women and youth inclusion;
- Prepare a nutrition mainstreaming plan with key targets and indicators aligned to R-HVAP for Nutrition mainstreaming;
- Work with the M&E Specialist to ensure that the M&E, Logframe and MIS is gender, youth and nutrition sensitive and reflective of the real-time situation. Integrate relevant empowerment indicators in the information system and follow up on the monitoring of WEAI, including work of service provider responsible for baseline, mid-term and final evaluation;
- Work to sensitize all Programme staff and partners that Programme outcomes should be achieved with respect for the principle of gender equity, inclusion, diversity and women's empowerment;
- Review programme plans and budgets to ensure that adequate attention is paid (and resources allocated) to support practical and strategic support to women, and to influence the wider policy/decision-making community to protect and promote equity;
- Work with Business development specialist for the ToR development and recruitment of service providers to implement youth related activities under component 2 and supervise activities performance;
- Provide overall guidance, training support to community mobilisers and facilitators to organize separate consultation with women and vulnerable categories as part of mobilisation/consultation activities as well as for validation of PAPs and (ii) participate in key field activities;
- Draft specific ToRs as required for community facilitators (e.g. gender, nutrition, social inclusion) working at village level, including training if any capacity gap is assessed;
- Draft Specific ToR for GALSS/ Household methodology expert and supervise the activities performed;
- Lead and conduct key training/workshop for gender and youth mainstreaming, including preparation of all relevant training materials for the ToT (e.g. women and youth leadership training for community mobilisers);
- Provide training support to Community Mobilisers to conduct the wealth ranking exercise and targeting of ultra-poor HHs at community level (ToT);
- Provide support and prepare training on nutrition for community nutrition facilitators and supervise activities;
- Provide checklist to community mobilisers to ensure that participatory planning process comply with gender and social inclusion principles of the project;
- Form and lead a small appraisal team to conduct monitoring of PAPs planning process to ensure gender and social inclusion have been considered and (ii) draw lessons to improve the process;
- Conduct constant review of project implementation processes on how to achieve the best possible project outcomes with respect to targeting, gender equality, women's empowerment and social inclusion with key focus on youth and vulnerable categories;
- Coordinate capacity building and training sessions on gender-sensitive and youth sensitive interventions for project staff, implementers as relevant. The training should also include specific information on safeguard instruments for avoiding GBV, SEA and key information about GRM.

Expected outputs:

- Gender and social inclusion (GESI) strategy, plan and contents for gender-awareness messages;
- Nutrition Mainstreaming strategy and plan;
- Delivery of AWPB, progress reports, project documentation related to gender, youth, nutrition and Social Inclusion issues and activities;
- Prepare ToRs for community mobilisers/facilitators responsible for GESI related activities;

- Finalisation of ToRs for Service Provider (SP) to deliver youth activities (enterprise development and employment);
- Finalisation of ToRs for Nutrition Facilitators;
- Training materials for community facilitators finalized and ToT delivered (e.g. leadership trainings, community engagement, targeting for the poorest including Wealth Ranking Exercise, Nutrition, GALS "lite");
- Appropriated social safeguard instruments into operations are set.

Qualification, Experience and Competency

Education: Advance University Degree (Master's Degree or equivalent) in gender studies, or sociology, social work or rural development and other social science with experience in gender and development;

Experience:

- At least 7 years of relevant experience in programming with at least 4 years of relevant experience at national level geared to support large scale multi-sectoral agriculture development and empowerment programs;
- A proven track record in managing and monitoring results-based and rights-based national programming is required, including in-depth knowledge of results-based management approaches;
- Demonstrated knowledge of programming issues within the field of agriculture, and women's economic empowerment;
- Working experience and knowledge of programming and procedures of the government system and/or donor agencies will be an advantage;
- Motivated, and capable of working under pressure

Competencies

- Be familiar with gender mainstreaming policies including any national policies, policies of ministries, implementing institutions and financing agencies, including IFIs;
- Sound understanding and awareness of issues relating to gender and women's issues
- Strong analytical and problem solving skills and is creative, innovative, persistent and resourceful;
- Excellent oral and written communication skills – both in Nepali and English;
- Ability and sensitivity to work with a wide cross-section of partners, including government, NGOs and private sector;
- Excellent interpersonal skills, proven networking, team-building, decision making, organizational and communication skills;
- Displays cultural, gender, religion, race, nationality and age sensitivity and adaptability
- Experience in developing strategies for agriculture and community lead economic development programs is highly desirable;

Additional considerations:

- Qualified Women and people from disadvantaged and minority groups are especially encouraged.

- Candidates working with IFAD projects/programmes in the past in the similar capacity will be given due preference.

Household Methodology Specialist

General scope of the position: The Household Methodology (HM) Specialist provides professional technical assistance and support for intervention design, planning, implementation, monitoring, evaluation, and administration of Programme activities with specific focus on ensuring implementation of transformative approaches. Overall the HM specialist will also support other activities related to data analysis, progress reporting, knowledge networking and capacity building in line with the Programme goals and gender transformative strategy of the Programme.

As Household Methodology is a part of gender and empowerment, the Household Methodology Specialist works closely with all the Programme Staff but more closely under the guidance of GESI Specialist. The position reports directly to the GESI Specialist.

Main tasks and responsibilities

- Lead the development of the HM work plan and related technical decisions for implementation and monitoring of sectoral programme activities;
- Develop a GALS workplan with targets and activities;
- Revise and adapt the GALS methodology (GALS "lite") to FELB trainings;
- Identify the GALS champions among community facilitators;
- Organise a 3-day catalyst workshops in each cluster for GALS champions on 5 basic GALS tools (as appropriate);
- Support at least for 1 month practical work of champions in the communities after each catalyst workshop;
- Provide timely implementation follow-up, including monitoring inputs, to build on programme efficiency and effectiveness;
- Participate in the field visits to sites and relevant events for monitoring programme activities and follows up with local government counterparts and other partners on programme implementation;
- Work together with the KM Specialist to identify best way that disseminate the impact of using GALS in people's lives;
- Facilitate the production of case studies and life stories that can be used to bring evidence of change. And facilitate the use of them in trainings as role models. Share knowledge, information, experience and lessons learned with all stakeholder at national, regional, district, community and household levels.

Expected outputs:

- HM workplan developed;
- GALS lite methodology adapted and integrated into FELB training package;
- GALS workshops conducted in each cluster;
- At least 12 case studies (2 per clusters) produced.

Qualification, Experience and Competency

Education. University degree in Sociology, Development Studies, Gender and Development or any other development field with experience in Gender.

Experience

- Four years of professional work experience in planning, programming, implementation monitoring and evaluation of gender programmes;
- Professional work experience in a programme management function or a technical expert capacity in gender and development;
- Knowledge of HM is required (practical experiences in other projects is an advantage)
- Proven experience in conducting ToT and use of mentoring approaches;
- Experience with similar internationally funded development programme will be an advantage.

Competencies: Strong written and spoken skills of Nepali and English languages and (ii) Strong communication skills.

Additional considerations:

- Qualified Women and people from disadvantaged and minority groups are especially encouraged.
- Candidates working with IFAD projects/programmes in the past in the similar capacity will be given due preference.

ToRs on gender and social inclusion for Community Mobilisers (to be included in the general ToRs for CM)

General scope of the position: Community Mobilisers are overall responsible for community engagement and consultation process. They are key to ensure inclusiveness of disadvantaged social groups and ensure women, youth and disadvantaged categories are properly informed and mobilised to participate in project activities.

Support to be received: The Community Mobilisers will receive the following technical assistance to help prepare them for the community consultation, engagement and support activities:

- 1 day gender, social inclusion and leadership training from GESI expert with periodic refresher training;
- 1 day targeting training to support the selection of the poorest (Ultra Poor HHs) using wealth ranking criteria tools;
- Training materials and pedagogical tools to be used for community sessions especially for conducting FGDs; management of group dynamics;
- Any other operational support that is required.

Main tasks and responsibilities

A. Community Mobilization and Engagement

- Conduct a series of dialogues with the community members to inform them about project activities ensuring that women, youth and marginalised groups are included in these dialogues in the main group or in separate dialogues;
- Seek community concurrence and feedback about the options offered under R-HVAP and offer them choice to select those most relevant for them and ascertain their interest in participating in the different activities.
- Facilitate a series of dialogues in support of:
 - Identification of community investments as part of the PAPs;
 - Identification of CIGs for ultra-poor households;
 - Identification of poor and vulnerable households (including WHHs, Elders, PWD, Dalits, Janajatis)through the Wealth Ranking Exercise.
- Support the organization of gender and youth related sensitisation events/sessions at community level for institutions and local leaders to create awareness on the importance to have women and youth as part of the economic development of the community. These sessions are preliminary to group formation to ensure women and youth are part of the community planning process and their concern captured during selection of investments.
- Gender Awareness for Community Members: It is key to consider raising the awareness of men leaders and members of CBOs (i.e. including POs) on the manifestations of gender bias (against women) and on the effects of discrimination against women on the personal and interpersonal growth of its leaders and members, as well as on the organizational development of the organisation. The activity will be part of gender awareness session taking place in all targeted clusters.

B. Participatory Planning Process

- Assist the communities to conduct the 4 steps participatory planning process for the identification of the priorities for PAPs;
- Ensure that women and youth are informed, mobilised and involved in the identification of community level priorities and prepare their development vision and priorities;
- Organize and facilitate specific separate sessions/ Focus Group Discussion (FGD) with women and youth during the engagement process (as needed) and identify women/youth that can play a leadership role for investments prioritisation;
- Provide overall monitoring and reporting of the process, especially in relation to consultation with specific groups such as Indigenous peoples;
- Document the consultation process and any specific consultative session to ensure transparency and accountability.

C. Women and youth leadership

- Assist women's and youth groups in identification of the community representatives who will be trained to enhance leadership skills to be representatives in CBOs and MSPs;
- Organize the women's and youth leadership trainings and keep track of monitoring of women and youth in leadership positions (30%);
- Train women and youth leaders in gender relations, self-awareness, leadership and accountability, negotiation and conflict management, effective communication;
- Provide trainings on local legislations, roles and responsibilities of local government and constitutional rights to properly inform community representatives about planning processes;
- Support collection of data (quantitative and qualitative) on women and youth participation to ensure that proper M&E data collection is sex and age disaggregated.

Community Nutrition Facilitators

General scope of the position: Community Nutrition Facilitators (CNF) will be responsible for implementing the activities related to nutrition mainstreaming to enhance the nutrition security of vulnerable households and ultra-poor HHs. The CNF (preferably also Community Health Volunteers) will undertake all field level activities for the successful implementation of these activities and of mentoring and tracking households targeted for nutrition improvement in the project area. The project will recruit about 200 CNFs from the project municipalities (two women from each Palika) in which they are expected to work. These field level workers will all be women as they are required to work with women at the community level and track women in households through regular home visits. The CNF will be initially selected using the existing network of community health volunteers at community level when present.

Support to be received:

The community facilitators will receive the following technical assistance to help prepare them for the community nutrition awareness, mentoring and support activities:

- 2 days nutrition training from nutrition focal point (GESI Specialist or specialised TA);
- Protocol on home visits and community interaction;
- Training materials and pedagogical tools to be used for community sessions;
- Support and regular visits from the local FFS facilitator for assistance with the kitchen gardens and livestock production activities;
- Monitoring tools for following up on the progress made by the households;
- Any other operational support that is required.

Main tasks and responsibilities:

- Support community mobilisers in the selection of the vulnerable and ultra-poor households to be included in the nutrition activities;
- Keep records of each of the households involved in their specific locations of responsibility (for example-questionnaires with their demography, any reported health and nutrition related diseases affecting the household etc),
- Provide nutrition training to the one nutrition community group, also defined as CIG (of 15 households) under their responsibility- intensive bi-monthly training for the first six months. (Each group training session will focus on a different nutrition topic which is detailed in the facilitators training modules).
- Work with the FFS facilitator to help the households set up their kitchen gardens, small livestock production activities and undertake food processing;
- Undertake individual household follow up, each month (for at least 6 months) and support the family to continually adopt good food and nutrition practise.
- Periodically follow up on each of the households after the first year of close interaction;

Duration: The Community Nutrition Facilitators will be engaged on a part time basis. For the first six months- each facilitator will offer training to one nutrition group, twice monthly. Each session will be a minimum of one hour and maximum of two hours. The other six months of the year, the facilitator will be expected to visit each household in his/her group (15 households) and assist them in implementing the lessons learned within their households, correct any poor practises and promote good nutrition behaviours for the general household and specific individual members of the household who are at risk of malnutrition. After engaging the group for the first year, the facilitator will make a visit once in two months to selected household for the remaining life of the project.

Qualifications:

- At least a secondary school certificate,
- At least one-year experience in supporting community development activities (preferably in health sectors).

FELB and GALS “lite” Community Facilitators

General scope of the position: FELB Facilitators will be directly hired to conduct finance literacy sessions using also the GALS “lite” methodology. The FELB facilitators will be chosen from among those who have previous experience of teaching and will be trained in the GALS “lite” methodology by the Household Methodology Specialist who will have technical expertise in this approach.

Support to be received:

The FELB facilitators will receive the following technical assistance to help prepare them for activities they are responsible:

- 2 days FELB and GALS “lite” training.
- Training materials and pedagogical tools to properly teach household methodologies (e.g. visioning tools)
- Monitoring tools for following up on the progress made by the households,
- Any other operational support that is required.

Specific duties of Facilitators

- Support the project team in the selection of the candidates to be included in the FELB and GALS Sessions ensuring that the targeted number specified in the PDR and PIM are met;

- Improving members' awareness and skills about various aspects of the value chain in which they are participating;
- Provide training in basic numeracy and business aspects;
- Conduct the Sessions for a six-month period and hold regular GALS "lite" sessions;
- Maintenance of the attendance of the participants and submit a monthly report on attendance and an annual report on the number of those graduating by sex and age
- Conduct follow up visits at HHs level to check on the implementation of household methodologies tools;
- Organise group experience sharing for participants to discuss about progresses after using the HM approach.
- Support the HM specialist to identify success story for documentation and KM.

Duration: The FELB Facilitators will be engaged on a part time basis. For the first six months- each facilitator will offer FELB training to women's group in about 45 modules of 3 hours each delivered twice a week. The learning group size will be 25 to 30 to facilitate learning. The facilitator will be expected to visit selected household in his/her group (e.g. 10 households) and assist them in implementing the GALS methodology at household level.

After engaging the group for the first year, the facilitator will make a visit once in two months to selected household for the remaining life of the project.

Qualifications:

- At least a secondary school certificate,
- At least one-year experience in supporting community development activities

PIM Appendix 9: Semlar Operational Guideline and Action Plan – Table of Content

Semlar Regional Agricultural Wholesale Market Operational Guideline and Action Plan

Table of Content

Part A: Initiation

1. Name of the guidelines
2. Definitions

Part B: Formation, roles and responsibility of Regional Agricultural Wholesale Market Management Committee

3. Formation of Regional Agricultural Wholesale Market Management Committee
4. Roles and responsibilities (TOR) of Regional Agricultural Wholesale Market Management Committee
5. Tenure of members of Regional Agricultural Wholesale Market Management Committee
6. Eligibility of members of Regional Agricultural Wholesale Market Management Committee
7. Meeting and decision-making procedure of Regional Agricultural Wholesale Market Management Committee

Part C: Financial Management of Regional Agricultural Wholesale Market Management Committee

8. Regional Agricultural Wholesale Market Management Committee fund
9. Financial administration
10. Annual Programme and Budget of Regional Agricultural Wholesale Market Management Committee

Part D: Staff management for Regional Agricultural Wholesale Market Management

11. Approval of required staff positions
12. Personnel administration
13. Recruitment of Chief Executive Officer/Managing Director
14. Minimum eligibility criteria for Chief Executive Officer/Managing Director
15. Roles and responsibilities of Chief Executive Officer/ Managing Director

Part E: System of market stalls/places distribution/ renting out

16. Transparent system of renting out of market stalls/places
17. Basis for determining monthly stall rents
18. Processes of fixing monthly rents for stalls/places
19. Reserve stalls for Producer Organizations/ Cooperatives
20. Parking charges
21. Charges for Conference/Meeting halls

Part F: Laboratory Management

Part G : Waste management

Part H: Miscellaneous

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 9: Integrated Project Risk Matrix (IPRM)

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

Overall Summary

| Risk Category / Subcategory | Inherent risk | Residual risk |
|---|--------------------|---|
| Country Context | Moderate | Moderate |
| <i>Political Commitment</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Governance</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Macroeconomic</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Fragility and Security</i> | | <i>No risk envisaged - not applicable</i> |
| Sector Strategies and Policies | Moderate | Moderate |
| <i>Policy alignment</i> | <i>Low</i> | <i>Low</i> |
| <i>Policy Development and Implementation</i> | <i>Moderate</i> | <i>Moderate</i> |
| Environment and Climate Context | Substantial | Substantial |
| <i>Project vulnerability to environmental conditions</i> | <i>Substantial</i> | <i>Substantial</i> |
| <i>Project vulnerability to climate change impacts</i> | <i>Substantial</i> | <i>Substantial</i> |
| Project Scope | Low | Low |
| <i>Project Relevance</i> | <i>Low</i> | <i>Low</i> |
| <i>Technical Soundness</i> | <i>Low</i> | <i>Low</i> |
| Institutional Capacity for Implementation and Sustainability | Substantial | Substantial |
| <i>Implementation Arrangements</i> | <i>Substantial</i> | <i>Substantial</i> |
| <i>Monitoring and Evaluation Arrangements</i> | <i>Moderate</i> | <i>Moderate</i> |
| Project Financial Management | Substantial | Substantial |
| <i>Project Organization and Staffing</i> | <i>High</i> | <i>High</i> |
| <i>Project Budgeting</i> | <i>Substantial</i> | <i>Substantial</i> |
| <i>Project Funds Flow/Disbursement Arrangements</i> | <i>Substantial</i> | <i>Substantial</i> |
| <i>Project Internal Controls</i> | <i>Substantial</i> | <i>Substantial</i> |
| <i>Project Accounting and Financial Reporting</i> | <i>Substantial</i> | <i>Substantial</i> |
| <i>Project External Audit</i> | <i>Substantial</i> | <i>Substantial</i> |
| Project Procurement | Moderate | Moderate |
| <i>Legal and Regulatory Framework</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Accountability and Transparency</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Capability in Public Procurement</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Public Procurement Processes</i> | <i>Moderate</i> | <i>Moderate</i> |
| Environment, Social and Climate Impact | Moderate | Moderate |
| <i>Biodiversity Conservation</i> | <i>Substantial</i> | <i>Substantial</i> |
| <i>Resource Efficiency and Pollution Prevention</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Cultural Heritage</i> | <i>Low</i> | <i>Low</i> |
| <i>Indigenous People</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Labour and Working Conditions</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Community health, safety and security</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Physical and Economic Resettlement</i> | <i>Moderate</i> | <i>Moderate</i> |
| <i>Greenhouse Gas Emissions</i> | <i>Moderate</i> | <i>Moderate</i> |

| Risk Category / Subcategory | Inherent risk | Residual risk |
|--|----------------------|----------------------|
| <i>Vulnerability of target populations and ecosystems to climate variability and hazards</i> | <i>Substantial</i> | <i>Moderate</i> |
| Stakeholders | Moderate | Moderate |
| <i>Stakeholder Engagement/Coordination</i> | <i>Low</i> | <i>Low</i> |
| <i>Stakeholder Grievances</i> | <i>Moderate</i> | <i>Moderate</i> |
| Overall | Moderate | Moderate |

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| Country Context | Moderate | Moderate |
| Political Commitment | Moderate | Moderate |
| <p>Risk:</p> <p>Nepal is at an advanced stage of transitioning from a unitary to a three-tier federal governance system. The second general elections were successfully held on 20 Nov 2022 with local election earlier in 2022 and a coalition government has been formed in December 2022. Despite the recent elections being completed without major incidents, the inherent level of risk is moderate due to frequent changes in the country's leadership. Since the end of monarchy in Nepal in 2008, the country has witnessed rise of 10 different governments. Additionally, the turnover of the ministers within the same government is also noticeable.</p> <p>Rural and agriculture development remains priorities for all major parties. However, smooth implementation due to constitutional arrangements, including the newly introduced system of federalism, is to be tested over time and required adjustments made. Overall, local government (municipalities) have started playing a more pro-active role in local development, including agricultural development.</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>The Programme is executed by mainstream government ministries: MoALD as the LPA, in partnership with MoICS and Ministry of Urban Development at Federal level, work in close collaboration with Provincial Agriculture, and forest Ministries and Municipality level Agriculture and Livestock Unit having strong internal financing mechanisms. Following the decentralization, implementation offices will be established at the three provinces while the federal office will act as the coordination unit. Deputation of lead position will be from the provincial governments ensuring full time and long-term availability of the key positions. The Semlar Wholesale Market construction and operation will be led by Center for Agricultural Infrastructure Development and Mechanization Promotion (CAIDMP), a dedicated and experience division under the MoALD with the success of construction and operation of major markets. A dedicated Sub-Project Implementation Unit (SPIU) will be established at the Lumbini province in close coordination with Butwal Metropolitan City. Maximum collaboration will be ensured with local governments for the planning, quality implementation, and monitoring.</p> | | |
| Governance | Moderate | Moderate |
| <p>Risk:</p> <p>The inherent governance risks to the Programme are moderate. Overall stemming from the effectiveness of the new constitutional arrangements, and assignment of powers across three tiers of government need to be tested over time and required adjustments made. Over time, ambiguities in the roles and responsibilities of different tiers have been reduced.</p> <p>Local government (municipalities) have started playing a more pro-active role in local development, including agricultural development. Significant changes have occurred, and the new generation of leaders are considered as more development oriented as observed in by Mission field visits.</p> | Moderate | Moderate |

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| <p>Mitigations:</p> <p>The program's planning and implementation approaches will be participatory with meaningful multistakeholder consultation and engagement. The planning process will follow bottom-up approach assessing situation and need of local communities ensuring their participation in each step. The Municipal Agroecological Plans (PAPs) will conduct series of community consultation ensuring participation from Dalit, Janajati, women, youth-young girls, and marginalized people. Multi Stakeholder Platform (MSP) will be vibrantly unitized to discuss and draft PAPs. MSP will engage MSMEs, other private sectors, government line agencies, non-government agencies, while local governments will lead the overall process. PAPs will be integrated into the palika's planning process to increase participation, transparency and ownership. The beneficiary targeting will be clearly set to benefit targeted smallholders. Activities for the investment will be selected from participatorily prepared PAPs. Investment decision will be transparent. Joint monitoring, including private sector and media centres, will be organized to supervise activity implementation. As a regular practice, public auditing will be conducted to increase transparency.</p> <p>The programme implementation will be facilitated by service providers mobilised at PPMO and corridor office levels. The IFAD country office team will provide continued guidance and backstopping to the implementation agencies. Overall coordination will be provided by a Federal level Programme Steering Committee (PSC), which provides a forum for inter-provincial and inter-agency coordination, and the Provincial Programme Steering Committee (PPSC) that conducts intra-provincial coordination.</p> <p>The Semlar wholesale market bidding and construction will follow national and international standards, ensuring transparency and accountability.</p> | | |
| <p>Macroeconomic</p> | <p>Moderate</p> | <p>Moderate</p> |
| <p>Risk:</p> <p>Movement restrictions with an almost complete shut-down of tourism during the COVID-19 pandemic resulted in Nepal's first economic contraction in almost 40 years in FY 2020 (-2.4 percent).</p> <p>In FY 2021, Nepal also witnessed: (i) increase in the current account deficit to \$2.8 billion —8.0% of GDP from 0.9% of GDP a year earlier; (ii) growth in exports by 31.0% but had a minimal impact on the trade deficit as they are relatively small at about 10% of imports; (iii) increase in workers' remittances by 8.2% to \$8.1 billion; (iv) marginal increase in foreign exchange reserves to \$11.7 billion (worth 10.2 months of current imports); (v) increase in government debt to 41.4% of GDP from an average of 25.1% during FY2016-FY2019.</p> <p>Despite the rise in debt, Nepal's risk of debt distress is low given the high level of official concessional borrowing at long maturity. GDP growth is likely to increase to 3.9% in FY2022 and slowing growth in advanced economies exacerbated by the Russian - Ukraine conflict along with disrupted trade flows and higher prices of oil and other commodities are expected to push inflation and exert pressure on the external sector.</p> <p>As imports outpaced foreign currency earnings during the recovery phase, Nepal used its reserves to finance imports, chipping away at the reserves stock until it was once again at pre-pandemic levels, slightly above optimal level recommended by IMF. Low budget execution rates and reduced intergovernmental transfers have kept the deficit in check, but structural problems remain unaddressed.</p> | <p>Moderate</p> | <p>Moderate</p> |
| <p>Mitigations:</p> <p>Potential negative impacts on the Programme are reduced by: a) Encouraged the smallholder farmers in the project area to increase agricultural production and productivity of high value crops strongly supported through co-investments in strengthening resilience enabling market, technical services, financial and credit linkages; b) primarily focussed on agro ecological sustainable farming of high value crops/livestock for national & international market where demand is increasing with supply chains traceability in place, and also address the pertinent chemical fertilizer shortage concern; and c) central role of private investment which is not primarily reliant on the fiscal position of the government.</p> | | |

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| <p>Risk:</p> <p>There is a specific risk to the programmes potential for scaling-up of improved agricultural lending in the wider financial sector from the persistent periodic liquidity constraints leading high interest rates especially for term finance, which may discourage PFIs from expanding agricultural lending regardless of the market opportunity. The term liquidity issues are closely related to the structure of sources of funds in the sector and prudent term matching requirements.</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>Specific mitigation measures on the agriculture lending risks for investments are: a) Term loans will be made available to R HVAP beneficiaries via the VITA subsidiary loan either directly by ADBL or wholesale term loans from ADBL to partner FIs, who then lend to beneficiaries, ultimately enhanced financial inclusion; b) ADBL has launched an agricultural Bond for 2 successive rounds and generated deposit of NPR 1.2 billion. Bonds are currently offered for 7-year term with 4% interest; and c) Continued policy engagement with NRB and others on agriculture finance promotion policies</p> | | |
| <p>Fragility and Security</p> | | No risk envisaged - not applicable |
| <p>No risk envisaged</p> | | |
| <p>Sector Strategies and Policies</p> | Moderate | Moderate |
| <p>Policy alignment</p> | Low | Low |
| <p>Risk:</p> <p>Overall risks are low as sector strategies and policy framework in both agricultural and financial sector are highly favourable to the Programme, as seen in the Agriculture Development Strategy (ADS – which IFAD is supporting the mid-term review and revision in 2023), the deprived/priority sector lending policies and financial inclusion road map and action plans. The transfer of substantial powers concerning the agriculture sector to province and municipal level are also expected to create increasingly accountable policy frameworks to the needs of rural people. Agriculture and rural development remain priorities for all major political parties.</p> | Low | Low |
| <p>Mitigations:</p> <p>No specific mitigation measures are required.</p> | | |
| <p>Policy Development and Implementation</p> | Moderate | Moderate |
| <p>Risk:</p> <p>Technical service provision to farmers – Municipalities have limited budget and inadequate & less-skilled human resources to facilitate Climate-Smart Agriculture / agroecological practices and services to farmers. This may affect the promotion /upscaling of agroecological farming at large. Development of Sustainable/Organic Farming Policy and its implementation will be a challenge.</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>Experience from IFAD past and ongoing projects HVAP, ASDP and ASHA reveal that lead farmer and private service providers capacitated under the project can be mobilized; they are either embedded through Agribusiness/Cooperatives or fee-based or voucher-based payment mechanism by Local government following the pluralistic extension mechanism of inputs and services supporting sustainable farming, which suggests there is a low risk if properly managed by the Programme. Similarly, Programme partner with provincial Ministries of Land Management, Agriculture and Cooperatives (MoLMAC) to ensure that the AKCs and VHLSSCs, who have more higher qualified staff, are provide technical backstopping to the municipalities and local service providers supported by the municipalities and the Programme as per their mandate.</p> | | |

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| Environment and Climate Context | Substantial | Substantial |
| <i>Project vulnerability to environmental conditions</i> | <i>Substantial</i> | <i>Substantial</i> |
| <p>Risk:</p> <p>Apart from significant seismic risks, agriculture-dependent populations in Nepal have inherent vulnerability to weather-related environmental conditions such as droughts, floods, landslide, rainfall, and temperature risks. While monsoon rainfall in 2022 was close to normal, fertilizer shortage in the main growing season of rice is expected to have some adverse impact.</p> <p>The Environmental and Social category is rated as substantial, primarily attributed to the community forest land's utilization for the Semlar Wholesale Market. The construction of the wholesale market is planned within the Ratanpur Community Forest, encompassing an area of 12.47 hectares.</p> | Substantial | Substantial |
| <p>Mitigations:</p> <p>Mitigation is by a) deploying agro-ecological farming packages developed by ASHA, b) appropriate screening and site selection for potential production clusters to avoid production on high-risk sites – informed by geospatial data and local knowledge, c) pre-engagement carrying capacity assessments – especially for livestock and fodder /forage promotion including e.g., making silage, hay etc., and d) promotion of water-efficient production practices as well as investment in small scale irrigation and multi-use water systems, with inbuilt climate proofing techniques.</p> <p>The Environmental Impact Assessment (EIA) for the construction and operation of the Semlar Wholesale Market has been completed, and the corresponding report has been submitted to the Ministry of Forest and Environment (MoFE) for final approval. The EIA report has been made available in the disclosed documents of the SECAP, as part of the advanced 120-day disclosure requirement (https://www.ifad.org/documents/38711624/47800070/secap-eia-2000003750.pdf/65c506a7-846e-36c5-8c32-928e44ee4ec6?t=1692016664474).</p> <p>The EIA findings confirm that the Ratanpur Community Forest, designated for the wholesale market construction, is a relatively young plantation forest of around 20 years, characterized by low biodiversity. This forest does not serve as a primary source of livelihood or economic activities for the local population.</p> <p>In accordance with Government of Nepal (GoN) regulations, the program has incorporated a provision for planting ten times the number of seedlings compared to the projected harvestable count of trees and poles from the construction zone. The program's budget covers the expenses for planting and maintaining the plantation site over a span of five years. The specific location for this plantation site, situated near the wholesale market construction area, is currently under discussion for finalization.</p> <p>According to the EIA, the residual environmental impacts resulting from the construction and operation of the Semlar Wholesale Market are assessed to be low.</p> | | |
| <i>Project vulnerability to climate change impacts</i> | <i>Substantial</i> | <i>Substantial</i> |
| <p>Risk:</p> <p>Inherent climate change risks in Nepal are high and well documented, being among the most vulnerable countries to climate change. Climate trends and future projections for Nepal indicate that seasonal variations in temperature and precipitation will increase, resulting in more frequent and intensified extreme weather events and likely impacts such as i) increased incidences of new (and existing) agricultural diseases, pest and insects, especially at higher altitudes; ii) greater variability in rainfall patterns within the year – coupled with increased water demand – resulting in higher risks of temporary water shortages for rainfed agricultural production; iii) increased heat stress to livestock from a small increase in the number of warm days, especially in the lean season, resulting in reduced milk production and reduced growth in poultry during these periods.</p> | Substantial | Substantial |

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| <p>Mitigations:</p> <p>Participatory preparation of PAPs, which will explicitly include climate risks as identification/prioritization criteria, and selection of climate-resilient commodities to be promoted in different locations and suitable to the agro-climatic condition; promoting and training small-scale producers and MSMEs on tools / increase their knowledge to help them factor in climate change considerations into their investment and production plans; promotion of agroecological/climate-smart agriculture technologies and management practices through strengthening of local support markets and investments along the value chain (particularly, for post-harvest management); and strengthening the capacity of staff in the area of climate change.</p> <p>The Programme will help to reduce climate-related risks and impacts by: improving farmers' understanding of climate risks to their farm business (increase availability and access to bio-inputs and climate resilient technologies and more importantly promote ago-ecological based farming practices); investing in climate proofing multi-use water system and small scale irrigation to reduce the risks from temporary water shortages, and upgrading processing, storage, and marketing facility.</p> <p>A preliminary climate risk assessment has been carried out for the Semlar Wholesale Market, and a collection of recommended mitigation measures has been incorporated into both the EIA report and the ESCMP.</p> <p>Considering the proximity of the construction area to the river, a comprehensive flood risk assessment has been scheduled, and Terms of Reference (ToRs) have been formulated. This assessment aims to enhance the design process by offering specific mitigation strategies tailored to the potential flood risks.</p> <p>The construction of the wholesale market will adhere to both national and international standards, inclusive of building codes that align with Nepal's regulations. These standards will ensure the market's resilience to earthquakes and will encompass climate-proofing measures within the design and operational framework of the wholesale market.</p> | | |
| Project Scope | Low | Low |
| Project Relevance | Low | Low |
| <p>Risk:</p> <p>The programme serves Nepal's most disadvantaged province and is highly relevant to both the government agenda and priorities of its target groups. It is a scaling-up of best practice of HVAP, ASHA and other projects within the country that achieved strong impacts. With the enactment of an enabling act for local governance, the rationale has been further strengthened. Furthermore, the huge dependency of regular shortage of chemical fertilizer, significant disruptions in supply chains and high trade deficit provided further justifications for organizing these organic and resilience supply chains better and strengthen them in a way that minimizes future disruptions.</p> | Low | Low |
| <p>Mitigations:</p> <p>No specific mitigation required.</p> | | |
| Technical Soundness | Low | Low |
| <p>Risk:</p> <p>Technical design risks are generally low as R-HVAP is principally a scaling-up Programme of proven best practice from past an ongoing IFAD funded projects within Nepal</p> | Low | Low |
| <p>Mitigations:</p> <p>No specific mitigation required.</p> | | |
| Institutional Capacity for Implementation and Sustainability | Substantial | Substantial |
| Implementation Arrangements | Substantial | Substantial |

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| <p>Risk:</p> <p>Inherent institutional capacity risks are high in Nepal, as evident in the recent country Programme performance. If not addressed both in design and implementation, these create significant risks of substantial delays in Programme delivery.</p> | Substantial | Substantial |
| <p>Mitigations:</p> <p>Several measures have been incorporated into the design to mitigate these, including setting up provincial management offices, cluster offices with cost centre, preparing participatory PAPs and including that into the palika's planning process, capacitating lead farmers and social mobilizers, supporting youths etc but the effectiveness of these measure must be continuously monitored by GON and IFAD, especially in the early years of implementation, with close implementation support.</p> | | |
| <p>Risk:</p> <p>The new federal governance structure while evolving and maturing to an extent and will take time to gain full maturity and start delivering services. Coordination within and between the three tiers of government has emerged as a critical issue across multiple sectors. The risk is that this may create disjointed policies and public investment programmes between the three tiers – with potential gaps, duplications or contradictions. The Programme may be impacted by a lack of coordination within the government itself.</p> | Substantial | Moderate |
| <p>Mitigations:</p> <p>Measure for mitigation of coordination risks include: establishing a Province Programme Coordination Committee in each province to coordinate among Programme stakeholders within the province and similar Municipality coordination forum in each municipality; signing MoUs between Programme and each municipal government for preparing the Community investment Plan, collaboration on the Programme, setting out expected contributions and roles;, and; providing capacity building training to province and municipality staff on key Programme approaches to raise understanding.</p> | | |
| <p>Monitoring and Evaluation Arrangements</p> | Moderate | Moderate |
| <p>Risk:</p> <p>M&E risks are moderate as the Programme will develop a GIS integrated robust MIS, built on best practices of ASHA & ASDP MIS, to collect individual HHs level data collection, management and reporting systems</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>The RHVAP will use M&E and MIS system those are well proven in past and ongoing projects.</p> | | |
| <p>Project Financial Management</p> | Substantial | Substantial |
| <p>Project Organization and Staffing</p> | High | High |
| <p>Risk:</p> <p>Provincial and Cluster PMUs will have government-deputed staff and recruited FM consultants. The government may not second Accounting Officers on time, the capacity of FM consultants may not be adequate for the needs of the R-HVAP</p> | High | High |
| <p>Mitigations:</p> <p>PCU at the federal level will monitor the secondment of government staff for provincial and cluster PMUs; PCU will also ensure that experienced FM consultants are recruited for them.</p> | | |
| <p>Project Budgeting</p> | Substantial | Substantial |

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| <p>Risk:</p> <ul style="list-style-type: none"> - Government budgeting system will be used for the project budgeting. -PCU and all PMUs will need to separate budgets and get them included in the overall government budget. -low staff capacity to prepare realistic and accurate budgets | Substantial | Substantial |
| <p>Mitigations:</p> <p>Central PCU will coordinate budgeting process and ensure timely and accurate budgets are included in the government overall budget</p> | | |
| <p>Project Funds Flow/Disbursement Arrangements</p> | Substantial | Substantial |
| <p>Risk:</p> <ul style="list-style-type: none"> -the government will pre-finance project activities and PCU will reimburse to Central Treasury every quarter. Inaccurate or insufficient budget allocations will have negative impact on project progress. - bureaucratic procedures within government institutions may delay the approval of payment orders | Substantial | Substantial |
| <p>Mitigations:</p> <ul style="list-style-type: none"> -PCU will need to play a key role in ensuring adequate budget allocations and timely approval of payment documents. -PCU will introduce a system to register and monitor approval and payment of all project related documents. | | |
| <p>Project Internal Controls</p> | Substantial | Substantial |
| <p>Risk:</p> <p>project will follow Government regulations in the area of payments, funds flow and treasury. Without stronger controls however effective and efficient use of project funds maybe compromised</p> | Substantial | Substantial |
| <p>Mitigations:</p> <ul style="list-style-type: none"> -PIM of the project will include essential controls. -Project beneficiaries and local communities will play a key role in approving acts of work completed and goods delivered. -External consultants will be responsible for internal audit reports. | | |
| <p>Project Accounting and Financial Reporting</p> | Substantial | Substantial |
| <p>Risk:</p> <p>Centralized Government Accounting Software (CGAS) will be used for accounting record keeping and financial reporting.</p> <ul style="list-style-type: none"> -CGAS does not generate IFAD required IFRs -CGAS can't consolidate financial reports for all PMUs and PCU | Substantial | Substantial |
| <p>Mitigations:</p> <ul style="list-style-type: none"> -Project will work with the MOF Treasury to customize CGAS so that it can generate IFRs and consolidate at PCU level automatically. | | |
| <p>Project External Audit</p> | Substantial | Substantial |
| <p>Risk:</p> <ul style="list-style-type: none"> -Unaudited Financial Statements are not submitted on time to OAG -Office of the Auditor General (OAG) may not have enough resources to complete audit on time. | Substantial | Substantial |

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| <p>Mitigations:</p> <p>PCU will ensure project unaudited financial statements and notes are sent to OAG on time. -It is proposed that a combination of private and SAI for the project audit is considered within the current legislature to address audit submission delays.</p> | | |
| Project Procurement | Moderate | Moderate |
| Legal and Regulatory Framework | Moderate | Moderate |
| <p>Risk:</p> <p>The risk that the Borrower's regulatory and institutional capacity and practices (including compliance with the laws) are inadequate to conduct the procurement in a manner that optimizes value for money with integrity.</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>(i) Review of procurement plans and ensure the use of competitive procurement method as mentioned in programme procurement arrangement (PPA) letter (ii) Programme to prepare General Procurement Notice - on start of Programme and disclose GPN in public websites. (ii) Procurement information and monitoring information to be publicly available in Programme website.</p> | | |
| Accountability and Transparency | Moderate | Moderate |
| <p>Risk:</p> <p>The risk that accountability, transparency and oversight arrangements (including the handling of complaints regarding, for example, SH/SEA and fraud and corruption) are inadequate to safeguard the integrity of Programme procurement and contract execution, leading to the unintended use of funds, mis procurement, SH/SEA, and/or execution of Programme procurements outside of the required time, cost and quality requirements.</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>i). Established IFAD prior review and post review requirement relative to risk in PPA letter. ii). TA to support the review of technical deliverable and contract management and administration. iii). Maintain records and promote reporting of allegation to IFAD iv). Gather occasional feedback on Programme procurement staff (risk that specific skill enables the individuals to "rent seek" to manipulate results of evaluation service provider and consultancy contracts) (v) Adequate and timely access to information by the public (vi) Enabling environment for public consultation and monitoring (vii) Direct engagement of civil society</p> | | |
| Capability in Public Procurement | Moderate | Moderate |
| <p>Risk:</p> <p>The risk that the implementing agency does not have sound processes, procedures, systems and personnel in place for the administration, supervision and management of contracts resulting in adverse impacts to the development outcomes of the Programme.</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>(i). Manage the recruitment and selection of a dedicated and experienced procurement officer in time (ii) provide training on the preparation of bid document, specifications, evaluation and award of contracts to the procurement staffs (iii) provide training on IFAD's OPEN online procurement End to End System. (iv). Support specialist through Technical Assistance - external consultant as and when needed.</p> | | |
| Public Procurement Processes | Moderate | Moderate |

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| <p>Risk:</p> <p>The risk that procurement processes and market structures (methods, planning, bidding, contract award and contract management) are inefficient and/or anti-competitive, resulting in the misuse of Programme funds or sub-optimal implementation of the Programme and achievement of its objectives.</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>i) Issue Programme Procurement arrangement (PPA) letter to mitigate the risk (ii) Preparation of PP based on collaborative realistic approach (iii) promote e-bidding (iv) Effective use of IFAD's OPEN online procurement End to End System. (v) Monitor procurement performance through ICP-CMT system, (vi) Review and update PIM to address weakness based on mitigation measure identified in the PRM (vii) perform procurement activities as per the approved program procurement strategy (PPS) and procurement arrangements. (viii) Adequate and timely access to information by the public (ix) Direct engagement of civil society</p> | | |
| <p>Environment, Social and Climate Impact</p> | Moderate | Moderate |
| <p>Biodiversity Conservation</p> | Substantial | Substantial |
| <p>Risk:</p> <p>The project activities will not involve conversion or degradation of ecosystems or habitats. However, there is a risk that excessive production of livestock with open grazing system and collection of MAPs, especially in the hills, may expand to unsustainable levels damaging local biodiversity. The construction of the Semlar Wholesale Market in a young community forest will change the land use and might impact local biodiversity</p> | Substantial | Substantial |
| <p>Mitigations:</p> <p>Improved production systems will be widely promoted. For livestock, this includes (i) an exclusive focus on stall-based production systems with planting of additional fodder and forage crops (and ceasing open-grazing) and promotion of more productive herd (by improvement in genetics) to help increase production without corresponding increases in herd size, (ii) use of veterinary medicines under the proper guidance from experts, and (iii) cultivation of MAPs in agriculture and private fallow lands, and in community and leasehold forestry as per the approved operational plan. ASHA project contributed to increase local agro-biodiversity. Upscaling ASHA's best practices will enhance agro-biodiversity in program targeted provinces. The EIA for the Semlar Wholesale Market included an assessment of biodiversity (trees /vegetation, wildlife) in the proposed site (a young community forest). Since 702 trees will be removed in collaboration with DFO and Ratanpur CFUG, 7020 saplings will be planted. Other measures to minimize or avoid impacts on biodiversity include garbage management to reduce the potential for wildlife to be attracted to the market and incorporating existing trees into the design of the market and avoiding tree cutting. Since the procurement of saplings will be from MOFE managed nursery, there are no risks of invasive species introduction.</p> | | |
| <p>Resource Efficiency and Pollution Prevention</p> | Moderate | Moderate |
| <p>Risk:</p> <p>There is an inherent risk of pollution from use of chemical fertilizer, pesticides and veterinary medicines or from poor management of livestock waste. As such, the intensity of chemical fertilizer and pesticide application is still low in Karnali and the two other target provinces and large-scale pollution is unlikely to occur within foreseeable future. However, some pockets may engage in intensive agricultural development for lack of proper guidance, and there might associated risks of overuse / run-offs / disposal and storage of containers. Poor management of solid waste generated by the Semlar Wholesale Market can introduce unpleasant odours or pollute soil and water. Similarly, there are inherent risks associated with wastewater generated by the market facilities.</p> | Moderate | Moderate |

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| <p>Mitigations:</p> <p>R-HVAP will promote good and sustainable agroecological / Climate-Smart Agriculture practices and technologies; enhancing homemade and commercial production of bio-inputs and liquid fertilizer (jholmol) to reduce use of pesticide / mineral fertilizer and promote recycling and reuse; and supplying quality organic inputs through private service providers as well as municipal agricultural extension staff. The Programme will also support better monitoring and enforcement of maximum residual level testing through an accredited laboratory.</p> <p>Waste management strategy for the market includes proposals for a wastewater treatment plant, a waste collection centre (with separation facility), and the engagement of a private contractor with extensive experience in bio-compositing to process the waste.</p> | | |
| <p>Cultural Heritage</p> | <p>Low</p> | <p>Low</p> |
| <p>Risk:</p> <p>The construction of the Semlar Wholesale Market could potentially temporarily impact a few households' access to the shrine (adjacent to the identified market site, advised to Service Provider to indicate in appendix 3_Project Layout Map") due to construction safety measures.</p> | <p>Low</p> | <p>Low</p> |
| <p>Mitigations:</p> <p>The small shrine belongs to 7/8 households, and they worship there once in a year. It is located at the edge of the community forest area. Access restrictions to the shrine might be proposed in line with SECAP-related safety norms for the construction site; the shrine is well-fenced and the eventual construction of the new access road to the market site will facilitate easier entry to the shrine. The probability of access restrictions (temporary in nature) was assessed to be low (page 121 of 200 of the EIA main report, section 7.2.3.2). The EIA has proposed to install clear signages and barriers around the construction area to alert people to potential hazards and indicate the correct pathway to the temple. EIA has also proposed to limit noise levels during prayers. These will be reflected in the procurement TOR and ESCMP. The integrity of the structure will not be impacted since it falls outside the market site. Nevertheless, the EIA proposed and the project will include regular inspection of structural integrity of the shrine/temple, which will also be included in the ESCMP.</p> | | |
| <p>Indigenous People</p> | <p>Moderate</p> | <p>Moderate</p> |
| <p>Risk:</p> <p>The program will work in the areas of IPs. There might be risk of IPs exclusion from the program activity.</p> | <p>Moderate</p> | <p>Moderate</p> |
| <p>Mitigations:</p> <p>i) Ensure meaningful IPs participation on agroecological cluster plan (PAP) preparation process, conduct separate IP focused group discussion where needed, ii) adopt proactive targeting strategies to benefit IPs, iii) collaborate with IP local to national organizations to update on issues and policies and to maximize benefits to IPs, and iv) ensure IPs are aware of and have adequate access to Grievance Redress Mechanisms.</p> | | |
| <p>Labour and Working Conditions</p> | <p>Moderate</p> | <p>Moderate</p> |

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|---|-----------------|-----------------|
| <p>Risk:</p> <p>Internationally funded and government-led development projects are well-regulated for labour conditions (forced labour, child labour, working conditions). There are no reports of forced labour or child labour in smallholder agricultural value chains of such projects. There are some reports of poor labour standards and working conditions in Nepal for private sector activities.</p> <p>It is possible that an agroecological approach might increase workload for women or youth, in some contexts, due to the nature of farming activities when combined with cultural norms on division of labour (e.g., increased need for weeding, gathering manure or managing vermicompost).</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>R-HVAP's procurement process and monitoring, particularly for the Semlar wholesale market, will require and ensure adherence to international norms, IFAD standards, and Government of Nepal. Such measures have proven to be adequate and effective in mitigating risks associated with poor working conditions, forced labour, and child labour in the past in Nepal (both IFAD and other donor projects implemented through the Government of Nepal).</p> <p>The project will take an adaptive management approach to monitor and manage emergent/unanticipated impacts on women and youth, drawing on lessons from HVAP and ASHA. This will be specified in the TOR for the GESI Specialist.</p> | | |
| <p>Community health, safety and security</p> | Moderate | Moderate |
| <p>Risk:</p> <p>There are no envisaged risks of significant negative impacts on community health and safety. In fact, the Programme expects to have several positive impacts – through the promotion of agroecological farming as well as through greater availability of high nutrient value foods in households and communities, which are a key drivers of health and nutrition.</p> <p>The construction of Semlar wholesale market may pose minor risks to community health and safety through influx of outside labours, pollution, and waste generation.</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>No specific mitigation measures are required for Component 1, Component 2 and Component 4 of R-HVAP, since agroecological approach (especially the use of bio-inputs) is promoted. Component 3 (the Semlar Wholesale Market) will take a proactive approach to community health and safety in its proposed design in a comprehensive manner, and several mitigation measures have been proposed in the EIA. For example, a wastewater treatment plant to reduce risk of contamination of surface/groundwater from market activities and accredited pesticide residue testing laboratory will be established. The contractor for the Semlar wholesale market will also be required to follow SECAP's Environment, Health and Safety requirements that will identify safety and mitigation measures during design, construction and operations. Finally, a detailed flood risk assessment, which will build on the preliminary flood risk assessment commissioned by Invest International, will also identify risks (if any) and propose measures for the market site design, construction and operations. GRM will monitor grievances and complaints, with a separate GRM process for Component 3.</p> | | |
| <p>Physical and Economic Resettlement</p> | Moderate | Moderate |
| <p>Risk:</p> <p>This is rated as moderate to reflect the fact that the Semlar wholesale market site is currently a young community forest.</p> | Moderate | Moderate |

| | | |
|---|--------------------|-----------------|
| <p>Mitigations:</p> <p>The Semlar wholesale market site does not involve human resettlement, physical or economic displacement, and was selected out of 9 preliminary sites precisely because of this factor (among other criteria; EIA Section 6.2 on Alternative site locations). The land that will be identified by MoFE for compensatory afforestation (7030 tree saplings) will also not involve any physical or economic displacement. Extensive stakeholder engagements have occurred through consultations, household surveys and focus group discussions, and Public Hearing as a part of the Feasibility Study and EIA (funded by Invest International, service provider RHDHV). Explicit consent will be obtained during early implementation, as a part of stakeholder engagement and associated FPIC processes. A Grievance Redress Mechanism will be established for the market site.</p> | | |
| <p>Greenhouse Gas Emissions</p> | Moderate | Moderate |
| <p>Risk:</p> <p>There is a moderate risk of the Programme significantly increasing greenhouse gas emissions. The promotion of bio-inputs (particularly bio-fertilizers as an alternative to mineral fertilizers), through increased production / enhanced quality and use by farmers, will help avert or avoid increased GHG emissions intensity of agricultural production.</p> <p>The Semlar wholesale market and Agricultural Cluster Plans are anticipated to contribute to reduced food loss and waste. New technologies introduced to enhance agroecological production, input-use efficiency, or post-harvest management will be renewable energy-based (e.g., solar pumps, solar incubators, solar dryers).</p> <p>In general, livestock activities contribute to emissions through enteric fermentation, manure, and land use change (feed, forage). However, the reduction in open grazing and damage to forest land through the promotion of stall-based production for goats, should reduce pressure on forests leading to some recovery. Other livestock production support activities such as manure management and forage/feed production will also reduce pressure on land; manure might also be utilized to produce bio-inputs for crops.</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>No specific mitigation measures are required</p> | | |
| <p>Vulnerability of target populations and ecosystems to climate variability and hazards</p> | Substantial | Moderate |
| <p>Risk:</p> <p>Rural populations in Nepal face inherent climate variability from the monsoon-based climate and geography of the country. As a result, they have developed their adaptive capacity. Compared to this inherent variability, expected climate change impacts of the 25-year Programme impact horizon are modest.</p> | Substantial | Moderate |
| <p>Mitigations:</p> <p>To reduce exposure to the inherent risks, the Programme will apply appropriate production site selection alongside promotion of climate resilience production technologies that reduce exposure to increased variability in rainfall – including poly-tunnels, mulching, liquid fertilizer, biochar water-efficient production practice as well as investment in multi-use and small-scale irrigation.</p> | | |
| <p>Stakeholders</p> | Moderate | Moderate |
| <p>Stakeholder Engagement/Coordination</p> | Low | Low |

| | | |
|--|-----------------|-----------------|
| <p>Risk:</p> <p>Engagement and coordination risks are low as the Programme widely leverages the participatory approach-based LAPA process and open multi-stakeholder platform (MSP) processes proven to be highly effective at stakeholder engagement in previous IFAD projects in Nepal (ASHA, HVAP and other Programmes). PAP will be prepared with wider stakeholder engagement and consultation and will be facilitated to endorse from the local government.</p> | Low | Low |
| <p>Mitigations:</p> <p>Stakeholder engagement plan has been prepared and will be implemented to ensure meaningful stakeholder engagement.</p> | | |
| <p>Stakeholder Grievances</p> | Moderate | Moderate |
| <p>Risk:</p> <p>There is a risk that complaints and grievances, both legitimate and vexatious, if not appropriately handled could delay programme delivery – especially through delays in recruitment and key procurements – for example if cases are referred to the Commission for Investigation of Abuse of Authority (CIAA)</p> | Moderate | Moderate |
| <p>Mitigations:</p> <p>Consistent with prevailing laws and regulations, the Programme will establish a grievance process for Programme beneficiaries and stakeholders to be monitored by the PSC (Programme Steering Committee). For the Semlar Wholesale Market, extensive stakeholder engagements have occurred through consultations, household surveys and focus group discussions, and Public Hearing as a part of the Feasibility Study and EIA (funded by Invest International, service provider RHDHV). A separate Grievance Redress Mechanism will be established for the market site.</p> <p>The programme will also maintain a high degree of transparency in all aspects of its operation, regularly publishing information on its activities.</p> <p>Finally, by minimizing the use of direct grants and subsidies to individuals, POs and businesses, the Programme reduces the incentives for complaints and other disputes related to the allocation of resources.</p> <p>R-HAVAP will continue to implement best practices from previous projects such as ASHA and HVAP, as well as ongoing projects like ASDP and RERP. These practices include: i) Placing the contact details of the information officer in visible locations within all program offices, ii) Managing complaint boxes at easily accessible locations in the offices, iii) Using easily understandable templates in Nepali to register and update grievance details, and iv) Including grievance updates in periodic reports.</p> | | |

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 10: Exit Strategy

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

PDR Annex 10: Exit Strategy

The objective of the exit strategy¹³³ is to ensure that at project completion, the different target beneficiaries may continue to get the net benefits of the project.

The extent to which the different target beneficiaries may continue to get the net benefits of the project depends on several factors. This requires that key interventions and activities continue or are scaled up by rural institutions/groups, government authorities, donor organizations, the private sector, and other agencies. It reviews interventions to improve required partnership, social capital, policy and institutions". Sustainability is measured at completion along above definition and throughout implementation along the following indicators:

• **Sustainability** as *"the prospects for the continuation of project activities or benefit streams after project closure and the durability of changes and impacts of project, including against risks"*.

Exit strategy

- 5: exit strategy supported stakeholder covering institutions, legal, ownership, post funding (incl O&M, extension etc.)
- 4 Partial and not yet agreement

| Institutions & policy & scaling | Partnership | Human and social capital and empowerment | Economic, CC & environment sustainability |
|---|--|--|--|
| <ul style="list-style-type: none"> • 5 Institution & policy impact: participation PO policy, use of evidence for policy & institutions capacities • 4: moderate influence | <ul style="list-style-type: none"> • 5: Implement & document public & private partnership strategy leading PP investment, coordination & improved KM • 4: partial, no clear strategy & moderate satisfaction/results | <ul style="list-style-type: none"> • 5. Individual and group capacities developed and contribute to participation in stronger decision making and economic activities • 4 Marginal improvement and control | <p>Economic & social results (income, asset, productivity, FSN etc.)</p> <p>Environmental sustainability</p> <p>Quality screening & safeguards</p> |

Investing in rural people

R-HVAP is designed as a medium-term initiative, with the first phase from 2024-2031, followed by a follow up phase starting in 2031. Therefore, the exit strategy takes in account the sustained support that is a key condition for sustainability of PO and related investments. **R-HVAP graduation approach** is to provide support to existing PO who have already been established, organised, trained, and coached. Support will be tailored to existing capacities by adopting dedicated maturity score cards to regularly track progress made by CBOs. This approach is expected to be more efficient by saving on mobilisation costs and time and is also expected to generate quicker and more sustainable results during the 8-year project lifetime.

In articulation with project TOC, this requires that key interventions and activities continue or are scaled up by rural institutions/groups, government authorities, donor organizations, the private sector and other agencies:

Institutions established and / or supported by the project have the capacity to maintain and further develop their structures, functions, roles and responsibilities in respect of good governance, gender equality and social inclusion and provide services and inputs for beneficiary to continue profitably the activities invested in (production support, PO strengthening, etc.)

¹³³ IFAD Evaluation Manual, Part I, (2022). IFAD project design guidelines Annex V Technical note – Developing exit strategies in IFAD projects

Physical infrastructures supported by the project are owned and managed by the adequate governance and O&M institutions in line with their institutional mandate, with adequate organizational structures, technical capacities, and financial means to ensure long term operation, maintenance, and further development where relevant. This may entail specific linkages with government institutions and organizations to ensure minimal backstopping and support more complex repairs. such roles and expectations are included in specific MoU with local government institutions (Palika) for elements that are beyond the communities' capacities and means.

Private sector entities (MSME) become financially independent and can maintain and develop their business activities and partnerships with the farmers groups beyond project complementation, and continue to deliver services to POs on the long run.

Producers Organisations are linked to relevant public-private institutions to continue accessing services and inputs to continue engaging in project viable activities (i.e. market partnership but also linkage with extension systems, lead farmers/entrepreneurs to facilitate access to inputs, seeds and services, access to credit etc);

Main investment activities (including promoted agroecology farming practices, infrastructure investments, post-harvest activities etc.) are economically and environmentally viable after project completion; this will be ensured through quality community driven process and screening of economic, social and environmental viability of promoted activities.

Knowledge management processes ensure that quality replication guidelines and videos are produced to facilitate continuity and scaling of relevant training and approaches

The exit strategy will be further developed with project management unit and implementing agency from start up going to ensure it is owned and adapted to project development. Indeed, the exit strategy development is a process that needs to be owned by local stakeholders, consider local implementation challenges, project changes and shall later lead to a sustainability plan to be signed by relevant entity that need to commit to specific actions.

Factors contributing to sustainability

| Project elements | Sustainability factors | Risks | Mitigation / exit |
|---|---|--|--|
| Public Institutions & enabling policies | Converging enabling environment and integrating planning at <i>Palika</i> level. Governance: Linkage with community/ decentralized extension/public institutions integrating farmers/ Motivated and capable staff Management capacity Funding | Nutrition planning and investments discontinued/no fund Insufficient staffing, Turnover of key personnel and insufficient capacity to retrain No more public support | Phasing over to <i>Palika</i> , Graduation of POs |
| Rural institutions /producer groups | Governance & members interest Management capacity Funding / revenue generation Actual benefits delivered by the group Quality linkages to supporting value chain and government partners | Turnover of key personnel Lack of involvement, low inclusion, “elite capture” Actual economic benefits of the groups & its activities Willingness to pay for O&M costs, dues, membership Limited access to finance and capacity to save & manage finance | Graduation of CBOs Linkages between <i>Palika</i> planning and provincial strategies to effectively use available financial and human resources, (GoN and development projects) |
| Public line agencies, | Governance & members interest Management capacity Budget allocation Integration of planning | Turnover of key personnel Limited capacity for intersectoral planning and coordination Lack of involvement / commitment by line agencies and local authorities Public budget constraints | Support to multisectoral planning Co-financing arrangement |
| Infrastructures | Ownership of land, buildings, and equipment Climate Resilient design Management and O&M capacity Funding | Climate risks Resource mobilisation: land, water, energy Low capacity for regular maintenance and repairs etc. | Graduation of PO Collection of maintenance fee and contributions to regular repairs Mobilisation of financial resources by <i>Palika</i> for major maintenance and repairs |
| Private entities | Viable business models Partnerships (formal, endorsed by line agencies and local authorities) Reliable access to market Access to finance Business Management capacity | Regular supply of quality products Market demand fluctuation External risks: climate, pandemic, international conflicts, etc. | Due diligence Networking Support to business planning and business literacy Market linkages Access to MSMEs finance |
| Improved agroecological | Technical and financial | Production technology less | PAP |

| | | | |
|------------|---|--|--|
| production | viability of proposed options Environmental sustainability (so that underlying natural resource can enable continuation of activities) Resilience to climate, pest, market risks etc. Sustainable supply chain for farmers to obtain required inputs and services and market to continue | profitable than other options or farmers face constrain to adopt (labour, cash, land etc.) Farmers cannot access sustainably required inputs/seeds/services to continue. No market access to sell if commercial. Climate change/pest occurrence etc. require adaptation of practices but no technical advisory available etc. | Community based participatory planning Graduation of PO to aggregate demands for infrastructure and services and aggregate products to enhance quality and value addition |
|------------|---|--|--|

Exit strategy and sustainability approach

Three approaches to exit strategies

- Phasing down is a gradual reduction of project activities, utilizing local organizations to sustain project benefits while the original donor or implementing agency deploys fewer resources. Phasing down is often a preliminary stage to phasing over and/or phasing out.
- Phasing over entails a transfer of responsibility for activities aimed at accomplishing project goals to another entity. This responsibility can be transferred to the beneficiary community (provided it has enough capacity to deal with it) or to existing organizations (e.g. government, NGOs, other development partners).
- Phasing out refers to a withdrawal of project inputs (food, services provision, technical assistance, etc.) without making explicit arrangements for the inputs or activities to be continued by any other entity, because the project itself resulted in changes that are likely to be sustainable without these.

Sustainability factors and risks

In addition, it is very important to examine the financial, economic, social, environmental, and institutional risks that may affect sustainability and capacities needed to address such risks. As much as possible, it involves differentiated analysis along different target groups (specific target categories being more at risk to lose benefits and targeting mechanisms may not be sustainable).

Sustainability is conditioned by several factors and subject to key risks as summarised in the table next page.

Draft exit strategy and sustainability matrix

| Project elements | Sustainability measures during implementation | Exit approach | Roles and responsibilities after completion | Exit calendar for phase 1: 2024-2031 | Funding after completion of R-HVAP phase 1 (2024-2031) | R-HVAP phase 2 (2031 and beyond) |
|--------------------------|--|-------------------------|--|---|--|---|
| Producers' organisations | <p>Capacity strengthening of PO committee for</p> <p>Capacity strengthening of staff of Palika and Provincial ministries staff responsible for PO support</p> <p>Partners' involvement: NGO/CSO</p> | Phasing down | <p>Local authorities at ward and Palika level</p> <p>Relevant departments in MoLMAC</p> <p>District nutrition committee (support, M&E, capacity building)</p> | After 4 years of PO graduation support by programme | <p>Partner Private sector engaged with PO in business relationships.</p> <p>Palika contributions</p> <p>NGO/CSO support. Other development initiatives</p> | <p>Continued support to PO for improved service delivery to their members</p> <p>Enhanced networking between PO and between PO and private service providers (B2S)</p> <p>Support, brokering and regulation of commercial relationships between PO and private companies (buyers, collectors)</p> |
| Irrigation schemes | <ul style="list-style-type: none"> • Site selection process • FPIC • SECAP risk screening, ESCMP measures incl. water balance assessment, climate proofing, etc. • Users' involvement in survey design and construction • Water Users' Groups O&M capacity strengthening • Extension services for irrigated agriculture • Market access support | Phasing over (transfer) | <p>Formal Transfer of O&M responsibilities to Water Users Associations (WUA)</p> <p>Local authorities' oversight (ward, Palika)</p> <p>Palika for technical and organizational support</p> | After first 2 years of Operation | <p>WUA irrigation service fee for O&M of the infrastructure</p> <p>Palika contributions for major repairs</p> | <p>Further strengthening of WUA to reinvest in irrigation infrastructure for modernization and increased water efficiency.</p> <p>Governance of irrigation infrastructure under formal cost-sharing arrangements with Palika and provincial ministries</p> |

| Project elements | Sustainability measures during implementation | Exit approach | Roles and responsibilities after completion | Exit calendar for phase 1: 2024-2031 | Funding after completion of R-HVAP phase 1 (2024-2031) | R-HVAP phase 2 (2031 and beyond) |
|---|---|-------------------------|--|---|---|--|
| Other collective infrastructures (post-harvest, processing, RETs at PO level) | <ul style="list-style-type: none"> • Subproject and site selection process • Sound business planning • Effective GRM and feedback loops • SECAP risk screening, ESCMP measures incl., climate proofing, etc. • Users' involvement in survey design and construction of the facility • Adequate choice of methodology (for processing equipment and machinery) • Collective infrastructure: O&M committee capacity strengthening. • B2S for maintenance, reinvestment • Market access support for income generation | Phasing over (transfer) | <p>Primary responsibility: The PO and O&M committee through formal Transfer of O&M responsibilities</p> <p>Local authorities' oversight (ward, Palika)</p> <p>Palika and Provincial ministries for technical and organizational support</p> <p>Private partners of the PO for maintenance of the equipment (B2S)</p> | After 4 years of PO graduation support by programme | <p>Fee based service charged by PO to members benefitting the collective infrastructure.</p> <p>Partner Private sector engaged with PO in business relationships.</p> <p>Palika contributions for major repairs</p> <p>NGO/CSO support. Other development initiatives</p> | <p>Continued support to PO for improved service delivery to their members</p> <p>Promotion of subsequent investment cycles auto-financed by PO</p> <p>Enhanced networking between PO and between PO and private service providers (B2S)</p> <p>Support, brokering and regulation of commercial relationships between PO and private companies (buyers, collectors)</p> |

| Project elements | Sustainability measures during implementation | Exit approach | Roles and responsibilities after completion | Exit calendar for phase 1: 2024-2031 | Funding after completion of R-HVAP phase 1 (2024-2031) | R-HVAP phase 2 (2031 and beyond) |
|----------------------------------|--|--------------------|--|--------------------------------------|--|---|
| Co-financing schemes (PO, MSMEs) | <p>Community based participatory planning (PAP) involving Palika</p> <p>Effective MSP process with PO, private actors (B2S, B2B),</p> <p>Sound business planning at HH and PO level, with reliable market linkages</p> <p>Due diligence in selecting MSMEs benefitting programme support</p> <p>Adequate provision of support and incentives (transparent subsidies with inclusiveness measures)</p> | Phasing out | <p>Individual HH members of POs PO committees</p> <p>Local authorities' oversight (ward, Palika)</p> <p>Palika and Provincial ministries for technical and organizational support</p> <p>Strong commitment of MSME to continue business partnership with PO on the long run.</p> | In Year 6 at the latest | <p>CBOs and MSMEs own funds</p> <p>Financial institutions SUN BN</p> <p>Other projects</p> | <p>In Phase 2 incentives and subsidies to be phased out.</p> <p>Production subsidies to HH to be replaced by support to access to finance to encourage auto-financing, saving practices and investment by PO and member HH.</p> <p>Subsidies to private sector to be phased out and replaced by support to access to finance, market access, and export facilitation.</p> |
| Other programme elements | To be discussed with stakeholders during programme implementation and included in a dynamic exit / sustainability strategy | | | | | |

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex 11: Mainstreaming themes – Eligibility criteria checklist

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

| Mainstreaming themes – Eligibility criteria checklist | | | | | | |
|---|--|--|--|---|--|--|
| | <input checked="" type="checkbox"/> Be gender transformative | <input checked="" type="checkbox"/> Be youth sensitive | <input type="checkbox"/> Be nutrition sensitive | <input type="checkbox"/> Prioritize persons with disabilities | <input type="checkbox"/> Prioritize indigenous peoples | <input checked="" type="checkbox"/> Include climate finance <input checked="" type="checkbox"/> Build adaptive capacity |
| Situation analysis | <input checked="" type="checkbox"/> National gender policies, strategies and actors <input checked="" type="checkbox"/> Gender roles and exclusion/discrimination <input checked="" type="checkbox"/> Key livelihood problems and opportunities, by gender | <input checked="" type="checkbox"/> National youth policies, strategies and actors <input checked="" type="checkbox"/> Main youth groups <input checked="" type="checkbox"/> Challenges and opportunities by youth group | <input type="checkbox"/> National nutrition policies, strategies and actors <input type="checkbox"/> Key nutrition problems and underlying causes, by group <input type="checkbox"/> Nutritionally vulnerable beneficiaries, by group | <input type="checkbox"/> National policies, strategies and actors <input type="checkbox"/> Main groupings among PwDs <input type="checkbox"/> Context-based barriers and opportunities for PwDs | <input type="checkbox"/> International standards, national policies, strategies and key IPs' organizations <input type="checkbox"/> Main IPs communities, demographic, social, cultural and political characteristics <input type="checkbox"/> Important livelihoods constraints and opportunities for IPs and their cultural heritage | |
| Theory of change | <input checked="" type="checkbox"/> Gender policy objectives (empowerment, voice, workload) <input checked="" type="checkbox"/> Gender transformative pathways <input checked="" type="checkbox"/> Policy engagement on GEWE | <input checked="" type="checkbox"/> Pathways to youth socioeconomic empowerment <input checked="" type="checkbox"/> Youth employment included in project objectives/activities | <input type="checkbox"/> Nutrition pathways <input type="checkbox"/> Causal linkage between problems, outcomes and impacts | <input type="checkbox"/> Pathways to PwDs' socioeconomic empowerment using a twin-track approach | <input type="checkbox"/> Pathways to IPs' socioeconomic empowerment | |
| Logframe indicators | <input checked="" type="checkbox"/> Outreach disaggregated by sex, youth and IPs (if appropriate) <input checked="" type="checkbox"/> Women are > 40% of outreach beneficiaries <input checked="" type="checkbox"/> IFAD empowerment index (IE.2.1) | <input checked="" type="checkbox"/> Outreach disaggregated by sex, youth and IPs (if appropriate) <input checked="" type="checkbox"/> Persons with new jobs/employment opportunities (CI 2.2.1) | <input type="checkbox"/> Outreach disaggregated by sex, youth and IPs (if appropriate) <input type="checkbox"/> Targeted support to improve nutrition (CI 1.1.8) Outcome level CIs <input type="checkbox"/> CI 1.2.8 MDDW <input type="checkbox"/> CI 1.2.9 KAP | <input type="checkbox"/> Outreach disaggregated by sex, youth, disability and IPs (if appropriate) | <input type="checkbox"/> Outreach indicator disaggregated by sex, youth and IPs <input type="checkbox"/> IPs are > 30% of target beneficiaries | |
| Human and financial resources | <input checked="" type="checkbox"/> Staff with gender TORs <input checked="" type="checkbox"/> Funds for gender activities <input checked="" type="checkbox"/> Funds for IFAD empowerment index in M&E budget | <input checked="" type="checkbox"/> Staff with youth TORs <input checked="" type="checkbox"/> Funds for youth activities | <input type="checkbox"/> Staff or partner with nutrition TORs <input type="checkbox"/> Funds for nutrition activities | <input type="checkbox"/> Staff with disability inclusion-specific TORs <input type="checkbox"/> Funds for disability inclusion-related activities (including accessibility) | <input type="checkbox"/> Staff with IPs-specific TORs <input type="checkbox"/> Funds for IPs related activities, including FPIC | IFAD Adaptation Finance \$19,947,000 IFAD Mitigation Finance \$0 Total IFAD Climate-focused Finance \$19,947,000 |

| | |
|------------------------|---|
| ECG Remarks | Gender Nutrition Youth Persons with Disabilities Indigenous Peoples <input type="checkbox"/> No social inclusion themes |
|------------------------|---|

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex: Draft Environmental Impact Assessment (Main report and appendices)

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

REPORT

**Environment Impact Assessment Report For
Development of the Export Oriented Agriculture
Wholesale Market in Semlar, Butwal**

Feasibility Study for Development of the Agriculture Value
Chains in Nepal Project

Client: Invest International and Ministry of Agriculture
and Livestock Development, CAIDMP

Reference: BH4289IBRP004D03

Status: Final Draft, version 03

Date: 01/06/2023

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Document title: Environmental Impact Assessment Report for the - Development of the
Export Oriented Agriculture Wholesale Market in Semlar, Butwal

Subtitle: Feasibility Study for Development of the Agriculture Value Chains in
Nepal Project

Reference: BH4289IBRP004D03

Status: Final Draft

Date: 01/06/2023

Project name: Agricultural Value Chain Infrastructure Nepal

Project number: BH4289

Table of Contents

| | |
|---|-----------|
| Executive Summary | ix |
| Acronyms | xvi |
| Chapter 1 Name and Address of the Proponent and Institutions Preparing the Report | 1 |
| 1.1 Name and Address of the Proponent | 1 |
| 1.2 Name and Address of the Institutions preparing EIA Report | 1 |
| 1.3 Rationality of the project | 1 |
| 1.4 Objectives of the EIA Study | 2 |
| Chapter 2 Introduction of the Project | 4 |
| 2.1 Project Background | 4 |
| 2.2 Project Description | 5 |
| 2.2.1 Location and Access Roads | 5 |
| 2.2.2 Technical Features | 6 |
| 2.2.3 Salient Features | 9 |
| 2.2.3.1 Administration Building / Agriculture sub-service Centre | 10 |
| 2.2.3.2 Rapid Bioassay of Pesticide Residue Analysis Laboratory | 11 |
| 2.2.3.3 Wholesale Shutters | 11 |
| 2.2.3.4 Market stalls for small farmers | 11 |
| 2.2.3.5 Canteen | 11 |
| 2.2.3.6 Guest Houses | 11 |
| 2.2.3.7 Farmer’s market/Auction centre | 12 |
| 2.2.3.8 Washing, Sorting, Grading and Packing Building | 12 |
| 2.2.4 Ancillary components | 12 |
| 2.2.5 Project requirements | 12 |
| 2.2.5.1 Utilities | 12 |
| 2.2.5.2 Construction Materials | 19 |
| 2.2.5.3 Human Resources | 20 |
| 2.2.5.4 Land Requirements | 21 |
| 2.2.6 Construction Schedule | 23 |
| Chapter 3 EIA Approach and Methodology | 25 |
| 3.1 Literature Review | 25 |
| 3.2 The Study Area | 25 |
| 3.3 Data collection methods | 26 |
| 3.3.1 Physical Environment | 26 |
| 3.3.2 Biological Environment | 28 |
| 3.3.3 Socio-economic and Cultural Environment | 30 |
| 3.4 Impact Identification, Prediction and Assessment Method | 33 |
| 3.5 Public Notice, Public Hearing and Stakeholders Consultation | 35 |

| | | |
|------------------|--|-----------|
| 3.5.1 | Publication of the Public Notice (as per GoN Requirements) | 36 |
| 3.6 | Public Hearing | 36 |
| 3.7 | Preparation of the report | 39 |
| 3.8 | Study team | 40 |
| Chapter 4 | Legal Review | 41 |
| 4.1 | Constitution of Nepal | 41 |
| 4.2 | Policy and Acts | 41 |
| 4.3 | Rules and Regulations | 47 |
| 4.4 | Guidelines/Manuals/Standards | 48 |
| 4.5 | International Conventions | 50 |
| 4.6 | Agricultural strategies and plans | 50 |
| 4.7 | International Standards | 51 |
| Chapter 5 | Baseline in the project area | 53 |
| 5.1 | Physical environment | 53 |
| 5.1.1 | Topography and Soil | 53 |
| 5.1.2 | Seismicity | 54 |
| 5.1.3 | Geology and Hydrogeology | 55 |
| 5.1.4 | Groundwater | 56 |
| 5.1.5 | Surface Water | 57 |
| 5.1.6 | Climate | 58 |
| 5.1.7 | Air quality | 59 |
| 5.1.8 | Noise and light | 61 |
| 5.1.9 | Land Use Pattern | 62 |
| 5.2 | Biological environment | 63 |
| 5.2.1 | Types of Forest by Vegetation | 63 |
| 5.2.2 | Types of Forest by Management | 64 |
| 5.2.3 | Vegetation at the Project Site | 65 |
| 5.2.4 | Ethno-Botanical Knowledge and Practice | 65 |
| 5.2.5 | Fauna in the project area | 65 |
| 5.2.6 | Protected, Rare or Endangered Flora and Fauna Species | 66 |
| 5.3 | Socio-economic and cultural environment | 67 |
| 5.3.1 | Demography of the Project Area | 67 |
| 5.3.2 | Settlement Pattern and Housing Structures | 69 |
| 5.3.3 | Social and Community Setting Adjacent Wards | 71 |
| Chapter 6 | Analysis of Alternatives | 72 |
| 6.1 | With and without project alternative | 72 |
| 6.2 | Alternative site locations | 74 |
| 6.2.1 | Alternative locations in Nepal | 74 |
| 6.2.2 | Alternative locations in Butwal | 79 |
| Chapter 7 | Environmental impacts | 84 |
| 7.1 | Beneficial Impacts | 84 |

| | | |
|------------------|---|------------|
| 7.2 | Adverse Impact | 85 |
| 7.2.1 | Physical environment | 86 |
| 7.2.1.1 | Pre-construction phase | 86 |
| 7.2.1.2 | Construction phase | 88 |
| 7.2.1.3 | Operation phase | 94 |
| 7.2.2 | Biological environment | 99 |
| 7.2.2.1 | Construction phase | 100 |
| 7.2.2.2 | Operation phase | 102 |
| 7.2.3 | Socio-economic environment and cultural environment | 103 |
| 7.2.3.1 | Pre-construction Phase | 103 |
| 7.2.3.2 | Construction phase | 104 |
| 7.2.3.3 | Operation phase | 110 |
| Chapter 8 | Mitigation and Enhancement Measures | 114 |
| 8.1 | Introduction | 114 |
| 8.2 | Physical environment | 114 |
| 8.2.1 | Pre-construction Phase | 114 |
| 8.2.2 | Framework of mitigation measures on physical environment | 115 |
| 8.2.3 | Construction Phase | 115 |
| 8.2.4 | Framework of mitigation measures on physical environment | 119 |
| 8.2.5 | Operation Phase | 120 |
| 8.2.6 | Framework of mitigation measures on physical environment | 124 |
| 8.3 | Biological Environment | 124 |
| 8.3.1 | Pre-construction Phase | 124 |
| 8.3.2 | Framework of mitigation measures on biological environment | 127 |
| 8.3.3 | Construction Phase | 128 |
| 8.3.4 | Framework of mitigation measures on biological environment (Construction phase) | 130 |
| 8.3.5 | Operation Phase | 131 |
| 8.3.6 | Framework of mitigation measures on biological environment (Operational phase) | 132 |
| 8.4 | Socio-economic and cultural environment | 132 |
| 8.4.1 | Pre-Construction Phase | 132 |
| 8.4.2 | Framework of mitigation measures on socio-economic environment | 134 |
| 8.4.3 | Construction Phase | 135 |
| 8.4.4 | Framework of mitigation measures on socio-economic environment | 146 |
| 8.4.5 | Operational Phase | 148 |
| 8.4.6 | Framework of mitigation measures on socio-economic environment | 151 |
| Chapter 9 | Environmental Management Plan | 152 |
| 9.1 | Introduction | 152 |
| 9.1.1 | Overview and Scope | 152 |
| 9.1.2 | Objectives | 153 |
| 9.2 | Organization | 153 |
| 9.2.1 | Roles and responsibilities | 153 |
| 9.2.2 | Interface | 156 |
| 9.2.3 | Training and Awareness | 156 |

| | | |
|-------------------|---|------------|
| 9.2.4 | Communication | 157 |
| 9.2.5 | Documentation | 158 |
| 9.2.6 | Managing Changes to Project Activities | 158 |
| 9.2.7 | Operational Control Procedures | 159 |
| 9.2.8 | Emergency Preparedness and Response | 159 |
| 9.3 | Checking and Corrective Actions | 160 |
| 9.3.1 | Monitoring | 160 |
| 9.3.2 | Auditing | 169 |
| 9.3.3 | Corrective Action | 173 |
| 9.3.4 | Reporting | 173 |
| 9.4 | Proposed Environmental Management Plan | 173 |
| 9.4.1 | E&S Specifications for the EPC Contractor | 174 |
| 9.4.2 | Community Investment Plan | 174 |
| 9.5 | Decommissioning | 175 |
| Chapter 10 | Conclusion and Commitment | 177 |
| Chapter 11 | References | 178 |

Table of Tables

| | | |
|-------------|---|----|
| Table 1.1 | EIA Provision specified in EPR 2077 | 2 |
| Table 2-1: | Technical features of the project | 8 |
| Table 2-2: | Salient features of the project | 9 |
| Table 2.3: | Water demand estimation operation phase of the project | 14 |
| Table 2.4: | Organic waste generated by the operation of the wholesale market | 15 |
| Table 2.5: | Mixed domestic waste generated by the operation of the wholesale market | 15 |
| Table 2.6: | Discharge requirements for discharge into surface water in line with IFC requirements | 17 |
| Table 2.7: | Estimate of Construction Materials | 19 |
| Table 2.8: | Estimated Heavy Equipment Required for Preparation of the site | 19 |
| Table 2.9: | Expected Manpower | 21 |
| Table 2.10: | Land requirement of the proposed project | 23 |
| Table 2.11: | Tentative Time Schedule of the Project | 24 |
| Table 3.1: | Project Area of Influence | 25 |
| Table 3.2: | Total Population and sample size by municipality | 31 |
| Table 3.3: | Location, group type and gender of the FGD participants | 31 |
| Table 3.4: | Position and gender of the KII participants | 32 |
| Table 3.5: | Methodology for Impact Assessment | 33 |
| Table 3.6: | Applied weight factors | 34 |
| Table 3.7: | EIA Study Team, declarations in EIA Appendix 17 | 40 |
| Table 4.1: | Articles in the Constitution of Nepal relevant to the Project | 41 |
| Table 4.2: | Nepal Policies relevant to the Project | 41 |
| Table 4.3: | Nepal Acts relevant to the Project | 44 |

| | |
|---|-----|
| Table 4.4: Nepal Rules and regulations relevant to the Project | 47 |
| Table 4.5: Nepal Guidelines, Manual and Standards relevant to the Project | 48 |
| Table 4.6: Nepal International Conventions relevant to the Project | 50 |
| Table 4.7: Nepal Agricultural Strategies and Plans relevant to the Project | 50 |
| Table 5.1: Site soil profile, Topographical Survey and Soil Investigation Report 2022 | 54 |
| Table 5.2: Ambient Air Quality at the project site and associated sampling locations | 59 |
| Table 5.3: Noise level at the project site | 61 |
| Table 5.4: Vegetation in and around the project area | 63 |
| Table 5.5: Current use of the community forest in Ward 15 | 64 |
| Table 5.6: Trees present on site to be cleared due to project development based on site specific tree counting survey | 65 |
| Table 5.7: Wildlife found listed in IUCN and CITES present in the project area | 66 |
| Table 5.8: Population distribution of Ward 15 by settlements and gender | 67 |
| Table 5.9: Caste/ethnic groups population of the project area, Ward 15 Semlar | 68 |
| Table 5.10: Language spoken in the project area | 68 |
| Table 5.11: Population distribution by religion in the project area | 69 |
| Table 5.12: Literacy of five years and above age groups literacy of the project area | 69 |
| Table 5.13: Time duration living in the present place | 70 |
| Table 5.14: Reasons for settling in the area | 71 |
| Table 5.15: Population distribution of the adjoining areas | 71 |
| Table 7.1: List of receptors/areas that may be potentially negatively impacted due to project development | 85 |
| Table 7.2: Expected estimate contribution of wholesale market to the ambient air quality | 97 |
| Table 7.3: Noise impact assessment based on Dutch Standard Calculation Method | 98 |
| Table 8.1: Mitigation measures on physical environment construction phase | 115 |
| Table 8.2: Mitigation measures on physical environment construction phase | 119 |
| Table 8.3: Mitigation measures on physical environment operation phase | 124 |
| Table 8.4: Compensatory Plantation and cost | 126 |
| Table 8.5: Mitigation measures on biological environment construction phase | 128 |
| Table 8.6: Forest and biodiversity training | 129 |
| Table 8.7: Mitigation measures on biological environment construction phase | 131 |
| Table 8.8: Mitigation measures on physical environment operation phase | 132 |
| Table 8.9: Framework of mitigation measures on socio-economic environment Construction Phase | 134 |
| Table 8.10: Framework of mitigation measures on socio-economic environment Construction Phase | 147 |
| Table 8.11: Framework of mitigation measures on socio-economic environment Operation Phase | 151 |

Table of Figures

| | |
|---|----|
| Figure 2-1: Project location and access | 6 |
| Figure 2-2: Proposed development Master Plan Layout | 7 |
| Figure 2-3: Central Waste Collection Area | 16 |
| Figure 2-4: Schematical representation of the WWTP with sludge thickening | 18 |

| | |
|--|----|
| Figure 2-5: Site boundaries map, produced for the purpose of the project Feasibility Study | 22 |
| Figure 5-1: Site topographic survey results, Topographical Survey and Soil Investigation Report 2022 | 53 |
| Figure 5-2: Geomorphological division of Nepal, Bricker et al. (2014) | 55 |
| Figure 5-3: Geological map of Rupandehi district (Pathak, 2017) | 56 |
| Figure 5-4: Overview of the river system near the project site, source GE image of 12/2022. | 58 |
| Figure 5-5: Monthly temperature and precipitation including observed variability. | 59 |
| Figure 5-6: Butwal land use map | 62 |

Appendices

1. Cover letter for EIA, indicating why the EIA is written in English and alignment with IFAD and IFC E&S PS (to be provided by Invest International)
2. Feasibility Study: Technical and Financial Assessment Report
3. Project Layout Map: master plan drawing
4. Wastewater treatment plant report for a wholesale market in Nepal
5. Methodology and forms used in EIA surveys (physical environment, biodiversity and socio-economic environment)
6. Results of Physical Environment Surveys (air, noise and ground and surface water)
7. Minutes of Public Hearing consultation (incl. 2 notice from newspaper, letters of invitation to PH, GRM, 4 consent letter collected after the PH, photo evidence)
8. Approval letter of the Scoping Document and EIA Terms of Reference
9. Copy of ToR
10. Minutes of consultations during the scoping phase, including notice, consent letters, photos, etc.
11. IFC Environmental and Social Performance Standards applicability to the project
12. Topographical and geotechnical survey report
13. Results of vegetation survey and vegetation Loss
14. Results of Household Survey, including FGD original attendance and minute
15. Flooding risk assessment report
16. Climate impact assessment memo
17. Grievance Redress Mechanism
18. Environmental Management Matrix
19. Declaration of experts

Executive Summary

Introduction

The Centre for Agriculture Infrastructure Development and Mechanization Promotion (CAIDMP), under the Ministry of Agriculture and Livestock Development, Government of Nepal is proposing to develop **Export Oriented Agriculture Wholesale Market in Butwal Sub-Metropolitan City-15, Semlar, Karsaghat Area (the PROJECT)**. The Government of the Netherlands through Invest International's Develop to Build Program is going to provide financial support to this project. The proposed wholesale market is expected to improve exports of agricultural products besides meeting domestic demand and help reduce post-harvest food loss and waste through access to better storage and processing facilities.

The Project is located at Butwal, Sub-metropolitan City (BSMC)-15, Semlar. The project is surrounded by Ward no 14 in east, Sainamaina Municipality, Ward no 1 in west, Ward no 13 in the north-west, and Ward no 16 (Karsaghat) of Butwal Sub-Metropolitan City in south. The project location is about 10 km west from Butwal and about 30 km from the Gautam Buddha International Airport in Bhairahawa. The GPS coordinates of the site are 27.678103, 83.386825.

The project area covers a total of 12.47 ha, which consists of the wholesale market area, vegetable collection, retail market, guest houses, and other general facilities. The project area will also consist of the other facilities - weighbridge house, retail stalls, parking, power station and back-up generator, and solar power supply system, water supply system with overhead tank, subservice centre, childcare centre, primary health care centre, cooperative office, CCTV surveillance room, agrovet facilities, processing and storage facilities for agricultural products, auction area, waste management infrastructure, and wastewater treatment.

Scoping Document and Terms of Reference (ToR) were prepared for the proposed development in line with GoN EPA, 2076 and EPR 2077 regulation as well as in alignment with the IFC E&S Performance Standards and with IFAD's Social, Environmental, and Climate Assessment Procedures. The Scoping Documents and Terms of Reference were approved by the Ministry of Forests and Environment on the 9th of March.

Study methods and materials

Impact Area

The impact area of the project was categorized at 3 levels, namely – (a) Direct Impact Area is the 12.47 ha area proposed for siting of the market structure including the access roads connecting to the site (200 m on the both sides of the road); (b) Indirect Impact Area are the surrounding of the project site up to 1000m from its boundary; (c) Area of Influence is the area within the ward 15 and ward 1 of Sainamaina Municipality.

Data collection

A multidisciplinary team was deployed for the study which covered the data collection of physical, biological, and socio-economic environmental conditions of the project area. The data were collected on the following environmental aspects:

| Physical environment | Biological environment | Socioeconomic environment |
|-----------------------------|-------------------------------|---|
| Topography | | Demography |
| Land use | | Caste, ethnicity, religion and language |
| Geology and groundwater | Forest management | Settlements and housing structure |
| Land stability and erosion | Flora | Social setting |
| Ambient Air Quality | Fauna | Gender |
| Surface and groundwater | Avia-fauna | Resource use (Community Forest) |
| Quality | Fishes | Public infrastructure and facilities |
| Noise level | Herpetofauna | Employment, and income |
| Waste management | Non-Timber Forest Products | Agriculture |
| | | Land holding |
| | | Perceptions towards the project |

The field data on physical environmental conditions were collected using measurement sample collection, sample measurement, analysis of samples in the lab, as well as observations of the phenomena such as ambient air quality, surface and groundwater quality, and noise level. The biological data were collected using sample plots, transect walk, direct observation, and consultation and key informant interviews. Furthermore, socio-economic data were collected using focus group discussion, consultation with stakeholders, key informant, and household survey.

Impact assessment

The impact assessment was carried out in the following steps:

- Step 1 identify sensitive areas and receptors that may be impacted by the project.
- Step 2 describe potential impacts on receptors/ areas associated with project development.
- Step 3 undertake the impact assessment by scoring the impacts.

The impacts were scored using the following variables: (a) probability of occurrence, (b) area of influence, (c) duration, (d) magnitude, (e) mitigation potential. The total qualification of the impact was determined to ascertain the significance as negligible significance, low, moderate, and high. Furthermore, the impacts were also categorized as direct and indirect impacts.

Public participation and public hearing

Interaction meetings were carried out to disclose the project, and to inform all interested stakeholders on the EIA Study. The study team also consulted other stakeholders such as Division Forest Office, District Development Committee Office (Now DCC), District Administration Office, Butwal Sub Metropolitan City etc., and collected their feed-back, any concerns on the project.

The 7 days public notice was published on Nepal Samacharpatra National Newspaper on 12 March 2023. The EIA notice was to request from rural municipality/ municipalities, schools, houses, stakeholders, and other related personnel to provide comments and feed backs in writing within 7 days of the date of first publication about the proposed project construction.

Impact Assessment

The project is expected to improve economy and agriculture of the region as well as the nation by providing market to the agricultural produces. The availability of permanent market will encourage farmers to increase agricultural production. In this process, this project will improve agriculture economy, create income generation opportunities, development of businesses and entrepreneurs in the area. The project will also provide jobs directly as well as indirectly for the locals. Furthermore, the project will prioritize locals, particularly disadvantaged groups and women, in recruitment processes and for participation in the project activities.

The project might also have some negative impacts, some of which are identified by this study. Some of the environmental, social health and safety impacts are:

Physical environment

- Potential impacts to air quality, due to emissions from diesel generators, traffic, dust as well as odour from handling of fruits and vegetables.
- Potential degradation and contamination of soil, surface, and ground water due to accidental spills and leaks from chemicals and improper waste management on site.
- Potential impacts to the Danab River water quality due to improper construction site activities (increase in sedimentation and turbidity) / camp management practices, discharge of the wastewater treatment plant effluent.

Biological environment

- Alteration and reduction of terrestrial habitat due to removal of the Ratanpur Community Forest;
- Potential loss of - 4 trees of Simal.
- Loss of ecosystem services due to forest removal, leading to flooding risk and riverbank erosion;

Socio-cultural environment

- Nuisance to community due to project construction /operation activities, increase in ambient noise levels, dust, traffic related emissions and light pollution.
- Potential health and safety issues due to temporary influx of workers, creating the feeling of insecurity.
- Impact on the users of the football ground due to project development.
- Potential impact on existing road infrastructure due to increased heavy traffic on roads as well potential impacts on other existing public infrastructure due to market construction and operation (public health institutions).

Mitigation Measures

This study has identified mitigation measures for all the key impacts to bring the risks and impacts to the acceptable levels. The mitigation measures are summarised in an Environmental and Social Management Plan.

Physical environment

- Treatment of storm (rain) water prior to releasing into the river
- Controlling and monitoring of air quality and noise level during construction to keep these within acceptable limits.
- Management of solid waste generated by the project to maintain healthy sanitary condition.
- Rainwater harvesting to supplement ground water extractions, as well as undertake groundwater recharge technologies – soak pits.

Biological environment

- Compensation of the forest area loss and undertake compensatory plantation at the ratio of 1:10. A total of 7020 saplings will be planted for 702 trees to be removed in collaboration with DFO and Ratanpur CFUG.
- Tree cutting will be minimized, only the essential trees in the building site will be removed, otherwise existing trees will be incorporated into the design.
- Alternative to firewood and timber will be made available to the workers to minimize pressure on forest.
- During the site clearance, 4 simal trees that are restricted in Nepal for felling, transport or export; are expected to be removed. Every effort will be made by designing structures around them so that these do not have to be removed. However, if removal is unavoidable, compensatory plantation will be carried out by planting 25 saplings for each tree that is removed tree.
- Prevent wildlife being attracted by the garbage by properly managing the solid wastes.

Socio-economic and cultural environment

- Land acquisition process will follow the existing rules and regulations – Land Acquisition Act 2034 and its subsequent amendments.
- Ensuring safety at the construction sites – operation of heavy vehicles and machinery, traffic management in and around the sites, safety barriers and warning signs, and regular inspections.
- For safety purposes, restrictions may be imposed temporarily on locals near the construction site. This could result in reduced access to existing temple and football ground located near the project area.
- The arrival of migrant workers at the construction site may create additional pressure on existing community services and market.
- Prioritizing locals and project affected families in recruitment process by the project.

- Health and safety measures – safeguarding from pollution, operational health hazards, solid waste management, disease control, such as malaria, water borne diseases, STDs, and COVID19 *etc.*

Environmental monitoring and auditing

A monitoring plan is essential in order to collect up to date baseline conditions for evaluating environmental impacts and the effectiveness of the mitigation measures adopted by the project. Three types of monitoring will be carried out:

- Baseline Monitoring;
- Compliance Monitoring;
- Impact Monitoring.

The Project Management Office with support of the Environmental and Social Management Unit (ESMU) will carry out site inspections jointly with the contractors particularly during prior to construction and at the end of construction at sites. The aim of inspection during prior construction will be to identify and jointly agree with contractors on site-specific environmental conditions and types of safety concerns that need particular attention while implementing work. Based on this information, the contractor will prepare site-specific EMP and OHS plans and submits for employers' approval prior to field mobilisation. The aim of site inspection after the work completion will be to ensure the site is properly cleaned of all construction related spoils, landscaped and well drained, vegetated and restored to original condition before contractor leaves the site. The inspection during work implementation will be the routine compliance and impact monitoring.

Environmental auditing will be carried out during the operation stage to examine performance of the project related to the environment - actual environmental impacts of the project, the accuracy of impact predictions, the effectiveness of mitigation and enhancement measures and functioning of the monitoring mechanisms. The Ministry of Forests and Environment will conduct the environmental auditing two years after the project begins operation.

The EPR 2077 requires that the environmental auditing be undertaken after the project has been operational for two years. It further specifies it shall be carried out by the authoritative government agency with the assistance of other relevant stakeholders as necessary.

Conclusion and Commitment

This report was prepared based on the several level of consultations with the local representatives, residents, government agencies, community-based organization, and other concerned stakeholders. The team has also carried out survey, and analysis of important environmental and social information from the area in analysing the possible impacts of the project. It was commonly agreed that the project will be a milestone in promoting the agriculture and developing economy of the region by providing a reliable market to the farming community. Moreover, this project is expected to promote business opportunity, entrepreneurships, and create jobs for the residents.

The project is expected to have some environmental impacts. The prominent impact of this project is acquisition of 12.47 ha of land from Ratanpur Community Forest and removal of 702 trees for construction works. The compensatory plantation of 7020 saplings have been proposed as the mitigation measure, which will be undertaken in coordination of the DFO and CFUG. The land acquisition will be carried out following the prevailing legislation of the country.

This report has identified all potential impacts anticipated at this stage from implementation of this project and proposed the mitigation measures. During project implementation, the risk matrix and mitigation measures will be revisited and incorporated in procurement contracts.

Given the above conclusion, this EIA Report recommends implementing the Proposal under the condition that the safeguard measures described in the Environmental Management Plan (EMP) are implemented and followed and monitored accordingly.

Acronyms

| | |
|--------|---|
| ADS | Agriculture Development Strategy |
| BSMC | Butwal Sub-Metropolitan City |
| CAIDMP | Centre for Agriculture Infrastructure Development and Mechanization Promotion |
| CF | Community Forest |
| CFUG | Community Forest User Group |
| D2B | Develop to Build |
| DPR | Detailed Project Reports |
| EIA | Environmental Impacts Assessment |
| EPA | Environment Protection Act |
| EPR | Environment Protection Regulation |
| E&S | Environmental and Social |
| EMP | Environmental Management Plan |
| FGD | Focus Group Discussions |
| FS | Feasibility Study |
| GoN | Government of Nepal |
| IFAD | International Fund for Agricultural Development |
| IFC | International Finance Institution |
| IIPP | Invest International Public Programmes |
| MCA | Multi-Criteria Assessment |
| MoALD | Ministry of Agriculture and Livestock Development |
| MoF | Ministry of Finance |
| MoFE | Ministry of Forests and Environment |
| NABIC | Nepal Agribusiness Innovation Centre |
| PSC | Project Steering Committee |
| RHDHV | Royal HaskoningDHV (the international consultant in the lead for EIA) |
| SDGs | UN Sustainable Development Goals |
| SEP | Stakeholder Engagement Plan |
| TMS | Total Management Services (the national consultant for EIA) |
| GRM | Grievance Redress Mechanism |

Chapter 1 Name and Address of the Proponent and Institutions Preparing the Report

1.1 Name and Address of the Proponent

The Proponent of this project is the **CAIDMP** in Lalitpur. The CAIDMP has the responsibility of planning, design, construction, and maintenance of agriculture related infrastructure. The name and address of the proponent is as follows:

**Ministry of Agriculture and Livestock Development
Department of Agriculture
Centre for Agriculture Infrastructure Development and Mechanization Promotion (CAIDMP)**

Harihar Bhawan, Lalitpur, Nepal

Phone: 01-5524227/015524228

Mailing address: campid2075@gmail.com

1.2 Name and Address of the Institutions preparing EIA Report

The **Environmental Impact Assessment (EIA) of the Export Oriented Agriculture Wholesale Market in Semlar, Butwal** has been prepared for the Project Proponent by the following Consultancy Companies:

HASKONINGDHV NEDERLAND B.V.

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Total Management Services (TMS) Pvt. Ltd

Kamal Pokhari, Kathmandu, Nepal

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The overall responsibility of the contents of the EIA study report lie with **Royal HaskoningDHV and TMS.**

1.3 Rationality of the project

The proposed wholesale market is proposed to be established at Semlar, Butwal Sub Metropolitan City – 15 by acquiring 12.47 ha of forested land of Ratanpur Community Forest. About 702 trees are in the forest at present, which might be removed for implementation of the project. Furthermore, operation of the market will produce solid waste, waste water, and commercialize the locality, which might have environmental implications. Thus, the EIA study has been carried out to address the possible environmental impacts.

This EIA study has been carried out to meet the environmental requirements of the Government of Nepal. The relevant EIA requirements specified by the Environmental Protection Regulations (EPR) 2077 (2020) are presented below.

Table 1.1 EIA Provision specified in EPR 2077

| SN | Environmental Protection Regulations 2077 requirements | Project Environmental Impact Assessment Details |
|----|---|--|
| 1 | Environment Protection Regulation, 2077 Rule 3, Annex 3 (KA) (9) If more than 5 ha of forest area will be used for another purpose, the project requires an EIA | The project will require more than 5 ha of community forest that will be cleared for project development (total community forest to be cleared amounts 12.47 ha) |
| 2 | Rule 3, Annex 3 (5) (5) If the floor area of the development is more than 10,000 sqm, the project requires an EIA | This project will have a floor area of more than 10,000 sqm. |

Apart from Rule 3, which is described in the Table above and triggers the project to carry out an EIA, also Rule 7 is relevant to this EIA. Rule 7 (7 and 8) of the Environment Protection Regulation (2077) informs about the language of the report. This report is prepared with the support from Invest International, which is a Joint Venture between the Dutch Ministry of Finance (51%) (Government of Netherlands) and Dutch Development Bank FMO (49%). Since the project is funded by a Dutch International Agency, the study is conducted in English Language (see Appendix 1).

In line with Invest International requirements, the impact assessment process will be also aligned with the requirements of the International Finance Corporation (IFC) Environmental and Social (E&S) Performance Standards 2012, and International Fund for Agricultural Development (IFAD) Social, Environmental, and Climate Assessment Procedures (SECAP), 2021.

1.4 Objectives of the EIA Study

The seven objectives of the EIA study are:

1. To identify key environmental and social impacts and key project alternatives.
2. Start at an early consultation with project key stakeholders at central, provincial, and local levels to obtain their views on the project.
3. Provide sufficient information for the project background and its interaction with environment and social receptors in the project area.
4. Comply with the EIA procedure in Nepal and align the process with the IFC E&S Performance Standards and IFAD's SECAP.
5. Enable stakeholders and the public to be timely informed for the planned project.
6. Inform about the EIA process and disclosure of the study results to stakeholders and public.
7. Enable a participatory EIA process and contribution from all stakeholders.

A detailed assessment for the project was carried out. It includes development of the Scoping Report and execution of the Environmental Impact Assessment (EIA) Study, including required project disclosure and stakeholders' consultation.

Chapter 2 Introduction of the Project

2.1 Project Background

The CAIDMP, under MoALD, Government of Nepal is proposing to develop the **Export Oriented Agriculture Wholesale Market in Butwal Sub-Metropolitan City-15, Semlar, Karsaghat Area (the PROJECT)**. The Government of the Netherlands through the Invest International's Develop to Build Program (D2B) is going to provide financial support to this project. This project aims to identify and develop sustainable public infrastructural measures to meet domestic demand and increase the export potential of agricultural production. The Government of Nepal recognizes this project as a **priority project** to support further development of the agricultural sector and create positive socio-economic impact in the region.

The need for a new modernized wholesale market in Semlar, Butwal includes appropriate collection, storage, grading, packaging and trading facilities. It will have ample area for further expansion, which has been reconfirmed during the project engagements at central, provincial and local level. These engagements were conducted in October 2021, July and December 2022 by the EIA study team with the support of CAIDMP.

The 5 main drivers for developing this Project in Semlar, Butwal are:

- 1) **Agricultural surplus.** Lumbini Province has a substantial agriculture catchment area with established surplus for potato, onion, cabbage, and banana. This surplus can be stored properly and used to meet the increasing local demand. The market will promote agricultural marketing, motivate district and neighbouring district's farmers to be more commercial and market oriented, will ensure farmers access to information and increase awareness in sector business opportunities.
- 2) **Its potential and economy boost-up.** The market has the potential for developing as a federal and export-oriented market. Furthermore, the proposed scale of the wholesale market will have a positive impact on the national economy and contribute to its boost-up.
- 3) **Its location.** The location in Semlar, Butwal is attractive because of its proximity to the Indian border, as well as Gautam Budhha International Airport in Bhairahawa (also known as Bhairahawa International Airport), which is at estimate 30km distance from proposed project site. This offers opportunities for export of agri-commodities in the future. Furthermore the site is located adjacent to the main East-West Highway with more than one point of access. The site is currently a community forest, however, this is a relatively young forest, it's not a natural forest, it does not contain endangered flora and fauna species, and it is not a wildlife corridor. Removal of the community forest does not result in livelihood impacts for nearby communities.
- 4) **The adverse environmental impact of the current market in Butwal.** The status of the current wholesale market in Butwal is not enough to supply the desired amount of fruits and vegetables to the increased population. As it is located in the middle of the

city, this results in traffic pressure, waste, emissions and noise nuisance. It is also putting enormous pressure on city's infrastructure, quality of the environment and social wellbeing of its citizens. A new market outside Butwal, with proper waste management infrastructure, proper roads and access points, drainage and greenery will reduce pressure on direct environmental and surrounding communities.

- 5) **Employment opportunities.** The Project may create short term employment opportunity for non-skill labourers during construction and operational phase and other business opportunities for the local communities, focusing where possible on youth and women group.

2.2 Project Description

2.2.1 Location and Access Roads

The Project is located in Butwal Sub-metropolitan City-15 (BSMC), Semlar. The proposed location was identified and recommended by the Butwal Sub-Metropolitan City in consultation with local key stakeholders, *e.g.*, Department of Agriculture, Butwal Fruit & Vegetable Wholesale Market Management Committee, representatives of farmers and traders associations, representatives of political parties, *etc.* The consultation process was commissioned by CAIDMP as part of the GoN effort to identify suitable locations for wholesale market development.

The project is surrounded by Ward no 14 in east, Sainamaina Ward no 1 in west, Ward no 13 in the north-west, and Ward no 16 (Karshaghat) of BSMC in south. There are altogether 14 settlements and clusters in Ward 15. The project is located close to the Muktidham settlement in a community forest and connects with Ratanpur in south. The western and northern part of the project site is surrounded by the Danab River. Sainamaina Municipality is located on the opposite bank of the Danab River in the Ward no 1 of the Sainamaina Municipality.

In terms of access, the project location is about 1 km south from the Bankatta Bazar, which is located on the East-West Highway, about 10 km west from Butwal and about 30 km from the Gautam Buddha International Airport in Bhairahawa. The project location can be easily accessed from the Sidhartha Highway, and East-West Highway. The GPS coordinates of the site are 27.678103, 83.386825 as per WGS84. This proposed project site covers an area of 12.47 ha.

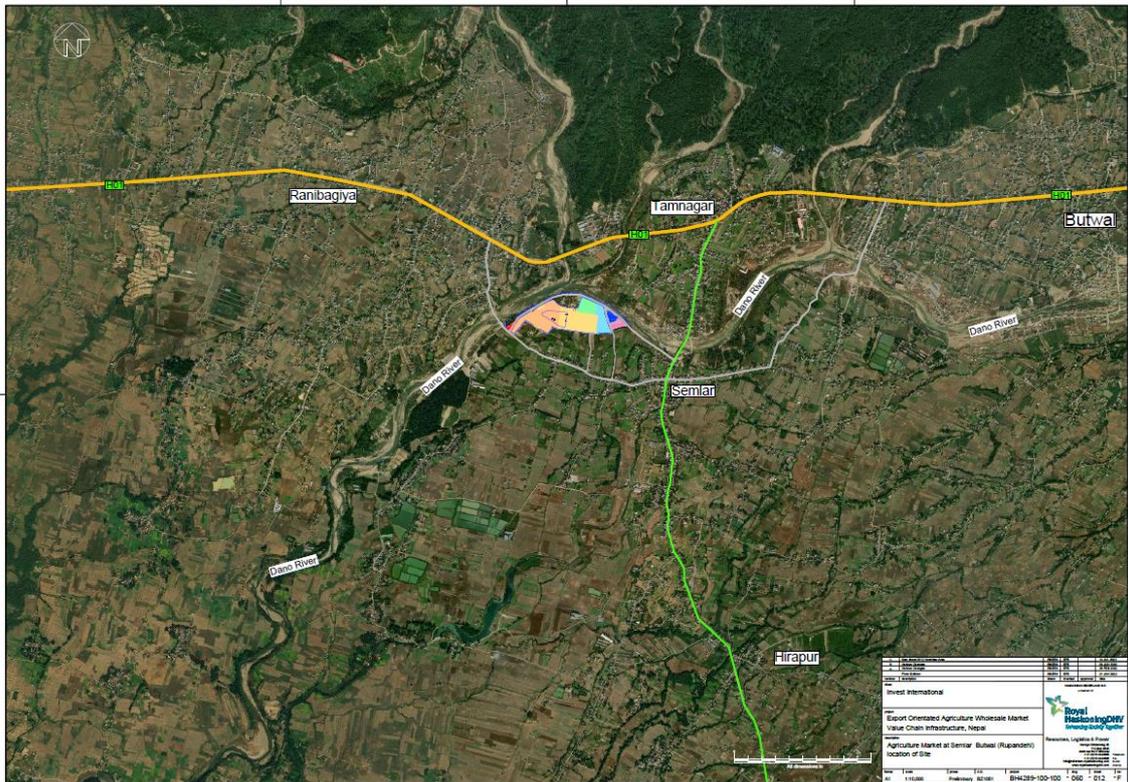


Figure 2-1: Project location and access

A new bridge has been recently constructed on the Danab River and a new road is being planned between the river and the proposed site (as part of the Tinau Danab Corridor Road Project also known as Danab River Corridor Project¹). These two infrastructure projects are expected to facilitate the accessibility to the site and the logistic operations.

The dedicated access road for the market will be located on the eastern side of the project site and will be connected to the Danab River Corridor Road. The access road will consist of 2 entrance lanes and 2 exit lanes, guard house and 2 weighting bridges. There will be one exit road, consisting of 2 exit lanes, guard house and weighting bridge. The access road will be designed with a suitable width to accommodate heavy and wide vehicles passage.

2.2.2 Technical Features

The project layout is presented below. For more details on the project technical features, please refer to the Technical and Financial Assessment Report in Appendix 2. For more details on the project layout drawings, please refer to Appendix 3.

¹ This part of the road is expected to be tendered at the end of this year by the Road Division and expected to be completed in 2027

The technical features of the project are listed in the table below.

Table 2-1: Technical features of the project

| Nr | Technical feature | Description |
|---------------------------|---------------------|---|
| 1 | Name of the project | Export Oriented Agriculture Wholesale Market |
| 2 | Location | Butwal Sub-Metropolitan City-15, Semlar, Karsaghat. The site is locally known as Karshaghat |
| 2.1 Geographical location | | |
| | Province | Lumbini Province |
| | District | Rupandehi District |
| 2.2 Geographical features | | |
| | Climate | Tropical |
| | Geology | Terai |
| | Hydrology | The groundwater distribution in the Terai is part of the larger system of the Gangetic Basin. The upper unconfined aquifer (50–60 m) is considered as a good productive shallow aquifer, though most of the groundwater is limited to the upper 250 m. |
| | Meteorology | Unevenly distributed precipitation controlled by Monsoon |
| 3 Classification | | |
| 3.1 | Classification | Federal Wholesale Market In line with IFC E&S categorisation: Category B: Business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures. |
| 3.2 | Land details | Government Public Land |
| 3.2 | Capacity | The wholesale market which is designed for 500 to 1,000 MT of trade per day Potato: 4,500 MT, cleaning, sorting & packaging Onion: 800 MT, cleaning, sorting & packaging Onions: 1500 MT(Optional) Cabbage: 1000 MT, cleaning, sorting & packaging Banana: 35 MT, ripening chambers, sorting & packaging (optional) |
| 3.3 | Access | Access road is located on the east side of the plot and will be connected to Tinau Danab Corridor Road Project (also known as Danab River Corridor Project). The access road will have 2 incoming lanes and 2 exist lanes, guard house and 2 weighting bridges 1 Exit Road consisting of 2 exist lanes, guard house and weight bridge |
| 3.4 | Total Area | Total proposed development is: 12.47 ha, composed of: The wholesale market area is 43,148 m ² = 4.31 ha |

| Nr | Technical feature | Description |
|-----|-------------------|--|
| | | The collection centre area is 45,910 m ² = 4.59 ha. The general facilities are 15,235 m ² = 1.52 ha. The small market/retail area is 3,646 m ² = 0.36 ha , The purple guest house area is 4,887 m ² = 0.48 ha The hatched area around the football ground is 12,058 m ² = 1.21 ha |
| 3.5 | Wholesale Area | The wholesale market area is 43,148 m ² = 4.31 ha |
| 3.6 | Built Up Area | 25,547 m ² + (4,441 m ² Future Buildings) |
| 3.7 | Road Area | For the complete project, it is estimated to have 42,801 m ² of roads (including all parking lots for trucks and cars) Only for the wholesale area, it is estimated to have 22,816 m ² of roads (including Wholesale parking lot for loading/unloading trucks) |
| 3.8 | Parking Area | The parking located on the north of the proposed development is 3,002 m ² , the employee parking inside the General Facilities area is 1,210 m ² |
| 3.9 | Football ground | The hatched area around the football ground is 12,058 m ² = 1.21 ha |

Source: Technical and Financial Feasibility Study Report, March 2023 produced by Royal HaskoningDHV as part of the Feasibility Study Developing Agriculture Value Chains in Nepal (see Appendix 2)

2.2.3 Salient Features

The salient features of the project are as listed in the table below. For more details on the project salient features, please refer to the Technical and Financial Assessment Report in Appendix 2.

Table 2-2: Salient features of the project

| Nr | Units | Nos | SIZE (mm) |
|----|--|--------|---------------|
| 1 | Gate house | 2 | |
| 2 | Electronic Display Board | 3 | 2800 X 5800 |
| 3 | Weighbridge house | 1 | 4250 X 6750 |
| 4 | Weighing Scale (100 MT) | 2 | |
| 5 | Parking garage | 1 | |
| 6 | Generator house (1 future) | 3 (+1) | |
| 7 | Office/Admin Building (2 storey) including pesticide residue lab, training hall, agriculture subservice center, childcare centre, primary health care centre, cooperatives office, CCTV surveillance room, office rooms. | 1 | 36900 X 23000 |
| 8 | Canteen | 2 | 19600 X 14800 |
| 9 | Wholesale Shutters (1 future) | 6 (+1) | 98000 X 32000 |
| 10 | Toilet Block with Septic Tank and Soak Pit (1 future) | 3 (+1) | 12750 X 6620 |
| 11 | Bank with ATM | 1 | 18700 X 12800 |
| 12 | Central waste collection centre/decomposition center | 1 | 16000 X 24000 |

| Nr | Units | Nos | SIZE (mm) |
|----|--|-----|----------------|
| 13 | Farmer's Auction Centre | 1 | 12000 X 12000 |
| 14 | Washing, sorting, grading and packaging block | 1 | 60000 X 28000 |
| 15 | Agrovet building | 1 | 42000 X 16000 |
| 16 | Onion/Potato/Cabbage intake storage and processing building | 1 | 147500 X 68500 |
| 17 | Workshop building | 1 | 40250 X 16200 |
| 18 | Power intake station | 1 | 10000 X 10000 |
| 19 | Water Supply System with Overhead tank and Fire Fighting Station | 1 | |
| 20 | Wastewater Treatment Plant | (1) | |
| 21 | Multipurpose go down | (2) | |
| 22 | Banana storage and processing building (future) | (1) | |
| 23 | Guest House | 2 | 26000 X 20800 |
| 24 | Grocery shop | 1 | 18500 X 27500 |
| 25 | Krishak Chautari (small market stalls area) | 1 | 40000 X 8000 |
| 26 | Parking for deliveries | 1 | |
| 27 | Bus stop | 1 | |
| 28 | Football ground with covered grandstand and water tap | 1 | |
| 29 | Landscaping | 1 | |
| 30 | Retail Market | 1 | 36000 X 8000 |
| 31 | Fumigation container | 1 | |
| 32 | Change room for the football ground users | 1 | |
| 33 | Truck wheel washing station | 1 | |

Source: Technical and Financial Feasibility Study Report, March 2023 produced by Royal HaskoningDHV as part of the Feasibility Study Developing Agriculture Value Chains in Nepal (see Appendix 2)

2.2.3.1 Administration Building / Agriculture sub-service Centre

The administration block is constructed in two floors with plinth area of 616 m². The ground floor is provided with reception area, cafeteria, childcare center with outdoor play area, primary health care center, pesticide laboratory, cooperative office, male and female toilets and meeting cum training hall with capacity for 200 persons.

Similarly, the first floor is designed to accommodate Manager's office with PA room, account and admin staff rooms, CCTV surveillance room, IT room, record room, meeting room, Traders organization's office room farmer's representative office room and toilets block. The admin block will be fully equipped with IT and telecommunication system. Electronic display board located at different places will be controlled from the IT room. A solar power back-up system will be provided for uninterrupted power supply. A separate

generator will also serve for the admin block as a backup power, which will start up automatically in case of failure of electric supply. It has been envisaged that operation of the market will be controlled by the admin block through manager, administrative staff and management committee with roles and responsibilities assigned to them.

2.2.3.2 Rapid Bioassay of Pesticide Residue Analysis Laboratory

A Rapid Bioassay of Pesticide Residue Analysis Laboratory lab will be established for chemical analysis of the routine residue test of Carbamate and Organophosphate in vegetables. The major objective of this lab is to evaluate the level of Carbamate and Organophosphate present in the vegetables collected from different production pockets. The laboratory will be located in the admin building. The laboratory shall be also equipped with equipment to undertake testing of the effluent from the onsite Wastewater Treatment Plant.

2.2.3.3 Wholesale Shutters

The wholesale shutters are designed in blocks: 8 nos of 80 m by 16 m containing 15 shutters in each block. Total number of shutters proposed in the master plan with 4.86 m by 9.4 m inner dimensions are 120 nos. The wholesale shutters are provided in such a way that all the shutters face main road providing equal opportunities to traders in terms of accessibility to their shop by the potential customers. The shutters are designed as single storey masonry frame structures with flat RCC roofing. A 6 m wide canopy is provided in front of whole blocks, to facilitate loading and unloading of the commodities to and from the vehicles. The space can also be utilized for temporary storage of the commodities before taking them into the shutters in a managed way. Optionally a few of the shutters can be designed as a cold storage room to improve storage life of the agricultural products.

2.2.3.4 Market stalls for small farmers

A small area on the wholesale market will be reserved for Farmer Cooperatives and nearby individual farmers allowing them to sell their product directly. This area will be covered with a simple canopy.

2.2.3.5 Canteen

Two canteen units with kitchen are proposed in the market area. The canteen building is designed as single store building with plinth area of 375 m³.

2.2.3.6 Guest Houses

Two units are proposed as guest house opposite of the market area. The guest house building is designed in three floors with plinth area of 391 sq.m. The ground floor consists of recreation, reception, lobby, kitchen with store changing room and wash area, dining for about 70 people with deck for viewing outside scene and toilets for male female and disabled. Guest rooms are provided in first floor with 2 rooms general non-attached with 2 beds, 4 rooms provided with attached bathroom and sitting room as VIP room, 2 dormitories with 5 beds in each room and one staff room. Similarly, there are 5 double bedrooms with attached bathroom and 2 dormitories with 5 beds in each are provided in the second floor. All the rooms are provided with electric fan. AC's are also provided in 4 VIP rooms.

2.2.3.7 Farmer's market/Auction centre

The farmer's market block is designed as a 12mx12m square single storey RCC frame structure with CGI sheet roofing with plinth area of 144 m². The block is a semi open type of structure. Proper pavements are provided around the block for easy pedestrian movement and ramp has also been provided for wheelchair access. Projecting RCC slabs at lintel level are provided in the farmer's market block as well for aesthetic appearance as well as providing sun shading.

2.2.3.8 Washing, Sorting, Grading and Packing Building

The washing, sorting, grading and packing block is designed as a 30mx10m rectangular single storey RCC frame structure with CGI sheet roofing with plinth area of 300sq.m. The block is also a semi open type of structure with proper provision of water taps provided.

2.2.4 Ancillary components

Ancillary components are temporary facilities that will be developed for the construction purpose. These include labour camp, laydown areas, access road for construction, temporary storage of construction waste.

The labour camp shall be developed to meet the IFC guideline on Workers' Accommodation, e.g., in terms of square meter per accommodation, type of facilities, green and recreation space, etc. The labour camp shall have access to domestic quality water and be connected to a septic tank system to be serviced by an approved third party. The camp shall also respect waste segregation and be equipped with sufficient waste collection bins. Final collection and disposal shall be serviced to approved third parties.

These facilities will be developed during the next stages of the project development by the Construction Contractor.

2.2.5 Project requirements

Project utilities are summarized below. For more details on the project utilities, please refer to the Technical and Financial Assessment Report in Appendix 2.

2.2.5.1 Utilities

Water supply

Water will be required both for construction and operation of the project, which include water for construction camps and construction works (e.g., batching plants). The Construction Contractor will be responsible to meet the water needs for the construction phase of the project. Water demand for this phase will be limited to construction works and operation of the camp. During the operation of the market, the supply of potable water will be through a pumped supply from the deep tube wells. Water will be pumped from the well and passed through the closed mechanical filtration unit before filling the overhead water tank. The water will be treated with a chlorination unit before feeding to the distribution system. Two deep borings are proposed to be installed (1 in use, 1 back up). A diesel generator for power backup is proposed in case of power failure. The total estimated average daily water demand during operation is 752,000 litres, see details below.

Table 2.3: Water demand estimation operation phase of the project

| Description | Demand |
|--|-----------------------|
| Basic Requirement: 12,5 ha x 4,000 litre/ ha/ day | 500,000 litres |
| Cold Storage requirements @ 10 litres per ton (7,800 mt) | 78,000 litres |
| <i>Basic Requirements</i> | <i>578,000 litres</i> |
| Add 30 % contingency, including washing of produce | 174,000 litres |
| <i>Estimated average daily water demand</i> | <i>752,000 litres</i> |

Source: Technical and Financial Feasibility Study Report, March 2023 produced by Royal HaskoningDHV as part of the Feasibility Study Developing Agriculture Value Chains in Nepal (see Appendix 2)

Power supply

During the construction period, power on the site will be provided by diesel generators of adequate capacity. During wholesale market operation, the site will be connected to the existing power supply infrastructure to provide power for the wholesale market. A three-phase electrical supply shall serve the market with a transformer. There is a possibility to install solar panels on the roofs of cold storage buildings and the wholesale market stalls to lead the way to zero emissions and reduce the costs of energy. Solar panels will be installed on the entire roof of the cold storage and processing building for onions, potato and cabbage.

Waste management infrastructure

The project will generate various waste streams during both construction and operation. During the construction phase of the project, the generated waste will be composed mainly of construction and demolition waste, mixed domestic and small quantities of hazardous waste. Waste estimation is difficult since the exact construction techniques are not known. The leading strategy will be re-use and recycle as much as possible of the construction and demolition waste, especially excavated material to be used for backfilling works. Operation of the construction site, camp and canteen will produce a mixed waste stream. This stream will be composed of paper, cardboard, packaging, plastic bottles, organic fraction small quantities of metal and glass. This volume is estimated at 13 metric tons of domestic waste stream per year (based on 225 construction workforce on site).

The wholesale market will produce an estimate of **66 metric tones of** organic waste per year, see table below. This is a high-level estimate connected based on fruits and vegetables that will be stored at the market. It is assumed that vegetables arrive at the storage facility relatively clean, meaning that farmers clean vegetables at the farm and residues are returned to the fields. The residue left after sorting strongly depends on the quality of vegetables and the overall quality standards on Nepal market. For this purpose, a 7% sorting loss is assumed (according to FAO²). Additionally, the wholesale market will undertake wholesale and small volume retail of fruits and vegetables that are not stored. The quantity of waste generated by this activity is difficult to estimate at this moment. However, this will increase the total volume of organic waste produced at the market.

² [Food loss and waste in the food supply chain \(fao.org\)](http://www.fao.org)

Table 2.4: Organic waste generated by the operation of the wholesale market

| Fruit and vegetable residues | | Sorting 7% loss | Packaging | Total | Total |
|------------------------------|-------------|--------------------|-----------|--------------|----------------|
| | MT/day | MT/day | MT/day | MT/day | MT/year |
| Potatoes | 4500 | 315.0 | 0 | 315.0 | 81,900 |
| Onions | 800 | 56.0 | 0 | 56.0 | 14,560 |
| Optional Onions | 1500 | 105.0 | 0 | 105.0 | 27,300 |
| Cabbage | 1000 | 70.0 | 0 | 70.0 | 18,200 |
| Banana | 35 | 2.5 | 0 | 2.5 | 637 |
| Total | 7835 | 548.5 | 0 | 548.5 | 142,597 |

Next to organic waste, the wholesale market will produce a stream of mixed household waste. This waste will be mainly generated by the operation of the administrative building, the guest house and operation of canteen. This stream will be composed of paper, cardboard, packaging, plastic bottles, organic fraction small quantities of metal and glass. It is estimated that operation of the market will generate estimate 66 metric tons of domestic waste per year, see table below. The number is based on maxim 800 person present at the market in one day (including 53 staff, visitors, traders, and 254 guests in the guest house).

Table 2.5: Mixed domestic waste generated by the operation of the wholesale market

| Other waste flows | Number | Average production Nepali waste | Total | Total |
|------------------------|------------|---------------------------------------|-------------|-----------|
| | | kg/day | MT/day | MT/year |
| Staff wholesale market | 800 | 0.317 | 0.25 | 66 |
| Canteen guests | | Included in above figures | | |
| Total | 800 | | 0.25 | 66 |

Source: WASTE MANAGEMENT BASELINE SURVEY OF NEPAL 2020³

Management of waste during the construction phase will be the responsibility of the Construction Contractor during the construction phase of the project. For this purpose The contractor should to ensure waste is segregated at source, there is a dedicated space for collection and temporary storage of waste (on site and at the camp), and that an approved third party is engaged for final collection and disposal of waste. The Construction Contractor shall apply the waste management principles as explained further in this report for the operation phase of the market.

During the operation of the wholesale market, the market will be equipped with necessary infrastructure for integrated waste management. Solid waste will be segregated as practical

³ <https://unstats.un.org/unsd/envstats/Censuses%20and%20Surveys/Waste-Management-Baseline-Survey-of-Nepal-2020.pdf>

at source into organic waste, recyclable, non-hazardous residual mix waste and hazardous waste. Solid waste bins classified according to waste type will be provided in all work areas.

A **central waste collection facility** is foreseen the vicinity of the wholesale market. The facility shall have two compartments with the possibility to separate different types of waste, mainly organic and other streams. The facility shall have a water tide floor, covered with a roof and retaining walls around it. It shall be constructed at ground floor level and have a total area of 384 m² (24 x 16m). From here waste shall be removed using a front loader and tractor with trailer and transported to final treatment/disposal destination.

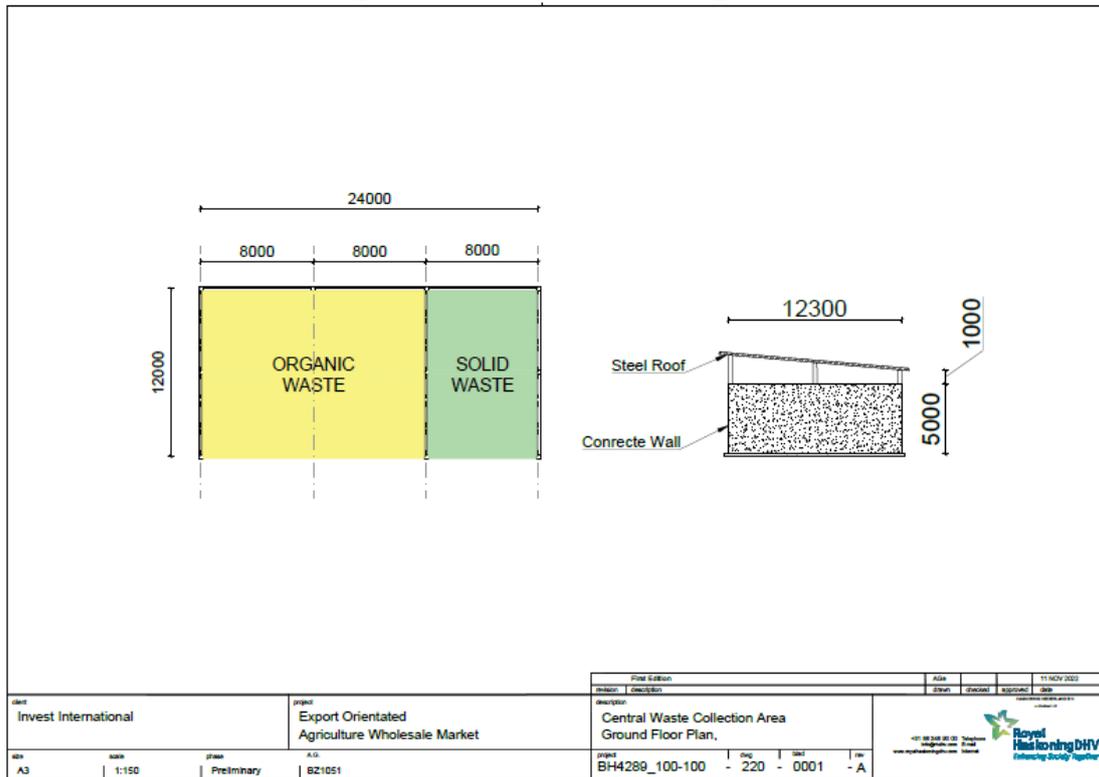


Figure 2-3: Central Waste Collection Area

Source: Technical and Financial Feasibility Study Report, March 2023 produced by Royal HaskoningDHV as part of the Feasibility Study Developing Agriculture Value Chains in Nepal (see Appendix 2)

It is foreseen that organic waste will be used as animal feed and/or be composted. Recyclable materials shall be sent for recycling and recovery of materials. Hazardous waste shall undergo specific treatment to ensure that these do not contaminate the environment during final disposal (e.g., packaging from oil and lubricants, plastic containers, residual paints, etc), although the expected quantises are very small. Inert waste shall be removed from site and disposed at the existing waste disposal facilities in the project area.

Waste management shall be subcontracted as service to approved waste management operators and landfill sites to ensure that final treatment and disposal takes place in a responsible manner for the environment and surrounding communities. This shall be the strategy for composting. The Chairman of Ward 15 requested to undertake composting outside the wholesale market because of the risk for odour nuisance. This shall be done by a private company that has extensive experience with bio composting. Butwal Municipality has acknowledged that there are sufficient waste management operators in the area and

approved disposal sites that could be engaged for this project. Furthermore, the municipality is finalising the construction of a pilot facility in Butwal for integrated waste management and recycling that could be also used by the project.

Wastewater Treatment Plant

Wastewater will be generated during all phases of the project. During the construction phase of the project, the waste water will be collected in a septic tank system that will be serviced by a third party. During the operation phase, the wastewater generated on the site, e.g., effluent from toilets, wheels washing, and processing buildings will be collected and treated in a dedicated wastewater treatment plant (WWTP).

The starting point for the design of this plant, is the fact that the treated wastewater will be discharged into surface water, e.g., Danab River. The discharge requirements shall therefore meet the IFC requirements. Only the discharge requirement on the Total Coliform parameter is derived from the Nepal requirements because it was stricter compared to the IFC requirement and therefore becomes leading.

Table 2.6: Discharge requirements for discharge into surface water in line with IFC 17 requirements

| Parameter | Unit | Discharge requirement (Maximum value) |
|------------------------------|------------|---------------------------------------|
| COD | mg/l | 125 |
| BOD | mg/l | 30 |
| Total nitrogen | mg/l | 10 |
| Total phosphate | mg/l | 2 |
| Oil and grease | mg/l | 10 |
| Total suspended solids (TSS) | mg/l | 50 |
| Total coliform* | MPN/100 ml | 400 |
| pH | - | 6 – 9 |

The discharge requirement for the Total Coliform parameter is according to the Nepal requirements since it is more stringent than of IFC⁴

At the WWTP the wastewater will be pumped from the inlet works into the different treatment steps. First step in the treatment is screening to remove coarse material, like leaves, branches, tie-raps and all kinds of other rather large debris. The second step is a Fat Oil and Grease (FOG) removal unit, which also will remove grit. Both steps (preliminary treatment) are to protect the subsequent treatment from clogging, blockage, or other damage. The third step is the aeration (secondary treatment). In the aeration tank a surface aerator will dissolve sufficient oxygen into the wastewater and sludge mixture for the conversion of the dissolved pollutants such as carbohydrates (COD, BOD) and nitrogen compounds by bacteria in the sludge. For the chemical removal of phosphorus ferric chloride dosing equipment will be installed. The treated wastewater from the aeration tank will overflow to the final sedimentation tank, in which treated effluent

⁴ Nepal Gazette, 2060/3/9 Bs (2003), Country Environmental Analysis for Nepal, ADB 2004.

and biological sludge will be separated. Chlorination is the last step (tertiary treatment) to meet the effluent requirements regarding the total coliform parameter before it is discharged into the river. Part of the biological sludge from the final sedimentation tank will be returned to the aeration tank to maintain a sufficiently high sludge concentration.

The other part must be wasted because of bacterial growth. This will be pumped to a sludge thickener for thickening before it is dried at sludge drying. In a sludge thickener the waste sludge is thickened from around 1% DS (dry solids) to 3% DS. This will significantly reduce the volume of the waste sludge and so the necessary surface area required for the sludge drying beds. After a sufficiently long drying period on the sludge drying beds, the remaining sludge will have a concentration of around 30% DS and can be removed for further treatment, disposal, or agricultural purposes. This last option must be further assessed during the detailed design of the project since there might be strict guidelines and requirements for the use of waste sludge as fertilizer. In proposed configuration a sludge thickener will be constructed due to lack of space for large sludge drying beds. Although this results in some more operational complexity of the plant, the surface area needed for the sludge drying beds will be significantly less.

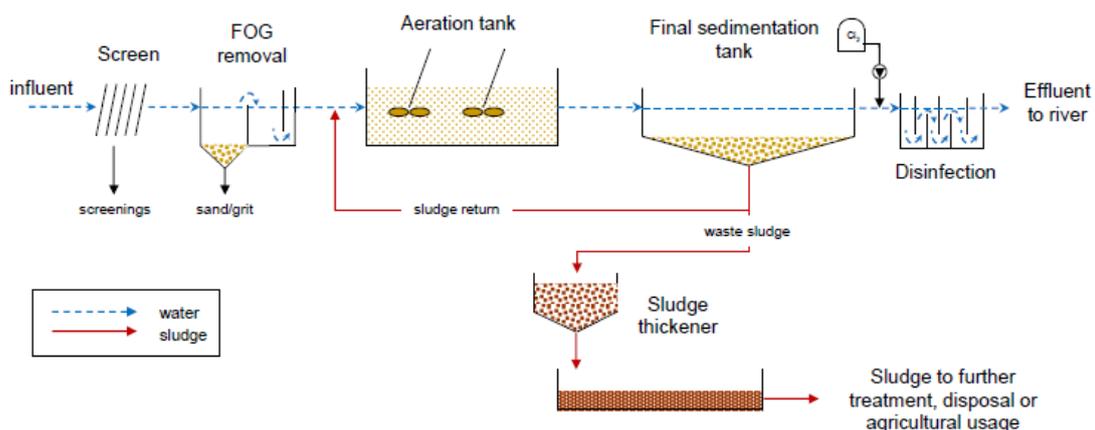


Figure 2-4: Schematic representation of the WWTP with sludge thickening

Source: Wastewater treatment plant report for a wholesale market in Nepal (see Appendix 4)

Please refer Wastewater treatment plant report for a wholesale market in Nepal in Appendix 4 for detailed requirements and proposed design of the Wastewater Treatment Plant.

Rainwater drainage (non-contaminated rainwater)

Rainwater falling on roofs, paved areas and other open areas must be collected and disposed of efficiently and quickly. A provision shall be made for a separate and independent storm (rain) water disposal system. Since the site is located at the bank of the Danab River, the sub surface rainwater drainage system shall be designed to drain the sub surface flow into the river. Considering that the site is low lying, the outlet shall be provided with non-return valves and a block valve. Manholes shall be provided at regular intervals and at all pipeline crossings for maintenance.

Rainwater from the roof of the onion, potato and cabbage intake, storage and processing building shall be harvested in a dedicated underground water tank for general cleaning purposes. The tank shall have a water storage capacity of 120 m³ and be connected to a dedicated pump near the fire water pump station.

2.2.5.2 Construction Materials

The requirements for construction materials and construction equipment are briefly given hereunder.

Table 2.7: Estimate of Construction Materials

| SN | Construction Materials | Value | Unit |
|----|--------------------------------------|-------|----------------|
| 1 | Cement | 7500 | MT |
| 2 | Reinforced bars | 850 | MT |
| 3 | Steel material | 250 | MT |
| 4 | Aggregate | 17600 | m ³ |
| 5 | Sand | 9000 | m ³ |
| 6 | Scaffolding and supporting materials | 500 | MT |
| 7 | Concrete pipes | 800 | m |
| 8 | Bitumen | 350 | MT |

Source: Environmental Impact Assessment (EIA) Report of Kathmandu Inland Clearance Depot (ICD) at Chovar, Kathmandu, Nepal⁵

The exact list and volumes of construction materials needed for the construction of the wholesale market will be determined by the Construction Contractor based on the detailed design to be developed as part of the engineering, procurement and construction contract (EPC). Construction materials will be sourced from vendors with existing permits active in Butwal. Materials shall meet the construction standards and specifications and be tested prior to application as construction materials.

Table 2.8: Estimated Heavy Equipment Required for Preparation of the site

| SN | Construction Machinery | Specifications |
|----|------------------------|--------------------------------|
| 1 | Excavator (Back Hoe) | 0.45, 0.8m ³ bucket |
| 3 | Bull Dozer | 21 ton |
| 4 | Dump Truck | 4 ton, 10 ton |
| 6 | Motor grader | W=3.1 ton |
| 7 | Tire Roller | 8-20 ton |
| 8 | Vibration Roller | 10 ton |
| 9 | Concrete Pump | 90-110m ³ /hr |
| 10 | Crawler Crane | 50 ton |
| 11 | Generator | 10-100KVA |

Source: Reference from Environmental Impact Assessment (EIA) Report of Kathmandu Inland Clearance Depot (ICD) at Chovar, Kathmandu, Nepal⁶

The exact list of heavy equipment needed for the construction of the wholesale market will be determined by the Construction Contractor based on the detailed design to be developed as part of the EPC package.

⁵ The proposed estimates are based on a similar development, e.g., Inland Clearance Depot (station to cater larger container type vehicles), including main site area, administrative area, quarter and utility area, total site: 11.77 Ha. (232.6 Ropani)

⁶ The proposed estimates are based on a similar development, e.g., Inland Clearance Depot (station to cater larger container type vehicles), including main site area, administrative area, quarter and utility area, total site: 11.77 Ha. (232.6 Ropani)

2.2.5.3 Human Resources

The expected manpower during both construction and operations is presented in table below.

Table 2.9: Expected Manpower

| SN | Manpower | Value | Unit |
|----------|------------------------------|-----------|---|
| 1 | Manpower Construction | | |
| | Managerial / Admin Staff | 5 | Staff |
| | Skilled Workers | 20 | Workers |
| | Unskilled Workers | 150 – 200 | Workers for whole Project construction period |
| 2 | Manpower Operation | | |
| | Managerial / Admin Staff | 53 | Staff |

Source: Technical and Financial Feasibility Study Report, March 2023 produced by Royal HaskoningDHV as part of the Feasibility Study Developing Agriculture Value Chains in Nepal (see Appendix 2)

The exact list of manpower needed for the construction of the wholesale market will be determined by the Construction Contractor based on the detailed design to be developed as part of the EPC package.

2.2.5.4 Land Requirements

The project land requirements are 12.47 ha. The proposed site is located on governmental land, that at present is occupied by community forest managed by Ratanpur Community Forest User Group (CFUG). Site map is presented below, site boundaries have been established for the purpose of this FS in cooperation with local authorities.



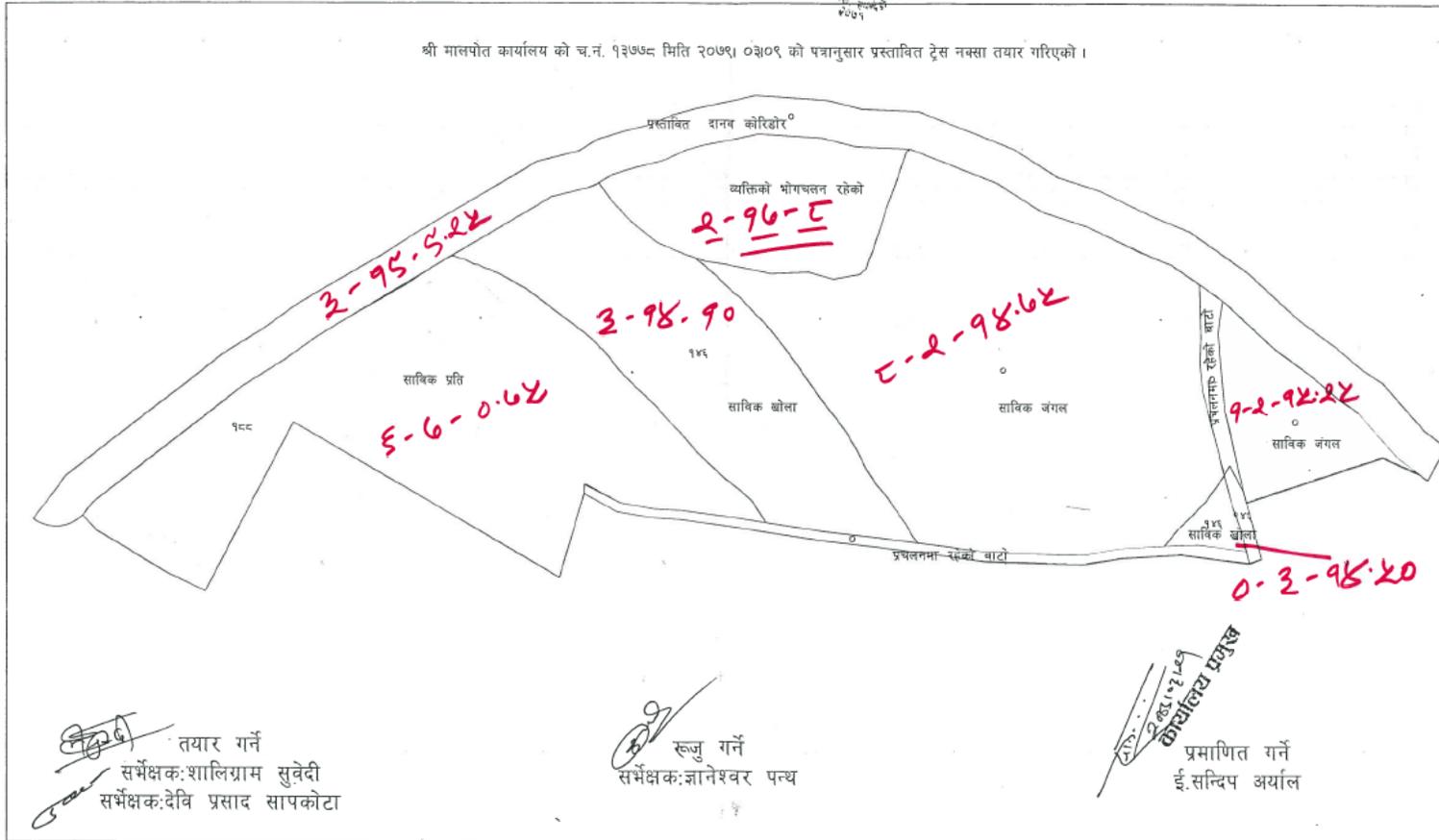
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भूमि व्यवस्था, सहकारी तथा गरिबी निवारण मन्त्रालय
नापी विभाग
नापी कार्यालय बुटवल
लुम्बिनी प्रदेश
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प्रस्तावित ट्रेस



पढा नं: १४
स्केल १:२,४००

श्री मालपोत कार्यालय को च.नं. १३७७८ मिति २०७९।०३।०९ को पत्रानुसार प्रस्तावित ट्रेस नक्सा तयार गरिएको।



तयार गर्ने
सर्भेक्षक: शालिग्राम सुवेदी
सर्भेक्षक: देवि प्रसाद सापकोटा

रूजु गर्ने
सर्भेक्षक: ज्ञानेश्वर पन्थ

प्रमाणित गर्ने
ई. सन्दिप अर्याल

Figure 2-5: Site boundaries map, produced for the purpose of the project Feasibility Study

Land use near in the proposed site consists of land used in agriculture, livestock grazing, community forest and households.

Table 2.10: Land requirement of the proposed project

| Project component | Forest area | | Cultivated land | | Bare land | | Riverbank | | Total |
|--|-------------|---------|-----------------|---------|-----------|---------|-----------|---------|-------|
| | Govt | Private | Govt | Private | Govt | Private | Govt | Private | |
| Permanent | | | | | | | | | |
| The proposed wholesale market and all components | 12.47 | - | - | - | - | - | - | - | 12.47 |
| Temporary | | | | | | | | | |
| - | - | - | - | - | - | - | - | - | - |

Source: Technical and Financial Feasibility Study Report, March 2023 produced by Royal HaskoningDHV as part of the Feasibility Study Developing Agriculture Value Chains in Nepal (see Appendix 2)

2.2.6 Construction Schedule

The project implementation will consist of 3 phases, which are described below with adequate illustration on the activities to be undertaken in each phase.

A. Preconstruction phase:

- Acquisition of permission for construction of buildings in the site as per the design;
- Land acquisition for the project site;
- Forest clearance approval from the Ministry of Forest and Environment;
- Marking and counting of the trees to be felled;
- Establishment of construction camp.

B. Construction phase:

- Site clearance;
- Earthwork and site preparation;
- Hauling of construction materials and equipment;
- Construction of the project structures and facilities;
- Installation of equipment;
- Replanting of trees;
- Landscaping and rehabilitation of the site.

C. Operation phase:

- Operation of the market (wholesale and retail);
- Operation of the processing and storage facilities;
- Transpiration of produce.

The tentative construction schedule is presented below. This shall be refined during the detailed stage of the project.

Table 2.11: Tentative Time Schedule of the Project

| Nr | Project Activity | Q4 2023 | Q1 2024 | Q2 2024 | Q3 2024 | Q4 2024 | Q1 2025 | Q2 2025 | Q3 2025 | Q4 2025 | Q1 2026 | Q2 2026 | Q3 2026 | Q4 2026 |
|----|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | Issue Tender Documents | Active | | | | | | | | | | | | |
| 2 | Tender announcement | Active | Active | | | | | | | | | | | |
| 3 | Tender evaluation and award | | Active | Active | | | | | | | | | | |
| 4 | Detailed Design of the wholesale market, verification of the EIA results | | | Active | Active | | | | | | | | | |
| 5 | Contractor mobilisation | | | | | Active | | | | | | | | |
| 6 | Ground works | | | | | Active | Active | Active | | | | | | |
| 7 | Foundations and sub-structures and infrastructure | | | | | | Active | Active | Active | | | | | |
| 8 | Erection of the buildings (super structures) | | | | | | Active | Active | Active | Active | | | | |
| 9 | Infrastructure and Utilities | | | | | | | Active | Active | Active | Active | Active | Active | |
| 10 | Installation of equipment | | | | | | | | Active | Active | Active | Active | Active | Active |
| 11 | Testing and Commissioning | | | | | | | | | | Active | Active | Active | Active |
| 12 | Training | | | | | | | | | | Active | Active | Active | Active |
| 13 | Start Operations | | | | | | | | | | | | | Active |

Chapter 3 EIA Approach and Methodology

3.1 Literature Review

The EIA team collected and studied pertinent documents, reports and maps to fully visualize and understand the project details including design and associated impacts on the environment. A base map was prepared, delineating project infrastructure siting on a land use map. The affected districts, municipalities, wards and settlements were subsequently listed for impact assessment. The maps and data were acquired from (a) the analogue and digital versions of topographic and GIS maps, collected from the Survey Department from the Government of Nepal (land use, settlement, drainage, slope), (b) Google imagery to assess recent land use change and expansion of settlements, (c) feasibility reports, which were studied to develop a thorough understanding of the project, (d) macro-level demographic data on the ethnic/caste groups and vulnerable groups through the economic census publication of the central bureau of statistics and municipality profile, (e) State of Environmental Statistics of Nepal 2019 published by CBS, (f) maps and research publications on vegetation and flora & fauna of Nepal. All of these maps and documents were thoroughly reviewed with a focus on each specific area of importance and catalogued for future reference. The complete list of sources can be found under the References chapter.

3.2 The Study Area

Part of the EIA process is to determine the potential environmental and social impacts for the project location. To properly assess the environmental and social impacts of the project location, the study area has been defined, see table below.

Table 3.1: Project Area of Influence

| Project Impact Area | Abbreviation | Description |
|--------------------------------|--------------|---|
| Direct Impact Area | DIA | <ul style="list-style-type: none">Potential environmental and social impacts occurring directly on site (12.47ha) plus 200m radius from the site boundaries.Refers to a direct alteration in the existing environmental conditions because of the project activity (market area, storage, temporary facilities on site and changes connected to access roads). |
| Indirect Impact Area | IIA | <ul style="list-style-type: none">Potential environmental and social impacts occurring in the vicinity of the site, within a radius of 1000m from the proposed project location.Refers to areas with environmental components having repercussions by other environmental components affected/changed by the project component or its activity. |
| Area of Influence (Study Area) | AoI | <ul style="list-style-type: none">For this purpose, wider area has been considered, e.g., Ward 15 and Ward 1 from Sainamaina. |

The proposed DIA, IIA and AoI are based on the expert judgment and experience of the EIA team who has worked on similar studies in the Agricultural Sector.

3.3 Data collection methods

Field studies were carried out by a multidisciplinary team comprising of Environmental Specialists, who examined the flora, fauna and the physical environment, and Sociologists, who covered the social aspects, archaeology, cultural heritage and community health & safety. During the site visit, baseline information on physico-chemical, biological, socio-economic and cultural conditions of the field site and project area, were collected through a checklist and questionnaire.

3.3.1 Physical Environment

The physical environmental checklist was prepared identifying the parameters associated with the project including topography, land use pattern, geology, probable landslide, soil erosion, air, water, noise quality, solid waste management practice, labour camp sites and waste disposal sites, see Appendix 5. Immediately after establishment of the official site boundaries, RHDHV, has conducted a topographic survey using GPS instruments. An exploratory geo-technical investigation was performed to characterize the subsurface conditions at the site.

Ambient air quality

- Monitoring locations:
 - a. Station-1 - BM 1, Near Temple Area (2993/-M - 1/079-080), GPS: Latitude - 27.677352, Longitude: 83.388835 Station-2 - BM 1;
 - b. Temple Near Bridge Area (2993/-M - 2/079-080), GPS: Latitude - 27.679427, Longitude: 83.379913;
 - c. House Middle Route (2993/-M - 3/079-080), GPS: Latitude - 27.682743, Longitude: 83.379812;
 - d. First House on the Route of Highway (2993/-M - 4/079-080), GPS: Latitude - 27.683105, Longitude: 83.379720;
 - e. House on the Route of Second Bridge (2993/-M - 5/079-080), GPS: Latitude - 27.676787, Longitude: 83.393852.
- Monitoring parameters: particulate Matter Less than 10 Micron (PM₁₀), Particulate Matter Less than 2.5 Micron (PM_{2.5}), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x), CO, Benzene, Ozone, Lead.
- Methodology: for the determination of TSPM, PM₁₀, PM_{2.5} and Lead, sampling was done with the help of a high-volume sampler (HVS). Pre-weighted fiber glass filter paper was used for the collection of PM₁₀, PM_{2.5} and a pre-weighted cup was used for particles larger than PM₁₀, PM_{2.5}. After sampling, the samples were safely transported to the laboratory and the weight was taken of the exposed filter paper and cup to finally determine the PM₁₀ and TSPM against the drawn volume of air. For determination of lead exposed filter paper digested in Nitric Acid and determine the lead concentration in AAS (Atomic Absorption Spectrophotometer). SO_x and NO_x were sampled simultaneously by the same instrument through the attached gas sampling gadget. Sodium Hydroxide and Tetra Chloro Mercurate (TCM) solutions absorbing reagents were used for NO_x and SO_x respectively. The collection tubes were kept chilled with

ice water to prevent evaporation and to provide greater absorption. Samples were instantly stored in a refrigerator and safely transported to the laboratory under cold condition with ice in an ice box and kept at low temperature until the analysis to determine the values of the parameters. For the sampling of Benzene Organic Vapor Sampling equipment and activated charcoal tubes were used. After sampling, the samples were safely transported to the laboratory to determine the concentration in GC (Gas Chromatography). Field information data on ambient air temperature in monitoring days, relative humidity, air flow direction and velocity were also taken.

- Measurement requirements:
 - Per each location measurements shall be done from 7.00-22.00 to get a noise value for the day, and one measurement from 22:00-7:00 to get a noise value for the night
 - Reading shall be taken in every 2 hours gap interval each have 15 minutes duration recording
 - Recordings shall cover “rush hour” (meaning a period of time that it is busier, thus there is more sound from traffic), for example between 7:00-8:00, it is important a measurement takes place during this rush hour so its representative

Noise level monitoring

- Monitoring locations: the same locations as for the ambient air quality;
- Monitoring parameters: L_{max} , L_{min} , L_{eq} , L_5 , L_{10} , L_{50} , L_{90} , L_{95} ;
- Methodology: Noise level was recorded at site using Lutron SL – 4023 SD Noise Level Meter and SD Card data logger software.

Ground and Surface Water Quality

- Monitoring locations groundwater:
 - a. Upstream Zone of Project Area (Near Danab River, Near Temple Ar–a - 2985/–W - 1/079-080), Jeet Dhakal, Latitude: 27.676048 Longitude: 83.390448;
 - b. Downstream of Project Area (Near Danab Riv–r - Near Temple Ar–a - 2986/–W - 2/079-080), Bhim Lal Sapkota, Latitude: 27.677188 Longitude: 83.384775.
- Monitoring locations surface water:
 - a. At Upstream Zone of Project Area (from Danab River, Nearby Second Bridge (2987/–W - 1/079-080), Latitude: 27.676395 Longitude: 83.393528. Monitoring parameters groundwater: COD, BOD₅, Chloride, Iron, Manganese, pH, Silica, Ammonical Nitrogen, Nitrate, Nitrite, Sulphate, Total Phosphorus, Cyanide, Suspended Solids, Total Dissolved Solids, Electrical Conductivity, Total Hardness, Total Alkalinity, Arsenic, Sodium, Potassium, Mercury, Chromium, Zinc, Copper, Cadmium, Cobalt, Aluminium, Nickel, Lead, Lithium; Others: Total Coliforms, Faecal Coliforms.
- Monitoring parameters surface water: pH, BOD₅, COD, Ammonical Nitrogen, Nitrate, Nitrite, Total Nitrogen, Total Phosphorus, Sulphate, Oil & Grease, Total

Suspended Solids, Total Dissolved Solids, Total Coliforms, Faecal Coliforms, Arsenic, Sodium, Potassium, Mercury, Iron, Manganese, Chromium, Zinc, Copper, Cadmium, Cobalt, Aluminium, Nickel, Lead, Lithium, Dissolved Oxygen; Others: Chloride, Silica, Cyanide, Electrical Conductivity, Total Hardness, Total Alkalinity, Total Coliforms, Faecal Coliforms.

- Methodology: Sampling of Ground & Surface Water Samples were conducted at site by Grab Sampling Technique and Laboratory Analysis of all water samples were executed in Water Engineering and training Centre Laboratory, Kathmandu, Nepal by preserving in Ice Box and transporting immediately after sampling as per the Standard Protocols as mentioned in Standard Methods for the Examination of Water and Wastewater, 2³rd Edition. Field parameters of water samples (such as pH, Temperature, Dissolved Oxygen) were taken on site.

For more details, please refer Report on Ground & Surface Water, Ambient Air and Noise Quality Monitoring February-March 2023, in Appendix 6.

3.3.2 Biological Environment

The biological checklist includes types of forest management (e.g., community forest, governmental, private and collaborative forests in the project area). The checklist helped gathering information on major flora, fauna, birds, fishes, amphibians and NTFP (Non-Timber Forest Products) that occur in the project area, as well as used by the project affected families. Biological Environment checklist is included in Appendix 5.

Method to ascertain tree removal

Number of trees required to be removed was enumerated on the project site. In addition, information regarding vegetation status, forest area, non-timber forest product (NTFP), has been acquired, in accordance with the requirement and practices.

Estimation of wood/stem volume, biomass and carbon content has been done following a standard volume model (Sharma and Pokula 1996, FSRO 1967). Standing volume of the tree was predicted based on the directives of MoFSC (2017).

Standing Tree Volume have been predicted using the following formula:

$$\ln(v) = a + b \times \ln(d) + c \times \ln(h)$$

Where a, b and c are volume constants, d: diameter at breast height and h: height of the tree.

Biomass content of a tree/shrub has been estimated using biomass models or “Biomass and Volume tables” developed by Tamrakar (2000). Total carbon that may be lost due to execution of the project has been predicted based on total biomass (Negi et al., 2003), which is total above ground biomass (Chaturvedi and Khanna, 1982) and root biomass (RB, FAO, 2000).

$$\text{Above Ground Biomass (AGB)} = \text{SB} + \text{BB} + \text{LB}$$

Where, SB is Stem Biomass and is calculated as Stem Volume multiplied by Wood Density, BB is Branch Biomass and LB is Leaves Biomass. Carbon offtake has been predicted based on the total biomass of a tree.

The total number of trees that need to be cut down were counted at the site. The census was done in coordination with the Ratanpur CFUG.

The following vegetative parameters have been measured during forest sampling:

- Circumference at Breast Height (CBH) is measured at 1.3 m from the ground level and later converted to diameter at breast height (DBH) for volume and basal area estimation or directly by diameter tape;
- Ground conditions such as gregariousness of the herbaceous vegetation, rock outcrops, richness of the ground flora, *etc.* have also been noted;
- Height of the trees have been measured;
- Ground flora will be identified on the field as far as possible, while trees and other species that cannot be identified in the field will be later identified in the National Herbarium and with the help of standard literature.

The flora of conservation significance (as per the GoN Protection List, IUCN Red Data Book and CITES Appendices) in the project impact area have been studied and listed along with their distribution and frequency of occurrence. Efforts of floral diversity conservation in the project impact areas have been gathered through consultation with the locals. In summary, the following forest data and information have been used to evaluate baseline conditions of the project:

- Forest Type Distribution and habitat conditions;
- Forest Management Practices and Present Status;
- Plants of Ethnobotanical Significance and Argo-biodiversity;
- Forest Diversity and Distribution along the Project Alignment;
- Invasive and Alien species.

Data and information related to the following aspects of the biological environment of the project area have been collected:

- Forest data in the core project area (direct impact area) as per Forest Act;
- Estimated number of trees, wood volume and biomass;
- Cumulative impacts on loss of vegetation/ forest resources/habitat of protected and other species.

3.3.3 Socio-economic and Cultural Environment

To generate a comprehensive understanding of the socio-economic and cultural environment, various assessment methods to elicit data, were employed. These included the administration of a sample of household surveys, focus group discussion (FGD), key informant interviews, direct field observation and via secondary data review and analysis. The socio-economic survey (SES) applied both quantitative and qualitative methods. For the quantitative assessment, an SES was initiated, which comprised of a standard questionnaire survey distributed amongst a sample of households from 12th to 19th October 2022. As the Project site area itself does not support residential or economic use of the land, there are no directly affected households identified. To define a geographical sample range, a 1-km radius from the site delineated the range at which the sample households could be targeted. Four community settlements fell into the 1-km radius, those being, Ratanpur, and Muktidham of ward No. 15 of BSMC, and Ekata, and Buddha Tole of Sainamain Ward No.1 The number of households within this range are estimated to be 258 households. Using

a systematic random sampling method, 50 households (20% of the total number of households within the 1-km range) were targeted for the household survey. The list of the households was collected from the Office of Ward No. 15 and Sainamaina Ward No. 1. The collected lists of names of household heads were arranged separately based on settlements. The name of the household's head was ordered alphabetically. Households in each settlement were selected randomly, at intervals, without the use of defining characteristics.

Table 3.2: Total Population and sample size by municipality

| Nr | BSMC-15 | No of households | Sample size | Percentage |
|----|-----------------------------|------------------|-------------|------------|
| 1 | Ratanpur | 141 | 26 | 18.43 |
| 2 | Muktidham | 76 | 14 | 18.42 |
| | Sub- Total | 217 | 40 | |
| | Sainamaina Ward no.1 | | | |
| 1 | Ekatatole | 20 | 5 | 25 |
| 2 | Budhhatole | 21 | 5 | 23.8 |
| | Sub-total | 41 | 10 | |
| | Total | 258 | 50 | 19.37 |

The Qualitative Approach

For the qualitative assessment, four focus group discussions (FGDs) were held in the different adjacent communities to the project area. FGDs were divided into a women's group, a farmers' group, a mixed group, and a group of representatives from the BSMC and Sainamaina Municipality of Rupandehi District. Table below shows the FGD schedules, location, the type of groups and total participants by gender in each FGD.

Table 3.3: Location, group type and gender of the FGD participants

| Location | Date | Type of group | Total participants | | |
|-----------------------------------|------------------|---|--------------------|--------|-------|
| | | | Male | Female | Total |
| Srijanatole | 15 October, 2022 | Mixed groups (farmers) | 4 | 4 | 8 |
| Butwal Sub-metropolitan city | 15 October, 2022 | Mixed group (Representatives & politicians) | 13 | 2 | 15 |
| Ratanpur, ward 15 | 16 July, 2022 | Mothers' group | 0 | 30 | 30 |
| Sainamaina Municipality ward no.1 | 17 July, 2022 | Mixed group | 8 | 11 | 19 |
| Total | | | 25 | 47 | 72 |

Similarly, key informant interviews (KIIs) were held with six persons who have ample knowledge of the project area. The key informants were farmers, people's representative, cooperative operator, and representative of the Tharu people, see details table below.

Table 3.4: Position and gender of the KII participants

| Nr. | Date | Gender | Position |
|-----|---------------|-----------------|--|
| 1 | 16 July, 2022 | Male | Farmer |
| 2 | 16 July, 2022 | Male | Ward Chairperson |
| 3 | 17 July, 2022 | Male | Butwal Organic Agriculture product collection centre |
| 4 | 18 July, 2022 | Male | Tharu |
| 5 | 18 July, 2022 | Male | Former Budghar of Tharu |
| 6 | 18 July, 2022 | Male | Ward member-1, Saina Maina Municipality |
| 7 | 18 July, 2022 | Male and female | Ratanpur CFUG |
| 8 | 18 July, 2022 | Male | Traders Representatives |

Sample Survey Questionnaire

Standard structured questionnaires were administered to collect quantitative data, see Appendix 5. A set of questionnaires were designed for data collection. Questionnaires were formulated through a series of consultations with experts. For example, draft questionnaires were shared among the national and international experts of the EIA team for comments and feedback. Questionnaires were first drafted in English, once finalized, it was translated into Nepali. The questionnaires were administered with each household head or in the absence of the head of household, with the adult male/female member of the household (above the age of 18 years) group. Verbal consent was given by the respondent before administering the questionnaires.

Two female enumerators were hired for the administration of questionnaires. Before the sample survey, two days of orientation and questionnaire training were provided to the enumerators, spanning from the 10th to the 11th of October 2022, with the survey commencing on the 12th and ending on the 19th of October 2022.

Focus Group Discussion (FGD)

To substantiate and add to the quantity and quality of the data collected from the household questionnaire survey, FGDs were carried out in 4 locations in the project area starting from the 15th of October until the 17th of October 2022.

Key Informant Interviews (KII)

A total of 10 KIIs were held with the Ward Chairperson of Ward No.15 and Ward member of ward No.1 of Sainamaina Municipality, Chairperson, and Executive members of the Ratanpur FUSG, local farmers, and traders regarding the development of the agriculture wholesale market. The key informants were selected based on their knowledge on local environment, society, economy and culture. They could provide adequate information about migration patterns, cropping patterns, caste/ethnicity, and available facilities in the project area. These meetings took place from the 16th until the 18th of October 2022.

Direct Field Observations

The survey team observed the settlement pattern, available infrastructure, health, and sanitation situation of the project area. Informal interviews were conducted along with observation. These techniques helped the team to triangulate the data collected through FGDs and household surveys. Photographs were taken to visually record the day-to-day patterns of human activity on site, as well as to record the household survey undertaking.

3.4 Impact Identification, Prediction and Assessment Method

The environmental impact assessment methodology is organised around 3 steps.

Step 1 identify sensitive receptors and/or areas that may be impacted by the project development, e.g., physical, biological and social receptors.

Step 2 describe potential impacts on receptors/areas considering the technical details of the project, expected emissions and discharges and applying the baseline conditions of the project site, project area.

Step 3 undertake the impact assessment by scoring the impacts as presented in table below. The lower the score, the smaller the impact.

Direct impacts are potential impacts that result from a direct interaction between the project (construction and operation) and a resource/receptor (e.g., between development of a plot of land and the habitats which are affected).

Indirect impacts are potential impacts that follow on from direct interactions between the project and its environment, such because of interactions between different aspects of the environment (e.g., viability of a species population resulting from habitat loss because of the Project developing a plot of land).

A categorisation of the project impact, relevant to whether it directly or indirectly affects a resource/ receptor, is included in the impact table in Chapter 7.

Table 3.5: Methodology for Impact Assessment

| Criteria and the Scale used for the Impact Evaluation | | | | | |
|--|-----------------------------------|---------------------|--|---|---------------|
| Probability of Occurrence | | | | | |
| Remote (0) | Very Low (1) | Low (2) | Medium (3) | High (4) | Certain (5) |
| Area of Influence (Extent in space, according to EPR 2020) | | | | | |
| No Impact (0) | Within project area footprint (1) | | Within or the vicinity of the project area (2-3) | Within, vicinity or/and extended area (4-5) | |
| Duration (According to EPR 2020) | | | | | |
| Hours to Days (0) | Days to Weeks (1) | Weeks to Months (2) | Months to Years (3) | Years to Decades (4) | Permanent (5) |
| Magnitude (According to EPR 2020) | | | | | |
| None (0) | Very Low (1) | Low (2) | Medium (3) | High (4) | Very High (5) |
| Mitigation Potential | | | | | |

| Criteria and the Scale used for the Impact Evaluation | | | | | |
|---|--------------------------------------|------------------------|--|-----------------------------|---------------|
| Total Mitigation (0-1) | Total Mitigation with Difficulty (2) | Partial Mitigation (3) | Partial Mitigation with Difficulty (4) | Mitigation Not Possible (5) | |
| Total Qualification of Impact | | | | | |
| None (0) | Very Low (1) | Low (2) | Medium (3) | High (4) | Very High (5) |

Probability of Occurrence expresses the likelihood that an impact will occur because of the project activities. This variable is defined as: remote (0), very low (1), low (2), medium (3), high (4), and certain (5).

Area of Influence (AOI) represents the extent in space of the impact. The ranking varies between 0 and 5, related to the size of the area of influence: Potentially impacted areas are ranked as no impact (0), within the boundaries of the project area (1), impacts to receptors in the general area (comprising the project area footprint and the vicinity to the project area (2-3), impacts to receptors further afield of the project likewise aquifer, or catchment of water body (4-5).

Duration measures the length of time an impact persists. Duration categories are as follows: hours to days (0), days to weeks (1), weeks to months (2), months to years (3), and years to decades (4). If the impact lasts continuously and indefinitely, it is considered permanent (5).

Magnitude evaluates the severity of the impact, with the following categories: none (0), very low (1), low (2), medium (3), high (4) and very high (5). The presence of existing impacts is considered when evaluating the magnitude of the potential impact to existing local conditions.

Mitigation Potential indicates the ease (in terms of time, effort, and cost) with which the following levels of mitigation can be achieved through preventive and/or reactive measures: total mitigation (0-1), total mitigation, but with difficulty (2), partial mitigation (3), partial mitigation with difficulty (4), and mitigation not possible (5).

Total Qualification/Evaluation of Impact is the overall severity of the impact assessed as the weighted average of the above listed parameters. The total qualification is calculated by taking the average score of all characteristics and applying the following weight factors:

Table 3.6: Applied weight factors

| Category | Attributed weight factor |
|---------------------------|--------------------------|
| Probability of Occurrence | 25 % |
| Area of Influence | 10 % |
| Duration | 10 % |
| Magnitude | 45 % |
| Mitigation potential | 10 % |

Weight factors are proposed, to better differentiate between the severity of the different criteria. The reason for this is that the criteria “area of influence” “duration” and “mitigation potential” are not very distinctive, meaning the scoring is similar for all criteria. The Probability of Occurrence has been given a higher weight factor because certain impacts are highly unlikely to occur. Such impacts should receive a lower total impact score. The Magnitude has been given the highest weight factor because this is the key impact to determine the severity of the impact. If an impact scores high on the other criteria, but has a very low score on Magnitude, it should still be considered a minor impact.

The weighted averages result in the following total qualification of the impacts: none (0), very low/negligible (1), low significance (2), moderate significance (3), high significance (4), and very high significance (5).

3.5 Public Notice, Public Hearing and Stakeholders Consultation

Interaction meetings were carried out to disclose the project, and to inform all interested stakeholders on the EIA Study. The study team also consulted other stakeholders such as Division Forest Office, District Development Committee Office (Now DCC), District Administration Office, etc., collected their feed-back and any concerns on the project. Stakeholders’ consultation was also used as a platform to inform about the project Grievance Mechanism.

With respect to this project, the following main engagements have been conducted:

1. EIA Scoping disclosure and consultation with the aim to consult with MoALD, Ward 15 and key stakeholders on project development, conducted in 4-11 July 2022 in Semlar, Butwal. Main outcome of the consultations were: confirmation that Ratanpur CFUG do not rely on the community forest use as a source of income, and that they have access to and are also using a community forest in Ward 12; waste management is a major concern among engaged stakeholders; concerns were raised about security aspects and potential impact due to influx of visitors; project benefits for local community, especially in terms of employment, employment of women, see details in EIA Appendix 10.
2. Consultation conducted as part of the Feasibility study with the MoALD and key stakeholders, 10-16 December 2022. Main outcome of the consultations were: approval of the technical design of the wholesale market, presentation of the results of the household and vegetation survey. Alignment of the results of the vegetation survey was done with the Ratanpur CFUG. Minutes of meeting can be provided upon request.
3. EIA Public Hearing with the aim to present the results of the EIA study, 24 March 2023. Main outcome of the consultations were: key stakeholders and nearby communities support the project. The following main issues have been raised: management of waste, management of fruits and vegetables containing a high level of chemicals/pesticides (their final treatment and disposal), employment for women and youth. This has been addressed in the EIA in section 8 mitigation measures. Minutes of meeting and more details can be found in EIA Appendix 7.

3.5.1 Publication of the Public Notice (as per GoN Requirements)

The following public notice was published:

The 7 days public notice (before Public Hearing) was published in the national daily newspaper “Samacharpatra” on 12 March 2023, see Appendix 7 for details.

The public notice provided information about the proposed project (e.g., location, aim of the project, type of activities). The EIA notice was to request from rural municipality/municipalities, schools, houses, stakeholders and other related personnel to provide comments and feedbacks in writing within 7 days of the date of the first publication about the proposed project construction. The notice was also posted at the Division Forest Office, District Administration Office, District Coordination Committees, Subdivision forest offices, Community Forest User Groups Offices, schools and hospitals of the project affected district. A public deed of act (*Muchulka*) was collected confirming the posting of the public notice.

The second 7 days public notice (after the Public Hearing) was published in the national daily newspaper “Samacharpatra” on 7 April 2023, see Appendix 7 for details.

3.6 Public Hearing

The public hearing must be carried out in accordance with the EPR 2077’s Rule (6). The followings provisions are made by the EPR 2077:

- Rule (6), Sub-rule (1) requires a public hearing and public consultation meeting to be conducted in the project influence area to collect public concerns and opinions on the proposal.
- Rule (6), Sub-rule (2) requires participation of project affected people and representatives affected local bodies in the public hearing program.
- Rule (6), Sub-rule (3) requires public hearing to be undertaken in the project affected area.
- Rule (6), Sub-rule (4) requires dissemination of the public hearing by publishing a notice in the national daily (by following the notice format provided in EPR 2077’s schedule 5). It will have to specify date, location, time of the public hearing. Furthermore, this notice must be pasted in the public locations and in the offices of affected wards.
- Rule (6), sub-rule (5) requires submission of details of the public hearing, which consist of attendance, suggestions collected during the program, photographs and videography of the program and the program minutes.
- Rule (7), sub-rule (2) requires collection of a public deed of inquiry (*Muchulka*) in accordance with the format provided in EPR2077’s schedule 7, which confirms pasting of the public notice that calls for the written suggestions from the concerned local bodies, stakeholders, institutions, and local agencies within in 7 days.
- Rule (7), Sub-rule (3) require publication of the notice in a national daily.
- Rule (8), Sub-rule (9) and (10) require collection of recommendation letters from affected local bodies.

Highlights of the Public Hearing Event

The public hearing was conducted at the project site – Shiva Ganesh Mandir, Semlar, Butwal – 15 on 24 March 2023. The Public Hearing was attended by 70 participants from Ward 15, 16 and Butwal Sub-Metropolitan City. The attendance of participants is presented in EIA Appendix 7. The participants included farmers, teachers, students, NGOs, CBOs, businessmen, servicemen, forest user groups, government organizations, indigenous community, women, youths, and representatives.

The hearing was chaired by Mr Shiva Rana, Chairperson of the ward -15, Butwal. Mr Khel Raj Pandey, Mayor of the Butwal Sub-Metropolitan City was the Chief Guest of the public hearing, and Mr. Tek Raj Panthi, Chief Administrative Officer, of BSMC. Mr Tikaram Sharma, Chief of the CAIDMP, MoALD and Mr Robbin Boustead representative of Invest International were presented at the program. The program was also attended by the representatives of district government line agencies, district representatives of the major political parties, and the local respected figures.





The program was formally started with Dr Maniratna Aryal, Senior Agricultural Economist, Under Secretary, Centre for Agri-Infrastructure and Agri Mechanization Promotion, Ministry of Agriculture and Livestock Development, Nepal Government by welcoming the participants to the public hearing and making a presentation on the project. The EIA team consisting of Ms Violeta Paginu, Mr Ajay B Mathema and Prof Dr Binod Pokharel presented the findings of the EIA report.

The second session was entirely dedicated for the discussion, in which participants were given sufficient time to express their comments and suggestion. In addition to it, written comments from the participants were also collected. The comments mainly consisted of the followings:

- (a) Timely commencement of the project;
- (b) Women and youth shall be prioritized for recruitment in the project (this is included as one of the project mitigation measure, see section 8.4) ;
- (c) Access gate in the south to the project site shall also be included in the design.
- (d) Waste management for the future market (the measures that will be embedded in the project design are explained in section 2.2.5. Project requirements, see details on waste management on site and provision of the wastewater treatment plan. Further mitigation measures on this aspect are included in chapter 8 of this report, see section Pollution of direct environment due to improper waste management)
- (e) Management of fruits and vegetables that have a high pesticides content and cannot be traded/ consumed and shall be disposed in a responsible, environmentally safe manner (see details in chapter 8, section Pollution of direct environment due to improper waste management during the operation phase of the project).

Mr Khel Raj Pandey thanked all the participants for their active involvement and assured that their concerns will be adequately addressed in the EIA final report as far as possible. Further he requested the MoALD to start the project on the timely basis. The Chairperson

of the program, Mr Shiv Thapa concluded the public hearing. For more details, please refer to the event minutes of meeting in EIA Appendix 7.

After the PH, a written comment was provided per email from Yub Raj Dhakal, Environment Safeguard Specialist, emailed 6th of April 2023. The email suggested the following measures to be adopted by the project:

1. Project shall provide direct benefit to the community i.e. for employment as well as business (this is now addressed in section 8.4.3 and 8.4.5 with respect to prioritization during employment process).
2. Project structure shall not face back to the community area i.e. shall have access and approach to the settlement in the manner that the community get direct benefit from the project (market access is via the eastern side of the site, this will prevent direct nuisance from the market construction and operation on nearby communities and will still facilitate easy access to the market for nearby communities, see section 2.2.1 for more information on location and site).
3. As an enhancement measure if some demonstration agriculture farming plots can be developed in the area it could be mutually beneficial (this is now suggested as part of the Community Investment Plan, see section 9.4.2).

3.7 Preparation of the report

The report has been prepared as per the Annex 12 of EPR 2077 and in line with the approved scoping report (see approval letter and its approval conditions in Appendix 8), including the EIA Terms of Reference (see Appendix 9) and the consultation results as conducted during the scoping phase of the EIA (see Appendix 10).

3.8 Study team

Table 3.7: EIA Study Team, declarations in EIA Appendix 17

| SN | Name | Academic Qualification Copy diploma can be provided upon request | Expertise | Experiences of Environment Assessment |
|----|----------------------|---|---|---|
| 1 | Ajay Mathema | MSc Environmental System Analysis and Management / Environmental Engineering | EIA and Physical Environmental Expert | 23 years of experience working in EIA studies and due diligence |
| 2 | Prof. Binod Pokharel | PhD Anthropology | Social Development Expert | 30 years of professional experience and contributed to more than 50 EA |
| 3 | Eric Pereira | BSc. Civil Engineering | Feasibility Study Technical Lead, Technical Design and Financial assessment | 35 years of international relevant experience and contributed to more than 10 environmental assessments |
| 4 | Dr Lars De Ruig | PhD Flood risk and adaptation | Climate Resilience Expert Flooding Risk Impact Assessment | 5 years of international relevant experience and contributed to more than 5 environmental and flooding risk impact assessments |
| 5 | Violeta Paginu | MSc. Environment Management MSc. Agriculture Science BSc. Agricultural engineering and plant protection | Forest and Physical Environment, Impacts Assessment from project Emissions and Discharges | 15 years of international relevant experience and contributed to more than 20 environmental and social impact assessments and due diligence |
| 6 | Kim Moonsamy | Postgraduate in Anthropology BA, Anthropology and Psychology | Social Expert | 25 years of international relevant experience and contributed to more than 60 environmental and social impact assessments and due diligence |
| 7 | Taco Hoencamp | Master's degree in Irrigation and Water Management | Environmental, Health and Safety Expert | 30 years of international relevant experience and contributed to more than 25 environmental and social impact assessments and due diligence |
| 8 | Laura Bergsma | MSc. Earth Surface and Water BSc. Earth Sciences | Climate change specialist | 3 years of international relevant experience and contributed to more than 5 environmental & climate risks impact assessments |
| 9 | Pepijn van Ravesteyn | Master of Hydrology Bachelor of Environmental science | Water Management Hydrogeologist Ground Water Impact Assessment | 5 years of international relevant experience and contributed to more than 10 environmental assessments connected to ground water |

Chapter 4 Legal Review

4.1 Constitution of Nepal

The key articles in the Constitution of Nepal that might have a direct relevance to the project are listed below.

Table 4.1: Articles in the Constitution of Nepal relevant to the Project

| | |
|----------------|--|
| Article 27 | Every citizen shall have the right to demand and receive information on any matter of his or her interest or of public interest. |
| Article 30 (1) | Every person shall have the right to live in clean and healthy environment |
| Article 30 (2) | The victim shall have the right to obtain compensation, in accordance with law, for any injury caused from environmental pollution or degradation |
| Article 51 | Mentions about pursuing policies to develop balanced, environment friendly, quality and sustainable physical infrastructures, while according to priority to the regions lagging behind from development perspective. The article also mentions sustainable development. |

4.2 Policy and Acts

The key environmental policies and acts of the GoN that have a direct relevance with the project's development and operations are listed below⁷.

Table 4.2: Nepal Policies relevant to the Project

| | | |
|------------------------------------|--|--|
| National Environmental Policy 2076 | Section 6. Target | Ensuring citizens' right to live in a clean and healthy environment by pollution control, waste management and green promotion |
| | Section 7. Objectives | <ol style="list-style-type: none">1. Prevention, control and reduction of all types of pollution including water, air, soil, sound, electromagnetic waves, chemical and radioactive.2. Managing waste generated from all sources including domestic, industrial and service sector.3. Mainstreaming environmental concerns in all dimensions of development. |
| | Section 8. Policy Section 8.2 Environmental Mainstreaming | <ol style="list-style-type: none">1. Based on the extent, magnitude and duration of the environmental impact, the approval process will be made transparent and simplified by the proponent before implementing the proposal.2. Arrangements will be made to carry out the project by selecting suitable options so that there is a balance between environment and development.3. Arrangements will be made to allocate the required funds by the proponent for reducing the adverse effects caused by the environmental impact and enhancing the adaptation effect while preparing the environmental study report. |

⁷ For the purpose of this section, all years and dates are presented as stated in Nepali legislation

| | | |
|-------------------------------------|---|--|
| | Section 8.5 Sustainable Development | 1. Environment friendly structures will be built during the construction of physical infrastructures. |
| National Forest Policy, 2075 | Section 6. Objectives | 1. Conservation, restoration and sustainable use of forests, flora, fauna and biological diversity 2. Restoring forests that have been damaged in various ways without reducing the current forest area. |
| | Section 8. Policy 8.1 Forest Land Tenure | Strategy and program: If there are no option to use forest to carry out projects of national priority or national pride, the federal government will plan to use forest area based on laws, guidelines and procedures, and in order to compensate the reduced forest area by using forest area, the federal government will also plant trees and restore the forest by coordinating with the provincial and local governments. |
| | 8.4 Biodiversity Conservation | Protection and management of rare, endangered and protected wild animals and plants will be done. |
| | Section 5. Long term view | Achieving social, economic and environmental development and prosperity in a sustainable way by optimum utilisation of available land and land resources |
| National Land Use Policy 2072 | Section 8. Policy and Strategy | 2.3 Maintaining balance between physical infrastructure development and environment. 2.3 (g) Ensuring conservation and promotion of biological diversity. 7.2 If forestland is to be used for implementation of national priority projects, then, arrangements for mandatory plantation in equal land without reduction will be made. |
| | | 9.3 Construction or expansion of roads that promote soil erosion, adversely affect arable land and endanger local settlements will be discouraged. 10.2 While implementing the development construction works, in order to maintain a balance between land, environment and development, the principle of sustainable development will be adopted along with considering the impact of climate change. |
| | Section 7. Objectives | c. To promote a green economy by adopting the concept of low carbon emission development. f. Mainstreaming or internalising climate change issues in policies, strategies, plans and programs at all levels and thematic areas of the nation. |
| National Climate Change Policy 2076 | Section 8. Policy 8.2 Forest, Biodiversity and Watershed Conservation | d. An action plan will be formulated and implemented for protection of rare and endangered wildlife and flora and sensitive ecological systems that are at risk of climate change. |

| | | |
|--|--|--|
| | Section 8.5 Industry, Transport and Physical Infrastructure | d. Climate-related risk reduction measures will be adopted during the design and construction of physical infrastructures. |
| National Transport Policy 2058 | Section 5.8 | Construction, improvement and management of the means of transport shall be done in harmony with the environmental effect |
| | Section 7.1.5 | Manage the design, construction and maintenance of the roads with minimal environmental effects |
| Policy on Land Acquisition, Resettlement, and Rehabilitation for Infrastructure Development Project 2071 | Section 7. Policy | 7.1 To create a situation where there is no displacement of local people, families or communities or as a little displacement as possible due to the implementation of the project 7.2 In case of displacement due to the project, minimising the adverse effects of the project provides opportunities for compensation and economic-social benefits to the affected person, family or community. 7.3 Make land acquisition, compensation, rehabilitation and evaluation work simple, easy, transparent and fair, creating an environment to complete the project within the stipulated time. |
| National Gender Equality Policy 2077 | Section 6. Long Term Thought | Gender Equitable Nation Construction |
| | Section 7. Scenario of Thought | Ensuring substantive and meaningful participation of women in all sectors and maintaining gender equality through economic and social transformation. |
| | Section 8. Target | To establish equality between women, men, gender and sexual minorities in legal and practical terms, including economic, social and political empowerment of women. |
| | Section 10. Strategy | Changing the tradition of gender-based division of labour and increasing women's participation in the labour market and assessing women's contribution to the economy. |
| National Child Policy 2069 | Section 7. Major Objectives of Policy | 7.1 Protecting children from all types of physical or mental violence, harm or abuse, neglect, exploitation and sexual abuse. |
| | Section 9. Strategy (Related with Objective 7.1) | As child labour can impact on long term physical and psychological development, its redress monitoring mechanism to check whether any industries or enterprises are employing child labour or not should be made effective. If any employer is found using child labour, then immediate rescue of such a child should be done and the employer should be punished. Integrated facilities will be provided for rehabilitation of children. |
| Fifteenth five-year plan (2076/77- 2080/81) | Chapter 2, Short term National Strategies | (6) To build a just society characterised by poverty alleviation and socio-economic equality. (7) To conserve and utilise natural resources and improve resilience. |

| | | |
|--|--|---|
| | Section 3.4, table 3.1, S.N. 3.2.2, S.N. 4.2 | Indicators of families with access to electricity mentioned. Indicators of production and consumption of clean energy mentioned. |
| | Table 3.1 S.N. 7.1 and 7.2 | Mentions about pollution free and clean environment and ecological balance and sustainable utilisation of national resources. |
| | Table 3.1 S.N. 7.3 | Climate Change adaptation |

Table 4.3: Nepal Acts relevant to the Project

| NS | Act | Related Provision |
|----|------------------------------------|---|
| 1 | Environmental Protection Act, 2076 | <p>The Environment Protection Act, 2076 is the principal legal framework for environment protection and pollution control. The legal regime on the environment makes every effort to integrate environmental aspects in the projects and programs. The Environment Protection Act (EPA), 2077 oblige the proponent to carry out Initial Environmental Examination (IEE) and/or Environmental Impact Assessment (EIA) of the prescribed proposal before implementation of the Project. The Act provides that no one shall implement or cause to implement a proposal without getting it approved from the concerned agency or the Ministry.</p> <p>The environmental laws contain elaborated provisions on the approval process of the EIA report. Sections 3 to 6 of the EPA, 2076 and Rules 3 to 11 of the EPR, 2077 contain such provisions and this EIA report has been prepared following those legal requirements. Rule 12 of the EPR, obliged the proponent to comply with the matters mentioned in the report and other conditions, if any, prescribed by the approving agency or concerned agency. Furthermore, the environmental law has made the public consultation a prerequisite to all the prescribed projects to provide different stakeholders an opportunity to raise their concerns. Section 18 of the Environment Protection Act (EPA), 2077 empowers the prescribed authority in case any person implements a proposal requiring environmental assessment without any approval or carries any act contrary to the approved proposal.</p> <p>The environmental management plan is the heart of the environmental study report. The proponent is obliged to implement the mitigation measures. The environmental Monitoring works should be performed by the concerned agency / Ministry and auditing by the Ministry of Forests and Environment (MoFE) in accordance with the provisions of the EPR, 2077.</p> |
| 2 | Forest Act, 2076 | <p>The Forest Act, 2076 has provisioned for the development, conservation, management and sustainable use of forest resources to meet the basic needs of forest products of the people, socio-economic development, and environmental promotion. The provisions relating to protected forests, community forests and leasehold forests will have a long term impact on the conservation and sustainable use of biological resources.</p> <p>The Section empowers the Government to delineate any part of a national forest that has a special environmental, scientific or cultural importance as a protected forest. It is necessary to prepare and implement an operational plan for any protected forest. The government is empowered to grant any part of a national forest to the community users, and as leasehold forests for the purpose of meeting the raw materials required by industries, planting and</p> |

| NS | Act | Related Provision |
|----|---------------------------|--|
| | | <p>increasing the production of forest products for sale or use, and promoting eco-tourism or agro-forestry in a manner conducive to the conservation and development of forests.</p> <p>The Forest Act has divided national forest into five categories:</p> <ul style="list-style-type: none"> ● Government-managed Forests: National forests managed by the Government; ● Community Forests: National forests handed over to user groups for development, conservation and utilisation for the collective benefit of the community; ● Leasehold Forests: National forests leased to any institution established under existing law, industry or individual, for the production of forest products, agroforestry, tourism or farming of insects and wildlife; ● Religious Forests: National forests handed over to any religious group or community for development, conservation, and utilisation; and ● Protected Forests: National forests declared by the Government of Nepal as protected forests in consideration of their special environmental, scientific or cultural significance. <p>The Act states that “in case there is no alternative except to use the forest area for the implementation of the plan having national priority and if there shall be no significant adverse effect on the environment while implementing such plan, the Government of Nepal may give assent to use any part of the government managed forest, community forest, leasehold forest or religious forest for the implementation of such plan.” The government has the ownership of any categories of forests.</p> |
| 3 | Labour Act, 2074 | <p>According to the Labour Act, 2048, section 4 on employment of workers and employees, and sub-section 3 on workers or employees engaged in any contract work of a permanent nature in any enterprise shall also be made permanent under subsection (2).</p> <p>Workers or employees engaged in any work as mentioned in subsection (3) shall be paid benefits provided for in this Act according to their post and scale. Notwithstanding anything contained under subsections (2) and (3), in the event that any establishment is required to increase production or service for a short period of time, it may appoint workers or employees according to need for a certain period by specifying such a period.</p> <p>Under section 5, no child shall be employed. Except in prescribed circumstances, minors and women may ordinarily be employed for the period from 6 a.m. to 6 p.m. Women may be employed like men after making appropriate arrangements on the basis of mutual agreements between the general manager and the employees or workers in question. All labourers should be provided safety equipment such as helmets, gloves <i>etc.</i> during work.</p> |
| 4 | Water Resources Act, 2049 | <p>The Water Resource Act, 2049 is a comprehensive legislation on water resources. It deals with the development, utilisation and conservation of the water resources in the country. The Act states that the State is the owner of water resources of the country. This Act grants the right to use water by individuals, organisations and the private sector. No person shall be entitled to utilise the water resources without obtaining a licence under this Act. The licensee has to pay a prescribed charge or annual fee for utilising the water resources. Prior approval is required to transfer the licence in any manner.</p> |

| NS | Act | Related Provision |
|----|-------------------------------------|---|
| | | <p>The service may be stopped or the licence can be cancelled as prescribed. Licence is not required for the usage of water resources in the following situation:</p> <ul style="list-style-type: none"> • For one’s own drinking and other domestic use on an individual or collective basis; • For the irrigation of one’s own land on an individual or collective basis; • For the purpose of running water-mill or water-grinder as cottage industry; and • For the use of boat on personal basis for local transportation. <p>Section 16 of the Act deals with utilisation and acquisition of land and house. This Section allows the licensee to submit an application to the Government of Nepal if someone’s land or house needs to be acquired. The Section further states that the Government may make available such land and house in the same way as it makes available to any corporate body under the prevailing laws. Sections 18, 19 and 20 of the Act deal with water quality standards, water pollution and adverse effects on the environment. Sections 18 and 19 allow the Government to prescribe pollution tolerance limits and water quality standards for various uses. Sub-section 2 of Section 19 prohibits anyone from polluting water resources to the effect that the prescribed tolerance limits are exceeded. Section 20 of the Act states that “while utilising water resources, it shall be done in such a way that no significant adverse effect be made on the environment by the way of soil erosion, flood, landslide, or similar other cause”.</p> <p>The Act provides 46 priority orders to be followed while utilising the water resources:</p> <ol style="list-style-type: none"> 1. Drinking and domestic use; 2. Irrigation; 3. Agricultural uses such as animal husbandry and fisheries; 4. Hydro-electricity; 5. Cottage industry, industrial enterprises and mining use; 6. Navigation; 7. Recreational uses, and 8. Other uses. |
| 5 | The Solid Waste Management Act 2068 | <p>The Act has the following key provisions:</p> <p>Establishment of a Solid Waste Management Fund: The Act established a Solid Waste Management Fund at both the federal and provincial levels. The Fund will be used for implementing solid waste management programs and for providing financial assistance to local bodies for the same.</p> <p>Responsibility of Local Bodies: The Act made it mandatory for local bodies to manage solid waste within their jurisdiction. The local bodies can also outsource the management of solid waste to private entities.</p> <p>Waste Segregation and Collection: The Act emphasizes on waste segregation at the source and the collection of segregated waste separately. It also requires the local bodies to ensure that waste is collected and transported in a scientific and hygienic manner.</p> <p>Prohibition of Open Burning: The Act prohibits the burning of solid waste in open spaces, which is a common practice in many areas of Nepal. The Act also prohibits the dumping of waste in public places, rivers, and other water bodies.</p> <p>Penalties: The Act imposes penalties on those who violate its provisions. The penalties can range from fines to imprisonment depending on the severity of the offense.</p> <p>Waste Management Plan: The Act requires project proponents to develop a waste management plan as a part of their project design. The plan should identify the types of waste generated by the project, the methods of waste segregation, collection, transportation,</p> |

| NS | Act | Related Provision |
|----|-----|--|
| | | <p>treatment, and disposal, and the measures to prevent pollution and environmental degradation.</p> <p>Waste Reduction and Reuse: The Act encourages project proponents to adopt waste reduction and reuse measures as part of their waste management plan. This includes measures like reducing the use of non-biodegradable materials, promoting recycling, and reusing materials and products where possible.</p> <p>Safe Disposal: The Act requires project proponents to dispose of their waste in a safe and environmentally sound manner. This includes ensuring that hazardous waste is disposed of according to the relevant regulations and that non-hazardous waste is disposed of in a designated landfill or other waste management facility.</p> <p>Monitoring and Reporting: The Act requires project proponents to monitor their waste management practices and report on their compliance with the waste management plan. The reports must be submitted to the relevant authorities periodically.</p> |

4.3 Rules and Regulations

The key environmental rules and regulations of the GoN that have a direct relevance with the project's development and operations are listed below.

Table 4.4: Nepal Rules and regulations relevant to the Project

| NS | Rules and Regulations | Related Provision |
|----|--------------------------------------|---|
| 1 | Environmental Protection Rules, 2077 | The EPR obliges the proponent to inform the public on the contents of the proposal in order to ensure the participation of stakeholders. EPR contains the elaborative provisions on the process to be followed during the preparation and approval of projects requiring BES, IEE and EIA including scoping document, terms of reference, information dissemination, public consultation and hearing and environmental monitoring and auditing. Article 12 of the EPR, requires the proponent to comply with the matters mentioned in the report and other conditions, if any, prescribed by the approving agency or concerned agency, while Rules 13 and 14 are related to environmental monitoring and environmental auditing. |
| 2 | Forest Rules, 2079 | <p>The Forest Rules 2079 elaborates legal measures for the conservation of forests and wildlife. Based on forest legislation, thirteen plant species are included in the level protection list. Of them, GoN has banned the felling, transportation and export of protected species.</p> <p>Rule 4 stipulates that in case the execution of any project having national priority in any forest area causes any loss or harm to any local individual or community, the proponent of the project itself shall bear the amount of compensation to be paid. The Rule also stipulates that the entire expenses for cutting and transporting the forest products in a forest area to be used by the approved project shall be borne by the proponents of the project.</p> |
| 3 | Wildlife Reserve Rules 2034 BS | Rule 4 stipulates provision of entry pass to enter the Parks or Reserve; Rule 6 stipulates restricted activities within the Parks and Reserves; Rule 11 stipulates prior approval for any research activities or study within the parks or reserves. |
| 4 | Child labor (prohibition and | Child labor (prohibition and regulation) Act, 2056 (2000) prohibits engaging children in factories, mines or similar risky activities and to make necessary provisions with regard to their health, security, services and facilities while engaging them in other activities (GON, |

| NS | Rules and Regulations | Related Provision |
|----|-----------------------|---|
| | regulation) Act, 2056 | 2000). Child not to be Engaged in work: (1) No child having not attained the age of 14 years shall be engaged in works as a laborer. (2) No child shall be engaged in any risky business, by subjecting him/her to any influence or fear or threat or coercion or by any other means. Nepal has approved the National Master Plan (NMP)-II on Child Labour (2018 – 2028) that aims to amend and formulate national child labour policies and legislations based on evidences. The Government is highly committed to achieving the Sustainable Development Goals (SDGs) targets 8.7 and 16.2 that specifically contribute to ending child labour in all its forms. |

4.4 Guidelines/Manuals/Standards

The key environmental guidelines/ manuals/ standards of the GoN that have a direct relevance with the project’s development and operations are listed below.

Table 4.5: Nepal Guidelines, Manual and Standards relevant to the Project

| NS | Guidelines/ manuals/ standards | Related matters |
|----|--|--|
| 1 | National EIA Guidelines, 2050 | The guideline provides clear directions about the process of conducting EIA. This guideline makes EIA in Nepal legally mandatory and contains a process for ensuring public involvement during the preparation of EIA report. It calls for information regarding identification of physical, biological, socio-economic and cultural impacts. Impact ranking method also suggested in this guideline. It stresses the inclusion of mitigation measures to avoid, minimise and mitigate adverse impacts and maximise beneficial impacts resulting from the development project and Monitoring & environmental auditing in the EIA report. Its revision in 1997 calls for the ensuring local people’s participation in the collection of relevant information, identifying major issues of public concerns, evaluating them and establishing priorities for EIA study. |
| 2 | EIA Guidelines for the forest sector, 2055 | EIA Guidelines for the Forestry Sector has given focus to make proposals which have forest components socio-culturally acceptable, economically feasible and environmentally sustainable, thereby to conserve genetic resources and biodiversity, and minimise environmental damage in forest areas and facilitate in identification of positive and adverse impacts of proposal implementation. |
| 3 | Procedure related to using national forest area for national priority plans 2076 | In order to manage the matter of giving approval to operate the national priority projects related to the use of national forest area for the national priority plan, 2076 has been implemented. In this procedure, basically, when studying the feasibility of the plan, the ministry related to the plan should study the possibilities and alternatives so that the national forest area is not used as much as possible, and if the national forest area is to be used in the study, only the minimum forest area that is very necessary should be used or the option of removing the minimum tree saplings. In addition, if it is found that the national forest area should be used for the projects, the ministry related to the plan should prepare a preliminary test or environmental assessment report in accordance with the prevailing environmental protection laws and regulations regarding the impact on the environment during the implementation of such plans. |

| NS | Guidelines/ manuals/ standards | Related matters |
|----|---|--|
| | | <p>If it is found from the survey that there will be an impact on the environment during the implementation of the plan, there is a provision that the relevant ministry should prepare a report including the environmental management plan including mitigation measures and before approving the report, the relevant ministry should seek the agreement of the Ministry of Forest and Environment. There is a provision to request permission to use the national forest area, to send it to the Division Forest Office, to be approved by the government of Nepal, to provide land in the form of a mortgage, to be able to pay the amount for using the forest area, to manage forest production and to plant trees.</p> <p>In order to implement the plan, using the national forest area and removing the tree saplings, the plan has to hand over the said saplings to the concerned office after felling and mulching at its own cost. The plan should plant trees according to the felling standards (Norms) of the Ministry of Forest and Environment. In case of cutting of saplings, trees shall be planted. The land which needs to be compensated by the Project. The plantation should be done as per the prevailing rules and regulations of Nepal. The rate of replantation must be twenty-five times of such saplings. There is a provision that the plan related to planting trees for five years should be cared for, maintained and maintained in coordination with the forest office and after five years such trees and forest area should be handed over to the relevant office.</p> |
| 4 | Community Forest Resource Survey Guidelines, 2061 | The Community Forest Resource Guidelines (2061) gives the details of the Community Forest. It gives the composition, species, habitat, growth and economic value of plants in the community forest which are useful while giving compensation as well as for implementing enhancement programs especially to Forest User's Group. |
| 5 | National Ambient Air Quality Standard 2012 | <ul style="list-style-type: none"> (a) PM_{2.5} should not exceed 120 micrograms per cub. m of air for the annual average, and 150 micrograms per cub. m of air for 24 hr average (b) PM₁₀ should not exceed 120 micrograms per cub. m of air for the annual average, and 150 micrograms per cub. m of air for 24 hr average (c) NO_x: The annual average concentration of nitrogen dioxide (NO₂), which is a type of NO_x, should not exceed 40 µg/m³. (d) SO_x: The annual average concentration of sulphur dioxide (SO₂) should not exceed 20 µg/m³. (e) Ozone: The 8-hour average concentration of ozone should not exceed 100 µg/m³. (f) CO: The 8-hour average concentration of CO should not exceed 10 milligrams per cubic metre (mg/m³). |
| 6 | Sound Quality National Standard 2012 of Nepal | The noise level in the residential area should not exceed 50 decibels during the daytime, whereas 40 decibels during the nighttime. |

4.5 International Conventions

The international conventions in which GoN has made commitments that might be relevant for the project are listed below.

Table 4.6: Nepal International Conventions relevant to the Project

| NS | International Convention | Related matter |
|----|--|--|
| 1 | Convention on Biological Diversity (CDB), 1992 | Nepal signed the convention on biological diversity in 1992, ratified in 1993 and formally became a state party to the CBD in 1994. The CBD linked PAs to larger issues of public concern like sustainable development, traditional knowledge, access to genetic resources, and equitable sharing of benefits. The main purpose of CBD is to integrate plans, policies, and programs in sectoral and cross-sectoral agencies to conserve biological components. |
| 2 | ILO Convention, 1969 | <p>ILO Convention No.169 is a legally binding international instrument, which deals specifically with the rights of indigenous and tribal peoples. Article 4 of the Convention calls for special measures to be adopted to safeguard the persons, institutions, property, labour, cultures and environment of these peoples. In addition, the Convention stipulates that these special measures should not go against the free wishes of indigenous peoples. The Convention recognizes these differences and aims to ensure that they are protected and considered when any measures are being undertaken that are likely to have an impact on these peoples. The Convention requires that indigenous and tribal peoples are consulted on issues that affect them. It also requires that these peoples can engage in free, prior and informed participation in policy and development processes that affect them. Article 7 of Convention No. 169 states that indigenous and tribal peoples have the right to “decide their own priorities for the process of development as it affects their lives, beliefs, institutions and spiritual well-being and the lands they occupy or otherwise use, and to exercise control over their economic, social and cultural development”.</p> <p>The complete legal review (e.g., complete list of regulatory acts, policies, rules and conventions) will be completed during the EIA phase of the project.</p> <p>The complete list of international conventions relevant to this project will be assessed and included in the EIA Report.</p> |

4.6 Agricultural strategies and plans

The agricultural strategies and plans of GoN relevant for this project are listed below.

Table 4.7: Nepal Agricultural Strategies and Plans relevant to the Project

| NS | Strategies/ plans | Related matters |
|----|---|--|
| 1 | Agriculture development strategy, 20–5-2035 | The guiding policy document in the agriculture sector in Nepal is the Agriculture Development Strategy (ADS). The twenty years ADS envisions the following impacts which align with the plan for construction of the wholesale market in Butwal: |

| NS | Strategies/ plans | Related matters |
|----|-------------------------------------|---|
| | | <p>Food and Nutrition Security;</p> <p>Poverty Reduction;</p> <p>Agricultural Trade Competitiveness;</p> <p>Higher and more equitable Income;</p> <p>Farmers' rights ensured and strengthened.</p> <p>Promoting agriculture sector competitiveness is a key expected outcome of the ADS. Developing market infrastructure is planned as a key output under this goal. The ADS intends to promote and develop market infrastructure through a combination of public investment, private and cooperative sector investment, PPP, and community participation, focused on the development of prioritized value chains. Examples of PPP involving different types of infrastructure include:</p> <ol style="list-style-type: none"> a. Promotion of on-farm storage, cool/cold/CA storage; b. Creation of new markets and improvement of existing ones; c. Network of collection centres linked by hub and spoke system to wholesale markets; d. Agro-processing plants; e. Creation of agro-industrial parks to facilitate access of agroindustry enterprises to land and basic infrastructure to conduct agro-processing activities. <p>Furthermore, the ADS also envisages the following measures with regards to agriculture market infrastructure: capacity building programs for market infrastructure management and governance: identification of strategic locations for market development and undertake feasibility studies; and developing rules and regulations and standard operating procedures for improved market management.</p> |
| 2 | Agribusiness promotion policy, 2063 | <p>The following objectives of the Agribusiness Promotion Policy (APP) also aligns with plans to build the wholesale market in Butwal:</p> <ul style="list-style-type: none"> • support market oriented and complete agricultural production; • promote domestic market and export promotion for development of agro industries; • poverty reduction through commercialization of agriculture. <p>The APP emphasizes development of agricultural markets and encourages collaboration with the private sector, cooperatives and non-governmental organisations (NGOs).</p> |

4.7 International Standards

The EIA has been conducted in alignment with IFC Environmental and Social Performance Standards, see Appendix 11. Furthermore, alignment was also sought with IFAD's Social, Environmental and Climate Assessment Procedures (SECAP) which are comparable with the IFC.

These international standards are applicable due to investments from the Government of the Netherlands and IFAD.

Chapter 5 Baseline in the project area

5.1 Physical environment

This section presents the physical environment covering the Project area as defined in chapter 2. Baseline information description is based on both secondary and primary data.

5.1.1 Topography and Soil

Butwal Sub Metropolitan City is in the Terai region of Nepal, with an altitude ranging between 121 m in the south-west and 1,060 m in the north. About 38% of its territory consists of a gently sloping plain, 6% highly dissected gently sloping land, and 52% steeply to very steeply sloping hills. The plain areas of the municipality consist of silt, clay and sand, whereas the sloping area of the bhabar zone consists of clay, sand and gravel. The Chure hill range, that borders the Municipality in the north, consists of the Middle-Miocene to Plio-Pleistocene molassic fluvial deposits, conglomerates, sandstone and shale with vertebrate fossils. Some of the Danab Riverbank exhibit lithological characteristics that are typically found in marshy land (like the Middle Terai).

The topographical survey undertaken as a part of this study revealed that the altitude of the site varies between 133.0 and 136.5m above Mean Sea Level (MSL). Average ground level is around 134.5m above Mean Sea Level.

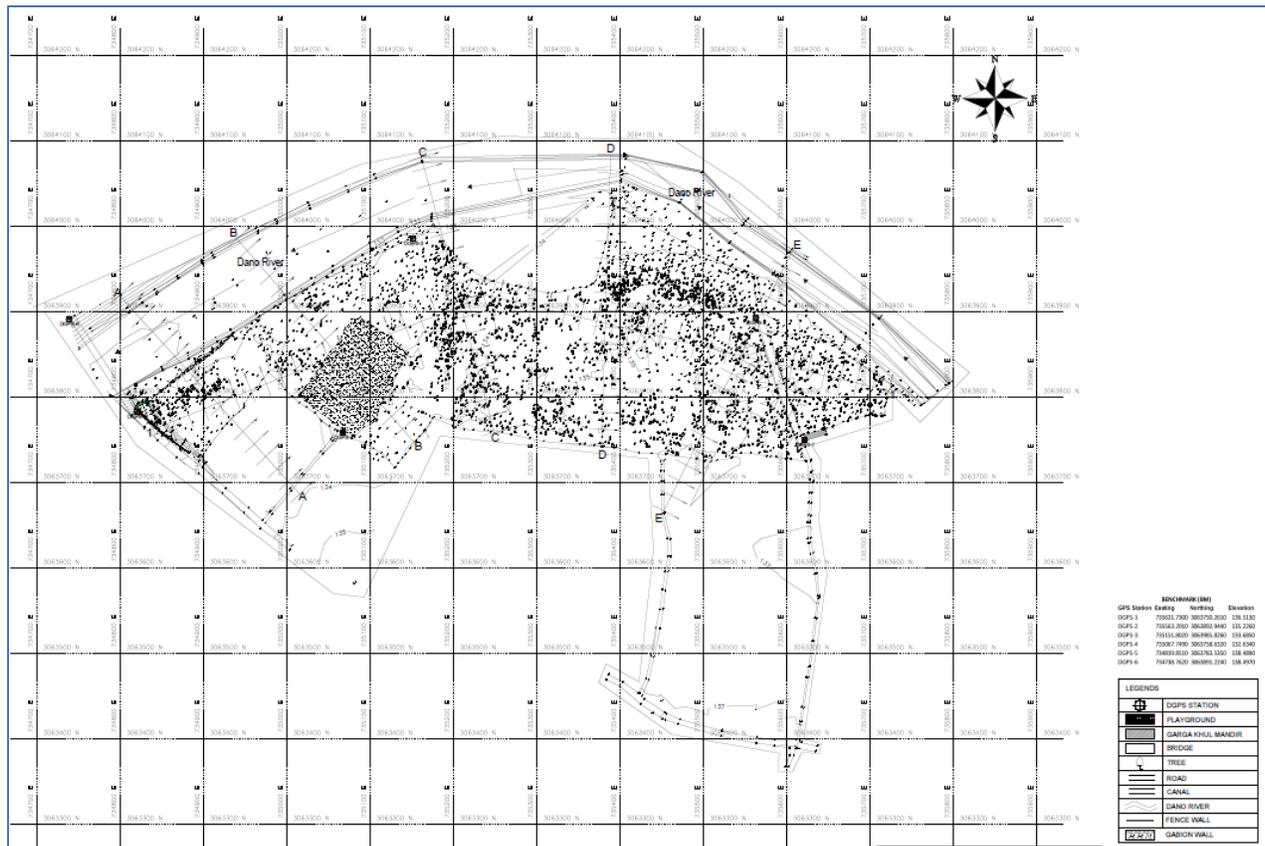


Figure 5-1: Site topographic survey results, Topographical Survey and Soil Investigation Report 2022

Soil investigation work, at a depth up to 20m, was carried out, which concluded that the project site has gravels on the top layer followed by silty clay and silts.

Table 5.1: Site soil profile, Topographical Survey and Soil Investigation Report 2022

| Depth, m | Thickness, m | Soil Description |
|-----------|--------------|-------------------------------------|
| 0.0-3.0 | 3.0 | Greyish Colour Gravels and Boulders |
| 3.0-7.5 | 4.5 | Greyish Colour Silty Clay. |
| 7.5-9.0 | 1.5 | Greyish Colour Sand with Silt. |
| 9.0-12.0 | 3.0 | Greyish Colour Silty Clay. |
| 12.0-20.0 | 8.0 | Greyish Colour Sand with Silt. |

Further details can be found in Topographical Survey and Soil Investigation Report 2022, in Appendix 12.

5.1.2 Seismicity

The Himalayan seismicity, in general, owes its origin to the continued northward movement of the Indian plate after the continental collision between the Indian plate and Eurasian plate. The magnitude, recurrence and the mechanism of continental collision depend upon the geometry and plate velocity of the Indian plate in relation to southern Tibet (Eurasian Plate). Recent results suggest that the convergence rate is about 20 mm /year and that the Indian plate is sub-horizontal below the Sub-Himalaya and the Lesser Himalaya.

The result of micro seismic investigation, geodetic monitoring and morphotectonic study of the Western Nepal has depicted that the more frequent medium size earthquakes with a magnitude between six and seven are confined either to flat decollement beneath the Lesser Himalaya or the upper part of the middle crustal ramp. The ramp is occurring at about 15 km depth below the foothills of the Higher Himalaya in the south of Main Central Thrust surface exposures. Big events of magnitude greater than eight are nucleated near the ramp flat transition and rupture the whole ramp-flat system up to the Main Boundary Thrust (MBT) of the Sub-Himalaya (Pandey et.al. 1995).

This general model as described above was effective for Western Nepal and can be applied to other parts of the Himalaya, with the evaluation of further subsequent ramping towards the south in the Lesser Himalaya and the associated seismicity. The structural variation along the Himalayan Arc is responsible for the segmentation of potential ruptures along the arc *i.e.*, along the longitudinal direction. For deterministic assessment of seismogenic sources, the local structural environment modifying the general model near the project site is considered.

As compared to the northern and eastern part of Nepal, the proposed project area is less susceptible to seismic hazard. Based on probabilistic Seismic Hazard Assessment, conducted by the department of Mines and Geology, Nepal (2002), peak horizontal acceleration at/or around the project area is about 100 gal (100 cm/sec²).

5.1.3 Geology and Hydrogeology

Nepal is located in the central part of the Himalayan Arc, the geology is relatively young and tectonically active and the mountain range is characterised by the high mountains dissected by deep river valleys undergoing constant landscape evolution.

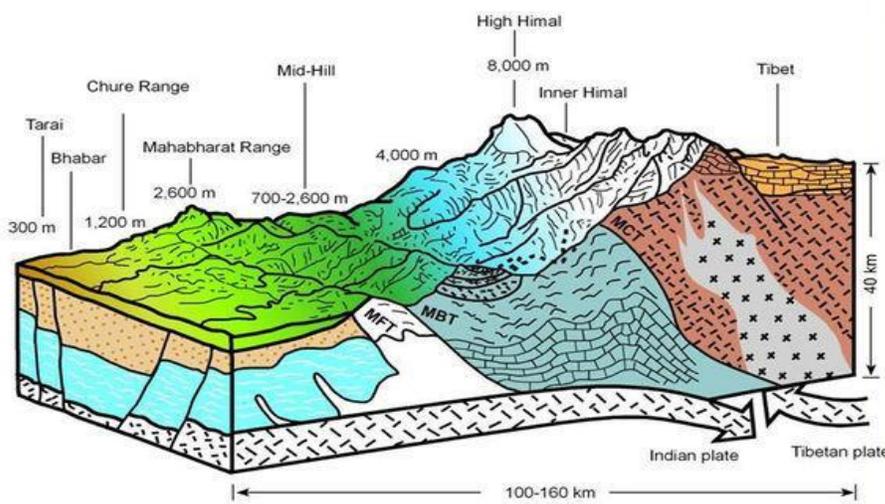


Figure 5-2: Geomorphological division of Nepal, Bricker et al. (2014)

The Terai Plain, continuation of the Indo-Gangetic Plain, lies at the southern part of the mountain range of Nepal. The land slopes gently southward into the Terai Plain and supports most of the country's agriculture. The streams in the Terai are characterised by frequent shifting of their courses sometimes by a few kilometres. As a consequence, the sediments are cross bedded, eroded and redeposited. The Terai aquifers occur in the following two main hydrogeological depositional units:

- **Bhabar Zone** – Bhabar Zone is situated on the foothills of the Siwalik range consisting of alluvial and colluvial coarse sediments (boulder, cobble, and pebbles). This is the northern part of the Terai Plain and is considered the major recharge area of Terai Plain. The thickness of the Bhabar layer ranges from a few metres to more than a hundred metres. The Bhabar Zone sediments consist of permeable, unconfined aquifers with deep water table. This zone represents the river fan and colluvial deposits consisting of poorly sorted sediments of boulders, cobbles, gravel and sand. The alluvial sediments in the plain are

mainly clay and silts intercalated with layers and lenses of gravel and sand. Regionally, the sediments show variation in grain size from north to south becoming finer towards south.

Southern Zone (Terai Plain) - The Terai Plain consists of thick sediments, consisting of clay, silt, sand, and gravel. Due to the noticeable topographical breaks between the Siwaliks and Terai, the coarser sediments were deposited along the Siwalik foothills forming the Bhabhar Zone and finer sediments were carried away and deposited farther south to form the present Terai Plain, this process is still ongoing. The Terai plain is underlain by alluvial deposits of Holocene age which also include channel sand and gravel deposits and outwash deposits.

The project site is in the northern part, the Bhabhar zone. This zone occupies a relatively large part in the Rupandehi district with about 130 km² along the foothills of the Siwalik (Churia) Hills.

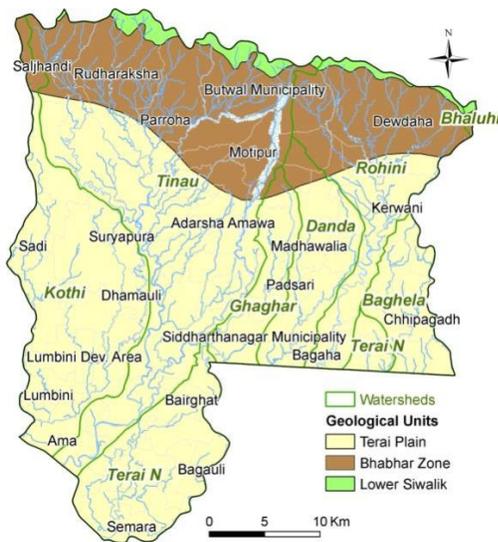


Figure 5-3: Geological map of Rupandehi district (Pathak, 2017)

The description of boreholes (depth 100 m) drilled in proximity of the project site revealed stratigraphy of the subsurface, which was highly irregular and localised in nature of sediments in the region (Rao et al. 1996). Furthermore, frequent shifting of the river courses resulted in the aquifers being highly localised in the form of lenses and layers (Sharma, 1974 in Rao et al., 1996).

5.1.4 Groundwater

The Terai regions mostly depend on groundwater to meet most of the water needs. The groundwater distribution in the Terai is part of the larger system of the Gangetic Basin. According to Shah et al (2013), the upper unconfined aquifer (50–60 m) is considered as a good productive shallow aquifer, though most of the groundwater is limited to the upper 250 m (Rao et al., 1996).

Four boreholes were drilled in the project site for this study up to 20 m.b.g.l. The ground water levels in these boreholes were recorded at 2.0 m.b.g.l. at least 24 hours after the boreholes were completed, see details in Topographical Survey and Soil Investigation Report 2022, in Appendix 12.

The recharging for the Terai groundwater primarily occurs from the Churiya range, which is distributed on the adjoining northern Siwalik zone. Furthermore, the seepage from the streams and rivers, such as the ones in the Rupendehi District - Tinau River and Danab River - also contribute to the groundwater recharge. Although the exact demarcation of potential recharge area for Terai groundwater basin has not been made to date. The recharge in the Terai is estimated to be 8800 MCM/year (Shrestha et al. 2018).

Shrestha et al. (2018) studied the groundwater balance and estimated the total groundwater abstractions at 1935 MCM/year. The report states that only about 22% of the available dynamic groundwater recharge in Terai is being utilised. Care should be taken with this conclusion as abstracting 100% of the calculated recharge is not sustainable. When groundwater abstractions increase, a new hydrogeological equilibrium should also be maintained.

5.1.5 Surface Water

The Tinau is the main river originating from the Mahabharat zone in the Rupendehi District. Furthermore, there are other smaller streams originating from the Churiya range - Sukaura and Barurbakhola, these are the boundaries of Rupendehi District in east and west, respectively. These rivers originating from Churiya range are temporary in nature that cause flash floods during the monsoon season, which damages properties in Butwal on an annual basis.

The Tinau River has a total watershed area of 2350 square kilometres, of which about 850 square kilometres lie in India and the remaining in Nepal. It is estimated that the total watershed area of the Tinau River within Nepal is about 1194 square kilometres, consisting of 554 square kilometres in the hills and about 640 square kilometres in the Terai. The hills watershed portion of Tinau River lies mainly in the northern district of Palpa and a portion of Siwaliks of Rupendehi district, whereas the Terai portion of watershed comprises Butwal municipality and several municipalities in Rupendehi District.

Danab River is a distributary of the Tinau River and the river, which is adjoining to the proposed site (see the figure below). The Danab River bifurcates near a bridge over East-West Highway on Tinau River and eventually meets it again farther (more than 40 km) downstream. There are four tributaries (joining Danab river from the north side) within the reach between the bifurcation point and the project area, creating two three-way confluences as shown in figure below.

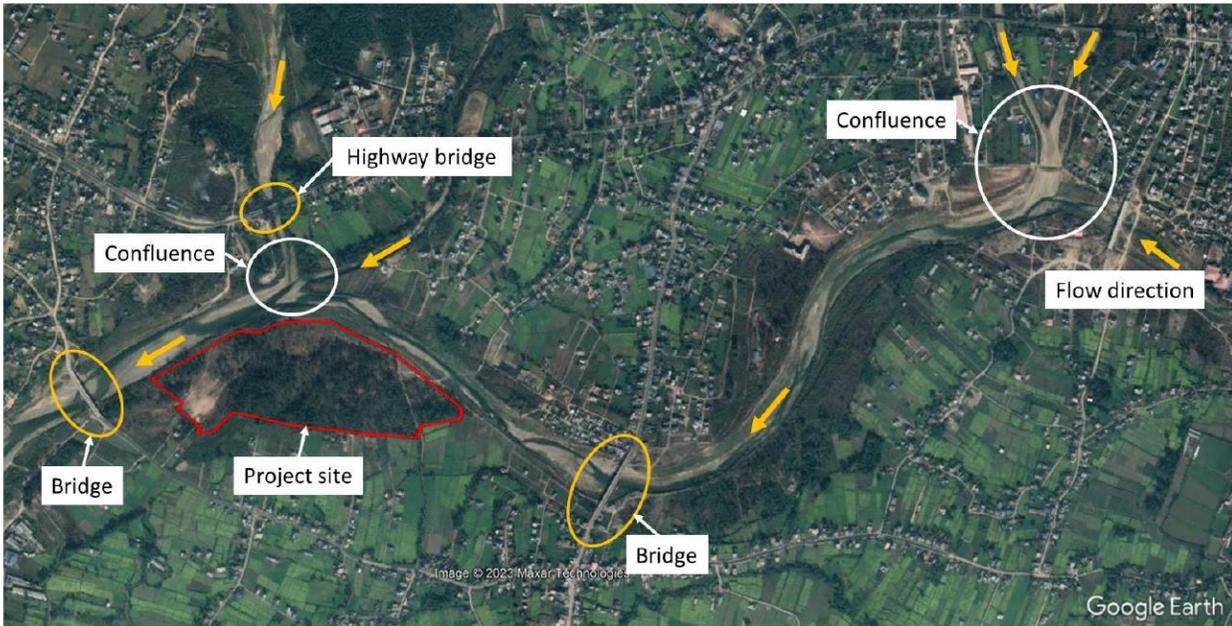


Figure 5-4: Overview of the river system near the project site, source GE image of 12/2022.

The Danab River surface water quality has been tested as part of this EIA. The tested water sample shows slightly higher turbidity range with presence of Iron content. Bacteriologically, the sampled water is contaminated with *E. coli* and Coliforms. The complete report can be found in Report on Ground & Surface Water, Ambient Air and Noise Quality Monitoring February 2023, in Appendix 6.

5.1.6 Climate

The project area is characterised by a humid subtropical climate influenced by the monsoon. The dry season lasts between October and May, followed by the rainy season that peaks in July. Typically, four seasons are observed in Nepal, namely:

- Pre-monsoon (March–May) characterised by hot and dry weather with localised precipitation;
- Monsoon (June–September) characterised by widespread precipitation;
- Post-monsoon (October–November) characterised by a dry season with sunny days;
- Winter (December–February) cold season with precipitation mostly in the form of snow in high-altitude mountainous regions.

The observational climatic records from Rupandehi District for the past 30 years are presented in the figure below. The temperature fluctuates between 7°C in January and 40°C in pre-monsoon months. April and May are the hottest months with temperature reaching up to 35°C to 40°C. Heavy precipitation events of more than 100 mm/day are frequent during the monsoon period, yielding almost 80% of the total rain occurring in the region. A total average annual rainfall received by the Rupandehi District is 1,808 mm.

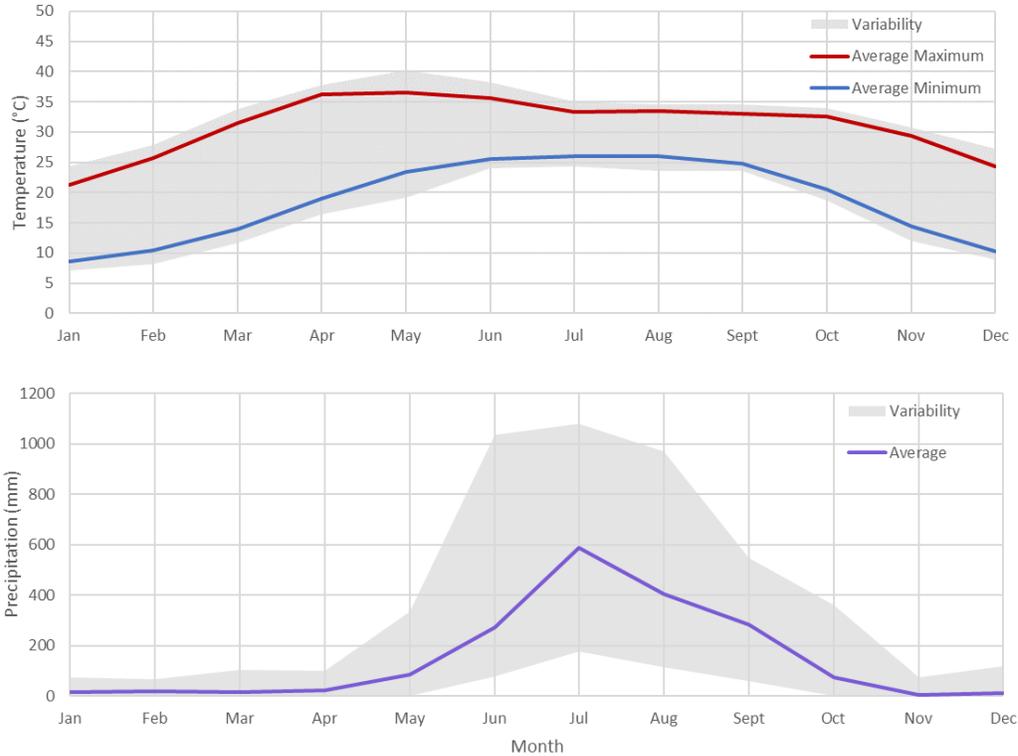


Figure 5-5: Monthly temperature and precipitation including observed variability.
Source: Department of Hydrology and Meteorology: Rupandehi District meteorological station

5.1.7 Air quality

Air quality has been tested by the EIA team. The results are presented below, details can be found in Report on Ground & Surface Water, Ambient Air and Noise Quality Monitoring February-March 2023, in Appendix 6.

Table 5.2: Ambient Air Quality at the project site and associated sampling locations

| SN | Location | PM ₁₀ | PM _{2.5} | TSPM | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|----|--|-----------------------|-------------------|------------|----------------|-----------------|-----------------|--------------|---------------------------|----------------|
| | | (µg/Nm ³) | | | | | | | | |
| 1. | Near Temple – at Jungle, Butw-1 – 15 | 177.0 | 44.0 | 313.0 | <0.002 | <0.02 | 1.3 | <2.0 | 27.0 | ND* |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |
| | IFC Ambient Air Quality (24 hours interim target 1) | 150 | 75 | | | 125 | 40 | | 160 (8h daily max) | |
| 2. | At Near Temple & First Bridge - Butw-1 – 15 | 183.0 | 93.0 | 564.0 | <0.002 | <0.02 | 0.70 | <2.0 | 31.0 | ND* |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |

| | | | | | | | | | | |
|--|--|------------|-----------|--|--|------------|-----------|--|---------------------------|--|
| | IFC Ambient Air Quality (24 hours interim target 1) | 150 | 75 | | | 125 | 40 | | 160 (8h daily max) | |
|--|--|------------|-----------|--|--|------------|-----------|--|---------------------------|--|

| SN | Location | PM ₁₀ | PM _{2.5} | TSP M | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|----|--|-----------------------|-------------------|------------|----------------|-----------------|-----------------|--------------|---------------------------|----------------|
| | | (µg/Nm ³) | | | | | | | | |
| 3. | House of Middle Near Highway - Butwal - 15 | 187 | 54 | 575 | <0.002 | <0.02 | 0.80 | <2.0 | 29.0 | ND* |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |
| | IFC Ambient Air Quality (24 hours interim target 1) | 150 | 75 | | | 125 | 40 | | 160 (8h daily max) | |

| SN | Location | PM ₁₀ | PM _{2.5} | TSPM | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|----|--|-----------------------|-------------------|------------|----------------|-----------------|-----------------|--------------|---------------------------|----------------|
| | | (µg/Nm ³) | | | | | | | | |
| 4. | First House from Route of Highway – Butwal – 15 | 187 | 46 | 625 | <0.002 | <0.02 | 0.50 | <2.0 | 33.0 | ND* |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |
| | IFC Ambient Air Quality (24 hours interim target 1) | 150 | 75 | | | 125 | 40 | | 160 (8h daily max) | |

| SN | Location | PM ₁₀ | PM _{2.5} | TSPM | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|----|--|-----------------------|-------------------|------------|----------------|-----------------|-----------------|--------------|---------------------------|----------------|
| | | (µg/Nm ³) | | | | | | | | |
| 5. | House Near from Second Bridge – Butwal – 15 | 161 | 49 | 336 | <0.002 | <0.02 | 0.50 | <2.0 | 26.0 | ND* |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |
| | IFC Ambient Air Quality (24 hours interim target 1) | 150 | 75 | | | 125 | 40 | | 160 (8h daily max) | |

The air quality measurement results show higher values for PM_{2.5}, PM₁₀ and TSPM, which exceed the NAAQS as well as IFC AAQ standards. This is an indication that the ambient air is contaminated by the dust particulates from the soil, which is evident as the project area is a dry area. The measurement of these variables will go down once the rainy season starts, such pattern is also observed in other parts of Nepal. Lower values and sometime non-detected values for lead, SO_x, NO_x, Benzen, Ozone and CO indicate that the project area has low industrial and transport related pollution. However, the air is still considered unhealthy and recommended to avoid prolonged exposure to such air or to use appropriate protective measures such as masks.

5.1.8 Noise and light

Noise quality has been tested by the EIA team. The results are shown below, see details in Report on Ground & Surface Water, Ambient Air and Noise Quality Monitoring February March 2023, in Appendix 6.

Table 5.3: Noise level at the project site

| S N | Location / Spots | | Test Parameters | | | | | | | Range | |
|--------|--|--|------------------|------------------|-----------------|----------------|-----------------|-----------------|-----------------|-------|-----------------|
| | | | L _{max} | L _{min} | L _{eq} | L ₅ | L ₁₀ | L ₅₀ | L ₉₀ | | L ₉₅ |
| 1 | House Near Second Bridge – Butwal – 15 (2993-1 -17-18/02/2023) | L _d | 58 | 41.8 | 47.3 | 52.6 | 51.9 | 46.5 | 43.7 | 43.3 | Normal |
| | | L _n | 75.9 | 33.9 | 41.7 | 47.3 | 45.7 | 41.5 | 37.7 | 36.8 | Normal |
| 2 | At Near Temple & First Bridge – Butwal – 15 (2993-2 -17-18/02/2023) | L _d | 102.5 | 36.6 | 50.6 | 68.3 | 62.7 | 48.4 | 42.9 | 40.4 | Normal |
| | | L _n | 79.9 | 40.1 | 46.03 | 51.5 | 49.1 | 45.7 | 42.9 | 43.1 | Normal |
| 3 | House of Middle Near Highway – Butwal – 15 (2993-3 -17-18/02/2023) | L _d | 62.8 | 42.2 | 46.1 | 50.6 | 49.2 | 45.4 | 43.6 | 43.3 | Normal |
| | | L _n | 60.6 | 41.4 | 44.7 | 49.9 | 48.5 | 43.9 | 42.3 | 42.0 | Normal |
| 4 | First House from Route of Highway – Butwal – 15 (2993-4 -17-18/02/2023) | L _d | 76.8 | 49.3 | 59.1 | 67.3 | 64.6 | 58.2 | 54 | 53.4 | Normal |
| | | L _n | 75.6 | 35.3 | 58.9 | 56.1 | 56.1 | 53.5 | 39.1 | 37.9 | High |
| 5 | House Near from Second Bridge – Butwal – 15 (2993-5 -17-18/02/2023) | L _d | 73.8 | 37.8 | 57.3 | 54.3 | 52 | 43.7 | 39.2 | 38.8 | Normal |
| | | L _n | 68.3 | 37.8 | 52 | 51.2 | 46.9 | 41.5 | 39.7 | 39.4 | Normal |
| | | <i>NNQS – Day for Mixed Residential Area</i> | | | | 63 | | | | | |
| | | <i>NN-S - Night for Mixed Residential Area</i> | | | | 55 | | | | | |
| | | <i>NNQS – Day for Commercial Area</i> | | | | 65 | | | | | |
| | | <i>NNQS – Night for Residential Area</i> | | | | 55 | | | | | |

| IFC Noise Level Guidelines (One Hour L _{aeq} [dBA]) | | |
|--|------------------------|-----------------------------|
| Receptor | Daytime 07:00-22:00 | Night-time 22:00 – 07:00 |
| Residential; Institutional; educational | 55 | 45 |
| Industrial; Commercial | 70 | 70 |

The L_{eq} (equivalent continuous sound level) measured in the project area is below the NNQS standard for residential area both for day and nighttime. However, L_{max} (maximum sound level) was found to have reached beyond the standard, however, it occurs for a short duration,

particularly, because of use of machinery in the vicinity of sample site or during the peak period for vehicle movement in the area. This is evident from the L5 and L10 measurements for site 2 and site 3. In site 2, only 5% of the time (measured), the noise level has reached 68.3 dBA, whereas in site 3, noise level had reached 64.6 dBA for 10%, and 67.3 dBA for 5% of the measured time. Overall, the noise condition of the project area is considered 'quiet' for the residential area.

5.1.9 Land Use Pattern

About 83 % of the total area in the Butwal Sub-Metropolitan City is covered with forest. Cultivated land comprises only 6% followed by residential area estimate 4%, industrial estimate under 1%, institutional estimate under 1%, residential and commercial estimate under 1% and heritage site identified by the municipality (0.10%), see figure below.

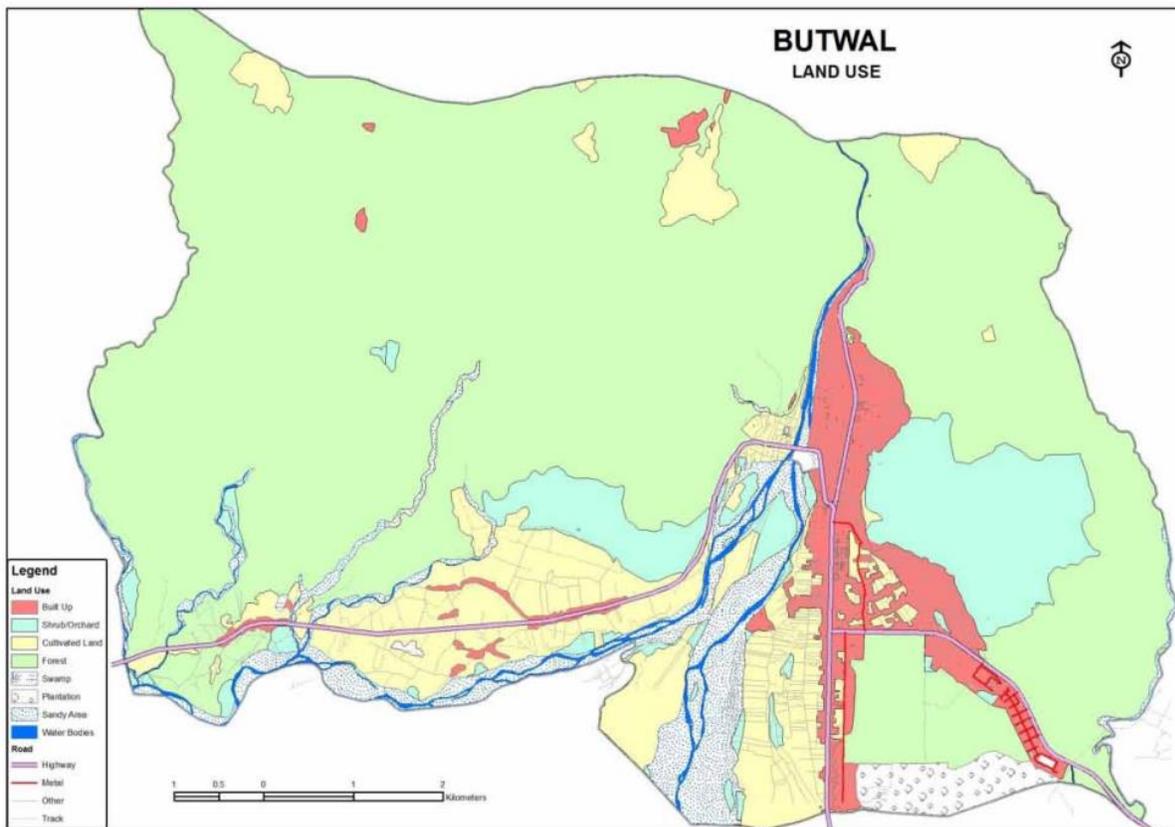


Figure 5-6: Butwal land use map
 Source: Secondary data collected from BSMC by Royal HaskoningDHV during the Scoping Report consultation, July 2022 Butwal

The proposed project site is located on the government land, which is currently used as a community forest by the Ratanpur CFUG.

5.2 Biological environment

5.2.1 Types of Forest by Vegetation

The vegetation of the project area belongs to tropical vegetation. The Terai mixed Hardwood and Khair-Sissoo Forest is dominant in the area. The common species found are Sal (*Shorea Robusta*), Khair (*Senegalia catechu*), Ashna (*Terminalia elliptica*), Sisau (*Dalbergia sissoo*), Khayar (*Acacia catechu*), Botdhayaro (*Lagerstroemia parviflora*), Siris (*Albizia procera*), Karma (*Haldina cordifolia*), Jamun (*Syzygoumcumini*), Amriso (*Thysanolaena maxima*), Kadam (*Neolamarckia cadamba*), Bakaino (*Melia azedarach*), Pipal (*Ficus religiosa*). Exotic species such as Masala (*Eucalyptus spp.*) were also observed along the roadsides. Kans (*Saccharum spontaneum*) were found on the flood plains and riverbanks. The species - *Shorea robusta* and *Acacia catechu* - are banned for export and felling for commercial purposes. For more details, please refer to the table below.

Table 5.4: Vegetation in and around the project area

| Local Name | Botanical Name | Use |
|------------|--------------------------------|--------------|
| Saal | <i>Shorea Robusta</i> | Timber |
| Sisoo | <i>DelbergiaSisoo</i> | Timber |
| Bel | <i>Aegle marmelos</i> | Timber/Fruit |
| Simal | <i>Bombax ceiba</i> | Timber |
| Bar | <i>Ficus benghalensis</i> | Timber |
| Bakaino | <i>Melia azedarach</i> | Timber |
| Pipal | <i>Ficus religiosa</i> | Timber |
| Khayar | <i>Acacia Catechu</i> | Timber |
| Masala | <i>Eucalyptus sps</i> | Timber |
| Kadam | <i>Anthocephalus chinensis</i> | Timber |
| Jamuna | <i>Syzygiumcumini</i> | Timber |
| Dabdabe | <i>Garuga pinnata</i> | |
| Ashok | <i>Saraca Asoca</i> | Timber |
| Badar | <i>Artocarpus lakoocha</i> | |
| Swami | <i>Ficus benjamina</i> | |
| Aap | <i>Mangifera indica</i> | Fruit |

Source: Secondary data collected from BSMC by Royal HaskoningDHV during the Scoping Report consultation, July 2022 Butwal

5.2.2 Types of Forest by Management

The proposed project site is in Ward No. 15 of BSMC, which is currently used as community forest by Ratnapur CFUG. The forest was planted in 1985 and registered for use as a Community Forest in 2015. About 169 households from Wards 15 and 12 are the members of the Ratnapur CFUG. Beside this portion of forest, the Ratnapur CFUG is also managing and has access to another piece of forest in Ward No. 12, which is larger in size than the one on Ward 15.

The Butwal Sub Metropolitan City authorities have informed that the forest on the project site was registered for use as a community forest to (a) prevent encroachment from the squatters, (b) prevent riverbank and soil erosion and (c) to serve as a source of forest products. No significant wildlife had been reported in the forest. Sisoo is the dominant tree species. During the visit, the team reported that the forest is also being used for grazing of cattle, which is now allowed since it is known that the forest will be removed, see photos below.



Table 5.5: Current use of the community forest in Ward 15

During the consultation with the Ratnapur CFUG, it was reported that no other land is available in Ward 15 that could be used to plant a new community forest. On the other hand, they have also informed that the users do not rely on the forest as a primary source of income or livelihood. Thus, loss of the forest at the project site will have no significant impact on their lives. Furthermore, they still have access to community forest in Ward 12.

Since the EIA has to be aligned to the IFC Environmental and Social Performance Standards, 2012, ecosystem services connected to this forest are identified and described. IFC defines ecosystem services as “*the benefits that people, including businesses, derive from ecosystems*”. Based on the site survey conducted by the study team, the following ecosystem services were noticed:

- provisioning services, e.g., locals are collecting firewood and mushrooms from the site;

- regulatory services, e.g., vegetation from the forest assimilates pollution to maintain good air quality, sequester carbon and offer space for river during high flooding events;
- supporting services, e.g., site is providing habitat for local fauna and flora species.

The engagement conducted for this EIA confirmed that the Ratanpur CFUG livelihood does not depend on the community forest, please refer to the Consent letter provided by the Ratanpur CFUG after the Public Hearing March 2023.

5.2.3 Vegetation at the Project Site

The vegetation present on site is listed in the table below. The enumeration of trees reported a total of 702 trees on site. Four main species were recorded: Sisso (*Dalbergia sissoo*) was found to dominate the site followed by Teak (*Tectona grandis*). There are few individuals of Bakaino (*Melia azedarach*) and Simal (*Bombax ceiba*) also recorded from the site. For details of the tree counting survey (vegetation survey), please refer to Appendix 13.

Table 5.6: Trees present on site to be cleared due to project development based on site specific tree counting survey

| Local Name | Scientific name | No of trees | DBH Range [cm] | Heigh range [m] | Total Volume [cub m] | Total Biomass [kg] |
|--------------|-------------------------|-------------|----------------|-----------------|----------------------|--------------------|
| Bakaino | <i>Melia azedarach</i> | 5 | -5 - 21 | 12 | 1 | 973 |
| Simal | <i>Bombax ceiba</i> | 8 | -0 - 30 | 12 to 18 | 7 | 5766 |
| Sisoo | <i>Dalbergia sissoo</i> | 542 | 12 to 21 | 12 to 16 | 146 | 112673 |
| Teak | <i>Tectona grandis</i> | 142 | 12 to 15 | 10 to 13 | 22 | 17322 |
| Unidentified | | 5 | 12 to 60 | Nov-14 | 5 | 3726 |
| Grand Total | | 702 | 45 | 45 | 182 | 140460 |

5.2.4 Ethno-Botanical Knowledge and Practice

Wild medicinal plant species are available in the project area as well as in other parts of the study area, e.g., *Senegalia catechu*, *Bacopa monnieri*, *Bombax ceiba*, *Drymaria diandra*, *Rauwolfia serpentina* and *Tribulus terrestris*. During the consultations, the local communities have confirmed that the site is not used for collection of ethnobotanical species.

5.2.5 Fauna in the project area

Official reports and surveys on flora and fauna species in the project area are scarce. For this purpose, primary data on fauna was collected during the EIA Scoping phase of the project. According to this, wild mammals, e.g., Fox (*Vulpes vulpes*) and Mongooses (*Herpestidae*) are

found in the project area. Bird species found in the project area are Parrot (*Psittacula Alexandri*), Crow (*Corvus spp.*), Eurasian Tree Sparrow (*Passer montanus*), Dove (*Streptopelia spp.*), etc. Similarly, Spectacled Cobra (*Najanaja*), Oriental Rat Snake (*Ptyas mucosa*), Yellow Monitor (*Vanarus Flavescens*) and Chamaeleon (*Lacertilia spp*) are reptile species recorded in the project area. With respect to fish species in Danab and Tinau River total of 35 species are recorded by literature (C.M. Sharma, 2001). Among collected fish species, *Cyprinidae* family was dominant constituting 81.73% of the total, followed by *Cobitidae* constituting 11.24% of the total collection. Primary data collection indicated the presence of Hile (*Channa stewartii*), etc. The project site is not part of a wildlife corridor.

5.2.6 Protected, Rare or Endangered Flora and Fauna Species

Of the reported flora and faunal species present in the project area, the following species have been identified as species of conservation significance under the conservation list of Government of Nepal (NPWC Act, 1973), IUCN Red data book and CITES Appendix, see table below.

Based on the vegetation survey and baseline setting, no protected, rare and /or endangered flora and fauna species have been identified. The proposed project site does not fall under national protected areas. Protected areas including National Parks, Wildlife Reserve, Game Reserve, Wetland etc., are not present in proximity of the proposed project location. The boundaries of Chitwan National Park which is also declared as world heritage site is located estimate 87km east from Semlar and Lumbini another world heritage site is located about 25.8km km south from Semlar (areal distance).

Table 5.7: Wildlife found listed in IUCN and CITES present in the project area

| SN | Common Names | Scientific Names | IUCN Category | Protected by NPWC Act 2029 | Listed in CITES Appendices | | |
|---------------|--------------|----------------------------------|---------------|----------------------------|----------------------------|----|-----|
| | | | | | I | II | III |
| Tree | | | | | | | |
| 1 | Sal | <i>Shorear obusta</i> | - | Protected | - | - | - |
| 2 | Simal | <i>Bombax ceiba</i> | - | Protected | - | - | - |
| Mammals | | | | | | | |
| 1 | Cobra | <i>Naja</i> | | | - | √ | - |
| Avian Species | | | | | | | |
| 1 | Bakula | <i>Bubulcus ibis</i> | - | - | - | - | √ |
| 2 | Dhukur | <i>Streptopelia senegalensis</i> | - | - | - | - | √ |

Source: Secondary data from IUCN and CITES data bases

Note: IUCN Red List Categories: Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Data Deficient (DD)

Critical habitat study is not required based on the baseline conditions (source official report insert) and confirmation through site visit.

5.3 Socio-economic and cultural environment

The socio-economic and cultural environment connected to project location is summarised below. The complete overview of the Household Survey conducted for the purpose of this project can be found in Appendix 14.

5.3.1 Demography of the Project Area

There are 14 prominent settlements in the Ward 15 of BSMC, which are presented in the table below. According to the ward office records, a total of 2043 people are living in these settlements in 1051 households, of which 2043 (42%) are men and 2623 (58%) are women.

Table 5.8: Population distribution of Ward 15 by settlements and gender

| SN | Name of settlement | Total HHs | Population | | Total |
|----|---------------------|-------------|-------------|-------------|-------------|
| | | | Male | Female | |
| 1 | Chamkipur | 150 | 293 | 346 | 639 |
| 2 | Gyan Jyoti Tole | 78 | 136 | 165 | 301 |
| 3 | Mainapur | 68 | 124 | 133 | 257 |
| 4 | MathilloChamkipur | 51 | 83 | 120 | 203 |
| 5 | Muktidham | 88 | 167 | 184 | 351 |
| 6 | NamunaMahadaiya | 163 | 118 | 344 | 642 |
| 7 | Ratanpur | 141 | 238 | 291 | 529 |
| 8 | Srijanshil tole | 53 | 88 | 108 | 196 |
| 9 | Ujelapur | 115 | 220 | 235 | 455 |
| 10 | Golar | 42 | 82 | 94 | 176 |
| 11 | Bagiya | 72 | 109 | 141 | 250 |
| 12 | PithiyaBagar | 49 | 78 | 95 | 173 |
| 13 | Bhatta Pragati Tole | 110 | 197 | 233 | 430 |
| 14 | Srijana Tole | 57 | 110 | 134 | 244 |
| | Total | 1237 | 2043 | 2623 | 4846 |

Source: Ward Office 15 Records, BSMC, 2022

Migration

Historically, Butwal has been a market centre of the mid-western region. Though, Tharu community was the original inhabitants, due to the migration from the hill, adjoining Terai Districts as well as Uttar Pradesh of India, hill communities are the dominant groups in the sub-metropolitan city.

Population by Caste/ethnicity

Ward 15 has a population of diverse caste and ethnic groups. Caste/ethnicity and the number of households are presented in the table below.

Table 5.9: Caste/ethnic groups population of the project area, Ward 15 Semlar

| SN | Name of the caste/ethnic Groups | Total population | Percentage |
|----|--------------------------------------|------------------|------------|
| 1 | Hill Brahmin | 1684 | 34.75 |
| 3 | Hill Chhetri | 1268 | 26.17 |
| 2 | Magar (Hill Indigenous group) | 924 | 19.07 |
| 4 | Tharu (Tarai indigenous group) | 293 | 6.04 |
| 5 | Hill Dalit (untouchable caste group) | 254 | 5.24 |
| 6 | Thakuri (Hill high caste) | 177 | 3.65 |
| 7 | Madhesi other caste groups* | 137 | 2.83 |
| 8 | Newar | 76 | 1.57 |
| 9 | Gurung (Hill Indigenous group) | 31 | 0.64 |
| 10 | Muslim | 2 | 0.04 |
| | Total | 4846 | 100 |

Source: Butwal Sub-Metropolitan City Profile, 2019, Ward No 15's Office Records, 2022.

*Note: Madhesi other caste group is a broader category of very small groups such as Dhobi, Majhi, Rajput, Kayastha, Kahar, Kurmi, Kanu, Koiri/Kushwaha, Sunuwar, Badhaee, Mallaha, Dhanuk, Lohar, Musahar, Dusadh/Pasawan/Pasi,

The groups presented in the project area are Tharus, Magar, Hill Dalits, Gurung, Newars, Muslim and Madhesi. While these groups are classified as indigenous groups, they are not indigenous to the Semlar Ward 15, but rather migrated into the area.

Languages Spoken in the Project Area

The population in the project area primarily speak the Indo-European languages (Nepali, Tharu, Hindi, and Maithali). More than two percent speak Sino-Tibetan languages (Magar and Newar).

Table 5.10: Language spoken in the project area

| Languages | Total population | Percentage |
|-----------|------------------|------------|
| Nepali | 4311 | 88.97 |
| Tharu | 293 | 6.05 |
| Awadi | 133 | 2.74 |
| Magar | 79 | 1.63 |
| Newari | 21 | 0.43 |
| Hindi | 2 | 0.04 |

| Languages | Total population | Percentage |
|--------------|------------------|------------|
| Maithali | 2 | 0.04 |
| Other | 5 | 0.10 |
| Total | 4846 | 100 |

Source: Butwal Sub-Metropolitan City Profile, 2019, Office records of ward no. 15, 2022.

Religion in the Project Area

Hindu is the major religion of the residents, which is 97.77% of the total population. The remaining population belong to Christianity and Buddhism.

Table 5.11: Population distribution by religion in the project area

| Religion | Total population | Percentage |
|--------------|------------------|------------|
| Hindu | 4738 | 97.77 |
| Christian | 73 | 1.51 |
| Buddhist | 27 | 0.56 |
| Others | 8 | 0.16 |
| Total | 4846 | 100 |

Source: Butwal Sub-Metropolitan City, 2019, Office records of ward no. 15, 2022

Literacy in Ward 15 Semlar

Literacy has been calculated from the population above the age of 5 and above. According to the BSMC (2019), the literacy rate of Ward 15 is 90.45 percent which is much more than that of the national literacy rate.

Table 5.12: Literacy of five years and above age groups literacy of the project area

| Level of literacy | Total population | Percentage |
|------------------------|------------------|------------|
| Able to read & write | 4173 | 90.45 |
| Able to read-only | 10 | 0.21 |
| Could not read & write | 431 | 9.34 |
| Total | 4614 | 100 |

Source: Butwal Sub-Metropolitan City, 2019

A total of 583 persons of Semlar have received formal and informal skill development training (Butwal Sub-Metropolitan Profile, 2019). The training includes mason, carpentry, electrician and vegetable farming.

5.3.2 Settlement Pattern and Housing Structures

There are 16 settlements in Ward 15 of BSMC and 12 in Sainamaina Municipality, name-y - Chamkipur, Mainapur, Gyanjyoti Tole, Mathillo Chamkipur, Muktidham, Namuna Madhaiya,

Ratanpur, Srijansil Tole, Ujelapur, Golar, Bagiya, Pithiya Bagar, Bhatta Pragatisil tole, and Srjana Tole. Similarly, Budhha Tole and Ekata Tole are two settlements in Sainamaina Municipality which are located near the project site. The range of the distance of these settlements from the project site is 500 to 1000 meters. Ratanpur and Muktidham of Ward No 15 of Sub-Metropolitan city, and Buddha Tole and Ekata Tole of Sainamain municipality are close to the project site.

Ratanpur and Muktidham of Ward 15, and Ekata Tole and Budhha Tole of Sainamaina tole are located within a one-km radius from the project site. All settlements have road access, electricity, and water supply. Majority of the houses are built with concrete and cement, most of which are two storey houses.

According to FGDs, the settlements near to the project area *i.e.*, Ratanpur, Muktidham, Buddha Tole and Ekata Tole have a relatively short history. Almost all families have migrated only one to two generations ago from the hill/mountain districts of Lumbini, and Gandaki provinces. As reported during the FGDs and KIIs, they have migrated in from Baglung, Palpa, Agrakhachi, Gulmi, Mygdi, and Syanja districts during the 1970s. The migrant population mostly belonged to Chhetri, Brahmin, Magar, Thakuri, Gurung, and Dalit groups. Tharu is the local ethnic group of the project area. There is a large Tharu settlement in Chamkipur, which is about 2.5 km away from the Project site, three households of Tharu were also recorded closer to the Project area. Of the total respondents of the socio-economic survey, 40 percent migrated into the project area less than ten years ago while 28 percent came in the project area about 25 years ago. Thirty percent of the respondents settled in the area over the period of 50 years ago.

Table 5.13: Time duration living in the present place

| Years | Nos. | % |
|--------------------------------|-----------|--------------|
| Recently (< 10 years) | 20 | 40.0 |
| One generation ago (25 years) | 14 | 28.0 |
| Two generations ago (50 years) | 15 | 30.0 |
| Do not know | 1 | 2.0 |
| Total | 50 | 100.0 |

Source: TMS Field Survey, October 2022

The current population are descendants of the migrated population, who had migrated for different reasons. These reasons are presented in the table below. Most of them *i.e.*, 88% moved in for the better opportunities, which consisted of better education, infrastructures and employment. Some of the families also moved in for the social reasons, such as maintenance of the social networking and marriage.

Table 5.14: Reasons for settling in the area

| Reasons | Nos. | % |
|--------------------|-----------|--------------|
| Marriage | 2 | 4.0 |
| Family connection | 4 | 8.0 |
| Better opportunity | 44 | 88.0 |
| Total | 50 | 100.0 |

Source: TMS Field Survey, October 2022

5.3.3 Social and Community Setting Adjacent Wards

The proposed project site is in Ward 15 of BSMC, Ward 14 in east, and Wards 12 and 16 in north, Ward 1 of the Sainamaina Municipality in north-west corner. This section briefly presents basic socio-demography of the adjacent wards. The social features of Sainamai-a - 1 and BS-C - 12, 14, 16 are similar to that of BSMC -15. The dominant groups are of the migrants from the Hills.

Table 5.15: Population distribution of the adjoining areas

| Municipality | Ward Number | Total Population | | | |
|-------------------------------------|-------------|-------------------|--------------|--------------|--------------|
| | | Total inhabitants | Male | Female | Total |
| Butwal Sub-Metropolitan City (BSMC) | 14 | 1141 | 2568 | 2510 | 5078 |
| | 12 | 3074 | 6963 | 6655 | 13618 |
| | 16 | 713 | 1846 | 1773 | 3619 |
| Sainamaina Municipality | 1 | 1184 | 2249 | 2798 | 5047 |
| Total | | 6112 | 13626 | 13736 | 27362 |

Source: Nepal Archive, 2020

There are 11 Wards in the Sainamaina municipality (traditionally known as *Dudharakchhe*). Only Ward 1 is near the Project site. The main language in the municipality is Nepali, which is spoken by 39,718 people out of a total population of 55 822. According to the 2011 census, Sainamaina Municipality is inhabited by mostly by Brahm-n - Hill caste with a total population of 17,272.

Chapter 6 Analysis of Alternatives

The Environmental Assessment is an instrument that enables exploration of potential alternatives for and within a project. This section delves into the various options available for the project, weighing technical, environmental, and social parameters to determine the most optimal course of action. The assessment of alternatives encompasses considerations such as with and without project scenario and alternative locations.

6.1 With and without project alternative

Without project

compared to the eastern region of the country, the marketing opportunities for agricultural products in the southwestern part of Nepal are relatively limited. Despite significant efforts in recent years, such as the establishment of new wholesale markets in Hetauda and Butwal, as well as the construction and improvement of roads, the region has yet to fully realize its potential. The Rupandehi District, which falls within the catchment area of the proposed new wholesale market in Butwal, produces surplus quantities of crops such as potatoes, onions, cabbages, and bananas. However, due to inadequate trade and storage facilities, these products cannot be stored or traded effectively during peak production periods. As a result, a significant percentage of the produce goes to waste (up to 25% depending on the crop). Without a proper wholesale market, this loss will continue to occur, even as the region struggles to meet the growing demand for these products, which are currently being largely imported from outside Nepal.

The Butwal wholesale market was established in September 2010 to meet the market demand at that time. While the market was upgraded a few years ago, it is currently unable to keep up with the increasing demand, and expansion is not feasible due to its location in the city center. As a result, a significant number of smaller, fragmented markets have emerged throughout the city to meet current and future demand. The existing wholesale marketplaces a significant strain on the environment, with issues such as air pollution from transportation of goods, increased noise levels from market operations, and generation of organic and domestic waste, leading to social nuisance. Without a properly designed and managed alternative wholesale market, this situation will continue to impact the immediate environment and the surrounding communities.

While the existing wholesale market provides employment and business opportunities and contributes to the socio-economic development of the area, it is not sustainable due to its negative impacts on the environment.

With the project

The development of an export-Oriented Agriculture wholesale market in Semlar, Karsaghat, Butwal Sub-Metropolitan City-15 will create an opportunity to capture a significant volume of fruits and vegetables produced in the Rupandehi District catchment area. In addition to serving as a local market, it will also function as a satellite market, allowing for the movement of produce

across different markets depending on demand and facilitating the export of fruits and vegetables that are specifically targeted for this market. The project aligns with the country’s agricultural strategies and sector specific programs, which emphasize the development of wholesale markets in the southwestern region of Nepal.

The proposed wholesale market is expected to address the existing infrastructural and environmental challenges faced by the current wholesale market in Butwal. The new market will cater to the current demand and provide adequate space for wholesale market operations and traffic. The layout of the market will be efficiently designed to segregate logistics, people, and product flows. The market will be equipped with infrastructure to prevent environmental pollution, such as a solid waste collection system, drainage and wastewater treatment plant, and measures to reduce nuisance to surrounding communities. It will also provide proper waste management infrastructure, roads, access points, drainage, and greenery to alleviate pressure on the immediate environment and the surrounding communities.

The proposed market is expected to stimulate socio-economic development in the study area by providing direct employment opportunities, especially for women and youth. The project will aim to address these needs in the most effective way possible.

Table 6: Comparison of alternatives - with and without the project

| | Without Project | With Project |
|-----------------------------|---|---|
| Construction of the project | <p>Without the project, expansion of the existing market will be necessary. It will result in environmental and social issues. The following are some of the notable issues:</p> <ul style="list-style-type: none"> • Acquiring land in the city centre to expand the existing market will have a significant impact on larger population including existing businesses. • Undertaking construction work in city will have impact on larger population, disrupt traffic flow, and affect operation of businesses. | <ul style="list-style-type: none"> • The project will acquire 12.47 ha of forest area currently under the management of the Ratanpur Community Forest. • Undertaking construction work in the proposed site will have some impacts to the Semlar settlement, however, compared to construction of Butwal, the impacts will be of lower significance. • These impacts are extensively assessed in this study, and the mitigation measures have been designed. |
| Operation of the project | <p>In absence of the project, there are limited marketing opportunities for agricultural products in the Southwestern parts of Nepal.</p> | <p>The development of an export-Oriented Agriculture wholesale market in Semlar, Karsaghat, Butwal Sub-Metropolitan City-15 will function as a satellite market for the agricultural products produced in the Southwestern parts of the country.</p> |
| | <p>The lack of storage and market facilities in the Rupandehi District, especially during peak production periods, leads to wastage of agricultural products.</p> | <p>The presence of storage and marketing facilities, particularly, during the peak production periods, helps minimize wastage of agricultural products.</p> |

| | Without Project | With Project |
|--|--|--|
| | The absence of storage and marketing facilities will result in a growing import of agricultural produce. | The agricultural production may increase as farmers are likely to start producing for the market opportunities provided by the facility. Thus, increased production can substantially reduce the need for imports. |
| | The expansion of the existing market would require acquiring high value land in the surrounding area, which would displace existing businesses. Thus, the probability of expanding the existing markets is low. | The proposed wholesale market will offer top-notch facilities that can serve not only Rupandehi District, but also other southwestern parts of the country. |
| | The existing market places a significant strain on the environment, with issues such as <ul style="list-style-type: none"> • air pollution from transportation of goods, • increased noise levels from market operations, and • generation of organic and domestic waste, leading to social nuisance. | The operation of the proposed market is expected to have environmental implication such as air, water, noise and others. However, the environmental impact assessment has been conducted for the proposed wholesale market, and appropriate mitigation measures have been developed to address any anticipated impacts. Therefore, this facility is expected to be environmentally friendlier and sustainable. |

6.2 Alternative site locations

6.2.1 Alternative locations in Nepal

As a part of the Feasibility Study for Developing Agriculture Value Chains in Nepal, 10 possible locations were investigated to identify the most suitable and sustainable site for establishing a wholesale market. To gain a better understanding of the present solutions, as well as the environmental conditions of the proposed region, specifically - Pokhara, Bardiya, Banganga, Butwal/Semlar, Hetauda, Birgunj, Bardibas, Itahari, Rangeli, and Kathmandu – the detailed project reports (DPRs) were reviewed.

Multi-criteria analysis (MCA) has been applied to compare locations between each other and to identify the most suitable location. The MCA is based on various criteria that concerns:

- Economic and business environment in the catchment area
- Synergy with other projects and activities in the agriculture value chain
- Infrastructure and logistics advantages
- **Socio-economic and environmental conditions**
- Benefits the proposed development can create for the surrounding communities and society.



Figure 6-2: Result of the MCA analysis for selection of suitable location of the wholesale market.

Table 6-2: Comparative advantages and disadvantage of the potential sites

| Sites | Advantage | Disadvantage |
|----------|--|--|
| Pokhara | <p>The agriculture sector in Pokhara is well-established, as evidenced by the variety and volume of commodities available in the markets.</p> <p>The region presents numerous prospects for expansion, with ongoing initiatives such as the Global Agriculture & Food Security Program and Prime Minister Agriculture Modernization Projects.</p> <p>Additionally, Pokh'ra's strategic location and connectivity to other crucial logistics points in the country make it a prime location for agricultural growth.</p> <p>There are no limitations in terms of social or environmental factors for selecting this area.</p> | <p>Due to its proximity to residential areas, further expansion can only occur if households are relocated to another location. This could have a significant impact on their daily livelihood, so resettlement is not the preferred course of action.</p> |
| Bardiya | <p>Bardiya boasts a well-established agricultural sector, which is evident from the range and number of commodities accessible in the markets.</p> <p>The area presents possibilities for growth and may benefit from ongoing programs such as the Commercial Agriculture for Smallholders and Agribusiness Project. As soon as road connectivity is improved, Bardiya has the potential to serve as a satellite market due to its strategic position.</p> <p>There are no social or environmental restrictions to selecting this location.</p> | <p>The proposed site is quite remote, and any future expansion would necessitate the creation of road infrastructure, which could result in physical and economic displacement.</p> |
| Banganga | <p>The region presents prospects for expanding the agricultural sector and may benefit from ongoing initiatives such as the Commercial Agriculture for Smallholders and Agribusiness Project.</p> | <p>Compared to other locations, like Pokhara, Bardiya, and Butwal/Semlar; Banganga has a smaller variety and volume of commodities available.</p> |

| Sites | Advantage | Disadvantage |
|-------------------|--|---|
| | | Although the area is linked to Butwal, its location is not as competitive as the other regions. There are no social or environmental restrictions in selecting this location. |
| Butwal/ Semlar | <p>Butwal/Sem'ar's agriculture sector is well-established, with a broad range of fruits and vegetables available.</p> <p>The area offers possibilities for expanding the agricultural sector and may benefit from ongoing initiatives such as the Commercial Agriculture for Smallholders and Agribusiness Project.</p> <p>Geographically, Butwal/Semlar is well-placed to serve as a satellite market and provide local access. There are no social or environmental constraints.</p> | The site has potential river interventions if the site in Ward 16 is chosen. |
| Birgunj | <p>Among the sites examined, Birgunj offers several advantages, including a favourable agro-profile, and a diverse range of fruits and vegetables, although the available volumes are slightly lower compared to Bardiya and Butwal/Semlar.</p> <p>The region presents opportunities for growth and may benefit from other ongoing initiatives such as the Global Agriculture & Food Security Program and Prime Minister Agriculture Modernization Projects.</p> <p>Birg'nj's geographical location is highly competitive due to its proximity to India.</p> | <p>There are socio-economic factors that need to be considered. The proposed site is currently inhabited by squatters, a well-established community of around 70 households.</p> <p>Resettlement and compensation procedures would pose a high risk for follow-up on the feasibility study and would have a significant impact on the affected households and families.</p> |
| Bardibas | Bardibas agro profile is relatively less developed than other areas and this is reflected in the traded volumes ad business opportunities. | The geographical position is also less competitive. There are no socio-economic and environmental restrictions. |

| Sites | Advantage | Disadvantage |
|---------|--|--|
| | <p>The area offers opportunities to increase the scope and can potentially benefit from other on-going activities (e.g., Global Agriculture & Food Security Program, Prime Minister Agriculture Modernization Projects).</p> | |
| Itahari | <p>The area presents prospects for expanding the agricultural sector and may benefit from other ongoing initiatives such as the Global Agriculture & Food Security Program and Prime Minister Agriculture Modernization Projects. Geographically, Itahari's position is competitive due to its border with India.</p> <p>There are no socio-economic or environmental restrictions in selecting this location.</p> | <p>The proposed location in Itahari was not suitable in terms of siting (location in close proximity to river) and available size for the development of a wholesale market</p> |
| Rangeli | <p>However, the area may benefit from other ongoing initiatives such as the Global Agriculture & Food Security Program and Prime Minister Agriculture Modernization Projects.</p> <p>Geographically, Rangeli is competitive due to its border with India.</p> <p>There are no socio-economic or environmental restrictions in selecting this location.</p> | <p>Rangeli is the least developed area in terms of traded and available volumes (no locally produced surplus) and offers fewer economic and business opportunities than other regions.</p> |

Pokhara, Butwal/Semlar, and Birgunj were the top-scoring locations, and they were visited by the project team to refine environmental and social challenges related to the sites. The land for the Pokhara wholesale market is situated in the city center and is owned by the Kaski Valley Town Development Committee, making its long-term availability uncertain. Furthermore, any future expansion to meet growing demand would necessitate land acquisition and resettlement. During the site visit to Birgunj, it was discovered that approximately 50-60 households would require resettlement and compensation, indicating the magnitude of the required resettlement. Based on the MCA and site visit, Butwal/Semlar was suggested as the top priority site for further investigation.

Lumbini Province with locations Butwal/Semlar, Barbradiya and Banganga represent a cluster that could benefit from interventions in Butwal and generate long-term synergies in the agriculture value chain (Province 5 has a range of agro-projects e.g., CASA, PMAMP, ASDP, implemented by GoN and other donor/financial organizations).

6.2.2 Alternative locations in Butwal

Two sites were considered at Semlar Butwal for establishment of the Wholesale Market.

These two sites have been identified and selected by the local authorities in close consultation with local key stakeholders based on land available, size, site conditions. This process was conducted before the start of the Feasibility Study and this EIA. No other sites are available in Butwal to meet the project requirements. Furthermore, due to high land ownership fragmentation and the complex land acquisition process in Nepal, it was recommended to proceed with these two options.

Site 1 – the site is located at Ward – 16;

Site 2 – the site is located at Ward – 15.

These sites are presented in the map below.



Figure 6-3: Site alternatives in Butwal Semlar (on the left side the site in Ward 16 and on the right side the site in Ward 15)

The two sites are situated adjacent to each other, and share many environmental and social benefits and drawbacks, except for their susceptibility to floods. As both sites are located on the right bank of the Danab River, a detailed flood analysis was conducted to compare the proposed sites. This assessment examined the historical dynamics of the Danab River and its potential impact on the project, as well as how the project's development could affect the river.

Flood vulnerability of ward 16 site

The preliminary evaluation revealed that the location in Ward 16 is situated partly within the floodplain of the Danab River, which is known for its high level of dynamism and activity. The figure below demonstrates that the river passed through the site in 2003 and has migrated roughly 80-90m closer to the proposed site in the last six years.

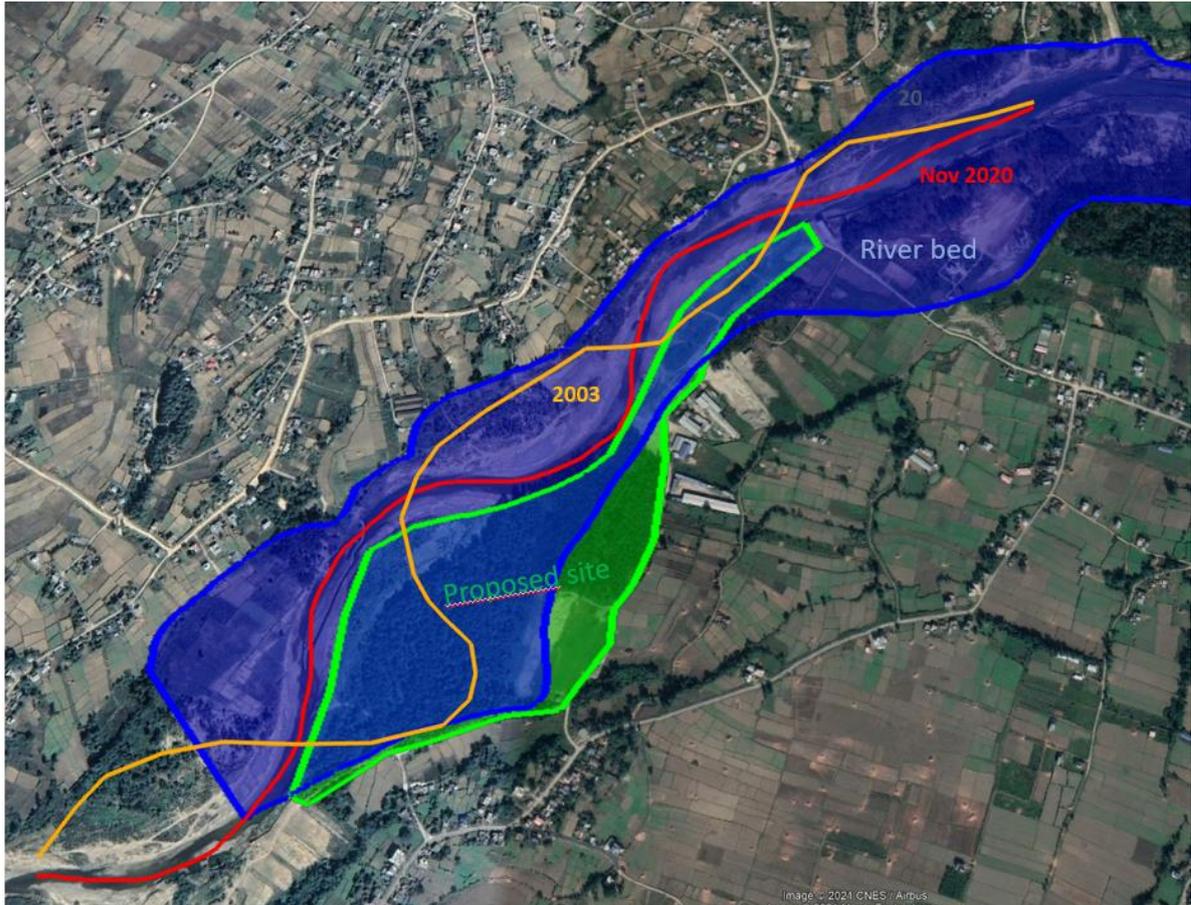


Figure 6-4: Danab River dynamics in Ward 16

Source: Map produced by RHDHV in ArcGIS Pro based on information from Preparation of Hazard Map and Fixing Warning and Danger Level at Flood Forecasting Station of East Rapti and Tinau River, submitted to the Department of Hydrology and Meteorology Government of Nepal.

Legend to the figure above:

- in red the current river flow;
- in orange the flow of the river in 2003;
- in blue the Dano Riverbed;
- in green the proposed site in Ward 16.

Strengthening the riverbank in Ward 16 would result in the Danab River shifting towards the north bank, posing a risk to the villages on that bank. Therefore, the north bank should also be protected. Furthermore, the project's development would create a bottleneck in the river, potentially leading to higher water levels upstream, resulting in inundations as far as Butwal, up to the bifurcation with the Tinau River. Recent extreme rainfall events in June and August 2021 in the catchment area almost caused flooding at the proposed site, as seen from satellite images showing a bank full river. The 100-year flood map and the proposed site boundary at Ward 16, as shown in the figure below, indicate that flood levels up to 2 meters are expected, which is significant. Strong flood protection and erosion measures, estimated at about 5-10M EUR, are necessary to develop any infrastructure at this location. However, the cost of flood protection is considerably high and disproportionate to the project's value.

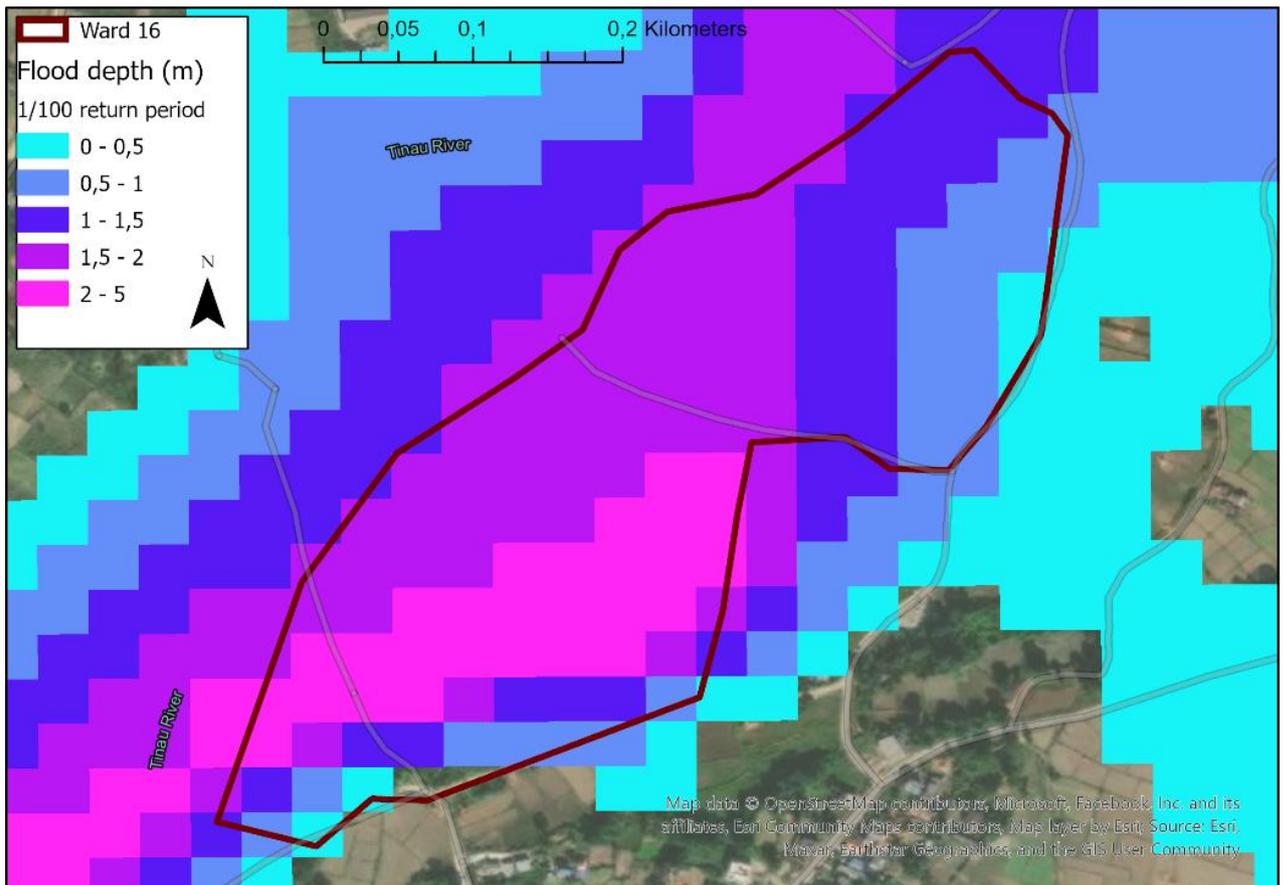


Figure 6-5 100yr flood map in Ward 16

Source: Visualisation made by RHDHV in ArcGIS Pro based on information from Preparation of Hazard Map and Fixing Warning and Danger Level at Flood Forecasting Station of East Rapti and Tinau River, submitted to the Department of Hydrology and Meteorology Government of Nepal.

Given the possibility of climate change and potential increase in rainfall intensity, significant flooding can be anticipated at the proposed site in Ward 16. Consequently, it is deemed that not all of the land offered at Ward 16 is appropriate for the establishment of the wholesale market, and the remaining suitable land is insufficient for the project’s development. A comparable flood analysis has been conducted for the location situated in Ward 15, with the outcomes shown in Figure 6-4. While both sites at Wards 15 and 16 are exposed to flood hazards, the flood depths are lower at Ward 15, likely due to its higher average elevation.

Flood vulnerability of ward 15

According to the flood assessment, the proposed site in Ward 15 is expected to experience flood depths of up to 1 meter. Although this would still require additional protection measures, it is considered more economically viable than at Ward 16.

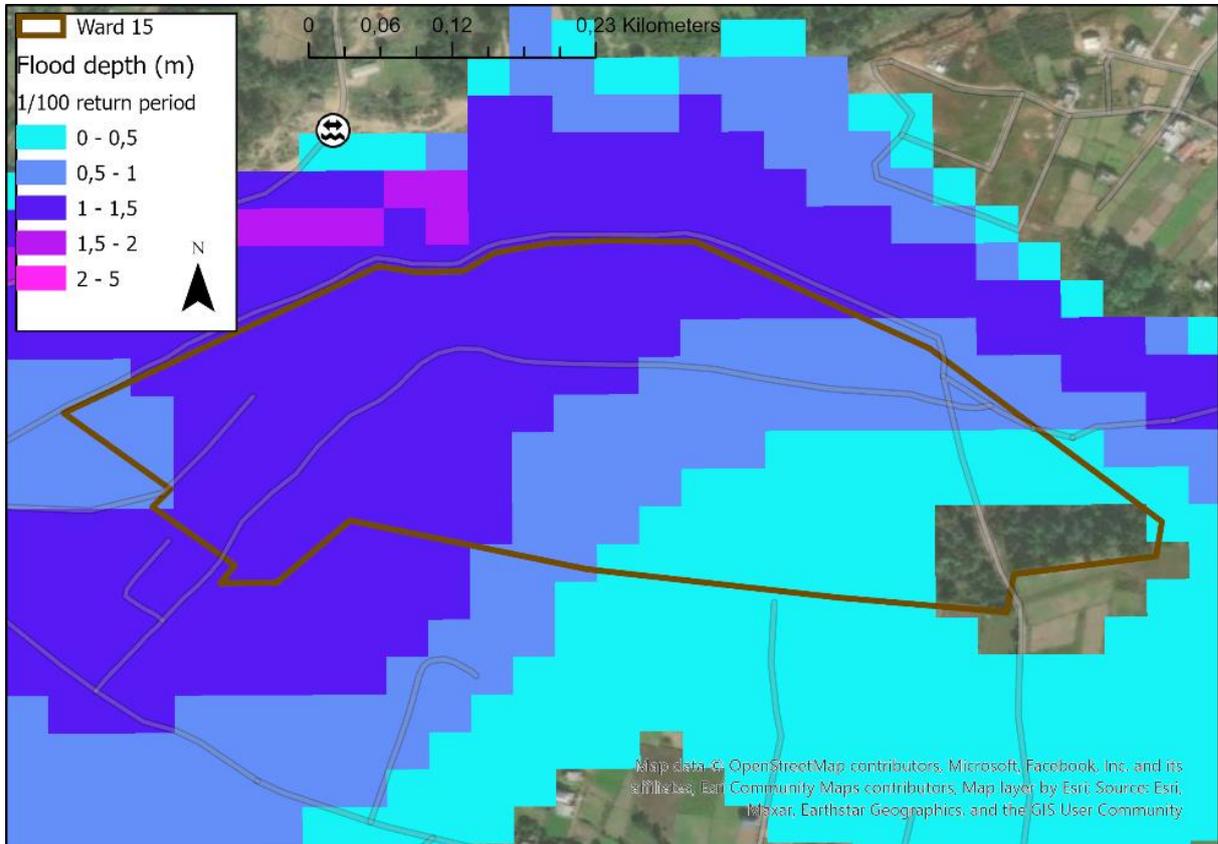


Figure 6-7: 100yr flood map in Ward 15

Source: Map produced by RHDHV in ArcGIS Pro based on information from Preparation of Hazard Map and Fixing Warning and Danger Level at Flood Forecasting Station of East Rapti and Tinau River, submitted to the Department of Hydrology and Meteorology Government of Nepal.

Both sites have a small forest. During the site visit, it was observed that the forest at Ward 16 is more mature than the forest at Ward 15, which requires more nature compensation measures, and the ecological impact would be greater. Furthermore, other than the forest in Ward 16, the forest in Ward 15 is registered for use Community Forest which would allow for a clear assessment of the impact and development of a proposal for compensation measures.

After considering the information mentioned above, the decision has been made to choose the site in Ward 15 for the wholesale market development over Ward 16.

Chapter 7 Environmental impacts

7.1 Beneficial Impacts

The likely beneficial aspects, envisaged during construction and operation stages, are:

Construction Stage

- During the construction stage, the project will require up to 200 unskilled workers, 20 skilled workers, and 5 managerial staff. The project will prioritize sourcing of local labour residing within the vicinity of the project area, *i.e.*, residents of Ward 15 BSMC and Ward 1 of Sainamaina Municipality. Further prioritisation will be given to women and youth, within the legislated working age, from the project affected areas.
- Existing roads and access roads into the project area (roads connecting the wholesale market to East-West Highway and to Semlar) will be improved, as part of the project, enhancing the living conditions for the neighbouring settlements.
- During project development, living conditions will be improved and employment opportunities will be made available, reducing the need for residents to emigrate and decreasing population outflow. This will also support poverty reduction. One of the primary reasons residents migrate from the project area, is in search for better living conditions and employment opportunities.
- In the broader regional community, construction jobs will provide cash income encouraging regional economic growth, provide investment opportunities, and raise the standard of living in the region.
- With the increased income earned by the labour working at the construction site, the spending capacity of the locals will be strengthened. The cash will flow into the local market, enhancing the local economy and allowing local businesses to grow.

Operation Stage

- Wholesale market operation will require staff, for which priority will be given to locals for recruitment. Special emphasis will be given to women and youth, within the working age limit, from the nearby community in recruitment.
- With the operation of the market, local producers will have better access to the market for their products, which will offer them a platform to trade their products. Furthermore, the farmers will have access to cold storage and/or other storage facilities, which will minimise spoilage of their vegetables and fruits.
- The operation of the wholesale market can further spur the development of local markets for small farmers and traders.
- The new wholesale market is expected to enhance local and regional economic growth, which can lead to the establishment of hotels, lodges, and related industries in the area.
- The revenue generated by the new businesses can provide additional benefits to the overall development of the local community.

- Registered businesses that are supported by the wholesale market can further contribute to the national tax base.
- Provision of adequate storage facilities avoiding/reducing the fruits and vegetable spoilage (prevent or reduce GHG emissions from degrading organic waste).

7.2 Adverse Impact

The following receptors /areas have been identified as relevant for this study and may be impacted negatively due to project development.

Table 7.1: List of receptors/areas that may be potentially negatively impacted due to project development

| Nr. | Sensitive receptor | Description & Project Activity |
|---|---|--|
| Physically Sensitive Receptors | | |
| 1 | Soil | The proposed site is in a community forest (CF). The soil content is gravels on the top layer followed by silty clay and silts. Due to presence of CF, it was also assumed that the topsoil may have a certain value for reuse. |
| 2 | Groundwater level and quality | Groundwater will be used by the project both during construction and operation of the market. Groundwater in the project area is an important source of water for domestic and irrigation purposes. Private wells are used for domestic water use. Groundwater is also of high importance for sustaining ecological balance in the existing habitats. |
| 3 | Surface water quality | The project is located next to the Danab River. The river provides both ecological and cultural functions. There is a risk that project related waste will be discharged into the river and contaminate the sediment, impact water quality and ecosystem balance. |
| 4 | River flood levels and river morphology | The river provides an important physical function to discharge water and sediments downstream. Both aspects can be impacted by the project due to changes/obstruction in the floodplain as a result of the land raise/buildings to be erected. This may have effects on the nearby infrastructure (e.g., bridge downstream) and also communities north of the river. |
| 5 | Ambient air quality | The project traffic, excavation activities and emissions from generators will have a cumulative effect and impact the local air quality. |
| 6 | Noise, light and vibrations | The project traffic, excavation activities and operation of generators will have a cumulative effect on local noise levels. |
| Biologically Sensitive and Receptors | | |
| 7 | Terrestrial Ecology | The habitat in the Project area is used as foraging grounds for a diverse range of fauna species. Habitat degradation caused by construction and operation of the market, noise, light may negatively impact these species. |
| 8 | Ecosystem Services | The site provides the following ecosystem services: firewood and raw materials (mushrooms) for local communities. The CF present on site maintains a good local climate, air quality, carbon segregation and storage, and provides space for river during flooding events. The CF provides a habitat for local fauna and flora species. These services will be impacted due to wholesale market development. |

| Nr. | Sensitive receptor | Description & Project Activity |
|-----------------------------------|---|---|
| Social Sensitive Receptors | | |
| 9 | Communities in the indirect impact area (within a 1 km radius from site location) | The nearest houses from the proposed site are located approximately 200m from the boundaries of the wholesale market. There are an estimated 258 households within the 1 km range that could potentially be impacted due to dust, noise, emissions, visual and landscape changes from the project development, but also cumulatively impacted due to the possible construction of the Danab river road in the future. |
| 10 | Communities in the wider project area of Butwal and Sainamana Municipalities | Communities in the wider project area will be impacted due to project development activities during the construction and operation of the market resulting in dust and emissions, increase in noise levels, potential road safety accidents, influx of labour, <i>etc.</i> |
| 11 | Public infrastructure and its users, communities located north of the river | Public infrastructure (e.g., bridge downstream) its users as well as communities north of the river may get affected due to interventions in the river floodplain, land raise/buildings to be erected. |

7.2.1 Physical environment

7.2.1.1 Pre-construction phase

Erosion, river morphology and flooding risk

Riverbank erosion and flooding risk due to community forest removal, land raise and erecting of the wholesale market buildings in the river floodplain affecting the construction site and adjoining areas

- The current CF fulfils several ecological functions, i.e., carbon segregation and storage, maintaining of the riverbank in place and stabilization of the soil so indirectly it helps to maintain the floodplain. These functions will be lost due to land use change and construction of commercial buildings in the river floodplain which may trigger riverbank erosion and flooding events at the proposed site and adjoining areas⁸.
- The site is located on the left floodplain, which is a relatively fresh fluvial deposit that makes the area morphologically vulnerable. It is an inner-bend deposit with some vegetation as well as presence of cohesive materials that may not be that severe in terms of large erosion. However, it is clearly under the risk of floods with high sediment-laden flow that may lead to sediment havoc as well. Also, under certain unfavourable (local) condition given the confluence dynamics, the deep channel might change its course unpredictably leading to erosion and/or sedimentation on the project site. The riverbed appears to be rather high with large sandbars, almost at the level of the floodplain. Such condition increases the flood and morphological hazards and risk during higher/extreme flow and sediment transport. Moreover, there is quite some in-channel vegetation, which induces additional resistance to the flow. This may be positive against the erosion, however, it may lead to higher flood levels. Also, the backwater effect due to the confluence dynamics of the tributaries

⁸Loss of the ecosystem services, e.g., the provisioning ones, are addressed under the social impact assessment.

flowing into the main river (depending on the flow and sediment transport from the tributaries) may result in higher flood and morphological hazards and risks under extreme conditions.

- The proposed project site occupies a large part of high-flow river corridor leading to significant constriction at the bend reach including the confluence with other two tributaries. This will lead to unexpected morphological behaviour making the north floodplain rather vulnerable. Given the fact that the river reach shows the indication of increasing meandering feature towards the downstream of the confluence (near the project site), any interventions with drastic morphological changes might trigger more active meander dynamics with lateral migration along the downstream reaches, see more details in Flooding Risk Impact Assessment in Appendix 15.
- Riverbank erosion and flooding events may bring substantial damage to the construction site and adjoining areas. The impact is direct for the site and indirect for adjoining areas. The probability of occurrence is high and predicted based on the flooding risk assessment report (4). The area of influence is the site and adjoining areas (4). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is high (4) as the impact can cause damage to assets and private property (without mitigation measures). Mitigation is possible, e.g., land raise and increase of the buildings level (2). Furthermore, the proposed mitigation measures shall be reassessed during the details design on sufficiency and benefits, especially if the Danab Road corridor road is in place or not at the time of site construction and market operation. The environmental significance of this impact is rated as **moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Potential impacts on the groundwater levels due to abstraction

- Water will be required for both construction and operation of the project, which will be fulfilled using groundwater. For this purpose, groundwater wells will be installed to extract deep groundwater (>100m). Construction Contractor will be required to develop the required groundwater supply system. Water needs for construction phase are limited and required for production of cement, spraying against dust and domestic needs. The groundwater extraction may put pressure on the groundwater aquifer, e.g., reducing the effective yields of site and nearby wells. Climate change may also impact the availability of groundwater in long term (see details Appendix 16). However, the aquifer located under the project site is part of a larger system that is distributed over the Terai region and connected with the Gangetic plain. Furthermore, the recharge potential of Churiya range and rivers located in the Terai region is used a limited extent.
- The impact is direct for the site well and indirect for nearby wells. The probability of occurrence is relative (3) since although groundwater is available in the project area, groundwater sourcing study and abstraction tests have not been conducted yet. The area of influence is site and vicinity (2). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is very low (1) since relative limited volume of water is required for construction activities. Mitigation is

possible though development and implementation of sustainable (ground) water management practices (2). The environmental significance is **negligible**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

7.2.1.2 Construction phase

Land use change

Potential impacts due to land use change from community forest to built-up/commercial.

- 12.47 ha of forested area will be transferred from Ratanpur CFUG to the project. About 83 % of the total area in the BSMC is covered with forest which is 3,542.33 ha. Our project site represents only 0.35% of the total forest area of Butwal;
- The impact is direct for the site. The probability of occurrence is certain (5). The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is low (2) due forests coverage in BSMC. Mitigation is possible (1) and connected to the mandatory compensation for replantation of the forest, including associated obligations to take care of the forest in the initial years after plantation. The environmental significance of this impact is rated **as low**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduce.

Erosion, river morphology and flooding risk

Riverbank erosion and flooding risk due to community forest removal, land raise and erecting of the wholesale market buildings in the river floodplain affecting the construction site and adjoining areas

- The current CF fulfils several ecological functions, i.e., carbon segregation and storage, maintaining of the riverbank in place and stabilization of the soil so indirectly it helps to maintain the floodplain. These functions will be lost due to land use change and construction of commercial buildings in the river floodplain which may trigger riverbank erosion and flooding events at the proposed site and adjoining areas⁹.
- The site is located on the left floodplain, which is a relatively fresh fluvial deposit that makes the area morphologically vulnerable. It is an inner-bend deposit with some vegetation as well as presence of cohesive materials that may not be that severe in terms of large erosion. However, it is clearly under the risk of floods with high sediment-laden flow that may lead to sediment havoc as well. Also, under certain unfavourable (local) condition given the confluence dynamics, the deep channel might change its course unpredictably leading to erosion and/or sedimentation on the project site. The riverbed appears to be rather high with large sandbars, almost at the level of the floodplain. Such condition increases the flood and morphological hazards and risk during higher/extreme flow and sediment transport. Moreover, there is quite some in-channel vegetation, which induces additional resistance to the

⁹Loss of the ecosystem services, e.g., the provisioning ones, are addressed under the social impact assessment.

flow. This may be positive against the erosion, however, it may lead to higher flood levels. Also, the backwater effect due to the confluence dynamics of the tributaries flowing into the main river (depending on the flow and sediment transport from the tributaries) may result in higher flood and morphological hazards and risks under extreme conditions.

- The proposed project site occupies a large part of high-flow river corridor leading to significant constriction at the bend reach including the confluence with other two tributaries. This will lead to unexpected morphological behaviour making the north floodplain rather vulnerable. Given the fact that the river reach shows the indication of increasing meandering feature towards the downstream of the confluence (near the project site), any interventions with drastic morphological changes might trigger more active meander dynamics with lateral migration along the downstream reaches, see more details in Flooding Risk Impact Assessment in Appendix 15.
- Riverbank erosion and flooding events may bring substantial damage to the construction site and adjoining areas. The impact is direct for the site and indirect for adjoining areas. The probability of occurrence is high and predicted based on the flooding risk assessment report (4). The area of influence is the site and adjoining areas (4). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is high (4) as the impact can cause damage to assets and private property (without mitigation measures). Mitigation is possible, e.g., land raise and increase of the buildings level (2). Furthermore, the proposed mitigation measures shall be reassessed during the details design on sufficiency and benefits, especially if the Danab Road corridor road is in place or not at the time of site construction and market operation. The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Soil

Loss of topsoil due to excavation and earth works

- According to the Topographical Survey and Soil Investigation Report 2022, at the depth of 0.0-3.0 the soil is alluvial deposits of sediments from the Danab River. They are composed of a mixture of sand, silt, clay, and organic matter. The soil is mainly sandy loam. This type of soil is often present in both arid and very wet conditions. The construction work will affect the top 2m of the soil. The topsoil on site has good properties due to coverage with forest vegetation. If not properly managed during construction, the topsoil can be mixed with other soil and its properties will be lost.
- The impact is direct for the site. The probability of occurrence is high (4). The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is high (4) due to size of the site and good properties of the topsoil. Total mitigation is possible to a certain extent (2), e.g., topsoil management during construction. The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Potential disturbance and degradation of soil, compaction of soil due to construction activities

- Construction activities will involve construction and use of temporary roads, establishment of temporary storage areas, establishment of the labour camp, etc. This may disturb, degrade or compact the soil at site as well as in close vicinity to the site.
- The impact is direct for the site. The probability of occurrence is high (4). The area of influence is site and vicinity (2). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is high (4) due to the size of the site and the fact that adjoining areas are a mix of agricultural and residential areas. Total mitigation is possible to a certain extent (2). The environmental significance of this impact to soil is rated **as moderate**. With appropriate mitigation measures and sound HSE construction practices the significance of the impact can be further reduced to low.

Potential contamination of soil due to accidental spills and leaks

- The construction works will include usage and storage of chemicals, e.g., fuel and lubricant oils, paints, additives, etc. Chemicals are normally used in vehicles and machinery maintenance, preparation of cement at the batching plant, fuelling operation, etc. The used chemicals might be hazardous in nature. Spills and leaks may occur while performing these operations which may contaminate the soil.
- The impact is direct for the site. The probability of occurrence is high (4) considering the average construction practices in the county. The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is low (2) since only a limited amount of chemicals will be stored on site and any spills and leaks will be of small volume and connected to the construction site only. Mitigation is possible though development and implementation of sound construction practices and chemicals management (2). The environmental significance of this impact is rated **as low**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced

Groundwater

Potential impacts on the groundwater levels due to abstraction.

- Water will be required for both construction and operation of the project, which will be fulfilled using groundwater. For this purpose, groundwater wells will be installed to extract deep groundwater (>100m). Construction Contractor will be required to develop the required groundwater supply system. Water needs for construction phase are limited and required for production of cement, spraying against dust and domestic needs. The groundwater extraction may put pressure on the groundwater aquifer, e.g., reducing the effective yields of site and nearby wells. Climate change may also impact the availability of groundwater in long term (see details Appendix 16). However, the aquifer located under the project site is part of a larger system that is distributed over the Terai region and connected with the Gangetic plain.

Furthermore, the recharge potential of Churiya range and rivers located in the Terai region is used a limited extent.

- The impact is direct for the site well and indirect for nearby wells. The probability of occurrence is relative (3) since although groundwater is available in the project area, groundwater sourcing study and abstraction tests have not been conducted yet. The area of influence is site and vicinity (2). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is very low (1) since relative limited volume of water is required for construction activities. Mitigation is possible through development and implementation of sustainable (ground) water management practices (2). The environmental significance is **negligible**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Potential impacts to the groundwater quality due to accidental spills and leaks.

- According to the Topographical Survey and Soil Investigation Report 2022, groundwater table is at 2m below ground (shallow groundwater flows above a 4m thick greyish colour silty clay layer). The results of the sampled groundwater show slightly higher iron content as per WHO Guideline Value for drinking purpose while other physical, chemical parameters were found within the acceptable range for human consumption. Therefore, the groundwater is relative clean water. During construction spills and leaks of hazardous chemicals may take place, e.g., during equipment maintenance as well as from outdated machinery used in excavation and site construction works (from damaged oil filters, broken hydraulic systems, etc). Due to exposed surface, the contaminants can easily reach out and contaminate the relative clean groundwater. Although small quantities of chemicals will be used/stored on site, the status of the machinery is not known. If spills and leaks will occur on a frequent basis, the contamination may accumulate and disperse easily outside the site boundaries.
- The impact is direct. The probability of occurrence is high (4) considering the high levels of shallow ground water. The area of influence is site and vicinity (3). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is medium (3) since even a small spill can affect the local groundwater quality. Mitigation is possible through development and implementation of sound construction practices and chemicals management (3). The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Surface water quality

Increase in Danab River sedimentation load due to construction in the river flood plain and run off from construction site.

- The project site will have exposed soil due to earthwork, as well as construction and demolition waste temporarily stored on site. The site is located in close proximity to the river, e.g., 30m from the Danab River. Especially during the monsoon season,

the loose soil could be washed off to the Danab River, increasing the sedimentation load of the river, affecting the morphology of the river and water quality (increase in turbidity).

- The impact is direct. The probability of occurrence is moderate (3). The area of influence is site and vicinity (3). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is medium (3) due to existing turbidity level in the river and the fact that during the monsoon season the sediment load in the Danab River is high and project contribution will be negligible. Mitigation is possible through development and implementation of sound construction practices (2). The impact may be further prevented if the Danab River road corridor is already constructed which will serve as a natural elevated barrier between the site and the river. The environmental significance of this impact is rated **as low**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Potential impacts to the Danab River water quality due to improper construction site/camp management practices.

- Due to proximity to the construction site and worker camp, the Danab River may be used in unsustainable ways, e.g., for equipment and construction trucks washing, disposal of any liquid waste streams accumulated on site and/or at the worker camp site. The results of Danab River water quality testing show slightly higher turbidity range with presence of iron content. Bacteriologically, the sampled water is contaminated with E. coli and Coliforms. Project activities may pose risk for river water further contamination and cause health and safety risks to workers, communities and nuisance to the downstream users of the river.
- The impact is direct. The probability of occurrence is high (4). The area of influence is site and vicinity (2). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is relative (3) since continuous construction liquid waste and/or sewage discharge into the river can affect the water quality and its users. Mitigation is possible through development and implementation of sound construction practices and waste management (3). The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Ambient air quality

Deterioration of ambient air quality due to construction related emissions (traffic and operation of machinery) and dust at the construction site and adjoining areas

- The primary source of air pollution will be combustion emissions (e.g., Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Sulphur Oxides (SO_x) and Particulate Matter). Combustion emissions will be generated by the operation of batching plant, diesel generators and construction traffic. Dust will be generated from overall construction works and traffic on gravel roads. Combustion emissions form Green House Gasses (GHG) and contribute to climate change.

- Removal of 12,47ha of CF will also contribute to release of GHG, particularly CO₂. This will be mitigated as part of the obligatory compensation and replanting process of the project (see mitigation measure section 8.3 of this report).
- The ambient air quality in project area is already affected by high concentrations of particulate matter (TSP, PM₁₀ and PM_{2.5} exceeds Nepal Ambient Air Quality Standard Tolerance Limit for all monitoring locations as well as IFC Ambient Air Quality guidelines). The project will contribute to further degradation of ambient air quality, especially in terms of PM and dust. This will affect workforce themselves and settlements nearby the project site.
- The impact is direct. The probability of occurrence is high (4). The area of influence is site and vicinity (3). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is high (4) due to cumulative effect, e.g., already existing degraded air quality and addition of project related emissions. Mitigation is possible but only partial (4) since operation of traffic and machinery will remain required. The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Noise, light, and vibration

Increase in ambient noise levels, vibration and light due to construction works.

- The construction works and use of vehicles are sources of noise, light and vibration. Construction will take place only during daytime and will probably start in early morning hours.
- A noise level baseline has been conducted for this project. Recorded equivalent noise levels for both day and night-time sound level were found in normal range as per Nepal Government National Noise Quality Standard for both Commercial and Mixed Residential Area (e.g., for houses near bridges, near highway). Recorded equivalent noise levels for night-time sound level were found higher than the National Ambient Noise Quality Standard for Commercial area (e.g., at the first house near the East-West Highway), probably due to vehicular and animal activities. The compliance with IFC noise standards is mixed. Day noise level of 55 dBA for residential areas is met for all sampling locations, except for the First House from Route of Highway – Butwal and House near Second Bridge – Butwal. The night noise level of 45 dBA for residential is only met by 2 sampling locations, e.g., House Near Second Bridge – Butwal, House of Middle Near Highway – Butwal.
- The residents living around the project construction site and along the road used for vehicular movement will be affected. The impact is direct. The probability of occurrence is high (4). The area of influence is site and vicinity (3). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is high (4) due sensitive receptors located in the direct vicinity of the site and along the transport routes connected to the site. Mitigation is possible but only partial (4) since operation of traffic, machinery, delivery of construction materials, goods and workers will remain required. The environmental significance of this impact is rated

as moderate. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Waste and sewage management

Pollution of direct environment due to improper waste management

- The construction works consisting of earth works, construction of wholesale market and supporting facilities, operation of the camp site will generate (solid and liquid) waste and sewage. Waste stream will be composed of mainly construction and demolition type of waste, plastics, metal, glasses and limited organic waste. Sewage will be generated from toilets located on site and from the worker camp. Waste and sewage require proper management to avoid pollution of the direct environment, e.g., soil, surface and ground water and to avoid nuisance from litter disposed in the vicinity of the site.
- Management of waste and sewage generated by the project site and camp will be the responsibility of the Construction Contractor.
- The impact is direct. The probability of occurrence is high (4). The area of influence is site and vicinity (3). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is high (4) due existing limitations of the waste management sector in Nepal and sensitivity of the matter. Mitigation is possible (3). The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

7.2.1.3 Operation phase

Flooding risk affecting the wholesale market and adjoining areas

- The site is located on a floodplain, which is relatively fresh fluvial deposit that makes the area morphologically vulnerable. It is an inner-bend deposit with some vegetation as well as presence of cohesive materials. The site is clearly under the risk of floods with high sediment-laden flow that may lead to sediment havoc as well. Also, under certain unfavourable (local) condition given the confluence dynamics, the deep channel might change its course unpredictably leading to erosion and/or sedimentation on the project site. The flood events may cause direct damage to assets of the wholesale market, and/or cause damage indirectly via business interruption. In addition, the flood events can cause riverbank erosion, see details in 7.2.1.1.
- Construction and operation of commercial structures in the river floodplain may also lead to potential impacts to the adjoining areas such as the downstream bridge and communities north due to elevated flood levels. These impacts may occur during operational phase once the land has been raised and the buildings constructed. This impact is further addressed in the social part of the impact assessment, section 7.2.8.
- The impact is direct for the site and indirect for adjoining areas. The probability of occurrence is high and predicted based on the flooding risk assessment report (4). The area of influence is extended (4). The duration is years to decade (4) and connected to the live time of the market. The magnitude is very high (5) as the impact

can cause damage to assets and private property (without any flood protection measures in place). Mitigation is possible (2). The environmental significance of this impact is rated as **high** and requires further assessments to reconfirm the range of mitigation measures to be put in place, e.g., especially if the Danab Road corridor road is in place or not at the time of site construction and market operation. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Climate change increasing the flooding events at the wholesale market and adjoining areas

- Climate change may lead to increase of frequency and intensity of flooding events, affecting the wholesale market as well as adjoining areas.
- The impact is direct for the site and indirect for adjoining areas. The probability of occurrence is high and predicted based on the flooding risk assessment report (4). The area of influence is extended (4). The duration is years to decade (4) and connected to the live time of the market. The magnitude is very high (5) as the impact can cause damage to assets and private property (without any flood protection measures in place). Mitigation is possible (2). The update of the flooding risk does take climate change into consideration. The environmental significance of this impact is rated as **high** and requires further assessments to reconfirm the range of mitigation measures to be put in place and their alignment with climate change forecasts. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Groundwater

Potential impacts on the groundwater levels due to abstraction affecting water availability for the wholesale market and adjoining community wells

- A large amount of water will be required for operation of the wholesale market, which is estimated to be about 752000 litres daily. This requirement will be consistent and for a long-term duration. This water demand is proposed to be fulfilled by extracting the groundwater through two deep boring wells installed at the project site (>100m deep). The groundwater extraction may put pressure on the groundwater aquifer reducing the effective yields of adjoining (tube) wells. However, this groundwater aquifer is part of a larger system that is distributed over the Terai region and also connected with the Gangetic plain. Furthermore, the recharge potential of Churiya range and rivers in the Terai region are still intact.
- The impact is direct for the site well and indirect for adjoining wells (impact on the adjoining community wells is also assessed as part of the social section). The probability of occurrence is relative (3) due to the fact that groundwater is available in the project area, but a water sourcing study and groundwater abstraction tests has not been conducted yet. The area of influence is extended (3). The duration is years to decade (4) and connected to the live time of the market. The magnitude is relative (3) considering the volume of water to be extracted on the daily basis. Mitigation is possible though development and implementation of sustainable (ground) water

management practices (3). Although extraction will remain required. The environmental significance is **moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Ambient Air Quality

Deterioration of ambient air quality due to wholesale market operation related emissions (combustion emissions from traffic and equipment) and dust

- The primary source of air pollution will be traffic connected to operation of the market (delivery and dispatch of fruits and vegetables, other materials and goods, dispatch of waste) and operation of generators (back up, only in emergency situations) and other equipment on site (e.g., operation of WWTP, cooling and processing buildings, etc). The primary pollutants expected are combustion emissions (e.g., Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Sulphur Oxides (SO_x) and Particulate Matter). Dust will be generated from commodity/material handling. Combustion emissions form Green House Gasses (GHG) and contribute climate change.
- The air quality impact assessment has been done using the NIBM tool¹⁰. This is a tool that allows to determine the contribution of spatial plans and traffic plans to air quality. This method is normally applied in the Netherlands for EIA studies and air quality assessments. The results are explained below. For the purpose of this assessment only emissions connected to traffic are estimated, since the emissions connected to market operation itself are difficult to estimate at this stage of project development.
- The contribution of a road on which 540 trucks move two-ways leading to 1080 effective movements can lead, based on the Dutch NIBM tool to a maximum contribution of around 1 µg/Nm³ of PM₁₀ and to 15 µg/Nm³ in NO₂. However, trucks in Nepal, do not have to adhere to relatively strict European standards and are assumed to be older. Due to this, emissions are expected to be higher, meaning a maximum contribution of 30-45 µg/Nm³ in NO₂ would not be unrealistic¹¹. For this approximation it is assumed that Nepalese trucks adhere to the Indian standards and are on average one category older.
- We also assume that particulate filters are not regularly maintained. This means that PM₁₀ emissions could be up to 5-7 times higher, meaning a maximum contribution of around 5-7 µg/Nm³ could also not be excluded.
- The PM₁₀ and PM_{2.5} background levels are already very high in Nepal, and pose a threat to local health. If a contribution of 20 µg/Nm³ would be additionally introduced, it worsens this situation. A NO₂ contribution of around 30 µg/Nm³ is also very significant and can impact the local health of the inhabitants. An indicative value of the contribution on local air emissions is shown in the table below.

¹⁰ <https://www.infomil.nl/onderwerpen/lucht-water/luchtkwaliteit/slag/hulpmiddelen/nibm-tool/>

¹¹ *Comparative the Indian emissions standards* <https://cpcb.nic.in/vehicular-exhaust/> relative to the European <https://dieselnet.com/standards/eu/hd.php>

Table 7.2: Expected estimate contribution of wholesale market to the ambient air quality

| Component | Estimated year average Background [$\mu\text{g}/\text{Nm}^3$] | Estimated contribution [$\mu\text{g}/\text{Nm}^3$] | Estimated new year average ³⁾ [$\mu\text{g}/\text{Nm}^3$] | WHO guideline 2021 [$\mu\text{g}/\text{Nm}^3$] | Nepal legislative limit [$\mu\text{g}/\text{Nm}^3$] | Risk of exceeding WHO guideline | Risk of exceeding local norm |
|-------------------|---|--|--|--|---|---------------------------------|------------------------------|
| NO ₂ | 25 ¹⁾ | 30-45 | 55-70 | 10 | 40 ²⁾ | Very likely | Likely |
| PM ₁₀ | 72 ²⁾ | 5-7 | 77-79 | 15 | 120 | Very likely | Unlikely |
| PM _{2,5} | 53 ²⁾ | 4-6 ⁴⁾ | 57-59 | 5 | - | Very likely | - |

Legend

- 1) Average of the Banepa valley, due to limited measurements and information about Butwal area
- 2) Annual average of 2017 Butwal measuring station (annual data is used since it is more reliable and accounts for seasonal changes)
- 3) These estimates have a high margin of error since emissions have been estimated without detailed modelling
- 4) Based on the ratio PM₁₀:PM_{2,5} in diesel engines as described in Appendix: PM_{2,5} Speciation in MOVES

- Air quality in Nepal is in general a problem¹². The average concentration of PM₁₀ exceeds the national legal limit of 120 $\mu\text{g}/\text{Nm}^3$ in many places in the surroundings of the capital Kathmandu as well as outside the area. Also, PM_{2,5} concentrations can be up to 153 $\mu\text{g}/\text{Nm}^3$ on a bad day, which is around 12x the maximum healthy amount as determined by the WHO. The impact on ambient air quality due to market operation is expected to be high. All WHO guidelines will very likely be exceeded, this is already due to the high background concentration. Introducing new traffic leads to a significant elevation of particulate matter levels which will impact the local health. The elevation of NO₂ levels could also be very significant, several times the expected background concentration. The legal limit for the NO₂ concentration would therefore likely be exceeded. However, the national legal limit of 120 $\mu\text{g}/\text{Nm}^3$ annually is not likely to be exceeded.
- The impact is direct. The probability of occurrence is certain (5). The area of influence is extended (4). The duration is years to decade (4) and connected to the live time of the market. The magnitude is high (4) considering the local air quality and the estimate of additional emissions generated by the market. Partial mitigation is possible with difficulty (4). Transport emissions connected to delivery of the commodities to market will remain. The environmental significance of this impact is rated as **high**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Noise, light, and vibration

Increase in ambient noise levels, vibration and light due to operation of the wholesale market affecting the quality of environment and wellbeing of nearby communities

- Operation of the wholesale market, use of vehicles and equipment are sources of noise, light and vibration. Noise will propagate in the surroundings and affect residential areas located next to the market and along the main connecting roads to the market. The usage of light, particularly, for the early morning operations will

¹² <https://www.iqair.com/nepal/western-region/butwal> ; <https://aqicn.org/station/@198922/>

require light of high lumens. The residents living around the wholesale market will be affected.

- Noise impact assessment has been done using the Standard Calculation Method (SCM) I of Appendix III of the Calculation and Measurement Regulations for Noise 2012¹³. This method is normally applied in the Netherlands for EIA studies and noise assessments. The results are presented in the table below. For the purpose of this assessment only noise connected to traffic is estimated, since the noise connected to market operation is difficult to estimate at this stage of project.

Table 7.3: Noise impact assessment based on Dutch Standard Calculation Method

| Project details | Noise level Lnight in dB(A) | Noise level Lden in dB |
|---|--------------------------------|---------------------------|
| 1. Number of truck passages = 1000 a. 500 passages during the day and b. 500 passages at night. | 62 | 67 |
| 2. Driving speed = 30 km/h | | |

- Since the market will operate during the day, but also during the night (early morning hours), the Lden is an important indicator, showing the average noise level during the day and night in dB. For average noise exposure, the Guideline Development Group (GDG) of the World Health Organisation (WHO) strongly recommends reducing noise levels produced by road traffic to below 53 dB Lden, as road traffic noise above this level is associated with adverse health effects. For night noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic during night-time to below 45 dB Lnight, as night-time road traffic noise above this level is associated with adverse effects on sleep.
- Based on the produced calculations, WHO standards are exceeded. The Nepali standards as presented in section 5.1.6 are likely to be exceeded as well.
- The impact is direct. The probability of occurrence is high (4). The area of influence is site and its vicinity (2). The duration is years to decade (4) and connected to the live time of the market. The magnitude is high (4) due sensitive receptors located in the direct vicinity of site and transport routes connected to site. Mitigation is possible but only partial (4) since operation of traffic, machinery, delivery of goods will remain required. The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Solid Waste

Pollution of direct environment due to improper waste management affecting the quality of natural resources

- The operation of the wholesale market may create a significant waste management challenge. Large volumes of organic waste will be generated because of fruit and

¹³ Please refer here for more details on the SCM: [Standaard Rekenmethode I RMG 2012 - Kenniscentrum InfoMil](#)

- vegetable trade. Waste will also be generated by visitors, vendors, and other processing activities undertaken on the market.
- Organic waste will be mainly composed of fruits and vegetables that are no longer suitable for sale or consumption. This includes vegetable and fruit peels, trimmings, spoiled or overripe produce, and other food waste. Since, these are biodegradable, thus decompose over time naturally, it can create strong unpleasant odour in addition to creating sanitary challenges. The project foresees that management of organic waste will be outsourced to approved third parties that will have dedicated facilities in place to manage this stream in a safe and responsible manner.
 - Inorganic waste, on the other hand, will consist of non-biodegradable materials such as plastic bags, packing materials, cardboard boxes and others. The project foresees that approved third parties shall be contracted to collect and dispose these waste streams.
 - Sewage will be generated from WC and other sanitary facilities on site. Processing of fruits and vegetables also includes a washing step that will result in wastewater. Washing and cleaning of trade space, process equipment will also result in a residual wastewater. A wastewater treatment plant is foreseen on site to manage wholesale market wastewater.
 - If these solid & liquid waste streams are not treated properly, they can contaminate the direct environment, e.g., soil, surface and groundwater as well as create nuisance to surrounding communities. Especially the soil may get contaminated in open areas next to utilities where for example waste is temporarily stored.
 - Although specific facilities are foreseen by the project design, these shall be properly operated and maintained to ensure they deliver the required result.
 - The impact is direct. The probability of occurrence is high (4). The area of influence is site and vicinity (3). The duration is years to decade (4) and connected to the live time of the market. The magnitude is high (4) due existing limitations of the waste management sector in Nepal and sensitivity of the mater. Mitigation is possible (2). The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

7.2.2 Biological environment

Pre-construction phase

Loss of forest vegetation due to construction of the wholesale market.

- 12.47 ha of forested land will be cleared for site development. The vegetation enumeration reported a total of 702 trees present on site. Four species were recorded on site: of which Sisso (*Dalbergia sissoo*) was found to dominate the site followed by Teak (*Tectona grandis*). There are few individuals of Bakaino (*Melia azedarach*) and Simal (*Bombax ceiba*) also recorded on site. As the construction stage starts, these trees will be removed completely from the site, thus, a total of 182 m³ of wood volume will be lost in the process. The majority of trees e.g., 542 trees that will be removed are Sisso, followed by 142 individuals of Teak. The ecological functions

- of the CF, e.g., maintaining a microclimate in the area, contributing to a better air quality, etc., will be lost as well.
- The impact is direct. The probability of occurrence is certain (5). The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is relative (3) due to the availability of other CF in the project area (in Ward 12, forest in Ward 16), the CF is still a relatively young forest, the forest is not a natural forest, does not support endangered and critical species. Mitigation is possible (2). During the detailed design, an exercise will be undertaken to identify patches with trees on site that can be still maintained and used as greenery during wholesale market operation. This approach can minimise the magnitude of the impact. This impact has therefore a **moderate** environmental significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Impact on nationally protected tree species of Simal affecting conservation goals.

- Amongst the tree species reported on site, the Government of Nepal has provided protection status to Simal (*Bombax ceiba*) under NPWC Act 2029. However, only about 4 individuals of Simal were reported out of 702 trees enumerated from the project site, thus, these 4 individual trees might be removed during the site preparation. As discussed above, the project layout shall prioritise avoidance of removing Simal trees to minimise the magnitude of impact.
- The impact is direct. The probability of occurrence is high (4). The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is moderate (3) since the project will affect only 4 species of Simal. Mitigation is possible (2). During the detailed design, an exercise will be undertaken to identify possibilities to save these 4 trees. The environmental significance of this impact is rated as **moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

7.2.2.1 Construction phase

Fragmentation of the habitat due to land clearance and site preparation

- Fragmentation of the habitat (due to clearance of 12.47ha of CF) can compromise to certain extent the habitat role in maintaining ecosystem balance and biological diversity in the project area. The habitat present on the site is a modified habitat, where human activities have substantially modified the forest primary ecological functions. The current CF and direct project surroundings do not sustain vulnerable, protected species of flora and fauna species. The projects site is not part of a wildlife corridor.
- The impact is direct. The probability of occurrence is low (2). The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is low (2) since the forest is not a natural forest, not a wildlife corridor, nor a critical habitat and alternative community forest are

available in the project area. Mitigation is possible (2). This impact has therefore a **low** environmental significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Increased demand for forest products

Increase demand for forest products placing pressure on existing forests/ wood availability.

- Many workers are expected to accumulate in the project area during the construction period, which will require a consistent supply of energy for cooking and next to already existing demand from local communities. Though petroleum products including LPG gas are available in the project area, the workers and locals might still prefer firewood as this might be easily available, could be collected free of cost and/or for relatively lower price. Thus, the obvious choice for energy might become the firewood, increasing pressure on the local forests, e.g., CF in Ward 12 and forest in Ward 16. Furthermore, the workers may also harvest timber, which they can use for construction of temporary shade. Such requirements may also be applicable to residents who live in the vicinity of the project site. These activities may lead to exerting pressure on the nearby forests.
- This impact is expected to be indirect in nature. The probability of occurrence is high (4). The area of influence is site and vicinity (3). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is low (2) since firewood is only used for preparing animal feed by locals. Mitigation is possible (2). This impact has therefore a **low** environmental significance . Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Disturbance to wildlife

Disturbance of wildlife due to construction works (noise, light).

- The construction activities such as earthworks, use of machinery, transports *etc.*, will create noise and vibration which might disturb the wildlife in the area. Though the project area is not a natural habitat for wildlife neither significant species of wildlife has been reported in the area, the local resident wildlife still can be disturbed.
- Though occurrence of protected species were not reported on the project site, few species are reported in the project area, such as Cobra (*Naja naja*). This species might occur in the project area as well. Generally, people are wary about snakes and usually kill them if they are sighted. During the construction phase the movement and excavation of soil and rocks will potentially disturb microhabitats. Rocky slopes and areas with big boulders are used as breeding/nesting sites by a variety of snakes and lizards which may become vulnerable to being killed. As a result of hunting and poaching, the population of wild animals having food and medicinal value or animals that threaten people is decreasing.
- Furthermore, the high intensity lights used in construction can also have negative impacts on local wildlife. The lights can interfere with the natural behaviour of nocturnal animals, including birds and bats, and disrupt ecosystems by altering light

patterns and cycles. This can have long-term effects on biodiversity and ecosystem health.

- The impact is direct. The probability of occurrence is low (2). The area of influence is site and vicinity (2). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is low (2) due to limited biological diversity present on site and project area. Mitigation is possible but partial (2). This impacts have **a low** environmental significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Introduction of invasive non-native species by site clearance works

- Introduction of invasive non-native species (e.g., *Chromolaena odorata*, *Lantana camara*, *Mikania micrantha*, *Eichhornia crassipes*, *Parthenium hysterophorus*) may occur during site clearance works. Such species can be brought on site on the wheels of construction machinery. Such species can invade the site and even spread outside the site affecting the native species. Their introduction can modify the structure and functions of the ecosystem supply and alter the rate of nutrient cycling. Invasive alien species compete with the crop mainly for water, light, and nutrients. They can directly affect the productivity of food crop like rice, wheat, maize¹⁴.
- The impact is direct. The probability of occurrence is relative (3). The area of influence is site and vicinity (2). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is low (2) due to a mix of cultivated and residential nature of the surrounding areas. Mitigation is possible (2). This impact has **a low** environmental significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

7.2.2.2 Operation phase

Terrestrial wildlife and avia-fauna displacement due to habitat modification and interferences in the project area

- The habitat present on site is a modified habitat, where human activities have substantially modified the area primary ecological functions of the forest. The current community forest and direct project surroundings do not sustain vulnerable, protected species of flora and fauna species. The projects site is not part of a wildlife corridor.
- The impact is direct. The probability of occurrence is low (2). The area of influence is site and vicinity (2). The duration is years to decade (4) and connected to the live time of the market. The magnitude is low (2) due to the nature of the CF and mix of cultivated and residential areas around the site. Mitigation is possible (2). This

¹⁴ DOCUMENTATION OF INVASIVE ALIEN PLANTS SPECIES OF RUPANDEHI DISTRICT, WESTERN NEPAL, Anant Gopal Singh, International Journal of Science and Technology available at [View of Documentation of Invasive Alien Plants Species of Rupandehi District, Western Nepal \(nepjol.info\)](http://View_of_Documentation_of_Invasive_Alien_Plants_Species_of_Rupandehi_District,_Western_Nepal_(nepjol.info))

impact has a **low** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Vermin population affecting the sanitary conditions at the wholesale market

- During the operation stage, the wholesale market will generate large amount of waste. Improper waste management may attract vermin to congregate, *e.g.*, especially around the organic waste storage and open waste bins on site. The population of vermin can rise exponentially due to availability of deteriorating food, the sanitary condition of the market.
- The impact is direct. The probability of occurrence is high (4). The area of influence is site and vicinity (2). The duration is years to decade (4) and connected to the live time of the market. The magnitude is high (4) due to nature of the activity of the wholesale market and required sanitary conditions that need to be maintained. Mitigation is possible (2). This impact has a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

7.2.3 Socio-economic environment and cultural environment

7.2.3.1 Pre-construction Phase

Land transfer to the project

- The proposed site is located on government (public) land, thus complexities related to land ownership are not applicable for this project. However, the proposed land contains a community forest that is used by the Ratanpur CFUG. The land, while owned by Government, is registered for use as a Community Forest. The land acquisition shall be led by the Government. Prior to the start of construction, the land will need to be officially transferred to the project.

Ratanpur CFUG will lose land under their management to the project affecting community diversity of access to CF resources (forest products, firewood and animal fodder)

- Ratanpur CFUG will lose land under their management to the project.
- The Ratanpur CFUG will lose 12.47 ha of their forest due to project development. At present, households collect firewood and fodder from the Ratanpur CF. Of the total sampled households (Household Survey, section 5.3 of this report and details in Appendix 14), 40% of the households collect firewood and 16 percent collect fodder from the CF. The Household Survey indicates that the livelihood of surveyed families do not depend on the CF. This has been also confirmed during the engagements with the Ratanpur CFUG during the scoping phase of the EIA (see details, EIA Appendix 10).
- The impact is direct. The probability of occurrence is certain (5). The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is low (2) since Ratanpur CFUG have also access to another community forest located within 1km from the current

site. Mitigation is possible (3). This impact has therefore a **low** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Hiring of workers

Workers will be required to construct and operate the market. A range of policies and procedures shall be developed to ensure that hiring targets affected people, women, youth, Ratanpur CGUG and that the conditions of hiring are aligned with IFC PS 2 requirements.

- The impact is direct. The probability of occurrence is certain (5). The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is relative (3) since local employment conditions may show gaps in comparison with IFC PS 2 requirements on labour. Mitigation is possible (3). This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

7.2.3.2 Construction phase

Restricted access to the Shiva Temple

- According to the Ratanpur CFUG discussions held during the Household Survey, the settlements near to the project area *i.e.*, Ratanpur, Muktidham, Buddha Tole and Ekata Tole have a relatively short history. Almost all households in the project area migrated one to two generations ago from the hill/mountain Districts of Lumbini, and Gandaki provinces. Nonetheless, when people moved into the area, so did their religious and cultural practices. The Shiva Temple is found adjacent to the development site. The temple holds religious significance for the locals, thus, potential inconveniences to access the temple might create discomfort amongst locals, with disdain directed towards the project. The construction phase, while potentially being an inconvenience, will be temporary and not have profound long-term impacts on the temple practices. The impact is temporary and connected to the construction period.
- The impact is direct. The probability of occurrence is low (2). The area of influence is site and vicinity (2). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is low (2) Total mitigation is possible (1). This impact has therefore a **low** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Impacts related to roads, traffic and road safety

Social nuisance due to traffic congestion on public roads, restricted access and delays

- Construction vehicles and delivery of equipment, transport of workers can cause traffic congestion on nearby roads (e.g., Tamnagar road and bus stop, the roads around Semlar, roads connecting to East-West Highway H01), which can lead to delays, increased travel times, and frustration for drivers. Road users (both pedestrians and vehicular) may have to add additional journey time to their schedule. Some main roads may have slower mobility during peak periods of construction as

construction vehicles generally move at a much slower pace on roads. Construction traffic will cause noise and emissions which may lead to nuisance from communities connected to site and main roads.

- The impact is direct. The probability of occurrence is relative (3). The area of influence is extended (3). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is medium (3) due to close proximity of residential areas to site and roads that will also be used for the transportation of construction materials. Mitigation is possible (3), however transport of materials, workers will be required. This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Health and safety risks due to increased construction vehicle movement

- Due to the increase in construction phase traffic, the incidents of road-related traffic accidents may increase if road users are unaware of the adjustments to be made to accommodate construction bearing large/abnormal loads.
- With an increased number for residents in the area (local or from the labour camp), it is expected that road usage will increase as more goods and services are available and income earners (direct beneficiaries of employment at the new facility), would have higher spending power, prompting higher road traffic numbers to purchase and access such goods and services.
- The impact is direct. The probability of occurrence is relative (3). The area of influence is extended (3). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is medium (3) since due to close proximity of residential areas to site and roads to be used for construction materials delivery. Mitigation is possible (3), however transport of materials will be required. This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Deterioration of public roads due to construction vehicular traffic

- Construction materials will be transported to the site via road using heavy vehicles. Construction traffic will travel on roads that connect the site to the East-West Highway among others. If the Tinau Danab Corridor Road is in place, this will be used as well since the site access road will be connected to this road.
- Construction works involves the delivery of large and abnormal loads, e.g., cooling equipment, prefabricated building parts. Transporting such items involves some risk, for example damage to road infrastructure by such industrial vehicles, particularly when navigating through turns and at un-allocated rest stops, etc.
- Heavy construction vehicles are likely to wear down the roads faster (in the vicinity to the development site, and regionally). Heavy vehicles that park on curbs

of roads will cause damage and rapid deterioration of those portions of the roads. Heavy construction vehicles can damage the surface of nearby roads, leading to potholes, cracks, and other types of damage.

- The impact is direct. The probability of occurrence is relative (3). The area of influence is extended (3). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is medium (3) due to significant materials required to be delivered for construction of the market and current conditions of the roads. Mitigation is possible (3), however transport of materials will be required. This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Health impacts related to improper waste disposal (site, accommodation) affecting the workers and nearby communities

- Construction works will generate various waste streams. Improper waste management may lead to the following health and safety risks for workers and surrounding communities.
- Spread of disease: Waste can attract disease-carrying pests such as rats, flies, and mosquitoes, which can spread diseases like cholera, dengue fever, and typhoid fever. Improper waste disposal can also contaminate food and water supplies, leading to the spread of water-borne illness.
- Aesthetic degradation: The accumulation of waste in public spaces can lead to a deterioration in the appearance of the community, creating an unpleasant living environment for residents.
- Social and psychological impact: The accumulation of waste in public spaces can lead to a feeling of helplessness and frustration among community members, which can have negative social and psychological impacts.
- The impact is direct. The probability of occurrence is relative (3). The area of influence is site and vicinity (2). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is high (4). Mitigation is possible (2). This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Pressure on the public services and provisioning due to worker influx

- Within Ward 15, there is one health post, three Government schools, three private schools, two vocational schools and one commercial bank. Likely impact on service provision are explained below.
- **Healthcare:** non-local workers may require access to healthcare services, including emergency care, preventative care, and treatment for work-related injuries or illnesses. This can place pressure on local healthcare facilities, leading to increased wait times, crowded emergency rooms, and a strain on healthcare resources pressure. There is one health centre in the project area. For the major treatment people go to Butwal Bazar which is 10 km far away from the project site.

- **Education:** non-local workers may have children who require access to education services, which can place additional pressure on local schools and teachers. Schools may need to hire additional staff, provide additional resources, and develop special programs to meet the needs of migrant students. e. There is one community/government school near to project area. Other schools are private.
- **Housing (cost of housing and tariff for rental accommodation), infrastructure, energy and other resources supply:** Nonlocal workers require housing and other infrastructure, such as water and sanitation services, which can place a strain on local government resources. In some cases, the demand for housing and infrastructure may exceed the available resources, leading to overcrowding, inadequate housing, and other issues. Influx of project staff and workers might raise accommodation and rental supply and demand expectations, thereby resulting in an increase in tariffs at such facilities.
- The peak construction workforce is estimated at 200 persons. At the EIA stage there is no clear indication, how many are likely to be local or non-local. There is no current data to suggest that current service provision is under strain, therefore, looking at a worst-case scenario.
- The impact is indirect. The probability of occurrence is relative (3). The area of influence is extended (5). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is relative (4) due to the provision of an on site workers camp and medical clinic. Mitigation is possible to a certain extent (3). This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Relocation of the football field affecting the football ground users

- The proposed site for market development contains a football field that is currently maintained and used by the local Youth Club. The current 1.21 ha football field site will be relocated and will receive a new place within the boundaries of the proposed market.
- The impact is direct. The probability of occurrence is certain (5). The area of influence is connected to site (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is relative high (4) since access to site will not be possible during construction. Mitigation is possible to a certain extent (3). This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Potential worker's health and safety risks due to construction physical, chemical and confined space, exposure to noise and dust

- An estimated 200 workers will be involved in the construction of the wholesale market. The construction works involve a high diversity of works that may pose health and safety risks if the proper occupational health and safety protocol is not diligently applied.

- The impact is direct. The probability of occurrence is high (4). The area of influence is connected to site (1). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is relative high (4) due to severity of the currently known occupational health and safety accidents and construction practices in Nepal. Mitigation is possible (2). This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Community relations and inter-relationships

Establishment of a worker camp potentially affecting the community cohesion

Construction of the market will require the establishment of a worker camp that may inadvertently affect the local communities. The camp may host up to 200 workers. The diversity of non-local camp residents may result in altercations stemming from cultural, ethnic, race and/or gender differences. Mistreatment, abusive behaviours and sexual misconduct towards other camp residents as well as surrounding communities is possible.

- **Competition for resources:** when non-local workers arrive in a new community, they may compete with locals for housing, resources, leading to tension and conflict.
- **Cultural differences:** nonlocal workers may have different cultural practices and norms that are unfamiliar or unacceptable to locals, leading to misunderstandings and conflict.
- **Perceived threats to local jobs:** nonlocal workers may be seen as a threat to local jobs, particularly in industries where there is a high demand for labour. This can lead to conflict between locals and migrant workers.
- **Language barriers:** Language barriers can make it difficult for locals and non-local workers to communicate effectively, leading to misunderstandings and conflict. The peak workforce is estimated at 200 workers. Yet there is no clear indication, how many are likely to be local or non-local. During the Public Hearing for this project and engagements with the local authorities, this community cohesion was mentioned. It was requested that this item is paid attention to, to ensure law and order in project area. There is no current data to suggest that there are current socio-political strains in the surrounding communities.
- **Perceived increase of criminal activity, sense of insecurity in the community:** As non-local workers begin to visit nearby communities more often, community discomfort relating to having ‘foreign’ people in their communities may entice them to be more sensitive to associating criminal occurrences to them (social insecurity). The perception that ‘foreign’ people bring crime into the area, is possible. However, as local workers are also part of the workforce, the perception targeting foreign workers may not be strong enough to cause damage to relationships.
- **Introduction of further social ills:** Apart from possible conflicts related to having a non-local workforce engaging with local people and the possible spin-off effect thereof, there are other influences that could change the social fabric of existing local communities. Changing behaviours relating to the introduction of drugs and alcohol not only degrades the religious standing of communities, but also introduces

potential instances of sexual harassment (transmittal of communicable diseases) and abuse.

- The impact is direct. The probability of occurrence is high (4). The area of influence is extended (1). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is relatively high (4) due to sensitivities of items involved. Mitigation is possible (2). This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Ground water availability in the surrounding communities' wells

- Consumption of ground water by the project might lower water table, which might result in lowering of the water tables in the wells and tube wells in the surrounding areas compromising locals' ability to consume water for domestic as well as agricultural purposes
- The impact is indirect. The probability of occurrence is relative (3) due to the fact that groundwater is available in the project area, but groundwater abstraction tests have not been conducted yet. The area of influence is site and vicinity (2). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is very low (1) since relative limited volume of water is required for construction activities. Mitigation is possible through development and implementation of sustainable (ground) water management practices (2). The environmental significance is **negligible**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Decreased availability of natural resources (surface and groundwater water, soil) due to pollution

- Pollution of water and soil by the project activities can affect local communities, particularly, those who have been using the land for farming and/or water for irrigation/livestock feeding. This could affect their livelihoods, *e.g.*, reductions in agricultural yields or animal husbandry
- The impact is indirect. The probability of occurrence is high (4) considering the average construction practices in the county. The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 year construction period. The magnitude is low (2) since only limited chemicals and hazardous materials will be used in construction. Mitigation is possible through development and implementation of sound construction practices and chemicals management (2). The environmental significance of this impact to soil is rated **as low**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduce.

Impacts on the structural integrity of the Shiva Temple

- The Shiva Temple which is located adjacent to the wholesale market will not undergo any restriction of access during construction of the market. Access to the Temple may even become easier if the newly built access roads is in place. The temple is fenced and has a gate that can be locked. As such the construction activities will not impact the integrity of temple since these will take place outside the fence of the temple
- Furthermore, the site is not surrounded by any religious and cultural place of worship. Therefore, access to culturally important area for cremation, religious sites will not be restricted by the construction of the market.
- The impact is direct. The probability of occurrence is low (2) considering construction works to be done. The area of influence is site specific (1). The duration is months to years (3) and connected to the 2 years construction period. The magnitude is low (2). Mitigation is possible though development and implementation of sound construction practices (2). The environmental significance of this impact to soil is rated **as low**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduce.

7.2.3.3 Operation phase

Potential impacts to downstream bridge and communities located north of the river due to new wholesale market in a portion of the river floodplain

- Construction and operation of the wholesale market in the flood plain of the river may also create potential impacts to the surrounding areas such as the bridge and communities north due to elevated flood levels. These impacts, if present, will emerge during operational phase once the land raise/buildings have been built.
- The impact is indirect for adjoining areas. The probability of occurrence is high and predicted based on the flooding risk assessment report (4). The area of influence is extended (4). The duration is years to decade (4) and connected to the live time of the market. The magnitude is very high (5) as the impact can cause damage to assets and private property (without any flood protection measures in place). Mitigation is possible, e.g., the proposed flooding risk measures and update of the study in the detail design (1). The environmental significance of this impact is rated **as high** and requires further assessments to reconfirm the range of mitigation measures to be put in place. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Wholesale market groundwater abstraction affecting the surrounding community wells

- Substantial groundwater will be required for wholesale market operation. Groundwater abstraction may impact the groundwater level and availability in the project area. This could affect local communities who use water for irrigation or livestock feeding. This could affect economy/livelihoods due to reductions in agricultural yields or animal husbandry.

- The impact is indirect. The probability of occurrence is relative (3) due to the fact that groundwater is available in the project area, but groundwater abstraction tests have not been conducted yet. The area of influence is extended (3). The duration is years to decade (4) and connected to the live time of the market. The magnitude is relative (3) considering the volume of water to be extracted on the daily basis. Mitigation is possible through development and implementation of sustainable (ground) water management practices (3) and additional commitments in case the impact does materialize. The environmental significance is **moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Availability of natural resources to community (surface and groundwater water, soil) due to pollution originating from the wholesale market

- The wholesale market will generate wastewater that will be treated in a dedicated wastewater treatment plant. The effluent of the plant shall be compliant with the IFC and Nepali discharge parameters as explained in section 2.2.5. If the effluent is not compliant and being directly discharged into the surface water, e.g., Danab River, this may impact the quality of the surface water and affect the users using this water for irrigation or other domestic needs (livestock feeding). This could affect the livelihoods of people practicing animal husbandry.
- The impact is indirect. The probability of occurrence is low (2). The area of influence is extended (3). The duration is years to decade (4) and connected to the live time of the market. The magnitude is relative (3) considering the volume of effluent to be discharged into the river and the existing practices of using the river. Mitigation is possible through development and implementation of sustainable (surface) water management practices (2). The environmental significance is **low**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Required energy consumption of the wholesale market thereby affecting overall energy availability

- Operation of the wholesale market will require a substantial amount of electricity. The market will be connected to the national grid and contain solar panels on the processing buildings. Nevertheless, the amount of electricity required for the market may put pressure on the local energy net. This could impact the availability of energy for local communities.
- The impact is indirect. The probability of occurrence is relative (2) since power availability aspects have not been yet coordinated with the local authorities. The area of influence is extended (3). The duration is years to decade (4) and connected to the live time of the market. The magnitude is relative (3) considering the scale of communities that can be affected. Mitigation is possible (2). The environmental significance is **low**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Traffic related impacts

Traffic nuisance (noise, emissions, dust community health and safety risks) due to operation of the market affecting surrounding communities

- One of the main reasons for developing a new wholesale market in Ward 15 is to alleviate the current environmental pressure of the existing wholesale market located in the centre of Butwal. Nevertheless, impacts will be present at the new market as well and especially connected to increased traffic on roads. Communities and roads that are in use within and around the new wholesale market will likely see an increase in traffic. Estimate 1,000 traffic movements per day are expected during operation phase of the market, e.g., for delivery and dispatch of fruits and vegetables.
- This may create nuisance with surrounding communities due to noise, combustion emissions and dust affecting the ambient air quality. Dust will occur especially during the dry season, while in the wet season the roads can become muddy due to the continues transport towards and from the market.
- Transport of personnel and materials may result in unsafe conditions and road accidents affecting the communities located near the market and along the roads connected to the market.
- The impact is direct. The probability of occurrence is high (4). The area of influence is site and vicinity (3). The duration is years to decade (4) and connected to the live time of the market. The magnitude is high (4) due sensitive receptors located in the direct vicinity of the site, transport routes connected to site and the status of these roads cumulative weathering impacts. Mitigation is possible but only partial (4) since operation of traffic, machinery, delivery of goods will remain required. The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Deterioration of public roads due to intense use by the market users

- Roads will be intensively used for delivery of goods to the market. This will put pressure on the integrity of the roads and will affect the resulting noise and dust level from these roads. The market access road is the responsibility of the market and will be maintained by the market. However, the municipal roads will remain under the responsibility and attention of local authorities.
- The impact is direct. The probability of occurrence is high (4). The area of influence is site and its vicinity (2). The duration is years to decade (4) and connected to the live time of the market. The magnitude is relative (3) due to the status of transport routes connected to site. Mitigation is possible (2). The environmental significance of this impact is rated **as moderate**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Nuisance, community health and sanitary risks related to operation of the market and improper waste disposal

- Various waste stream will be generated during the operation of the market. The site foresees development of waste collection and temporary storage on site as well as wastewater treatment plant (embedded in the design). A composting plant is foreseen by the project, however due to land requirements and potential odour emissions, it has been decided in close consultation with Ward 15 authorities to locate the facility outside the market. Although facilities are foreseen by the project, improper operation of these can cause significant harm to local environmental quality, health and safety of workers and surrounding communities.
- The impact is direct. The probability of occurrence is high (4). The area of influence is extended (4). The duration is years to decade (4) and connected to the live time of the market. The magnitude is high (4). Mitigation is possible (2). This impact has therefore a **moderate** significance. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Access to and structural integrity of the Shiva Temple

- The Shiva Temple which is located adjacent to the wholesale market will not undergo any restriction of access during operations of the market. Access to the Temple may even become easier if the newly built access roads is in place.
- Furthermore, the market is not surrounded by any religious and cultural place of worship. Therefore, access to culturally important area for cremation, religious sites will not be restricted by the operation of the market.
- The Shiva temple will remain untouched and undisturbed throughout the operation of the wholesale market.
- The impact is indirect. The probability of occurrence is very low (1). The area of influence is site and its direct vicinity (2). The duration is years to decade (4) and connected to the live time of the market. The magnitude is low (2). Mitigation is possible (1). This impact is considered **negligible**. Provided the mitigation measures as listed in the EMP are implemented and monitored, the significance of the impact will be reduced.

Chapter 8 Mitigation and Enhancement Measures

8.1 Introduction

An important element of the environmental assessment process is to prevent or reduce the significant impacts of development using mitigation measures. The approach is that, wherever possible, efforts should be made to mitigate the negative environmental and social effects. The mitigation hierarchy follows a clear order of preference: prevent, reduce, remedy, compensate. Consequently, the main mitigation efforts have been directed at:

- Prevent impacts at source/reduce at source;
- Abate impacts on site;
- Abate impacts at receptor level;
- Repair or remedy impacts;
- Compensate in kind;
- Compensate through other means.

Mitigation measures presented in this chapter of the report represent actions that are commitments for the Project Proponent. The means of implementing these commitments is through developing an Environmental Management Plan for the Project. The mitigation measures as listed in this EIA report, the associated timelines, costs, roles and responsibilities are the base of the future EMP.

8.2 Physical environment

8.2.1 Pre-construction Phase

Riverbank erosion and flooding risk due to community forest removal, land raise and erecting of the wholesale market buildings in the river floodplain affecting the construction site and adjoining areas PH1

To mitigate potential impacts from erosion, flooding, or site instability, the project design contains the following measures: levelling of the project site (fill-up the lower parts) and elevate the buildings with 0.8m (these measures are embedded in the project design).

Before these measures are implemented, we recommend undertaking an update of the Flooding Risk Impact Assessment and assess the hydraulic, morphological and community health and safety impacts of:

- Removal of vegetation (i.e., trees) at the site;
- Effectiveness of existing measures (i.e., gabion wall, design/presence of the Danab Road Corridor Road);
- Impact of the tributaries north of the site.
- Sufficiency of the proposed mitigation measures as concluded by the study.
- The assessment should consider how flooding in the area can change in the future due to climate and economic development and a plan on what to do when the mitigation measures' capacities are exceeded

A cost-benefit analysis shall be undertaken to evaluate the effectiveness of different flood protection measures based on the hydraulic and morphological assessment. From this, it's

likely to result in additional measures, such as construction of erosion protection, an additional flood wall or dike and extra erosion protection.

See for the proposed scope of additional studies to be conducted during the detailed stage of the project in the Flooding Risk Impact Assessment Report, in Appendix 15b.

Potential impacts on the groundwater levels due to abstraction PH2

The following measures are proposed:

- Assess the current and future conditions of the groundwater source
- Undertake a ground water pumping test
- Develop a plan to use alternative sources of water in times of crises including the reuse of treated wastewater where possible
- Develop a monitoring plan to detect groundwater over extraction
- Identify and integrate water reduction solutions in the detailed design of the project; both for the construction and operational phases. The solutions must align with IFC EHS guidelines 1.4 on water conservation, 3.1 on water quality and availability and 4.1 on environment.
- The chosen construction contractor must show evidence on how the identified solutions are utilized in performing the construction activities before the start of the construction works.

8.2.2 Framework of mitigation measures on physical environment

The mitigation measures described in 8.2.1 on physical environment are presented as a collected overview in the table below.

Table 8.1: Mitigation measures on physical environment construction phase

| S.N. | Mitigation measure | Location | Schedule | Cost | Responsibility |
|-------------|--|-----------------|--|--|-------------------------------------|
| PH1 | Update of the Flooding Risk Assessment | Project site | Pre-construction phase (Detail design stage) | 300 000 USD, excluding local data collection and surveys | IIPP with input from IFAD and MoALD |
| PH2 | Groundwater management | Project site | Pre-construction phase (Detail design stage) | 75000 USD | MoALD, IFAD |

8.2.3 Construction Phase

Potential impacts due to land use change from community forest to built-up/commercial.

Due to nature of the project, the mitigation measures for this land use change are addressed under the biological environment. BI1 and BI2.

Riverbank erosion and flooding risk due to community forest removal, land raise and erecting of the wholesale market buildings in the river floodplain affecting the construction site and adjoining areas PH4

Implement and monitor the flooding and erosion protection measures as re-confirmed by the update of the Flooding Risk Assessment during the detailed design.

Loss of topsoil due to excavation and earth works PH5

Conservation and stockpiling of the topsoil, which can be used for restoration of the site after completion of the construction.

Potential disturbance and degradation of soil, compaction of soil due to construction activities PH6

The following measures are proposed:

(1) Avoid unnecessary excavation, (2) minimize soil compaction by using lighter machinery or avoid heavy equipment during wet conditions, (3) protect topsoil by stockpiling it and reusing it in the landscaping or grading processing, (4) limit the area of soil disturbance by staging the construction process and confining the construction activities to smaller areas at a time, (5) revegetate the area after completion of the construction at that site.

Potential contamination of soil due to accidental spills and leaks PH7

Chemicals and fuel use can create spills and leaks. These can seep down to contaminate the soil particularly from the area where chemicals are stored and used, vehicle parking and maintenance area, mechanical yards *etc.* The mitigation shall include:

- All chemicals on site shall be registered, have a complete Material Safety Data Sheet (MSDS) and a corresponding risk assessment for their use. Workers using chemicals shall be trained on correct use of chemicals (based on MSDS and risk assessment), provided with the required PPE. Additionally, workers will be trained on how to respond to chemicals spills and leaks.
- Chemical and fuel storage, maintenance workshops and parking lots will be located on dedicated yards at secure distance from the Danab River and any other water sources.
- These dedicated yards will be bunded, e.g., include watertight concrete floors and drainage systems connected to an oily water separation system. Recovered oil that cannot be recycled will be collected in an oil tank for removal by a waste contractor.
- In case concrete floors are yet to be provided, and/or cannot be provided, then the alternative is to use drip trays. which shall be provided at the site by the contractors.
- The construction site will have a spill response kit with sufficient absorbent materials like dry sand, sandbags available at all times.
- The Contractor E&S officer will be responsible for training and weekly inspection of the topic on site, check availability of the spill's materials, and their correct disposal.

Potential impacts on the groundwater levels due to abstraction PH8

The following measures are proposed:

- Use water efficient technologies and practices, such as low fixtures, and recycling of water for non-potable uses, to reduce demand for water.
- Use alternative sources of water such as rainwater, treated water for non-potable uses - dust control, site cleaning.

- Promote water conservation practices among the construction workers through training and awareness programs, conduct regular inspections to ensure that water management practices are being implemented effectively.

Potential impacts to the groundwater quality due to accidental spills and leaks PH9.

See mitigation measures as listed under the PH7, protection of soil from spills and leaks.

Increase in Danab River sedimentation load due to construction in the river flood plain and run off from construction site PH10

During the construction, and especially the monsoon season stormwater (rainwater) will accumulate on site and will require proper management. Stormwater may also wash down exposed soil from the construction site including storage sites, access roads and other sites into Danab River. As a result of this, the sediment load of the Danab River may increase degrading river water quality and increasing water turbidity. Stormwater may also carry contaminants into the river and contaminate the water. The following mitigation measures will be applied:

- Aim for all major earthworks to be performed during the dry season (October till the mid-to-late May).
- Construct stormwater collection channels, drainage control berms, sediment traps and control dams, and other means will be used as necessary to minimise cross contamination at the construction site as well as supporting facilities and workers' camp.
- Potentially contaminated stormwater, e.g., from maintenance workshop areas, parking, etc., will be kept separate from other drainage at construction sites.
- The collected stormwater will be treated in a sedimentary tank prior to releasing into the Danab River. Potentially contaminated stormwater shall, if necessary, be tested and treated to remove contaminants before being released into the environment (e.g., passing through an oily water separation system).

Potential impacts to the Danab River water quality due to improper construction site/camp management practices PH11

The labour camp shall be established in line with the Workers' accommodation: processes and standards, guidance note by IFC and the EBRD, 2009. This guideline provides requirements in terms of how to assess the need and requirements for workers accommodation (e.g., the m2 per type of accommodation, ratio living and recreational space, required services, etc), how to assess impacts of workers' accommodation on communities, standards for workers accommodation, management practices, etc/. and provides useful framework for managing this activity.

With respect to waste management, please refer to mitigation measures as listed in PH14.

Deterioration of ambient air quality due to construction related emissions (traffic and operation of machinery) and dust at the construction site and adjoining areas PH12

The primary sources of air pollution are the operation of batching plants, earth excavation works, handling and transport of construction material, etc. The primary pollutants expected are dust and combustion emissions. The mitigation measure will include:

- Calculate the maximum electricity demand of the construction site and size diesel generators (used at site and camp), considering the operational efficiencies of the generator sets. Generator sets could be configured so that those providing the baseload run are set to run at their optimum load (based on manufacturers specifications), while those providing power during peak periods could be fitted with variable speed drives.
- When more detailed information becomes available, recalculate the maximum water demand of the construction site, camp and size diesel generator and pump sets accordingly, taking into account the operational efficiency of the water pump. Generator and pump set could be fitted with a Variable Speed Drives to ensure that the loading of the generator and pump set is more responsive to changes in demand.
- Undertake regular checking, upkeeping, and maintenance of the equipment and vehicles used in construction, especially in terms of their exhaust gasses.
- For the construction heavy vehicles, within the carrying capacity of the vehicles, maximise the load transported in each trip in order to reduce the number of trips.
- Sprinkle water during the earthworks to avoid dust being dispersed to surroundings.
- Cover the stockpiled construction materials and particularly soil during the monsoon season and periods with strong wind.
- Set the following rules for traffic: speed limit 20 - 30 km/hr when passing settlement areas, engine idling of vehicle maximum of 5 mins, cover the cargo.
- Strictly prohibit of uncontrolled burning of solid waste on site.
- Where possible, plant live fences, such as tall hedges to serve as barrier between market and nearby households.

Increase in ambient noise levels, vibration and light due to construction works PH13

Construction works and use of vehicles are sources of noise, light and vibration. These can affect environmental quality and increase social nuisance. The following mitigation measures are proposed:

- Place noisy activities, e.g., operation of generators as far as possible from noise sensitive receptors (e.g., consider the location of households located south from site, at est. 200m).
- The starting point is that construction will take place only during daytime (7.AM – 10.PM). However, in practice delivery of construction materials may take place during night or early morning hours when it is still dark. The Contractor will, therefore, identify zones of high and low lighting requirements, focusing on only illuminating areas to the minimum extent possible to allow safe delivery of materials at night and for security surveillance.

- Utilise security lights that are movement activated rather than permanently switched on. Fit all security lighting with ‘blinkers’ or specifically designed fixtures, to ensure light is directed downwards while preventing side spill. Eliminate any ground-level spotlights.
- Provide adequate training and PPE including acoustic earplugs to the workers involved in works with a higher noise level.

Pollution of direct environment due to improper waste management PH14

During the construction stage various waste streams will be generated, which can compromise the environmental quality, sanitary condition of the project site as well as at surrounding settlements. The following mitigation measures are proposed:

- The Contractor must ensure that the waste management system is in place prior to commencement of the construction work, which include collection and sanitary disposal of waste.
- All waste generated shall be recorded according to category and national legal requirements.
- The segregation of biodegradable, non-degradable, hazardous waste will be done by using separate waste bins with proper signage.
- The waste bins and temporary storage yards must be enclosed, have watertight cement floor, and include restricted access to vermin and other wildlife. Temporary storage shall be located at least 500 m away from the Danab River. Final disposal of waste will be done by locally approved waste contractors and sites.
- Construction site will contain a WC connected to a septic tank system to be serviced and disposed by a third party on a weekly basis or each day during the hot months of the year.
- The workers must be trained on good housekeeping and environmentally sound storage and disposal of construction related waste.

8.2.4 Framework of mitigation measures on physical environment

The mitigation measures described in 8.2.3 on physical environment are presented as a collected overview in the table below.

Table 8.2: Mitigation measures on physical environment construction phase

| S.N. | Mitigation measure | Location | Schedule | Cost | Responsibility |
|--------------------|--------------------------------------|---|--------------------|------------------------------|-----------------------|
| PH4 | Riverbank erosion and flooding risks | Norther boundary of the project and along, upstream and downstream of the Danab river | Construction stage | Included in the project cost | MoALD, IFAD |
| PH5 PH 6 PH7 | Soil protection measures | Construction site | Construction stage | Included in the project cost | MoALD, IFAD |

| S.N. | Mitigation measure | Location | Schedule | Cost | Responsibility |
|--------------|--|-------------------|--------------------|------------------------------|----------------|
| PH8 PH9 | Ground water protection measures | Construction site | Construction stage | Included in the project cost | MoALD, IFAD |
| PH10 PH11 | Surface water protection measures Stormwater management | Construction site | Construction stage | Included in the project cost | MoALD, IFAD |
| PH12 | Ambient Air Quality protection measures | Construction site | Construction stage | 10000 USD/ per Year | MoALD, IFAD |
| PH13 | Noise, light and vibration | Construction site | Construction stage | | |
| PH14 | Waste Management | Construction site | Construction stage | Included in the project cost | MoALD, IFAD |

8.2.5 Operation Phase

Flooding Risks PH15 and PH16

A site-specific flood risk impact assessment has been conducted for this project to better understand the flooding risks and its impacts. Flood risk has been assessed for four scenarios – 1 baseline and 3 alternatives:

1. A baseline scenario without any adaptation measures;
2. Alternative A: A scenario with building elevation of 0.8m;
3. Alternative B: A scenario with a landfill;
4. Alternative C: A scenario with a landfill and building elevation of 0.8m.

Based on the above Alternative C has proven to be the most suitable and cost-efficient set of measures, reducing the risk from baseline scenario of about 588,000 EUR damage per year to about 15.000 EUR per year. The road corridor could be elevated to act as a dike structure, potentially also in combination with elevation of buildings. However, as the road corridor is not being developed as part of the wholesale market, care should be taken as it might be built with the necessary standards.

Before Alternative C is implemented it is recommended to undertake the update of the Flooding Risk Impact Assessment during the detailed stage of the project and assess the hydraulic and morphological impacts to the site and in the wider perspective, see details in 8.2.1 and Flooding Risk Impact Assessment in Appendix 15b.

Potential impacts on the groundwater levels due to abstraction PH17

Although the relative storage capacity of groundwater is substantial, still a large net amount of water will be required for operation of the project. It is estimated to be about 750,000 litres daily, which will be fulfilled using groundwater source. The following measures are proposed to optimise the demand and stimulate sustainable groundwater management:

- Follow the plans developed in PH2.
- Biannually check and repair the water pipes and taps to reduce leakage, if necessary
- Review the project water demand during the detailed design since the current water demand estimate includes a 30% contingency post. Undertake a project water balance to improve the accuracy of the water demand. Subsequently, review and adjust the Wastewater Treatment Plant capacity, see section solid waste management below for details.
- Rainwater harvesting will be installed to capture and store rainwater, which can be used for non-potable purposes like cleaning and toilet flushing (this measure is currently embedded in project design of the storage and processing buildings).
- Implement water-efficient technologies such as low flow faucets and toilets to reduce water usage.
- The storm (rain) water drainage system will also have a soak pit incorporated so that water will have a better chance to recharge the groundwater than simply flow out into the Danab River.

Deterioration of ambient air quality due to operation related emissions and dust PH18

During the operation stage, the project will cause pollution of ambient air. The primary sources of air pollution will be (a) transport vehicles, (b) operation of generators (back up), (c) solid waste management on site. The proposed mitigation measures are as follows:

- Calculate the project GHG profile considering the energy mass balance during the detailed design and final equipment selection.
- Calculate the maximum electricity demand of the wholesale market and size back up diesel generators, considering the operational efficiencies of the generator sets.
- When more detailed information becomes available, recalculate the maximum water demand of the operation of the wholesale market and size diesel generator and pump sets accordingly, taking into account the operational efficiency of the water pump. Generator and pump set could be fitted with a Variable Speed Drives to ensure that the loading of the generator and pump set is more responsive to changes in demand.
- Ensure connecting the market to the public transportation network which could reduce the number of personal vehicles coming to the market, and hence reduce vehicular exhaust gases.
- Regular maintenance of the vehicles owned by the market, and set maintenance protocol for transportation vehicles, so that these vehicles run efficient, thus, minimise emitting excessive pollutants.
- Ensure that the roads to the market are in good condition and maintain on a regular basis to avoid dust pollution in the surrounding settlements.
- Consider the lobby for a direct road connection to the highway from the market, allowing suppliers to avoid local entrance roads.
- Where possible, plant live fences, such as tall hedges to serve as barrier between market and nearby households.

Increase in ambient noise levels, vibration and light due to operation of the wholesale market PH19

The operation works and use of vehicles are sources of noise, light and vibration. The following measures will be carried out to address these issues:

- One of the effective ways to reduce noise and light issues is to install barriers, such as walls (up to 2m in height), fences and vegetation that can block the noise and light, as well as absorb sound waves. This will help in keeping the noise and light within the wholesale market area. Installation of sound walls can also increase the road safety since crossing of the roads will be in dedicated placed only.
- Identify zones of high and low lighting requirements, focusing on only illuminating areas to the minimum extent possible to allow safe delivery of materials at night and for security surveillance. Utilise security lights that are movement activated rather than permanently switched on. Fit all security lighting with ‘blinkers’ or specifically designed fixtures, to ensure light is directed downwards while preventing side spill. Eliminate any ground-level spotlights.
- Regular maintenance of machinery and equipment can also help to reduce noise pollution.

Pollution of direct environment due to improper waste management PH20

Various waste streams will be generated during the wholesale market operation. The following activities shall be implemented.

Solid waste

- The segregation of biodegradable, non-degradable, hazardous waste shall be done by using separate waste bins with proper signage.
- All waste generated shall be recorded according to category and national legal requirements.
- The waste bins and waste storage yards must be enclosed, have watertight cement floor, and include restricted access to vermin and other wildlife. Storage yards shall be located at least 500 m away from the Danab River. Final disposal of waste shall be done by locally approved waste contractors and sites.
- Ensure enough waste bins covering all areas of the market and sufficient staff to handle waste and cleaning of the facility.
- Market personnel and shop owners must be induced and trained on good housekeeping and environmentally sound storage and disposal of construction related waste.
- Collaborate with the local municipality to develop a long-term solid waste management system for the project as well as settlement.
- The composting facility can be developed outside the market that can process the biodegradable waste.
- The Wholesale Market E&S officer together with the Project Proponent shall undertake a due diligence of the waste contractor and sites used for final disposal of waste on compliance with Nepali regulation and this project requirements.

Wholesale Market E&S officer shall be responsible for training on the subject, weekly inspection of waste management system on site.

- During the Public Hearing for this EIA, a question has been raised on management of fruits and vegetables that have a high pesticides content and cannot be traded/ consumed and shall be disposed in a responsible, environmentally safe manner. First all, this waste stream shall be collected separately from the other organic waste. We advise the future market operator to discuss the treatment possibility of this waste stream with the waste management companies, e.g., composting may be still feasible. The waste management companies shall than demonstrate that their treatment process can treat this waste stream and that the end product does not have a high metal/chemical content and is safe for the environment. This can be done via a laboratory testing of the compost. Alternative solution is to collect this waste stream separately, compost it separately (when sufficient volume is present) and dispose the compost in areas that are not used for agriculture. Selection of such areas shall be done in close dialog with the local authorities.

Wastewater

- Review the capacity of the Wastewater treatment Plant during the detailed design, based on the accurate water demand and water balance exercise.
- With respect to the Wastewater Treatment Plant (embedded in the design), effluent shall comply with the Nepali effluent standard / IFC World Bank General EHS Guidelines, which weather is more stringent.
- Treated effluent (when meeting the above effluent quality) shall be used for site irrigation, wheel washing or discharge to Danab River.
- Remaining sludge from WWTP shall be collected and disposed by approved third party, e.g., trough composting.

Oily water

- All areas of possible oil leakage shall be banded.
- An oily water separator shall be used to treat the contaminated 'stormwater'/service water stream to reduce volume of oil to be cleaned/recycled.
- Oil that cannot be recycled can be collected in an oil tank for removal by a waste contractor.
- The oily storm (rain) water system must be designed to contain the 1 in 100-year storm event; or the buffer capacity (reservoir size) of the possible contaminated storm water sewer must be based on a risk analysis of different release scenarios.
- The storm (rain) water system of the site must be able to handle all fire protection water, in case of an emergency. There should be sufficient capacity to store the water and not discharge into the environment before conducting chemical analysis.
- Oil traps must be included in the design of the storm (rain) water sewer. Oil recovered from oil traps must be recycled or disposed of through a certified waste contractor.

8.2.6 Framework of mitigation measures on physical environment

The mitigation measures described in 8.2.5 on physical environment during the operations phase are presented as a collected overview in the table below.

Table 8.3: Mitigation measures on physical environment operation phase

| S.N. | Mitigation measure | Location | Schedule | Cost | Responsibility |
|------|--|------------------|-----------------|--------------------------------|----------------|
| PH16 | Flooding risk assessment, riverbank erosion | Wholesale Market | Operation stage | Included into the project cost | MoALD, IFAD |
| PH17 | Groundwater abstraction and conservation | Wholesale Market | Operation stage | Included into the project cost | MoALD, IFAD |
| PH18 | Ambient Air Quality protection measures | Wholesale Market | Operation stage | 10,000 USD per year | MoALD, IFAD |
| PH19 | Noise, light and vibration protection measures | Wholesale Market | Operation stage | | MoALD, IFAD |
| PH20 | Waste Management | Wholesale Market | Operation stage | Included into the project cost | MoALD, IFAD |

8.3 Biological Environment

8.3.1 Pre-construction Phase

Loss of forest vegetation due to construction of the wholesale market BI1

The site contains a CF. During the detailed design, a review of the design shall take place to identify areas of CF that could be maintained as future greenery for the wholesale market.

Compensation to lost forest area

Acquisition of forest area for the project site will be guided by the Standards and Work Procedures Regarding the Use of National Forest Area for Projects of National Priority, 2076 BS.

Adhering with the work procedures, the project will have to handover equal quantities of land to the GoN as far as available. Alternatively, the project will pay the sum of money against the land at the rates specified for various types of land by Schedule 1 pertaining to

the section 10 of Standards and Work Procedures Regarding Use of National Forest Area for Projects of National Priority, 2076 BS. The project will clear the forest and stockpile as per the guidance of the Forest Produces Collection, Sale and Distribution Directives (2075) and will be handed over to the respective owners. The forest vegetation will be cleared as per the requirement of the project only following marking and documentation of the trees to be felled through joint inspection including the Divisional Forest Office (DFO). Remuneration of the government and community authority during the inspection including the cost for felling of the trees and managing the stockpile will be borne by the Project Proponent.

Compensatory plantation for the removed trees during the site clearance

Loss of forest cannot be avoided including for construction of this project, thus will have to be mitigated through compensatory plantation. In addition to it, the project will also carry out conservation works to improve forest conditions in degraded areas and/or unused lands. According to the Forest Rules, the compensatory plantations shall be carried in the ratio of 1:10 *i.e.*, plantation of 10 samplings for every lost tree. However, the ratio of plantation must be higher if the trees are removed from Protected Area, which is 1: 25. The compensatory plantation must be carried out in collaboration with the Divisional Forest Office (DFO) and the Ratanpur Community Forest User Groups (CFUG) of the respective District, which will consist of “cutting, stockpiling and transportation” of the felled trees. Furthermore, appropriate areas for the plantation shall be selected in coordination with them including management of the plantation sites (fencing, regular water treatment, caring) for the duration of 5 years from the plantation date. Regulatory procedures: The document of ‘Standards and Work Procedures Regarding Use of National Forests Area for Projects of National Priority, 2076 B.S.’ will be duly followed for this process.

Table 8.4: Compensatory Plantation and cost

| Cost calculation | Nos of trees to be cut down and rate | Total Cost | Remarks |
|--|--------------------------------------|------------|------------------------------|
| Total tree to be lost | 702 | | |
| No. of trees needed for compensatory plantation (in 1:10 ratio) | 7020 | | 1600 sapling/ ha |
| Cost for plantation (7020 sapling, including seedling cost and transportation, land preparation, etc.) [NPR] | @ 300 per plant | 2,106,000 | |
| Caring of saplings for 5 years (including caring, weeding, watering, watching, etc.) [NPR] | @ 100 | 245,700 | |
| Felling of trees (702 individuals including felling and transportation) [NPR] | @ 2000 per tree | 1,404,000 | |
| Total cost [NPR] | | 3,755,700 | |
| Total cost [USD] | USD 1= NRs 132.84 | 28,272.3 | Exchange rate on 20 Feb 2023 |

The following compensation plantation process will be undertaken:

- The project proponent together with the contractor will develop a reforestation plan using a plantation ratio of 1:10 as the project site is in the Ratanpur CF. To ensure that the project will cause “no net loss of biodiversity”, the forest land acquired by the project will be compensated by converting the same amount of land into the forest land.
- The compensatory plantation will require ensuring procurement of the tree saplings from the existing nurseries.
- Reforestation implementation to be undertaken in accordance with agreed reforestation plan at a standard ratio of 1600 seedlings per ha, unless otherwise indicated by DFO and Community Forest Groups due to local site conditions or species requirements.

- Reforestation sites will be selected in consultation with the Division Forest Office and Ratanpur CFUG, to be in similar climate range and soil type as deforested section as much as possible; proximity to existing protected or forest areas will be preferred to extend species habitat range.
- Plantation designs for each specific reforestation site identified will be developed after consultation with the Division Forest Offices and Ratanpur CFUG.
- Local species will be prioritised for plantation. Moreover, the Ratanpur CFUG preference will also be considered in selecting the species.
- The project proponent *i.e.*, the wholesale market must manage the re-vegetated areas for the duration 5 years after plantation, then hand it over to the DFO and Community Forest Group. Alternatively, the proponent may choose to delegate management of the plantation areas to the DFO / Community Forest Group, though the proponent must ensure the support for the whole 5 years.
- Promote if protected area management and forest officials in concurrence eco-friendly vegetation removal methods, while ensuring no disturbance to pre-existing habitat, for instance using goats for clearing overgrown bushes and small trees (under strict supervision) around high voltage power lines is known to be more effective as it is faster, cheaper and more eco-friendly. These animals can reach difficult places that are challenging for people to access and can eliminate the need for fuel for cutting devices.

The selection of the site where to replanting will be done, will be identified during the detailed design by the Project proponent in consultation with the Division Forest Office. Evidence of Broad Community Support (BCS) must be obtained. See further details in the EMP.

Impact on nationally protected tree species of Simal affecting conservation goals (review the detail design to save the 4 trees of Simal) BI2

According to the Forest Rules, the compensatory plantations are mandatory for every felled tree in the ratio of 1:10 for the trees of common category but in 1:25 ratios for the protected ones with national priority projects. Two species of protected tree species were found in the project area - Simal (*Bombax ceiba*) and Sal (*Shorea robusta*), however, only 4 individual trees of Simal were recorded inside the project site which might be lost due to construction activities. Firstly, these individuals shall be protected from the construction work, e.g., review the design of the market during the detailed design and find opportunities to save these trees to be used as greenery. In case these trees must be removed, compensatory planting of Simal trees in the ratio of 1:25 saplings shall be carried out.

8.3.2 Framework of mitigation measures on biological environment

The mitigation measures described in 8.3.1 on biological environment on the construction phase are presented as a collected overview in the table below.

Table 8.5: Mitigation measures on biological environment construction phase

| | Mitigation measure | Location | Schedule | Cost | Responsibility |
|-----|---|------------------------------------|--|-----------------|--|
| BH1 | Compensatory plantation for the removed trees during the site clearance | Location to be identified with DFO | Pre-construction phase (Detail design stage) | 28272 USD | MoALD, in close cooperation with FDO and Ratanpur CFUG |
| BH2 | Impact on nationally protected tree species of Simal affecting conservation goals | Project Site | Pre-construction phase (Detail design stage) | Included in BH1 | MoALD, in close cooperation with FDO and Ratanpur CFUG |

8.3.3 Construction Phase

Fragmentation of the habitat due to land clearance and site preparation BI3

The removal of vegetation and trees might compromise ecological functions, habitat integrity and biodiversity thus degrading the overall quality of the forest. Thus, the following measures will be carried out to prevent and/or minimise such forest degradation:

- Forest clearance will be compulsory, whereas trees and vegetation in other parts of the site can be preserved. Thus, the project will maintain the ground vegetation wherever or whenever it is possible to minimise tree/vegetation loss.
- Furthermore, while clearing the tree vegetation due attention will be paid and instruction will be given to the contractor to be vigilant and not to cut the trees outside the project site. Likewise, they will be further instructed to take care of the ground vegetation to maintain biodiversity of smaller life-forms. Conservation of surrounding forest area, especially at the thinly populated sites, will be given priority to expand forest growth.
- Conservation of biodiversity and ground vegetation including NTFPs and ethnobotanically important plants. There are forest areas having different growth status in adjacent and surroundings of the project site and degraded natural habitats. Conservation of the forests of moderate quality and afforestation in the degraded habitats of the surrounding area will allow growing almost the same plant species as these sites provide iso-potential habitat conditions due to similar climatic conditions and environmental setting.
- In case of encountering plant species of conservation significance of the herbaceous nature during clearing, care will be taken to translocate those species in suitable adjacent forest habitats in coordination with the forestry officials.

Increase demand for forest products placing pressure on existing forests/ wood availability BI4

The following mitigation will be adopted:

- Strict prohibition on construction workers to enter protected or forest areas outside of their working hours unless an existing resident within a buffer zone.
- Strict prohibition of fuelwood or timber being cut by the construction workers.

- Strict prohibition on purchase, sale, and use of firewood, timber and NTFPs, hunting and poaching of fauna by workers.
- Contractor and construction workers will be prevented from the use of firewood for cooking their food and heating etc.
- Contractor to undertake regular, compulsory awareness raising activities for all workers related to prohibitions including toolbox talks and posting of information and warning signs at site offices, worker camps, and at all work sites in forest land, patrols by security guards employed by the Contractor, regular inspections of the worker camps, and disciplinary procedures for any contravention by the workers.
- Contractor to provide a good standard of worker accommodation with heating and all meals to help discourage breaches of prohibition by the workers.
- Contractor to provide alternative fuel source to communal kitchens and for heating of worker accommodation. Use of fuelwood in communal kitchen
- During maintenance activities, all requirements for construction phase, in particular strict prohibitions on workers, are applicable.

Provision of alternatives to firewood and timber

Firewood collection, timber harvesting and illegal collection of non-timber forest products by the construction workforce in the surrounding area will further accelerate forest degradation. Thus, the following actions are proposed to prevent such activities:

- Alternate sources of energy will be supplied to the workforce and labourers. However, dead logs and branches will be allowed to take from the forest areas in case of inadequacy of the alternate sources.
- Awareness programs will be conducted to the working staff and labourers about the importance of forest environment and healthy ecosystem that will help to a great extent to control unwanted use of firewood, timber and other forest products (see the table below).
- For immediate action, enforcement of strong rules and regulations to the construction workforce, will be imposed and the optimum punishment up to the dismissal of jobs will be applied for those violating the rules. This clause will be included in the contractual agreement with the workforce and staff members.

Table 8.6: Forest and biodiversity training

| Nature of awareness program | Target group | Duration of training | Cost | No. of trainings | Remarks |
|---|---|----------------------|--|------------------|---|
| Forest and biodiversity management training | Construction workforce, project staff, CFUG | One week | 6 Lakh for each district (6 * 4=24 Lakhs) per year for 5 years | Twice a year | The cost includes patrolling the project site for checking illegal hunting and poaching |

Disturbance of wildlife due to construction works (noise, light) BI5

The project construction works might disturb the wildlife, though wildlife presence from the project area was reported to be insignificant, some local herpetofauna and mammals might be affected. The following measures to minimise disturbances to the wildlife:

- The construction area will be fenced to prevent wildlife getting into the construction site to minimise accidents to the wildlife. In case of an accident, ensure emergency fauna rescue and handling procedures, including contacts with the nearest veterinary *etc.*
- Keep written record, supported by photographs, of any animal casualties, including a cause of death if known.
- Construction work can be very noisy and can also generate vibrations that can impact wildlife. Measures such as noise barriers, sound-absorbing materials, and vibration dampening systems can help to reduce these impacts.
- The noisy construction works and use of high intensity lights during the night shall be avoided.
- Trees are to be cleared during non-breeding season – vultures may be using the community forest and their breeding season is January to March. However, no vultures have been recorded during the flora and fauna survey. If this not possible due to weather restrictions on access, trees cleared during breeding season to be checked by ecologist for nests prior to clearance, if present harvesting to be postponed until the young have fledged.
- Prior to undertaking the earthworks, the area will be checked by ecologists for any signs of burrows *etc.* If determined to be occupied, only manual digging under the supervision of the ecologists will be permitted.
- Excavated pits will be robustly fenced or covered to prevent fauna accidentally falling in, further an escape ramp will be provided to allow their escape – particularly in protected and forest areas.

Introduction of invasive non-native species by site clearance works BI6

The following measures are proposed:

- Conduct a thorough inventory of the site before clearing, to identify any existing invasive species
- Use least disruptive methods for site clearance, such as manual removal, rather than using machinery, which can spread invasive seeds
- If machinery must be used, ensure it is thoroughly cleaned before and after use, to prevent the spread of invasive seeds
- Native plants will be considered for re-vegetation after site clearance
- Monitor the site closely for any signs of invasive species after clearance and implement immediate control measures if necessary.

8.3.4 Framework of mitigation measures on biological environment

The mitigation measures described in 8.3.3 on biological environment on the construction phase are presented as a collected overview in the table below.

Table 8.7: Mitigation measures on biological environment construction phase

| | Mitigation measure | Location | Schedule | Cost | Responsibility |
|-----|---|------------------------------------|--------------------|------------------------------|----------------|
| BI3 | Fragmentation of the habitat due to land clearance and site preparation | Project site | Construction stage | 10000 USD / per year | MoALD, IFAD |
| BI4 | Increase demand for forest products Provision of alternatives | Project site Nearby communities | Construction stage | Included in the project cost | MoALD, IFAD |
| BI5 | Disturbance of wildlife due to construction works (noise, light) | Project site | Construction stage | Included in the project cost | MoALD, IFAD |
| BI6 | Introduction of invasive non-native species by site clearance works | Project site | Construction stage | Included in the project cost | MoALD, IFAD |

8.3.5 Operation Phase

Terrestrial wildlife and avia-fauna might be displaced due to habitat modification and interferences in the project area BI7

The following measures are proposed:

- Conduct a baseline survey to identify the species that are being affected by the market operation and their patterns of movement and habitat use
- Install fencing around the market site to prevent wildlife and avifauna from entering the area, and implementing measures to deter wildlife from entering the site
- Monitoring program to track the movement of wildlife and avifauna in and around the market site
- Conducting awareness and education programs for the market operators, workers, and visitors to promote responsible behaviour around wildlife and avifauna

Develop an emergency response plan to address any incidents involving wildlife and avifauna on the market site in collaboration of DFO.

Vermin and sanitary conditions at the wholesale market BI8

The following measures are proposed:

- Prevent the entry and proliferation of vermin around market, such as regular cleaning and disinfection of the market area, installation of screens on doors and windows, and proper storage and disposal of waste.
- Regular inspection of the market area to identify potential sources of vermin and implementing measures to eliminate them, such as sealing gaps and cracks in walls and floors, and removing standing water and debris.
- Providing designated waste collection areas and ensuring that all waste is properly disposed of, to reduce the attraction of vermin to the market.

- Provide adequate ventilation and lighting in the market area, to reduce the risk of vermin infestation and improve overall sanitation.
- Conduct regular cleaning and maintenance of processing and storage areas, to ensure that they are free from vermin and other pests.
- Educate market operators, workers, and visitors about the importance of maintaining good sanitary practices.

8.3.6 Framework of mitigation measures on biological environment

The mitigation measures described in 8.3.5 on biological environment in the operations phase are presented as collected overview in the table below.

Table 8.8: Mitigation measures on physical environment operation phase

| | Mitigation measure | Location | Schedule | Cost | Responsibility |
|-----|--|------------------|-----------------|------------------------------|----------------|
| BI7 | Displacement of Terrestrial wildlife and avia-fauna | Wholesale Market | Operation stage | 5000 USD/ per year | MoALD, IFAD |
| BI8 | Vermin and sanitary conditions at the wholesale market | Wholesale Market | Operation stage | Included in the project cost | MoALD, IFAD |

8.4 Socio-economic and cultural environment

8.4.1 Pre-Construction Phase

Acquisition of the land for the project site SOC1

12.47 ha of the land belonging to the Ratanpur CFUG has to be acquired for the project, which must follow the provisions made in the ‘*Procedure related to using national forest area for national priority plans 2076*’.

Provisions of procedure related to using national forest area for national priority plans 2076.

- The feasibility study of the project should study the possibilities and alternatives to the forest area to be used as much as possible, and if the forest area is to be used in the study, only the minimum forest area that is very necessary should be used or the option of removing the minimum tree saplings. If the forest area must be used, the project should prepare a preliminary test or environmental assessment report in accordance with the prevailing environmental protection laws and regulations regarding the impact on the environment during the implementation of such plans.
- If it is found from the survey that there will be an impact on the environment during the implementation of the plan, there is a provision that the relevant Ministry should prepare a report including the environmental management plan including mitigation measures and before approving the report, the relevant ministry should seek the agreement of the Ministry of Forests and Environment. There is a provision to request permission to use the national forest area, to send it to the Division Forest Office, to be approved by the government of Nepal, to provide land in the form of a

mortgage, to be able to pay the amount for using the forest area, to manage forest production and to plant trees.

- To implement the plan, using the national forest area and removing the tree saplings, the plan must hand over the said saplings to the concerned office after felling and mulching at its own cost. The plan should plant trees according to the felling standards (Norms) of the Ministry of Forests and Environment. In case of cutting of saplings, trees shall be planted. The land needs to be compensated by the Project. The plantation should be done as per the prevailing rules and regulations of Nepal. The rate of replantation must be twenty-five times of such saplings. There is a provision that the plan related to planting trees for five years should be cared for, maintained and maintained in coordination with the forest office and after five years such trees and forest area should be handed over to the relevant office.

Land acquisition process

Furthermore, the land acquisition process must be governed by the Land Acquisition Act, 2034 and its subsequent amendments. The following are the steps involved in the land acquisition process:

- Initiation of the process: The land acquisition process is initiated by the government or any other authority.
- Notification: The government or the authority concerned issues a notification announcing the intention to acquire the land, specifying the purpose of acquisition, and the location of the land.
- Notice to the Divisional Forest Office, Nawalparasi and the Ratanpur Community Forest: A notice is served to the landowners and any other interested parties, informing them of the intention to acquire the land, and inviting them to submit any objections they may have.
- Inquiry by the Land Acquisition Officer: The Land Acquisition Officer (LAO) conducts an inquiry into the objections raised by the landowners and other interested parties.
- Determination of compensation: The LAO determines the amount of compensation to be paid to the landowners, considering the market value of the land, any improvements made on the land, and any damages suffered by the landowners because of the acquisition.
- Compensation: The compensation mechanism must be settled with the landowners, or to the court, in case there is any dispute regarding the amount of compensation.
- Possession of the land: After the compensation is provided/agreed, the possession of the land is transferred to the project.
- Transfer of ownership: The land is then transferred to the Government or the authority concerned, and the landowners lose their ownership rights over the land.

It is worth noting that the land acquisition process can be lengthy and may involve legal disputes, particularly if the landowners are not satisfied with the amount of compensation

offered. In such cases, the landowners have the right to challenge the acquisition and seek a review of the compensation offered.

Ensure replacement and access to alternative community forest

The CFUG of Ratanpur CF will lose 12.47 ha of their land to the project, thus, their access to forest resources will be compromised. The following measures to compensate for this loss will be carried out.

- a compensatory plantation will ensure recovery of lost trees. Prioritising Ratanpur CF to undertake compensatory plantation in participation with the Ratanpur CFUG, so that lost forest resources can be compensated from the plantation area.
- However, compensatory plantation might be undertaken in other forests than Ratanpur CF. In such a case, the project will compensate for lost forest resources from other sources such as - promote agroforestry, in which the CFUG members are supported by the project to integrate trees into agricultural landscapes.
- For the loss of land compensation shall be paid by Project Proponent to the Division of Forest Office in line with the prevalent guideline Work Procedure with Standards for the Use of National Forest.

Hiring of workers SOC2

Before any construction begins and any hiring activities, in the detailed design phase of the project, the following shall be done:

- Quantify the number of workers needed in each project activity. Identify who will be direct workers and indirect workers.
- Develop a human rights and human resources policy for both the direct and indirect workers based on IFC Performance Standard 2 on labor. In areas where national regulations are more stringent than the requirements of IFC Performance Standard 2, national regulations will be followed.
- Living wage will be calculated based on Invest International's policy statement on decent work.
- A training programme will be developed for all the direct and indirect workers to be hired. The training programme should aim to mitigate the presence of child labor and forced labor, workplace discrimination, gender based violence, sexual exploitation, decent work conditions and grievance redress mechanism.
- Punitive actions need to be prescribed if the construction contractor or vendors of the wholesale market violate the human rights and human resources policy.
- Project employment to give priority to women, youth and Ratanpur CFUG

8.4.2 Framework of mitigation measures on socio-economic environment

The framework of mitigation measures on socio-economic environment as listed in section 8.4.1 for the pre-construction phase is presented below.

Table 8.9: Framework of mitigation measures on socio-economic environment Construction Phase

| S.N. | Mitigation measure | Location | Schedule | Cost | Responsibility |
|------|---|--------------|--|------------|----------------|
| SOC1 | Mitigation measures connected to land acquisition | Project Site | Pre-construction phase (Detail design stage) | 111070 USD | MoALD |
| SOC2 | Hiring of workers | Project Site | Pre-construction phase (Detail design stage) | 50000 USD | MoALD, IFAD |

8.4.3 Construction Phase

Reduce restriction of access Shiva temple, road safety and impacts to community services and infrastructure SOC3, SOC4, SOC5, SOC6

Because of the construction work, movement of heavy vehicles, and operation of construction machinery might create restriction of access to the community infrastructure and services, traffic congestion, as well as damages - deterioration of the road. The following measures are proposed:

- Contractor shall develop a HSE Plan, a Community Health, Safety and Security Plan and a Traffic Management Plan as well as a Contractor's Code of Conduct. These plans shall be aligned with IFC PS4 requirements on community health and safety and include details on community grievance mechanism.
- The contractor shall undertake clear communication and public awareness about the construction project and minimise confusion and frustration among drivers and pedestrians.
- Construction companies involved in the project shall implement safe work practices, such as ensuring that construction vehicles and equipment do not block traffic lanes and that debris is not allowed to accumulate on the road.
- Implement traffic control measures such as signage, traffic cones, barriers, and traffic lights to direct traffic and ensure safety.
- Schedule construction work during off-peak hours to minimise traffic disruptions and reduce the impact on traffic flow. Consider the time when children are going to/returning from school, allowing children mobility without being hampered by large trucks utilising the same road.
- Communicate with stakeholders such as residents, businesses, and emergency services to keep them informed of traffic changes and construction work.
- Regular inspections can help to identify any road damage caused by construction work, allowing for prompt repairs to be made to minimise the impact on road users
- Monitor traffic flow regularly during construction and adjust the traffic management plan as needed.
- The project assumes that the local municipality will maintain municipal roads. This will also reduce the dust on roads, the noise generated by traffic on poor roads and will positively contribute to reducing community roads safety on roads.

- Currently, a part of the project site is being used as a football ground by the locals. Locals will be restricted access to the ground with commencement of the construction works. However, to ensure recreation for the workers, the football ground can be translocated in a safe location with a safe access point. Locals can also be given access to the ground. This means that the construction of the market shall prioritize construction of the football ground.
- There is a possibility that the existing Shiva Temple will face a low level of disturbance from the movement of construction vehicles/ workforce in the adjacent area. Install clear signs and barriers around the construction area to alert people of potential hazards and to indicate the correct pathway to the temple. This will prevent people from accidentally entering the construction area and ensure that they stay on the designated path. Limit the noise levels during praying sessions.

Health impacts related to improper waste disposal (site, accommodation camp) SOC7, SOC14

The project construction raises some health and safety concerns for both workers themselves as well as nearby communities. The contractor shall develop a HSE Plan and a Community Health, Safety and Security Plan (CHSSMP) to outline measures connected to health and safety due to improper waste management on site, disposal offsite affecting both workers and nearby communities. The safeguard measures for it are discussed below:

Safeguarding local communities from environmental pollution

The project has potential to generate air emissions, increase the ambient noise level, or pollute the surface and ground water resources. These could potentially negatively impact local communities, there are several mitigation measures that will be implemented to safeguard locals:

- The project will implement pollution control technologies to minimise emissions and pollution by using filters, or other air and water treatment technologies.
- The project will monitor air and noise quality to ensure that local communities are not exposed to harmful levels of pollutants or noise.
- The project sites will be fenced to prevent the noise level reaching the settlement area in vicinity.
- The project will engage with local communities to understand their concerns about air, noise, and pollution. This could involve consulting with local community leaders and representatives, providing regular updates on air and noise quality monitoring, and collaborating with community groups to identify solutions to pollution challenges.
- Road signage, maintaining speed limits, watering down of the road during dry periods and the acknowledgement of free roaming cattle must be addressed.

Safeguarding health from the improper waste management

- It is important to segregate waste properly into recyclable, biodegradable, and non-biodegradable materials. This helps to reduce the amount of waste that ends up in landfills and decreases the risk of contamination.
- The construction site shall be foreseen with a dedicated area, where waste can be collected, segregated and temporarily stored until collection by third party for final treatment/disposal. The area shall be covered, contained and fenced.
- Composting is an effective way to reduce the amount of biodegradable waste that ends up in landfills. It also produces nutrient-rich soil that can be used for gardening and farming. The Construction Contractor shall identify and engage a waste company that can provide composting services for the project (construction phase, but especially for the operation phase of the wholesale market).
- Waste should be collected and transported in a safe and hygienic manner. This includes using covered and leak-proof containers, as well as properly sealed waste trucks.
- Waste will be disposed of in designated landfills that meet safety and health standards. These landfills will be located far away from residential areas to reduce the risk of contamination. The Construction Contractor together with the Project Proponent shall inspect the waste contractor to ensure the project requirements can be met.
- Educating the public about the importance of proper waste disposal can help reduce the amount of waste that ends up in landfills. This includes encouraging the use of reusable bags, bottles, and containers.

Reduce risk of spreading of diseases

Worker's influx may raise the risk of disease spreading, such as sexually transmittable diseases (STD), COVID19, and others. A proper disease control and response strategy must be in place to address this issue:

- Educate and raise awareness of the workers and residents on the risks of this communicable disease, prevention measures and importance of maintaining sanitary condition and personal hygiene.
- Wearing of personal protective equipment or at least face masks shall be encouraged particularly in the public places.
- Conduct temperature checks and health screenings for all workers entering the project site to screen possible COVID19 infection. Isolate workers with symptoms or who have tested positive.
- Encourage workers to regularly wash their hands and maintain good hygiene.
- Make sure that workers have access to medical treatment and counselling sessions and ensure an environment where the workers can freely seek treatment if they suspect to have STD or have been exposed to one.
- Encourage maintenance of a safe social distance from each other.
- Encourage workers to get vaccinated against STD (HPV and Hepatitis B) and COVID19.

- The workers camp must have a medical facility that can provide preliminary health services for the workers and an isolation section to treat the COVID19 positive workers.

Safeguarding from operational health hazards

- Workers will be provided with appropriate PPE to protect them from hazards that are present in their work environment. This may include safety glasses, earplugs or earmuffs, hard hats, gloves, respirators, and safety shoes and properly market for visibility clothing.
- Hazardous materials will be properly labelled and stored, and workers should be trained in their proper handling and disposal. This may include the use of spill containment and clean-up equipment, as well as proper labelling and storage procedures.
- Workers will be trained in safe lifting and handling practices to reduce the risk of musculoskeletal injuries, such as strains and sprains. This may include the use of lifting aids, such as hoists, cranes, and forklifts, as well as proper body mechanics.
- Equipment and machinery will be regularly inspected and maintained to ensure that they are in good working order and do not present a hazard to workers.
- An emergency response plan (ERP) will be in place in case of accidents or incidents. This will include procedures for evacuation, first aid, and emergency medical services. It is very important that the ERP is coordinated with the local authorities and communicated to the residents in the direct vicinity of the construction site.
- First aid kits, including snake bites shall be maintained at the construction site at all times.
- Workers will be trained and educated on the hazards associated with their work and how to properly mitigate them. This may include training on PPE, hazard communication, and emergency response procedures.

Release pressure on government/community services due to workers influx SOC8

The influx of migrant workers can put pressure on government services, including healthcare, school, and social services. The measures to reduce the pressure on government services:

- **Increase Funding:** Increased funding for government services can help to ensure that there are enough resources to meet the needs of both migrant workers and existing residents. This may involve allocating additional resources or seeking funding from other sources.
- **Coordinate with Community Organisations:** Community organisations can help to support migrant workers and reduce the burden on government services. These organisations may provide services such as language training, job placement assistance, and social support.
- **Implement Health Screenings:** Health screenings can help to identify and treat health issues among migrant workers before they become a burden on government

healthcare services. This may involve providing vaccinations, screening for infectious diseases, and providing access to primary care.

- **Encourage Employer Responsibility:** Employers should be responsible for providing basic services such as housing, healthcare, and transportation to their workers. This can help to reduce the burden on government services and ensure that workers are treated fairly.
- **Promote Self-Sufficiency:** Encouraging migrant workers to become self-sufficient can help to reduce their reliance on government services. This may involve providing education and training to improve their skills and job prospects and providing access to resources such as loans and grants to start businesses.

By implementing these mitigation strategies, it is possible to reduce the pressure on government services and promote the well-being of both migrant workers and existing residents.

Relocation of the football field SOC9

Give priority to the re-allocation of the football ground and/or identify a temporary solution for the re-allocation of the football ground outside the proposed market during the construction phase of the project in close cooperation with the Youth representative and Chairman Ward 15.

Ensure health and safety at the construction site and workers camp SOC10

To mitigate the risk of accidents involving heavy vehicles near construction sites, it is important to implement proper safety measures and procedures. This can include:

- The Construction Contractor shall develop a Construction Management Plan, covering Operational Health and Safety on site as well control measure for environmental pollution prevention.
- A Policy on Contractor Health and Safety for the duration of their work on site, must apply, and be monitored. In addition, a Contractor's Code of Conduct (especially in terms of respecting local by-laws and specific practical community concerns on which agreement may be reached), should be applied for the duration of the construction. In addition, it is vitally important that a formal labour grievance management system be put in place (and should remain throughout the life of the plant).
- **Proper training:** Workers operating heavy vehicles should be properly trained in their operation and safety procedures.
- **Traffic management:** Traffic Management Plan should be in place to control the flow of traffic around and to construction sites and to ensure that heavy vehicles can operate safely. The plan will assist in scheduling the logistics of abnormal truck loads, thus controlling traffics flows and congestion.
- **Safety barriers:** Physical barriers can be used to separate heavy vehicles from workers and the public, reducing the risk of accidents.
- **Warning signs:** Signage can be used to warn workers and the public of the presence of heavy vehicles and to indicate areas where heavy vehicles are operating.

- Regular inspections: Heavy vehicles should be regularly inspected and maintained to ensure that they are in safe working condition.
- Worker's camp, sanitation, to be aligned to Nepalese labour law and ILO Workers' Housing Recommendation 115 and IFC/EBRD Guidance note on Worker Accommodation (Processes and Standards). Contractor (worker) Code of Conduct (on/ off site) to be developed and implemented.
- Worker Code of Conduct is necessary to maintain and monitor labour as well as community social interfaces. A Worker Code of Conduct will be required to stipulate all expected discipline and behaviour from local and non-local labour. Control measures for exiting and entering of labour accommodation site to be included (with consideration of times, contraband goods such as drugs and alcohol, weapons, etc)
- Labour GRM to be implemented. The community GRM must also be active so that feedback is received from various streams, lending to credibility of the information for further investigation.

By implementing these and other safety measures, the risk of accidents involving heavy vehicles near construction sites can be reduced, ensuring a safer working environment for workers and a safer environment for the public.

Community relations and inter-relationships SOC11

The following is proposed:

- 1) A Community Health, Safety and Security Plan (CHSSMP) must be developed by the Construction Contractor to show how they will meet project HSE and community requirements as listed in this EMP and detailed in EIA Mitigation Measure Chapter. This plan shall be aligned with IFC PS4 requirements on community health and safety aspects.
- 2) A Worker Code of Conduct shall be developed to maintain and monitor labor - community social interfaces. Behaviour of workers to be set within defined rules and requirements. Control measures for exiting and entering of labor accommodation site to be included (with consideration of times, contraband goods such as drugs and alcohol, weapons, etc)
- 3) A labor GRM to be implemented. The community GRM must also be active so that feedback is received from various streams, lending to credibility of the information for further investigation.
- 4) With the potential non-local labor contingent presence, communities may feel threatened and blame any criminal activity on the foreign workers in the area. A Worker Code of Conduct shall be developed to stipulate all expected discipline and behaviour from local and non-local labor.

- 5) The local police service must be kept abreast of incidents, allowing them to investigate and remediate, or charge perpetrators as necessary. The mitigation measures as listed in the EIA report, section 8 on Law and order in the community shall be included in the CHSSMP and implemented.
- 6) The mitigation measures as listed in the EIA report, section 8 on Prioritising the project affected families in recruitment by the project and Social and Gender Inclusion in the project construction practices shall be included in the CHSSMP implemented.

Details on aspects law and order in the community

The influx of migrant workers can create challenges for safeguarding against crime in a community. Here are some tips to help address this issue:

- Building strong relationships between the community and migrant workers can help to reduce crime. This can be done by organising community events or programs that bring people together and promote understanding and respect for cultural differences.
- Increasing police presence in the area can help to deter crime and make migrant workers feel safer. This may include increased patrols or the establishment of a police station in the area.
- Providing access to legal resources and support can help to ensure that migrant workers are aware of their rights and can report any instances of crime or exploitation without fear of retribution.
- Migrant workers will be housed in the camp by the contractor. This can help to prevent crime by providing a secure place to live.
- Employers will conduct background checks on potential employees to ensure that they do not have a criminal history. This can help to prevent crime by reducing the number of individuals with a history of criminal activity in the community.
- Cultural awareness training can help to promote understanding and respect for different cultures and can reduce instances of discrimination or racism. This training can be provided to both migrant workers and members of the community.

Details on prioritising the project affected families in recruitment by the project

The project is designed to contribute to the nation's economy by promoting trading of Nepali agriculture products, in this process, the project will also generate many employment opportunities. The priority will be given to project affected families (PAF) (in project context these are nearby families, local residents, women and youth, Ratantur CFUG in the recruitment process). The following measures will be taken to ensure this provision:

- A transparent recruitment process will be implemented that outlines selection criteria and job requirements. The process should be communicated to all potential candidates, including project-affected families, and should be fair and non-discriminatory. Contractor shall develop a Human Resource Management Plan and policies to comply with local labour law and align the plan with IFC PS 2 provisions. The HR policy will be further aligned with financier position statements on gender

equality, human rights, and living wage. Contractor will be also required to quantify direct, indirect and supply chain workers. The number of migrant and non-migrant workers will need to be quantified and monitored. No child labor or forced labor will be allowed. Contractor will be required to provide explicit information / criteria related to wages, overtime and benefits for construction workers. Contractor will offer clear and understandable documentation – in all applicable languages – of the terms and conditions of employment.

- The project will maintain a roster of project affected families so that their prioritisation in the recruitment; provided they meet the job requirements. This could also involve consulting with the affected families to understand their skills, experience, and job preferences.
- The project will also undertake training and capacity building programs to the PAFs to help them develop skills and experience needed to secure the project jobs. This could include providing technical training, mentoring, and coaching.
- The project will engage with local communities to understand their needs and concerns. This could involve consulting with local community leaders and representatives, providing regular updates on job opportunities, and collaborating with community groups to identify solutions to recruitment challenges.
- The project should monitor and evaluate the recruitment outcomes to ensure that project-affected families are being prioritised in recruitment. This could involve tracking the number of project-affected families who have been employed and assessing their job satisfaction and performance.
- Based on the outcome of the Public Hearing for this EIA, the project shall prioritize women and youth in project area for project employment.

Details on the social and gender inclusion in the project construction practices

Social and gender inclusion in project construction practices will ensure that all individuals, regardless of their gender or social identity, have equal opportunities to participate in the project. The following measures to promote social and gender inclusion in project construction practices:

- Ensure that hiring and recruitment practices are inclusive and unbiased, and actively seek out and hire individuals from diverse backgrounds.
- Provide training and education on social and gender inclusion to all workers, supervisors, and managers involved in the project.
- Ensure that all workers, regardless of their gender or social identity, receive equal pay and benefits for the same job.
- Ensure that the work environment is safe and inclusive for all workers, and that there is zero tolerance for discrimination, harassment, or bullying.
- Engage with local communities to ensure that the project benefits all members of the community, and actively seek out the perspectives and input of women, marginalised groups, and other underrepresented communities.
- Regularly monitor and evaluate the project's social and gender inclusion practices and adjust as needed to ensure that they are effective.

Establishment of a worker camp SOC12

The labour camp shall be established in line with Nepalese labor law, ILO Workers' Housing Recommendation 115 and the Workers' accommodation: processes and standards, guidance note by IFC and the EBRD, 2009. This guideline provides requirements in terms of how to assess the need and requirements for workers accommodation (e.g., the m² per type of accommodation, ratio living and recreational space, required services, etc), how to assess impacts of workers' accommodation on communities, standards for workers accommodation, management practices, etc/. and provides useful framework for managing this activity.

Ground water availability to surrounding communities SOC13

The project will use a large amount of water: low amount during construction and substantial amount during the operation phase. The primary source of water will be groundwater. As discussed in the physical environmental impact section, groundwater extraction might reduce water level in the wells and tube wells, used by the residents from the close vicinity. Though we have also discussed that the groundwater in the project site is part of a larger groundwater system of the Gangetic plains, thus, groundwater extraction by the project might not have any significant impact. However, provisions to ensure water availability to the community must be ensured using the following measures:

- **Review the water supply strategy:** based on the results of the (Ground) Water Sourcing Study (conducted during the detailed design).
- **Reduce water usage:** The project should aim to reduce its water usage by implementing water-saving technologies or practices. This could include saving and recycling water where possible.
- **Increase water supply:** In case, the onsite wells do not provide the required water amount, the project must explore alternative sources of water, harvesting rainwater and others, e.g., installing additional low capacity wells in larger area than the site.
- **Develop water management plans:** The project could develop and implement a water management plan that outlines how water will be used, conserved, and recycled. The plan should also include procedures for monitoring and reporting on water use and any impacts on local water resources.
- **Engage with local authorities:** The project should engage with local authorities to understand the community water needs and concerns. This could involve consulting with local water users and stakeholders, providing regular updates on water use and conservation measures, and collaborating with local authorities to identify solutions to water availability challenges.

Overall, it's important for projects to balance their water needs with the needs of local communities to ensure that water resources are used sustainably and equitably.

Impacts to the structural integrity of the Shiva Temple SOC15

Undertake regular inspection of the structural stability of the Shiva temple.

Emergency preparedness and response requirements (cross disciplines aspect connected to SOC11)

Emergency preparedness and response is essential to guard against and mitigate the consequences of major accidents that make take place during construction and operation of the proposed wholesale market. The term, “major accident” means an unexpected and sudden occurrence of event from abnormal developments in course of construction and operation of the project leading to a danger, public or environment, whether immediate or delayed, inside or outside the installation. The three basic principles i.e., prevention, preparedness, and mitigation of effect through rescue, recovery, relief, and rehabilitation are described below.

The project requires that an emergency preparedness and response management plan is prepared separately for construction and operation phase of the wholesale market. The Construction Contractor will be responsible for the development of the EPR plan for construction while the Wholesale Market Operator for the operation phase. The plan shall identify the emergency situations and suggest the response measures, as well as roles and responsibilities, equipment, training and communication requirements to be able to manage such situations in a safe and responsible manner.

Identify and assess potential hazards:

The first step is to identify and assess potential hazards that could affect the wholesale market. These hazards could include natural disasters such as:

- Floods and landslides from the Danab River;
- Earthquakes;
- Fires – accidental fire are causes of large-scale loss of property and life.

The above hazards are also in line with the climate change impact assessment conducted for this study, see details in Appendix 16.

Flood safety

The following measures will apply:

- Prevention from flooding is the primary intervention. A high-level flood impact assessment has been carried out as a part of the EIA study and identified a range of measures to protect the site, see section 8.2.1. Furthermore, construction of the proposed Danab river corridor road, which passes along the Danab River and the project site will provide additional safety from flooding.
- The project site will consist of drainage network, which will drain out the storm (rain) water from the project site into the Danab river. This will prevent water logging in the project area as well, see section 2.2.3.
- In case of emergency, safe evacuation routes and a meeting place outside of the affected area will be defined. The signage board with clear instruction will be placed in visible locations within the project site.

- The water level in the Danab river, weather conditions as well as river back erosion (along the river, upstream and downstream) will be regularly monitored as a part of the environmental monitoring plan, particularly during the monsoon seasons.
- Practice flood drills for the workers will be organized so everyone knows what to do in the event of a flood.

Earthquake safety

The following measures will apply:

- The building design and construction will include the requirements of Nepal Building Code in conjunction with, IS 4326-1976 code of practice for earthquake resistance design and construction of buildings.
- Note: To decrease the risk of flooding, the market buildings have been elevated. However, this elevation also increases the risk of damage from earthquakes due to instability. To mitigate this risk, the market's construction must follow international best practices and incorporate earthquake-resistant design elements such as base isolation. This will help reduce damage and decrease the likelihood of collapse during a strong earthquake, see details in Climate impact assessment in Appendix 16.
- In case of earthquake, safe evacuation route and safe place will be defined together with the fire safety. The signage board will be placed with clear instruction at the visible locations within the project site.
- Practice earthquake drills for the workers will be organized so everyone knows what to do in the event of an earthquake.

Fire safety

The following measures will apply:

- The Nepal Building Code requires installation of fire safety in commercial, official, or ordinary residential buildings. These will be followed in the project.
- Installation of fire detection and alarm systems and undertake regular monitoring and maintenance of these devices.
- While calculating total water demand for the project, provision for firefighting has also been made, see details in Feasibility Study: Technical and Financial Assessment Report, in Appendix 2.
- Installation of fire suppression system and fire extinguishers in appropriate locations.
- The Nepal Building Code requires for emergency evacuation routes and exit doors and requires buildings to have clear signage indicating these routes. These will be maintained in the project site.
- Practice fire safety drills, involve where needed the residents located in the direct vicinity of the market.

Road safety

The following measures will apply:

- The construction vehicles will be instructed to limit their speed in the residential area as per the Nepal Traffic Rule to prevent road accidents.
- Road safety signages will be installed around the project sites.
- Ensure that the vehicles used in the project will be well-maintained and regularly service to reduce the risk of accidents caused by mechanical failure.
- Strict traffic violation rules will be applied to drivers using project vehicles.
- Train the drivers and project staff on the road safety, communicate road safety to households near the side and along the roads connected to the market
- All project vehicles will be given insurances coverage for accidents.

Train employees, key stakeholders and impacted households

All employees, key stakeholders (e.g., local authorities, traders) and where relevant impacted household should be trained on the EPR procedures. They should be aware of the potential hazards, the steps they need to take in case of an emergency, and the communication channels available during emergencies. Regular drills and exercises can help ensure that everyone is prepared.

Medical preparedness and collaboration with emergency responders

The wholesale market should collaborate with local emergency responders such as police, fire departments, and medical services to develop an effective emergency response plan. This collaboration should include regular meetings, joint exercises, and drills to ensure that everyone is prepared. The first aid medical facilities will be provided at the project site during construction and operation phase.

8.4.4 Framework of mitigation measures on socio-economic environment

The framework of mitigation measures on socio-economic environment as listed in section 8.4.3 for the construction phase is presented below.

Table 8.10: Framework of mitigation measures on socio-economic environment Construction Phase

| S.N. | Mitigation measure | Location | Schedule | Cost | Responsibility |
|------------------------------|--|--------------|--------------------|-------------------------------|----------------|
| SOC3 SOC4 SOC5 SOC6 | Social nuisance, reduction in access, impacts to community services | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |
| SOC7 | Health impacts related to improper waste disposal | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |
| SOC8 | Release pressure on government/community services | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |
| SOC9 | Reallocation of the football ground | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |
| SOC10 | Health and Safety at construction site and camp | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |
| SOC11 | Community relations and inter-relationships | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |
| SOC12 | Establishment and operation of the worker camp | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |
| SOC13 | Ground water availability to surrounding communities | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |
| SOC14 | Decreased availability of natural resources (surface and groundwater water, soil) due to pollution caused by the project | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |
| SOC15 | Impacts to the structural integrity of the Shiva Temple | Project Site | Construction Stage | Included in the project costs | MoALD, IFAD |

8.4.5 Operational Phase

Potential impacts to downstream bridge and communities located north of the river due to new wholesale market in a portion of the river floodplain SOC16

Implement the results of the update of the flooding and erosion impact assessment.

Wholesale market groundwater abstraction affecting nearby community wells SOC17

The project will use a significant amount of water during the operation phase of the market. The primary source of water will be groundwater. The basis of mitigation to reduced water consumption as proposed during the construction phase will also be followed during the operational phase, which will consist of:

- Reduce water usage by implementing water-saving technologies or practices.
- In case the wells/tube wells are dried out, the project has to explore alternative sources of water. Harvesting of rainwater is already embedded in the project design.
- The project will implement a water management plan that outlines how water will be used, conserved, and recycled. The plan should also include procedures for monitoring and reporting on water use and any impacts on local water resources.
- The project should engage with local authorities to understand the community water needs and concerns. This could involve consulting with local water users and stakeholders, providing regular updates on water use and conservation measures, and collaborating with local authorities to identify solutions to water availability challenges.

Community nuisance, health and safety measures at the wholesale market SOC18-22

The health and safety measure will also be continued in the operational phases, and will consist of:

Safeguarding from environmental pollution

- Various HSE (Health, Safety Environment) plans (Hazard/ risk management, driving safety standards, Emergency Response plan) shall be developed by the Construction Contractor. Community Health, Safety and Security Plan (CHSSMP), also showing HSE communication and consultation procedure is necessary.
- implementing pollution control technologies to minimise emissions.
- monitoring air and noise quality.
- fencing the premises to prevent the noise reaching the settlement area in vicinity.
- engaging with local communities to understand their concerns about air, noise, and pollution.
- maintaining road signage, speed limits.
- regular maintenance of the road condition.

Safeguarding from operational health hazards

- Use of PPE by the staff working in a hazardous environment, which may include safety glasses, earplugs or earmuffs, hard hats, gloves, respirators, and safety shoes and appropriate uniforms.

- Adequate ventilation in the working area to reduce exposure to airborne contaminants, such as dust, fumes, and vapours.
- Hazardous materials will be properly labelled and stored, and workers should be trained in their proper handling and disposal.
- Proper training of safe handling hazardous materials. This may include the use of lifting aids, such as hoists, cranes, and forklifts, as well as proper body mechanics.
- Equipment and machinery will be regularly inspected and maintained to ensure that they are in good working order and do not present a hazard to workers.
- An emergency response plan will be in place in case of accidents or incidents. This will include procedures for evacuation, first aid, and emergency medical services.
- First aid kits will be maintained at the construction site.

Safeguarding health from the improper waste management

- It is important to segregate waste properly into recyclable, biodegradable, and non-biodegradable materials. This helps to reduce the amount of waste that ends up in landfills and decreases the risk of contamination.
- The wholesale market shall be foreseen with a dedicated area, where waste can be collected, segregated and temporarily stored until collection by third party for final treatment/disposal. The area shall be covered, contained and fenced.
- Composting is an effective way to reduce the amount of biodegradable waste that ends up in landfills. It also produces nutrient-rich soil that can be used for gardening and farming. The market shall identify and engage a waste company that can provide composting services for the project (construction phase, but especially for the operation phase of the wholesale market).
- Waste should be collected and transported in a safe and hygienic manner. This includes using covered and leak-proof containers, as well as properly sealed garbage trucks.
- Waste will be disposed of in designated landfills that meet safety and health standards. These landfills will be located far away from residential areas to reduce the market shall inspect the waste contractor to ensure the project requirements can be met
- Educating the public about the importance of proper waste management can help reduce the amount of waste that ends up in landfills. This includes encouraging the use of reusable bags, bottles, and containers.

Reduce the risk for community impacts

- On-going feedback from nearby communities on specific inconveniences and disturbances (through the still-active community GRM) is vital to maintain a strong relationship with those in the indirect area of impact, during operations phase.
- The effects of artificial lighting and the change in landscape can be mitigated with planting of tall-growing indigenous trees that will assist with a more natural-looking landscape. The site can also consider low intensity solar powered lights

- that are equipped with movement sensors, thus allowing the lights to stay off, until movement is detected. GRM to remain active through operations phase.
- On-going feedback from nearby communities on specific incidents (through the still-active community GRM) is vital to maintain a strong relationship with those in the indirect area of impact, during operations phase.

Reduce risk of spreading of diseases

- Educate and raise awareness on the risks of this communicable disease, preventions and importance of maintaining sanitary condition and personal hygiene.
- Wearing of personal protective equipment or at least face masks shall be encouraged particularly in the public places.
- Conduct temperature checks and health screenings for all workers entering the project site to screen possible COVID19 infection. Isolate workers with symptoms or who have tested positive.
- Provide proper hand washing facilities to maintain good hygiene.
- Make first response medical facilities at the site.
- Encourage maintenance of a safe social distance from each other.

Prioritising the project affected families in recruitment by the market

As proposed for the construction phase, the project will also prioritise project affected families (PAF, e.g., women, youth and Ratantur CFUG) and residents in the recruitment process, by:

- implementing a transparent recruitment process that outlines selection criteria and job requirements.
- maintaining a roster of project-affected families so that their prioritisation in the recruitment; provided they meet the job requirements; can be ensured.
- undertaking training and capacity building programs to the PAFs to help them develop skills and experience needed to secure the project jobs.
- engaging with local communities to understand their needs and concerns.
- Ensure gender inclusion in the process and where possible give priority for employment of women and youth.
- monitoring and evaluating the recruitment outcomes to ensure that project-affected families are being prioritised in recruitment.
- Formal job application process to be communicated. Supply chain needs to be communicated to the wider (regional) population. Operational phase Human Resource Plan in place to respond to IFC PS 2 provisions. Local procurement and supply chain plan to be implemented. GRM for wider community to be kept active.
- Based on the outcome of the Public Hearing for this EIA, the project shall prioritize women and youth in project area for project employment

Emergency preparedness and response requirements (cross disciplines aspect)

See section 8.4.1.

Access to and structural integrity of the Shiva Temple SOC23

Ensure access to Shiva Temple. Operation of the wholesale market does not foresee structural impacts to the temple.

8.4.6 Framework of mitigation measures on socio-economic environment

The framework of mitigation measures on socio-economic environment as listed in section 8.4.5 for the operation phase is presented below.

Table 8.11: Framework of mitigation measures on socio-economic environment Operation Phase

| | Mitigation measure | Location | Schedule | Cost | Responsibility |
|----------|---|--|-----------------|-------------------------------|----------------------|
| SOC15 | Flooding and erosions risks | Wholesale Market | Operation stage | Included in the project costs | MoALD, IFAD |
| SOC16-21 | Community nuisance due to operation of the wholesale market | Wholesale Market | Operation stage | Included in the project costs | MoALD, IFAD |
| SOC 21 | Infrastructure (road) damage | Main roads connected to wholesale market | Operation stage | n/a | Government Authority |
| SOC22 | Access to and structural integrity of the Shiva Temple | Wholesale Market | Operation stage | Included in the project costs | MoALD, IFAD |

Chapter 9 Environmental Management Plan

9.1 Introduction

This chapter provides the EMP for the EOAWM in Butwal Project. Elements of this EMP will be taken forward and incorporated into a comprehensive project Environmental and Social Management System ('ESMS') that will be used to deliver the Project's EHS regulatory compliance objectives and other related commitments.

This EMP is a delivery mechanism for environmental and social mitigation and enhancement measures made in the EIA Report. The purpose of the EMP is to help that these recommendations are translated into practical management actions which can be adequately resourced and integrated into the Project phases. The EMP is, therefore, a management tool used to ensure that undue or reasonably avoidable adverse impacts of construction and operation are prevented or reduced and that the positive benefits of the Project are enhanced (Lochner, 2005).

For the purpose of this project, EMP and subsequent actions, MoALD (CAIDMP) is the project proponent of this project.

9.1.1 Overview and Scope

The EMP has been developed to meet international standards on environmental and social management performance, specifically those established out by IFC.

The EMP is intended to cover those activities described in Chapter 2 of this EIA report. It covers project activities during construction and operation and will be subject to thorough reviews prior to the commencement of activities to ensure completeness. The EMP does not include measures for activities related to equipment and facility fabrication being done offsite. It should be noted that this provides the outline for the environmental management requirement. Provision will be made for updating the outline EMP once the detailed project design is complete and for adapting the EMP to relevant project stages as part of the overall ESMS.

The plan details the mitigation and enhancement measures the Project Proponent has committed to implement through the life of the Project and includes desired outcomes; performance indicators; targets or acceptance criteria; monitoring and timing for actions and responsibilities. Project Proponent will have principal responsibility for all measures outlined in the EMP and may delegate responsibility to its contractors, future wholesale market operator, where appropriate. In cases where other individuals or organisations have responsibility for mitigation or enhancement measures, this is clearly indicated within the EMP matrix.

Capacity building and training requirements are also described, where these relate to specific skills required to deliver the EMP action in question.

9.1.2 Objectives

The EMP plays a critical role in ensuring the projects' environmental and social performance is effectively maintained throughout its lifespan. Having this framework in place ensures a systematic approach to bringing environmental and social considerations into decision making and day-to-day operations. It establishes a framework for tracking, evaluating and communicating environmental and social performance and helps ensure that environmental and social risks and liabilities are identified, minimised and managed. The EMP will be a living document and will continue to develop during the design and construction phase to enable continuous improvement of the Project's social and environmental performance.

In particular, the objectives of the EMP are to:

- Promote environmental and social management and communicate the aims and goals of the EMP;
- Ensure that all workers, subcontractors and others involved in the Project meet legal and other requirements with regard to environmental and social management;
- Incorporate environmental and social management into project design and operating procedures;
- Address concerns and issues raised in the EIA's stakeholder consultation process and those that will likely continue to arise during the Project's lifetime;
- Serve as an action plan for environmental and social management for the Project;
- Provide a framework for implementing project environmental and social commitments (i.e., mitigation measures identified in the EIA); and
- Prepare and maintain records of project environmental and social performance (i.e., monitoring, audits and non-compliance tracking).

9.2 Organization

9.2.1 Roles and responsibilities

At the time of this report, the institutional responsibilities for the environmental management are still being finalised by the CAIDMP. The main institutions that are assumed to be involved in environmental management and monitoring activities for this project are:

Ministry of Agriculture and Livestock Development (MoALD) oversee project implementation.

Centre for Agriculture Infrastructure Development & Mechanization Promotion (CAIDMP)¹⁵ holds the responsibility for managing environmental, health, and safety management and ensuring compliance with the regulatory requirements of Nepal and the project's loan covenants. Additionally, it will also oversee managing the day-to-day

¹⁵ Or delegated party by the CAIDMP

technical, environmental, and social aspects of the project, including revising the EMP for obtaining the necessary EIA related approvals from the government as well as funding agency.

The project foresees development of a separate **Project Implementation Unit (PIU)** at federal level. The PIU will be responsible for the complete implementation of the project and Environmental and Social monitoring during the construction period and thereafter. Market Management Committee will be established and capacitated to run the market from the beginning so that they take over the operation of the market from day 1. Federal, Provincial government could provide necessary support to the Market Management Committee. Market Management Committee will have a dedicated Environment and Social Department to ensure compliance with all environmental safeguards.

The Project PIU will have a position of a dedicated manager for environmental, social, health and safety monitoring for before and during the construction period and depending upon the need, the position may be extended to continue post construction period. The responsibility of the **Environmental and Social Officer** will be:

- review and confirm existing EIA and EMP are updated based on latest project development, detailed designs, as prepared by third parties;
- ensure that EMP is included in bidding documents of the EPC Contractor;
- provide oversight on environmental, social, health and safety management aspects and ensure EMP is implemented by contractors;
- establish a system to monitor environmental, social, health and safety safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
- supervise and provide guidance to the EPC Contractor and future E&S officers under the Wholesale Market Management Committee to properly carry out the environmental, social, health and safety monitoring;
- review, monitor and evaluate effectiveness with which the EMP is implemented, and recommend necessary corrective actions to be taken;
- consolidate monthly environmental monitoring reports from EPC Contractors, future E&S officers under the Wholesale Market Management Committee and submit semi-annual monitoring reports to CAIDMP, MoALD and other key stakeholders;
- undertake regular review of safeguards-related loan covenants, and the compliance during loan implementation; and
- organize periodic capacity building and training programs on safeguards for project key stakeholders.

Contractors: Prior to assigning any contract, Project proponent will pre-qualify each contractor according to commercial, technical, quality assurance and its past performance on EHS standards so as to satisfy Project requirements and policies. Each contractor will assign an HSE Manager whose responsibility is to ensure that environment, health and

safety regulatory requirements are met and that EMP requirements are properly implemented. The EPC contractor will be required to developed and submit to Project Proponent its corresponding EMPs in accordance with the Nepali Legislation and IFC PS requirements as listed in this EIA.

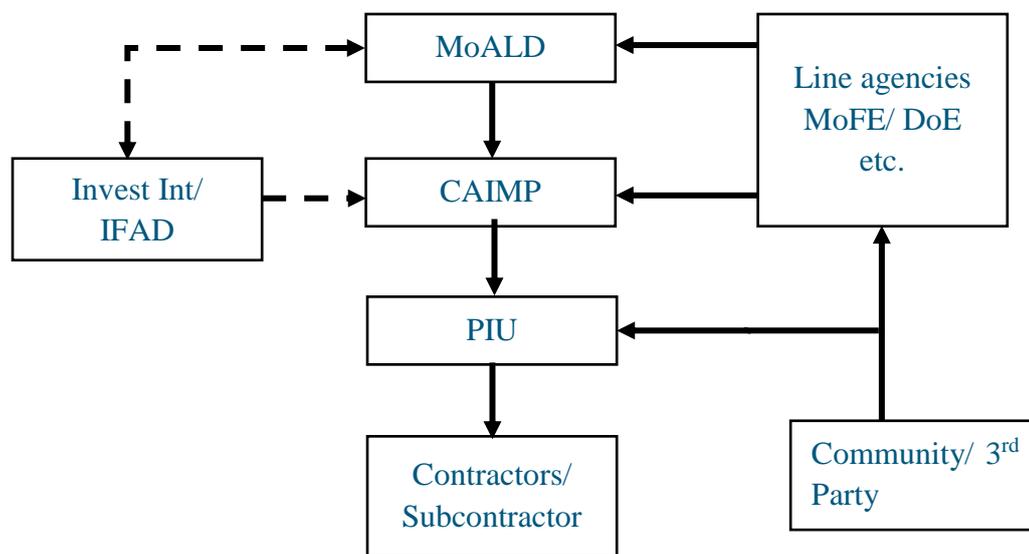
Regulatory agencies - MoFE are empowered by law to take responsibility for the monitoring of the operations of all organizations operating within the boundaries of the country/state to ensure environmental and socio-economic sustainability of the potentially affected communities.

Communities in Project Area of Influence will assist in public sensitization effort to advance implementation of the EMP.

Invest International/ IFAD – project finance.

More detailed information on the roles and responsibilities related to the implementation, supervision, and monitoring of the EMP are provided in the table below. The figure below illustrates the implementation arrangements.

Figure 9-1: Institutions involved in environmental management



Project will require dedicated personnel competent based on appropriate education, training, and experience that will manage and oversee the EHS aspects of Project construction and operation. The following resources are advised, see table below.

Table 9-1: Roles and Responsibilities

| Position | Responsibility |
|--|---|
| General Manager | Oversee and coordinate all activities pertaining to the Project; ultimately responsible for EHS. Ensure delivery by the Project of its EHS and operational targets. Ensure effective communication with all stakeholders. |
| Operations Manager | Technical aspects of the Project including subcontractor supervision during operations. Responsible for the execution of Emergency Preparedness and Response Plan. |
| Construction Manager | Technical aspects of the Project including subcontractor supervision during construction. |
| E&S Officer | Ensuring that the Project and subcontractors operate in accordance with the applicable regulatory environment, health and safety requirements and plans. Monitor implementation of environmental and social protection measures, and assist with technical input into spill response requirements. |
| Community Liaison Officer (CLO) Can be fulfilled by the E&S Officer | Liaise with local communities and government regulators on the Project's behalf. Implement EHS awareness and education programmes with communities. |

9.2.2 Interface

A Cooperation Agreement between the Project Proponent (or delegated party), project financiers, MoALD is recommended to set how parties will interface on the following topics:

- Stakeholder engagement;
- Community development, and
- Emergency preparedness and response.

9.2.3 Training and Awareness

Project Proponent (or delegated party) will identify, plan, monitor, and record training needs for personnel whose work may have a significant adverse impact upon the environment or social conditions. Project Proponent recognises that it is important that employees at each relevant function and level are aware of the Project's environmental and social policy; potential impacts of their activities; and roles and responsibilities in achieving conformance with the policy and procedures.

This will be achieved through a formal training process. Employee training will include awareness and competency with respect to:

- Environmental and social impacts that could potentially arise from their activities (including dust, noise, biodiversity and soil/water contamination);
- Necessity of conforming to the requirements of the EIA and the EMP, in order to avoid or reduce those impacts; and
- Roles and responsibilities to achieve that conformity, including those in respect of change management and emergency response.

The E&S Officer is responsible for coordinating training, maintaining employee-training records, and ensuring that these are monitored and reviewed on a regular basis. The E&S Officer will also periodically verify that staff is performing competently through discussion and observation.

Employees responsible for performing site inspections will receive training by drawing on external resources as necessary. Training will be coordinated by the E&S Officer prior to commissioning of the facilities. Upon completion of training and once deemed competent by management, staff will be ready to train other people.

Similarly, Project Proponent will require that each of its contractor institute training programmes, as appropriate, for its personnel. Each contractor is responsible for site EHS awareness training for personnel working on the job sites. The contractors are also responsible for identification of any additional training requirements to maintain required competency levels.

The contractors training programs will be subject to approval by Project Proponent (or delegated party) and it will be subject to checks to verify that:

- Training programs are adequate;
- All personnel requiring training have been trained; and
- Competency is being verified.

9.2.4 Communication

Project Proponent will maintain a formal procedure for communications with the regulatory authorities and communities. The E&S Officer is responsible for communication of EHS issues to and from regulatory authorities whenever required. Meetings will be held, as required, between Project Proponent (or delegated party) and the appropriate regulatory agency and community representatives to review EHS performance, areas of concern and emerging issues. Dealings will be transparent, and stakeholders will have access to personnel and information to address concerns raised.

Project Proponent will develop and implement a grievance mechanism whereby community members can raise any issues of concern. Grievances may be verbal or written and are usually either specific claims for damages/injury or complaints or suggestions about the way that the Project is being implemented. When a grievance has been brought to the attention of the Project team, it will be logged and evaluated. The person or group with the grievance

is required to present grounds for making a complaint or claiming loss so that a proper and informed evaluation can be made.

Where a complaint or claim is considered to be valid, then steps are required to be undertaken to rectify the issue or agree compensation for the loss. In all cases the decision made and the reason for the decision will be communicated to the relevant stakeholders and recorded. Where there remains disagreement on the outcome then an arbitration procedure may be required to be overseen by a third party (e.g., government official). Local community stakeholders will be informed on how to implement the grievance procedures.

A grievance redress mechanism (GRM) will be established at the project site to receive and manage any grievances (complaints) such as any disagreeable decisions, practices and activities, technical and general project-related issues and disputes that may arise from the project and facilitate prompt resolution of affected person's issues, concerns, problems or claims. Affected persons may include members of the local community or construction workers. The community will be made fully aware of their rights and the procedures for doing so verbally and in writing during community meetings and consultations. Please refer to Appendix 17 for details on proposed GRM development and implementation.

9.2.5 Documentation

Project Proponent (or delegated party) will control EHS documentation, including management plans and associated procedures, checklists, forms and reports, through a formal procedure. All records will be kept on site and will be securely backed up in accordance with good IT-practice. Records will be kept in both hard copy and soft copy formats. All records will be archived for the life of the project.

Furthermore, the document control procedure will describe the processes that the Project will employ for official communication of both hardcopy and electronic (through the internet) document deliverables. In addition, it will describe the requirement for electronic filing and posting and for assignment of document tracking and control numbers (including revision codes).

The E&S Officer is responsible for maintaining a master list of applicable EHS documents and making sure that this list is communicated to the appropriate parties. The E&S Officer is responsible for providing notice to the affected parties of changes or revisions to documents, for issuing revised copies and for checking that the information is communicated within that party's organisation appropriately.

Each contractor will be required to develop a system for maintaining and controlling its own EHS documentation and describe these systems in their respective EHS plans.

9.2.6 Managing Changes to Project Activities

Changes in the Project may occur due to unanticipated situations. Adaptive changes may also occur during final design, commissioning or even operations. The Project will

implement a formal procedure to manage changes in the Project that will apply to all project activities.

The objective of the procedure is to ensure that the impact of changes on the health and safety of personnel, the environment, plant and equipment are identified and assessed prior to changes being implemented.

The management of change procedure will ensure that:

- Proposed changes have a sound technical, safety, environmental, and commercial justification.
- Changes are reviewed by competent personnel and the impact of changes is reflected in documentation, including operating procedures and drawings.
- Hazards resulting from changes that alter the conditions assessed in the EIA will be identified and assessed and the impact(s) of changes do not adversely affect the management of health, safety or the environment.
- Changes are communicated to personnel who are provided with the necessary skills, via training, to effectively implement changes; and
- The appropriate person accepts the responsibility for the change.

As information regarding the uncertainties becomes available, the Project EMP will be updated to include that information in subsequent revisions. Environmental and social, as well as engineering feasibility and cost, considerations will be considered when choosing between possible alternatives.

9.2.7 Operational Control Procedures

Where possible, each potentially significant impact identified in the EIA will have an operational control associated with it that specifies appropriate procedures, work instructions, best management practices, roles, responsibilities, authorities, monitoring, measurement and record keeping for avoiding or reducing impacts. Operational controls are monitored for compliance and effectiveness on a regular basis through a monitoring and internal auditing procedure described in the EMP.

Operational control procedures will be reviewed and, where appropriate, amended to include instructions for planning and minimising impacts, or to at least reference relevant documents that address impact avoidance and mitigation.

9.2.8 Emergency Preparedness and Response

The Project Proponent (or delegated party) will prepare plans and procedures to identify the potential for, and response to, environmental accidents and health and safety emergency situations and for preventing and mitigating potentially adverse environmental and social impacts that may be associated with them. The emergency preparedness and response plan shall cover the aspects as listed in 8.4.3. of this report.

Emergency preparedness and response will be reviewed by Project Proponent on at least an annual basis and after the occurrence of any accidents or emergency situations to ensure that lessons learnt inform continuous improvement.

Emergency exercises will be undertaken on a regular basis to confirm adequacy of response strategies. Investigations of accidents or incidents will follow formal documented procedures.

9.3 Checking and Corrective Actions

Checking includes inspections and monitoring as well as internal audit activities to confirm proper implementation of checking systems as well as effectiveness of mitigations. Corrective actions include response to out-of-control situations, non-compliances, and non-conformances. Actions also include those intended to improve performance.

9.3.1 Monitoring

A monitoring plan is essential to collect up to date baseline conditions for evaluating environmental, social, health and safety impacts and the effectiveness of the mitigation measures adopted by the project. Three types of monitoring will be carried out:

- Baseline Monitoring;
- Compliance Monitoring;
- Impact Monitoring.

In order to improve the implementation of mitigation measures, the following activities will be undertaken in the process of environmental, social, health and safety monitoring: (a) determine carefully the indicators to be used in the process of monitoring; (b) collect important and relevant information; (c) apply measurable criteria with regard to prescribed indicators; (d) conduct objective analysis of the information collected; (e) work out clear conclusions based on objective analysis and processed information; (f) make rational decisions based on the conclusions drawn pursuant to clauses (a) to (e); (g) recommend improved mitigation measures to the implementing agencies; (h) implement corrective actions or new adaptive management programs, as required, if proposed mitigation measures are unable to reduce and/or eliminate potential project-related impacts, or meet the predetermined level of performance.

Baseline monitoring will be conducted during the pre-construction phase to fill in baseline data gaps and to update baseline information provided in the EIA report. A Baseline Monitoring is required to compile and maintain a database on environmental conditions prior to the implementation of the project. This is especially important if the project implementation is delayed due to unforeseen circumstances and information given in the EIA needs to be updated. The baseline data recorded before the project implementation will facilitate the comparison of the information obtained during the monitoring activities and in auditing of the project. **Baseline monitoring is the responsibility of the Project Proponent.**

Compliance monitoring will be conducted periodically or continue over the duration of construction and operation to ensure project compliance with recommended environmental protection standards. Compliance monitoring will be given priority with focus on ensuring compliance with mitigation actions, which are intended to contribute to the control and management of environmental degradation. The impact monitoring at ambient levels will be conducted as appropriate and required. This type of monitoring employs periodic sampling or continuous recording of specific environmental quality indicators or pollution levels to ensure project compliance with recommended environmental protection standards. ***Compliance monitoring is the responsibility of the Construction Contractor, and, or in combination with the Project Proponent.***

Impact monitoring. The actual impacts caused by Project Implementation should be closely monitored during the construction and operation of the project to examine the sufficiency and effectiveness of the mitigation measures. The ecological, social and economic, and public health parameters within the project area will be measured during the project construction and operation phases to detect environmental changes which may have occurred because of project implementation. ***Impact monitoring is the responsibility of the Construction Contractor, and, or in combination with the Project Proponent.***

The **Project Implementation Unit** with support of the Environmental and Social Officer will carry out site inspections jointly with the contractors particularly during prior to construction and at the end of construction at the site before construction closing starts. The aim of inspection during prior construction will be to identify and jointly agree with contractors on site-specific environmental conditions and types of safety concerns that need particular attention while implementing work. Based on this information, the contractor will prepare site-specific EMP and OHS plans and submits for Project Proponent' approval prior to field mobilisation. The aim of site inspection after the work completion will be to ensure the site is properly cleaned of all construction related spoils, landscaped and well drained, vegetated and restored to original condition before contractor leaves the site. The inspection during work implementation will be the routine compliance and impact monitoring.

Table 9-3: Environmental monitoring framework for construction

| Type | Indicator | Method | Location | Schedule | Cost per year | Responsibility |
|--|--|--|---|--------------------------------|---------------|----------------|
| Baseline | | | | | | |
| Riverbank erosion | Riverbank erosion | Visual inspection | Danab River along the project site | Quarterly, visual inspection | 5000 USD | MoALD, IFAD |
| Groundwater quality | COD, BOD5, Chloride, Iron, Manganese, pH, Silica, Ammoniacal Nitrogen, Nitrate, Nitrite, Sulphate, Total Phosphorus, Cyanide, Suspended Solids, Total Dissolved Solids, Electrical Conductivity, Total Hardness, Total Alkalinity, Arsenic, Sodium, Potassium, Mercury, Chromium, Zinc, Copper, Cadmium, Cobalt, Aluminium, Nickel, Lead, Lithium; Others: Total Coliforms, Faecal Coliforms | Testing of the groundwater from a well on site and laboratory analysis | At site | Quarterly, laboratory analysis | 10000 USD | MoALD, IFAD |
| Air quality | TSP, PM10, PM2.5, SO2, NOx, CO, Benzene, Ozone, Lead. | High volume sampling | In and around construction site | Quarterly, laboratory analysis | 10000 USD | MoALD, IFAD |
| Noise Level | dBA | Decibel metre | At site boundaries | Quarterly | 10000 USD | MoALD, IFAD |
| Water quality of the Danab River | Temperature, pH, conductivity, turbidity TSS, DSS, DO, BOD, COD, Total Coliforms and Faecal Coliforms | Testing and laboratory analysis | Upstream and downstream of the project site | Quarterly | 10000 USD | MoALD, IFAD |
| Social survey: Consumer price, Sanitation, Law and order | Price of consumables near the project site, status of sanitation and law and order environment | Market survey/ Enumeration | In and around the project area | Once a year | 20000 USD | MoALD, IFAD |

| Type | Indicator | Method | Location | Schedule | Cost per year | Responsibility |
|---------------------------------|--|-----------------------------------|-----------------------------|--|------------------------|----------------|
| Impact | | | | | | |
| Riverbank erosion | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Ground water Impact | Abstraction level | 1 piezometer well to be developed | At site | Quarterly | Part of EMP | MoALD, IFAD |
| Groundwater quality | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Soil quality | pH, Nitrogen, Phosphorus, Potash, Organic Matter, Available Boron, Other Micronutrients and Toxic Metals, Molybdenum, Copper, Zinc, Sodium, Lead, Total Chromium, Hexavalent Chromium Cadmium, Arsenic, Mercury, Total Organic, Cation Exchange Capacity, Sodium Exchange Capacity Potassium Exchange Capacity | Testing and laboratory analysis | At site | Before construction 1 sample After construction completion 1 sample | 5000 USD for 2 samples | MoALD, IFAD |
| Air quality | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Air Quality | Dust | Visual inspection | At the site | Daily | Part of EMP | MoALD, IFAD |
| Noise Level | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Water quality Danab River | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Social survey | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Labour and community grievances | Number of open grievances | GRM implementation | Site and nearby communities | Monthly | Part of EMP | MoALD, IFAD |

| Type | Indicator | Method | Location | Schedule | Cost per year | Responsibility |
|--|--|---|--------------------------|--|----------------|----------------|
| Establishment and operation of the worker camp | Type of accommodations present, m2 per type of accommodation, availability of required provisioning services (sanitation, etc) | Visual inspection | Site, accommodation camp | Monitoring check during construction, and afterwards quarterly | Part of EMP | MoALD, IFAD |
| Compliance | | | | | | |
| Air quality | Incl. baseline | Compliance on Nepali Ambient Air Quality Standards ¹⁶ | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Air Quality | Dust | Visual inspection at site, compliance on project mitigation measures | At site | Daily | Part of EMP | MoALD, IFAD |
| Noise Level | Incl. baseline | Decibel metre measurement on compliance with Nepali Noise Standards ¹⁷ | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Noise level | dBA | Inspection of the key noise equipment at site | At site | Daily | Part of EMP | MoALD, IFAD |
| Drainage system | Rainwater treatment and discharge | Visual inspection | At site | Daily | Part of EMP | MoALD, IFAD |

¹⁶ And/or as agreed with the project Financier

¹⁷ And/or as agreed with the project Financier

| Type | Indicator | Method | Location | Schedule | Cost per year | Responsibility |
|---|---|------------------------------------|--|-----------|---------------|----------------|
| Project alignment with key stakeholders' requirements | No grievances, nr. of CSR projects implemented, job and economic spin off created | Project stakeholders' key meetings | Project affected Wards and local authorities | Quarterly | Part of EMP | MoALD, IFAD |

Table 9-4: Environmental management framework for operational phase

| Type | Indicator | Method | Location | Schedule | Cost per year | Responsibility |
|----------------------|---|--|---|--------------------------------|----------------------------------|----------------|
| Baseline | | | | | | |
| Riverbank erosion | Riverbank erosion | Visual inspection | Danab River along the market infrastructure | Quarterly, visual inspection | 5000 USD | MoALD, IFAD |
| Air quality | TSP, PM10, PM2.5, SO2, NOx, CO, Benzene, Ozone, Lead. | High volume sampling | In and around market infrastructure | Quarterly, laboratory analysis | 10000 USD | MoALD, IFAD |
| Noise Level | dBA | Decibel metre | At the market infrastructure boundaries | Quarterly | Included in Air quality sampling | MoALD, IFAD |
| Ground water Quality | COD, BOD5, Chloride, Iron, Manganese, pH, Silica, Ammonia Nitrogen, Nitrate, Nitrite, Sulphate, Total Phosphorus, Cyanide, Suspended Solids, Total Dissolved Solids, Electrical Conductivity, Total Hardness, Total Alkalinity, Arsenic, Sodium, Potassium, Mercury, Chromium, Zinc, Copper, Cadmium, Cobalt, Aluminium, Nickel, Lead, Lithium; Others: Total Coliforms, Faecal Coliforms | Testing of the groundwater from a well on site and laboratory analysis | At the market | Quarterly, laboratory analysis | 10000 USD | MoALD, IFAD |

| Type | Indicator | Method | Location | Schedule | Cost per year | Responsibility |
|--|--|-----------------------------------|---|---|------------------------|----------------|
| Water quality Danab River | Temperature, pH, conductivity, turbidity TSS, DSS, DO, BOD, COD, Total Coliforms and Faecal Coliforms | Testing and laboratory analysis | Upstream and downstream of the market | Quarterly | 10000 USD | MoALD, IFAD |
| Social survey: Consumer price, Sanitation, Law and order | Price of consumables near the project site, status of sanitation and law and order environment | Market survey/ Enumeration | In and around the market infrastructure | Once a year | 20000 USD | MoALD, IFAD |
| Impact | | | | | | MoALD, IFAD |
| Riverbank erosion | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Groundwater level | Level groundwater | 1 piezometer well to be developed | At the market infrastructure | Quarterly | Part of EMP | MoALD, IFAD |
| Ground water Quality | Incl. in baseline | Incl. in baseline | At the market infrastructure | Incl. in baseline | Incl. in baseline | MoALD, IFAD |
| Soil quality | pH, Nitrogen, Phosphorus, Potash, Organic Matter, Available Boron, Other Micronutrients and Toxic Metals, Molybdenum, Copper, Zinc, Sodium, Lead, Total Chromium, Hexavalent Chromium Cadmium, Arsenic, Mercury, Total Organic, Cation Exchange Capacity, Sodium Exchange Capacity Potassium Exchange Capacity | Testing and laboratory analysis | At the market infrastructure | 1 sample before start operation, 1 sample before market closure | 5000 USD for 2 samples | MoALD, IFAD |
| Air quality | Incl. in baseline | Incl. in baseline | In and around market infrastructure | Incl. in baseline | Incl. in baseline | MoALD, IFAD |
| Air Quality | Dust | Visual inspection | In and around market infrastructure | Daily | Part of EMP | MoALD, IFAD |

| Type | Indicator | Method | Location | Schedule | Cost per year | Responsibility |
|---|---------------------------|---|---|-------------------|-------------------|----------------|
| Noise Level | Incl. in baseline | Incl. in baseline | At the market infrastructure boundaries | Incl. in baseline | Incl. in baseline | MoALD, IFAD |
| Water quality Danab River | Incl. in baseline | Incl. in baseline | Upstream and downstream of the market | Incl. in baseline | Incl. in baseline | MoALD, IFAD |
| Market workers and community grievances | Number of open grievances | GRM implementation | At the market and nearby communities | Monthly | Part of EMP | MoALD, IFAD |
| | | | | | | |
| Compliance | | | | | | |
| Air quality | Incl. baseline | Compliance on Nepali Ambient Air Quality Standards ¹⁸ | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Air Quality | Dust | Visual inspection at site, compliance on project mitigation measures | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |
| Noise Level | Incl. baseline | Decibel metre measurement on compliance with Nepali Noise Standards ¹⁹ | Incl. baseline | Incl. baseline | Incl. baseline | MoALD, IFAD |

¹⁸ And/or as agreed with the project Financier

¹⁹ And/or as agreed with the project Financier

| Type | Indicator | Method | Location | Schedule | Cost per year | Responsibility |
|---|---|--|--|-----------|---------------|----------------|
| Noise level | dBA | Inspection of the key noise equipment at site | At site | Daily | Part of EMP | MoALD, IFAD |
| Drainage system | Rainwater treatment and discharge | Visual inspection | At site | Daily | Part of EMP | MoALD, IFAD |
| Wastewater treatment plant effluent Impact and compliance | Temperature, pH, conductivity, turbidity TSS, DSS, DO, BOD, COD, Total Coliforms and Faecal Coliforms | Testing and Lab analysis Compliance with Nepali discharge requirements ²⁰ | At site | Quarterly | 10000 USD | MoALD, IFAD |
| Project alignment with key stakeholders' requirements | No grievances, nr. of CSR projects implemented, job and economic spin off created | Project stakeholders' key meetings | Project affected Wards and local authorities | Quarterly | Part of EMP | MoALD, IFAD |

²⁰ And/or as agreed with the project Financier

9.3.2 Auditing

Environmental auditing will be carried out during the operation stage to examine performance of the project related to the environment, social, health and safety aspects - actual impacts of the project, the accuracy of impact predictions, the effectiveness of mitigation and enhancement measures and functioning of the monitoring mechanisms.

The EPR2077 requires that the environmental auditing be undertaken after the project has been operational for two years. It further specifies it shall be carried out by the **authoritative government agency** with the assistance of other relevant stakeholders as necessary.

The main objective of the auditing is to monitor and assess environmental, social, health and safety parameters which are most significant with the implementation of the project:

- to assess accuracy of impact predicted during the EIA study, including the quality and completeness of the data, assumptions, and analysis used in the report.
- to identify potential risks and impacts that may not have been considered in the EIA report.
- to assess effectiveness of the mitigation and enhancement measures implemented during the project construction and operation.
- to identify areas where the project may be falling short of compliance or where improvements can be made.

The auditing framework for physical environmental component is presented in the table below.

Table 9-5: Auditing framework for physical environment

| SN | Parameter | Location | Methods | Indicator |
|----|------------------------|---|---|--|
| 1 | Air quality | In the project site and surrounding settlements | High Volume Air sampling and lab analysis | PM2.5, PM10, NO _x , SO _x , CO |
| 2 | Water quality | Danab river upstream and downstream of the project site | Water sampling and lab analysis | pH, TSS, TDS, DO, BOD, Faecal coliform, Total coliform Status of drainage system to trap stormwater in the project sites, particularly to trap hazardous chemicals - oil lubricants etc. Status of wastewater treatment system prior to disposing into the river |
| 3 | Drinking water quality | Water tanks and taps in the project site | Water sampling and lab analysis | pH, turbidity, TDS, Total hardness, Ca, Mg, Cl, NO ₃ , F, As, Fe, Mn, Coliform Status of drinking water treatment |

| SN | Parameter | Location | Methods | Indicator |
|----|------------------|--|---|---|
| 4 | Noise level | In the project sites and surrounding settlements | Sound level metre | dB level |
| 5 | Land use | Project site and surrounding area | Observation and mapping | Land cover change |
| 6 | Floods | Project site | Records of floods Flood mapping Observation and consultations | Flood level Flood damage - bank cutting, inundation damage and loss |
| 7 | Waste management | Project site and surrounding | Observation | Solid waste types and their production Waste collection system Waste disposal site and system Recycling and reuse of waste |
| 8 | Light | Project site and surrounding settlement | Observation and consultation | Use of light intensity at night Disturbance to local residents at nights |
| 9 | Ground water | Surrounding wells and tube wells | Observation and interview | Ground water table Yield of water in the wells and tube wells |

Table 9-6: Auditing framework for biological environment

| SN | Parameter | Location | Methods | Indicator |
|----|--------------|---|-------------------------------------|--|
| 1 | Forest | Project site and surrounding forest area (CF) | Observation, interview, records | Number of trees cleared Number of samplings planted and survived as a compensatory plantation Expenses for the compensatory plantation Management of the compensatory plantation site Use of firewood from the forest and other forest resources |
| 2 | Wildlife | Surrounding forest area | Observation, interviews and records | Records of poaching and hunting Poaching activities |
| 3 | Forest fire | Surrounding forest area | Observation, interviews and records | Forest fire incidences |
| 4 | Aquatic life | Danab river | Observation and interview | Fish and other aquatic lives found in the Danab river |
| 5 | Forest area | Project site | Records, observation, and interview | Records of land compensation Compensatory plantation |

Table 9-7: Auditing framework for socio-economic and cultural environment

| SN | Parameter | Location | Methods | Indicator |
|----|-----------------------|-----------------------------------|------------------------------------|--|
| 1 | Occupational health | Project site | Observation, interview, records | Use of PPE by workers Availability of medical facilities and first aid at site Records of injuries and health conditions |
| 2 | Sanitary condition | Project site and surrounding area | Observation, interview, records | Workers, staff and visitors practising solid waste management in the premises Availability of waste collection bins in the site Instructions signages posted in the sites and their appropriateness Sanitary condition in the project sites Incidences of diseases outbreaks Incidences of STD, communicable diseases |
| 3 | Livelihood | Project area | Observation and interview | Economic activities of local people Opportunity available to local Income level and purchase capacity Change in occupation type Change in types of houses Use of domestic appliances - computers, kitchen appliances, refrigerators etc. Land ownership Education status |
| 4 | Socio-economic change | Project area | Observation and interview | Change in local economy, Number of shops, industries, rental houses, involvement of locals in business and commerce, number of freight transportation ply per day, amount of revenue generated, increase or decrease in the price of commodity |
| 5 | Accidents | Project site and surrounding area | Observation, interview and records | Records of accidents and type of accidents Injury and casualty |
| 6 | Law and order | Project site and surrounding area | Observation, interview and records | Incidences of crime/ crime rate incident clearance rate Police to population ratio Citizens perception on safety |
| 7 | Community services | Project area | Observation, interview and records | Number of people using a community service verses facility available - school capacity vs number of students, health services capacity versus patient visits Staff to client ratio - number of teachers to student ratio etc. Funding available for the communities services Wait time Satisfaction of people |

| SN | Parameter | Location | Methods | Indicator |
|----|-------------------|-------------------------------|------------------------------------|---|
| 8 | Employment | Project area | Observation, interview and records | Number of local job openings Recruitment and training programs for locals Ratio of locals vs total workers recruited in the project |
| 9 | Women empowerment | Project area and project site | Observation, interview and records | Involvement of women in project activities - jobs, trainings, Job opening for women Gender ratio amongst the workers Wage rate for men and women |
| 10 | Fire hazard | Project site | Observation, interview and records | Number and intensity of fire incidents Fires extinguishers available in the project site |
| 11 | Migration | Project area | Observation, interview and records | Population growth in the project surrounding Number of houses increased Migratory population Origin of migration Purpose of migration |

The project will allocate environmental auditing costs, which will be for one time, 2 years after completion of the construction works and again 1 time 1 year after. The breakdown of the estimated cost is summarised in the table below:

Table 9-8: Breakdown of estimated cost for auditing

| Specifications | Input [MM] | Rate [NPR per MM] | Amount [NPR] |
|-----------------------------|------------|-------------------|--------------|
| Environment Expert | 6 | 250,000 | 12,00,000 |
| Forest Expert | 2 | 200,000 | 400,000 |
| Sociologist | 6 | 200,000 | 12,00,000 |
| Reporting and logistics | LS | | 500,000 |
| Transport | LS | | 200,000 |
| Field sampling and lab test | LS | | 400,000 |
| MALD | LS | | 500,000 |
| MoFE | LS | | 500,000 |
| Total | | | 49,00,000 |

A sample of general auditing report format is presented in below:

Chapter 1: Executive summary

Chapter 2: (i) Description of the examination administration and audit work, (ii) interviews conducted with project stakeholders, (iii) the area for monitoring (iv) methods of examination, (v) data and details related to the environmental monitoring

Chapter 3: Complete details of the examination

Chapter 4: Suggestions and corrective action to be followed regarding the project

Appendix: Related statistics and details

9.3.3 Corrective Action

Investigating a ‘near-miss’ or actual incident after it occurs can be used to obtain valuable lessons and information that can be used to prevent similar or more serious occurrences in the future.

Project Proponent (or delegated party) will implement a formal non-compliance and corrective action tracking procedure for investigating the causes of, and identifying corrective actions to, accidents or environmental or social non-compliances. This will ensure coordinated action between Project Proponent (or delegated party) and its contractors. The E&S Officer will be responsible for keeping records of corrective actions and for overseeing the modification of environmental or social protection procedures and/or training programs to avoid repetition of non-conformances and non-compliances.

9.3.4 Reporting

Throughout the Project, Project Proponent (or delegated party) will keep the regulatory authorities informed of the Project performance with respect to EHS matters by way of written status reports and face-to-face meetings. Project Proponent will prepare a report on environmental and social performance and submit it to MoFE. The frequency of this reporting will be agreed upon between Project Proponent (or delegated party) and MoFE.

If required, Project Proponent (or delegated party) will provide appropriate documentation of EHS related activities, including internal inspection records, training records, and reports to the relevant authorities. Contractors are also required to provide EHS performance reporting to Project Proponent (or delegated party) on a regular basis. These will be used as inputs to the above.

9.4 Proposed Environmental Management Plan

The environmental and social mitigation and enhancement measures and the monitoring and management responsibility for impacts during both construction and operation of the Project are presented and included in the EIA and consolidated in the project Environmental Management Matrix, see details in Appendix 18. These measures will be adopted by Project Proponent and imposed as conditions of contract on the contractors hired for the Project.

Additional detailed policies and plans will need to be developed to support the implementation of this EMP and as part of the development of the EOAWM ESMS. The timing of the development of the plans will be staged – construction related plans will be finalized and in place 60 days prior to the start of construction and the operations related plans will be finalized and in place 60 days prior to the start of operations. They will be finalised by Project Proponent (or delegated party), where appropriate in consultation with the MoALD and MoFE and other key stakeholders.

A full list of the key management plans and strategic E&S documents identified in the EIA for this Project is provided below (such plans shall be developed for both construction and operation phase of the project):

- Health Safety and Environment
- Occupational Health and Safety Management Plan;
- Waste Management Plan;
- Traffic Management Plan;
- Emergency Preparedness and Response Plan;
- Stakeholder Engagement Plan;
- Community Health, Safety and Security Plan;
- Community Investment Plan;
- Local Employment and Content Plan;
- Code of Conduct.

9.4.1 E&S Specifications for the EPC Contractor

The Environmental and Social (E&S) performance of the construction work carried out by the EPC Contractor will be guided by the E&S obligations outlined in the General and Particular Conditions of the Contract between the Project Proponent and the EPC Contractor. These obligations will be incorporated into a document called "Environmental and Social Specifications for the Construction Phase," which will be created in compliance with Nepali regulations and IFC PS requirements. The specifications will outline the actions that the EPC Contractor must take to adhere to the recommendations and measures outlined in the Environmental Impact Assessment (EIA). These measures will be detailed in several management plans created by the EPC Contractor. The Contractor will have to comply with general specifications for sound environmental management, which will be applicable to all their activities within the work site. A monitoring program will be established to ensure that the Contractor fulfils their environmental and social responsibilities.

9.4.2 Community Investment Plan

The entity behind the project plans to create a Community Investment Plan (CIP) that relies on voluntary contributions and initiatives to assist the communities in its sphere of influence. This approach aims to help the communities identify and tackle their development priorities and leverage the opportunities presented by the presence of the wholesale market in a sustainable manner while supporting the proponent's business goals. The primary objective of the CIP is to facilitate enduring enhancements to the communities' quality of life, leading to a social license to operate that benefits the company. Based on stakeholders' consultation for this project, the CIP shall prioritize such topics as **waste management, development of demonstration agriculture farming plots and the state of public roads connected to the market.**

The CIP will be developed, in coordination with key relevant stakeholders and shall be operational by the start of construction.

Steps to develop a Community Investment Plan include:

- Set out a medium-term plan for the Partnerships' community investments.
- Establish CIP objectives that are linked to the business case for each Partner.
- Identify / confirm target stakeholder groups and specify eligibility criteria for the CIP.

- Establish an iterative process of engagement with local communities and other partners on CIP.
- Undertake a socioeconomic baseline to understand the communities' current priorities, assets, needs, and understand the direct, legacy and/ or cumulative positive and negative impacts from the presence of Partners in the area.
- Link the CIP to this local context (by drawing upon socioeconomic baseline studies) by identifying the key program areas in which the company will invest - a participatory approach to identify investment projects that are aligned with the companies' and communities' priorities should be used.
- Involve a range of strategies, such as employing community members; creating external jobs through community-based procurement and enterprise development; promoting community members' skills for employability in the supply chain of operations; investing in education and health; and supporting infrastructure development.
- Present, discuss and agree the CIP with the communities.
- Integrate the CIP with other Partners programs that involve communities (stakeholder engagement, grievance process, environmental and social impact management, and local hiring and contracting).
- Identify the implementation model and decision-making/governance structures.
- Define roles and responsibilities, budget, scope, and timeline.
- Describe the Partners exit/handover and sustainability strategies; and
- Describe how results will be monitored and communicated.

9.5 Decommissioning

The proposed Project has an initial design lifespan of 30 years. Currently there is no concrete plan in place which defines what will happen to the facilities at the end of their useful life. It is also unknown what the characteristics of the surroundings will be at that time, and what the constraints to decommissioning activities and process might be. It can be anticipated that the decommissioning will essentially be the reverse of the construction process, and involve the dismantling of buildings and structures, removal of equipment, cabling and piping, and depending on future use removal of foundations and concrete.

A decommissioning plan will be developed based on the planned subsequent land use, surrounding constraints, as well as the applicable regulations in effect at that time, and input from local communities and other stakeholder. The plan will consider potential environmental and social issues and impacts including health and safety, air quality, noise, nuisance dust, and traffic and incorporate mitigation actions to manage potentially significant deleterious effects.

It can be anticipated that there are proven and well-known practices and measures to effectively manage these and all issues that can be anticipated to arise as part of decommissioning. It can be anticipated that a key aspect of the decommissioning plan will be management of waste material with an objective to divert as much material away from landfills and other non-productive fates and towards recycling and reuse.

Next to the environmental impacts of the decommissioning phase there are social impacts, especially regarding staff working in the operation of the market that will be laid-off. Project Proponent (or delegated party) will do its best to find alternative employment.

Chapter 10 Conclusion and Commitment

This report was prepared based on the several level of consultations with the local representatives, residents, government agencies, community-based organization, and other concerned stakeholders. The team has also carried out survey, and analysis of important environmental and social information from the area in analysing the possible impacts of the project. It was commonly agreed with the project key stakeholders, national, provincial and local authorities that the project will be a milestone in promoting the agriculture and developing economy of the region by providing a reliable market to the farming community. Moreover, this project is expected to promote business opportunity, entrepreneurships, and create jobs for the residents.

The project is expected to have some environmental impacts. The prominent impact of this project is acquisition of 12.47 ha of land from Ratanpur Community Forest and removal of 702 trees for construction works. The compensatory plantation of 7020 saplings have been proposed as the mitigation measure, which will be undertaken in coordination of the DFO and CFUG. The land acquisition will be carried out following the prevailing legislation of the country.

This report has identified all potential impacts anticipated at this stage from implementation of this project and proposed the mitigation measures. During project implementation, the risk matrix and mitigation measures will be revisited and incorporated in procurement contracts.

Given the above conclusion, this EIA Report recommends implementing the Proposal under the condition that the safeguard measures described in the Environmental Management Plan (EMP) are implemented and followed and monitored accordingly.

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Report on Environmental Status and Pollution Distribution in Lumbini province, prepared by Quest Frum Pvt LTD for GoN Province Government, Ministry of Industry, Tourism, Forest and Environment, 2020.

State of Social Inclusion in Nepal: Caste Ethnicity and Gender evidence from Nepal Social Inclusion Survey 2018, Central Department of Anthropology, Tribhuvan University, NEPAL, 2020.

Preparing the Secondary Towns Integrated Urban Environmental Improvement Project, Volume 19: BUTWAL INITIAL ENVIRONMENTAL ASSESSMENT, ADB, 2008

The following reports of the current Feasibility Study have been used:

- The Market Study Report (BH4289I&BRP002F01, dd 22 April 2021) has been used to understand the volumes and types of agriculture commodities produced in

the catchment area (Rupandehi District) of the future wholesale market, available surpluses and the needs of the agro sector with respect to trade, import, exports, issues and potential solutions.

- The Master Plan Report (BH4289IBRP004F03, dd 1 September 2022) and the Basis of Design Report (BH4289IBRP006F01 dd 10 November 2022) have been reviewed to gather information on salient and technical features of the project, details of design, project components and key activities. These reports have been used to determine project emissions and discharges into environment and determine the expected noise levels.

Additionally, the following existing sources of information have been reviewed to collect secondary information:

- Detailed Project Report (DPR) Preparation for the Infrastructure Development of Agriculture; Market, prepared by the Centre for Agriculture Infrastructure Development and Mechanization Promotion, at the request of MoALD.
- Initial Environmental Examination for upgrading of Tinau Danab Corridor Road Project (also known as Danab River Corridor Project) Rupandehi District Lumbini Province , prepared by Abhiyanta Solutions Pvt LTD for the GoN Ministry of Physical Infrastructure and Transport, Kathmandu, Nepal, 2019.
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- State of Social Inclusion in Nepal: Caste Ethnicity and Gender evidence from Nepal Social Inclusion Survey 2018, Central Department of Anthropology, Tribhuvan University, NEPAL, 2020.
- Ground water information has been collected from Ground Water Resources Development Board under the Ministry of Water Resources and Irrigation. Rainfall data, climate information, river discharges data, and other meteorological data has been collected from the Department of Hydrology & Meteorology, Kathmandu Nepal.

- Reports about environmental as well agriculture policies, laws, rules, standards, Acts, Regulation and other legal provisions were also collected and reviewed.
- Information about biological, social, chemical, physical, and cultural environments in the form of maps, and reports, etc., available with Butwal Municipality were collected and reviewed to get information on project area and fulfil the data gaps.

REPORT

Environment Impact Assessment Report For Development of the Export Oriented Agricultural Wholesale Market in Semlar, Butwal

EIA Appendixes

Client: Report

Reference: BH4289

Status: Final/01

Date: 2 May 2023

Appendices

1. Cover letter for EIA from Invest International
2. Feasibility Study: Technical and Financial Assessment Report
3. Project Layout Map: master plan drawing
4. Wastewater treatment plant for the EOAWM in Butwal Nepal
5. Methodology and forms used in EIA surveys (physical environment, biodiversity and socio-economic environment)
6. Results of Physical Environment Surveys (air, noise and ground and surface water)
7. Minutes of Public Hearing Consultation during the EIA Phase of the project, including 2 notice, letters of invitation to PH, GRM, 4 consent letters collected after the PH, photo evidence
8. Approval letter of the Scoping Report and EIA Terms of Reference
9. EIA Terms of Reference
10. Minutes of consultations during the Scoping Phase of the EIA, including the notice and other associated documents
11. IFC Environmental and Social Performance Standards applicability to the project
12. Topographical and geotechnical survey report
13. Results of vegetation survey and vegetation loss
14. Results of the Household Survey
15. Flooding risk assessment report
16. Climate impact assessment memo
17. Grievance redress mechanism
18. EMP Environmental Mitigation Matrix
19. Experts declarations

1. Cover letter for EIA from Invest International

To be included later

2. Feasibility Study: Technical and Financial Assessment Report

REPORT

Export-oriented Agriculture Wholesale Market Semlar, Nepal

Technical and Financial Feasibility Study Report

Client: Nepal CBA

Reference: BH4289I&BBRP009F03

Status: Final/03

Date: 20 April 2023



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Table of Contents

| | | |
|----------|---|-----------|
| 1 | Introduction | 8 |
| 1.1 | Background | 8 |
| 1.1.1 | Scope of Works | 8 |
| 1.1.2 | Approach and methodology | 9 |
| 1.1.3 | Structure of the Technical and Financial Feasibility Study Report | 11 |
| 2 | Basis of Design | 12 |
| 2.1 | Project Location | 12 |
| 2.2 | Technical Surveys | 14 |
| 2.2.1 | Topographic survey | 14 |
| 2.2.2 | Geotechnical soil investigations | 14 |
| 2.2.3 | Flood risk assessment | 15 |
| 2.3 | Design Criteria | 17 |
| 2.3.1 | General | 17 |
| 2.3.2 | Climate | 18 |
| 2.3.3 | Earthquake loads | 20 |
| 2.3.4 | Structural design of buildings | 20 |
| 2.4 | Marketable volumes | 23 |
| 2.4.1 | Catchment area | 23 |
| 2.4.2 | Import of agricultural products from Sanauli | 23 |
| 2.4.3 | Current and future potential of agricultural commodities | 24 |
| 2.4.4 | Marketable volume of agricultural commodities in Semlar | 24 |
| 2.5 | Project Description | 27 |
| 2.5.1 | Wholesale market | 27 |
| 2.5.2 | Priority products | 28 |
| 2.5.3 | Additional interventions Semlar/Butwal | 28 |
| 2.5.4 | Sustainability | 29 |
| 2.6 | Description of proposed facilities | 30 |
| 2.6.1 | Wholesale market | 30 |
| 2.6.2 | Additional interventions | 38 |
| 2.6.3 | Site logistics and traffic flow | 40 |
| 2.6.4 | General utilities | 41 |
| 2.7 | Capex Cost Estimate | 48 |
| 2.8 | Opex Cost Estimate | 49 |
| 2.8.1 | Summary | 49 |
| 2.8.2 | Personnel costs | 50 |
| 2.8.3 | Office and overhead expenses | 51 |
| 2.8.4 | EMP and monitoring | 51 |
| 2.8.5 | Energy costs | 51 |
| 2.8.6 | Maintenance costs | 51 |

| | | |
|----------|--|-----------|
| 3 | Project Plan | 52 |
| 3.1 | Structure of the Project Plan | 52 |
| 3.2 | Procurement Plan | 52 |
| 3.2.1 | Introduction | 52 |
| 3.2.2 | Potential tender strategies | 52 |
| 3.2.3 | Overview of tasks and responsibilities | 54 |
| 3.2.4 | Proposed tender strategy | 56 |
| 3.3 | Implementation plan | 58 |
| 3.4 | Governance, Management and Operations Plan | 59 |
| 3.4.1 | Introduction | 59 |
| 3.4.2 | Policy and Legal Framework | 59 |
| 3.4.3 | Institutional overview | 61 |
| 3.4.4 | Suggested Model for Semlar Wholesale Market | 63 |
| 3.4.4.1 | Trends and practices globally | 63 |
| 3.4.4.2 | Trends and practices in Nepal | 64 |
| 3.4.4.3 | Key considerations in determining a suitable model | 64 |
| 3.4.4.4 | Recommended Organisational form, governance and management structure | 65 |
| 3.4.4.5 | Financial management, deployment of surplus funds and strategies and plans to address potential financial deficits | 66 |
| 3.4.4.6 | Leveraging the Public and Private Sectors to Support Market Operations | 66 |
| 3.4.5 | Operational plan | 68 |
| 3.4.6 | Maintenance Plan | 70 |
| 3.5 | Monitoring and Evaluation Plan | 70 |
| 3.5.1 | Key performance parameters | 70 |
| 3.5.2 | Data collection | 71 |
| 3.5.3 | Reporting | 71 |
| 4 | Economic and Financial Analysis | 74 |
| 4.1 | Structure of the Economic and Financial Analysis | 74 |
| 4.2 | Financial Analysis | 74 |
| 4.2.1 | Background and Summary | 74 |
| 4.2.2 | Investment – Capital Expenditure | 75 |
| 4.2.3 | Income/ Revenue | 75 |
| 4.2.4 | Operational Expenses | 76 |
| 4.2.5 | Financial discount rate | 76 |
| 4.2.6 | Viability Gap Funding | 78 |
| 4.2.7 | Financial Analysis: Discussions, Conclusions and Recommendations | 78 |
| 4.3 | Economic Analysis | 79 |
| 4.3.1 | Background | 79 |
| 4.3.2 | Reader's guide | 79 |
| 4.3.3 | CBA Methodology | 79 |
| 4.3.3.1 | What is a Cost-Benefit Analysis? | 79 |

| | | |
|---------|---|----|
| 4.3.3.2 | Analytical Framework | 79 |
| 4.3.3.3 | Types of effects | 79 |
| 4.3.4 | Assumptions | 80 |
| 4.3.4.1 | Project timeline assumptions | 80 |
| 4.3.4.2 | Volumes | 80 |
| 4.3.4.3 | Commodity Prices | 81 |
| 4.3.4.4 | Storage capacity | 81 |
| 4.3.4.5 | Post-harvest losses | 82 |
| 4.3.4.6 | Social discount rate | 82 |
| 4.3.4.7 | Shadow Correction Factor | 82 |
| 4.3.4.8 | Inflation | 83 |
| 4.3.5 | Costs | 83 |
| 4.3.5.1 | Capex & Opex | 83 |
| 4.3.6 | Benefits | 83 |
| 4.3.6.1 | Increased production – all volumes | 83 |
| 4.3.6.2 | Reduced post-harvest losses – handled volumes | 84 |
| 4.3.6.3 | Reduced post-harvest losses – stored volumes | 84 |
| 4.3.7 | Employment and Indirect Effects | 84 |
| 4.3.8 | Results | 85 |
| 4.3.8.1 | Base Case Results | 85 |
| 4.3.9 | Sensitivity Analysis | 86 |
| 4.3.9.1 | Commodity prices | 86 |
| 4.3.9.2 | Capex and Opex | 86 |
| 4.3.9.3 | Volumes | 86 |
| 4.3.10 | Conclusion CBA | 87 |

5 Risk Analysis 88

Table of Tables

| | |
|---|----|
| Table 2-1: Overview of result of exploratory soil investigations | 14 |
| Table 2-4: Specific Weight of Materials | 21 |
| Table 2-5: Live loads | 21 |
| Table 2-2: Overview of imports via Sanauli border in 2017/2018 | 23 |
| Table 2-3: Forecast marketable volume of Agricultural commodities in Semlar | 25 |
| Table 2-6: Agreed list of priority produce | 28 |
| Table 2-7: List of suggested sub-set of priority interventions | 29 |
| Table 2-8: Proposed facilities at Semlar Agricultural Wholesale Market | 30 |
| Table 2-9: Overview of wholesale shutters | 32 |
| Table 2-10: Water demand estimation | 41 |

| | |
|--|----|
| Table 2-11: Discharge requirements for discharge into surface water | 44 |
| Table 2-12: Design principles for both wastewater treatment configurations. | 46 |
| Table 2-13: Design specifications of required process units | 46 |
| Table 2-14: Minimum illumination levels | 47 |
| Table 2-15: Capex costs estimate (price level 2022, excl. VAT) | 48 |
| Table 2-16: Summary of annual Opex costs | 49 |
| Table 2-17: Overview of annual personnel costs | 50 |
| Table 2-18: Overview of annual maintenance and repair costs | 51 |
| Table 3-1: Overview of tasks and responsibilities | 54 |
| Table 3-2: Comparison of tender strategies | 55 |
| Table 3-3: Monitoring and Evaluation | 71 |
| Table 4-5 Model Timeline Assumptions | 80 |
| Table 4-6 Annual average price of each commodity, NPR / ton | 81 |
| Table 4-7 Storage Capacity of each commodity, tonnes | 81 |
| Table 4-8 Current post harvest losses for each commodity, % | 82 |
| Table 4-9 Post harvest losses reduction with wholesale market, % | 82 |
| Table 4-10 Shadow Correction Factors | 82 |
| Table 4-11 Capital expenditures CBA (EUR, price level 2022) | 83 |
| Table 4-12 Operational expenditures | 83 |
| Table 4-13 Summary Metrics - CBA | 85 |
| Table 4-14 Sensitivity Analysis - Commodity prices | 86 |
| Table 4-15 Sensitivity Analysis - Capex and Opex | 86 |
| Table 4-16 Sensitivity Analysis - Volumes | 87 |
| Table 4-17: Overview of local supply and demand of priority produce in catchment area in MT | 4 |
| Table 4-18: Import priority produce through Sunauli Quarantine, Bhairahawa, Rupandehi, 2017/18 | 6 |
| Table 4-19: Annual transactions of priority produce in existing Butwal Market 2018/19 | 7 |
| Table 4-20: Annual transactions at collection centers in Rupandehi district | 8 |
| Table 4-21: List of suggested sub-set of priority interventions | 17 |

Table of Figures

| | |
|---|----|
| Figure 1-1: Feasibility study Phase 1 & 2 scope overview | 9 |
| Figure 1-2: Map of Nepal with the locations of the proposed market developments | 10 |
| Figure 2-1: Location new wholesale market [Source Google Earth] | 12 |
| Figure 2-2: Map with official site demarcation | 13 |
| Figure 2-3: Topographic survey | 14 |

| | |
|---|----|
| Figure 2-4: An overview of the current system, with river directing indicated with the light green arrows. The site is indicated with brown. The satellite image was taken in 2022. | 15 |
| Figure 2-5: Flood map with a return period of 100-years | 16 |
| Figure 2-6: Flood map with a return period of 5-years | 17 |
| Figure 2-7: Average temperatures | 18 |
| Figure 2-8: Average rainfall | 19 |
| Figure 2-9: Wind rose Butwal | 19 |
| Figure 2-10: seismic zoning map | 20 |
| Figure 2-11: Schematical representation of the WWTP with sludge thickening | 45 |
| Figure 3-1: Overview EPC Lumpsum Turnkey approach | 53 |
| Figure 3-2: Overview packages approach | 54 |
| Figure 3-3: Overview EPC Management approach | 54 |
| Figure 3-4: Overview proposed tender strategy | 56 |
| Figure 3-5: Overview of wholesale market departments | 67 |
| Figure 4-1 Projected Volumes of the wholesale market, thousand tonnes | 81 |
| Figure 4-2 Projected Economic cashflows | 85 |
| Figure 4-3: Agricultural commodities Butwal Market by supply source | 8 |
| Figure 4-4: Potato monthly average wholesale price FY 2019/20 | 10 |
| Figure 4-5: Monthly average prices of onion | 11 |
| Figure 4-6: Tomato monthly average price FY 2019/20 | 12 |
| Figure 4-7: Cucumber monthly average price FY 2019/20 | 12 |
| Figure 4-8: Cauliflower monthly average price | 14 |
| Figure 4-9: Cabbage monthly average price | 15 |
| Figure 4-10: Banana monthly average price | 16 |
| Figure 4-11: Product Flow Diagram potatoes | 19 |
| Figure 4-12: Dimension of storage room potato | 21 |
| Figure 4-13: Product Flow Diagram Onion | 22 |
| Figure 4-14: Dimension of onion storage room | 23 |
| Figure 4-15: Product Flow Diagram Cabbage | 25 |
| Figure 4-16: Dimension of cabbage storage room | 25 |
| Figure 4-17: Product Flow Diagram Banana | 26 |
| Figure 4-18: Dimension of banana storage room | 27 |



Appendices

- A1. Annual Tradable volume of agricultural commodities for Semlar**
- A2. Background to proposed interventions for priority products**
- A3. Description of additional interventions**
- A4. Geotechnical soil investigation report**
- A5. Masterplan layout drawing**
- A6. Architectural layout drawings**
- A7. Capex cost estimate**
- A8. Tender specification storage and handling equipment**

Glossary

| Abbreviation list | |
|-------------------|---|
| ADS | Agriculture Development Strategy |
| APP | Agricultural Perspective Plan |
| CAIDMP | Centre for Agriculture Infrastructure Development and Mechanization Promotion |
| CBA | Cost Benefit Analysis |
| D2B | Develop to Build |
| DPR | Detailed Project Reports |
| CAESC | Community Agricultural Extension Service Centers |
| EIA | Environmental Impacts Assessment |
| EPA | Environment Protection Act |
| EPC | Engineering, Procurement and Construction |
| EPR | Environment Protection Regulation |
| FS | Feasibility Study |
| ICT | Information and Communication Technology |
| IFAD | International Fund for Agricultural Development |
| IFC | International Finance Institution |
| IFI | International Financial Institutions |
| II | Invest International |
| LDDP | Livestock and Dairy Development Project |
| LPS | Litre per second |
| MCA | Multi-Criteria Assessment |
| MoALD | Ministry of Agriculture and Livestock Development |
| MoF | Ministry of Finance |
| MoLMAC | Ministry of Land Management, Agriculture and Cooperatives |
| NABIC | Nepal Agribusiness Innovation Centre |
| NPC | National Planning Commission |
| NGPTA | Nepali Ginger Producers and Traders Association |
| NLSIP | Nepal Livestock Sector Innovation Project |
| NTIS | Nepal Trade Integration Strategy |
| PACT | Project for Agricultural Commercialization and Trade |
| PMC | Project Management Committee |



| Abbreviation list | |
|-------------------|--|
| PSC | Project Steering Committee |
| RVO | Netherlands Enterprise Agency (Rijksdienst voor Ondernemend Nederland) |
| SDGs | UN Sustainable Development Goals |
| SEP | Stakeholder Engagement Plan |
| TMS | Total Management Services |
| USAID | United States Agency for International Development |
| VITA | Value chains for Inclusive Transformation of Agriculture Programme |
| VDC | Village Development Committee |
| WB | World Bank |
| WWTP | Wastewater Treatment Plant |



Executive Summary

Invest International on behalf of the Government of Nepal (GoN) has selected Royal HaskoningDHV (RHDHV) and its partners Agriplan Consultants, Nepal Agribusiness Innovation Centre (NABIC) and Total Management Services (TMS) to undertake a Feasibility Study (FS) for the development of the agricultural value chain infrastructure in Nepal (the Project). The FS is being financed as part of Invest International's Develop to Build Program (D2B) which aims to identify and develop suitable and sustainable public infrastructural measure(s) in Nepal throughout the value chain in order to improve domestic supply, to reduce import reliance and increase export potential. The Client for this project is the GoN, Invest International (II) is the financier, whereas the primary beneficiary is the Ministry of Agriculture and Livestock Development (MoALD).

The development of wholesale markets has been identified as one main intervention to help boost agricultural production and productivity, play an important role to improve the livelihood of farmers and provide for an efficient management of agriculture products once harvested. These are trading centres, where commodities are brought from the collection centres, where commodities can be properly stored, graded and packed.

As part of the study, 9 Detailed Project Reports (DPRs') for the development of new wholesale markets in Nepal have been reviewed: Pokhara, Barbardiya, Banganga, Butwal/ Semlar, Hetauda, Birgunj, Bardibas, Itahari and Rangeli. Based on the Pre-Feasibility Study, it has been decided that this Feasibility Study should focus on the development of an agricultural wholesale market in Butwal/Semlar, Rupandehi district, including a set of identified interventions. Once the new wholesale market is in operation, the existing market will be transformed to a consumer market.

IFAD and II are both interested to contribute to the construction of the wholesale market and some of the required additional interventions. The investment decision will be informed by the Feasibility Study. In addition, the Government of Nepal, IFAD and Invest International share the goal of strengthening the Agricultural value chains in Nepal. With the combined expertise of the three, the financing decision will likely be embedded within the broader VITA programme.

Basis of Design

The selected site for the proposed Export-oriented Agriculture Wholesale Market is located in Butwal Sub-metropolitan City-15, Semlar, Karsaghat, Rupandehi District. The site is currently accessible by an earthen road from the East-West Highway, except during high flood at Dano River. A new bridge is being constructed over the Dano river, together with a new road as part of the Dano River Road Corridor project, that will provide year-round accessibility to the site.

A flood risk assessment has been performed in a separate report to support the development of the wholesale market. Based on the assessment, flood risk mitigation measures are proposed in the design.

For design of the wholesale market a forecast was made on the marketable volumes of agricultural commodities in Semlar. The forecast calculated that the total tradable volume per day in Semlar comes out to be likely 466 mt per day, increasing up to 1,000 mt per day in the year 2040.

Development of the wholesale market has been identified as the main intervention. Based on the market study and discussions with key stakeholders, a supply and demand exercise has been conducted. The aim of the exercise was to identify surplus of commodities for which infrastructural interventions could be developed. Interventions identified based on supply-demand exercise are called additional interventions.



Additional interventions that are suggested as part of the D2B programme include the construction of cold storage facilities for Potato, Onion, Cabbage and Banana, including equipment for cleaning, sorting, grading and packaging.

It is considered that the above interventions will strengthen the agricultural value chain, by reduction of food waste and post-harvest losses, this will make more product available for local consumption and reduce import from other countries. It also provide conditions to further increase local production by creating a market for the (smaller) producers.

It is advised to construct the above set of priority interventions as a separate logistic center adjacent to the proposed Butwal wholesale market development. Here, produce can be collected, stored and packed and directly brought to the market via the adjacent wholesale market upon requirement. By combining the logistic center with the wholesale market they will strengthen each other. In addition, certain services such as workshops, offices, accommodation, etc. can be combined and/or shared with each other.

After site investigation, discussion with stakeholders, analysis of the present market, situation of the trade of the commodities in the existing market and present transaction volumes of the commodities and their future projection, a masterplan layout has been prepared and agreed upon for the so called “export-oriented agriculture wholesale market in Semlar”. The masterplan, including all facilities is designed for the anticipated throughput in the year 2040. To ensure that the facilities will not be overdesigned for the first operational years and left unused, a phased construction approach is proposed.

The total Capex costs for the construction of the wholesale market are estimated at Euro 40,473,400 (+/- 25%), excl. VAT, including an amount of approximately Euro 3,000,000 (all in) for future expansion of the wholesale market in 2030. These Capex costs are excluding the costs for land acquisition, project financing and taxes.

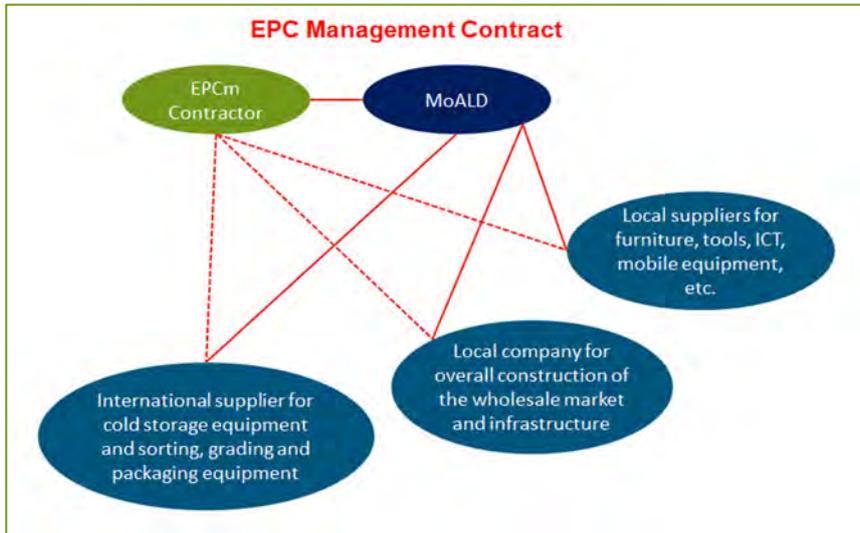
Procurement Plan

The procurement strategy aims to achieve the economic most favourable offers for the construction of the project.

Our proposed tender strategy is a combination of the EPCm approach and packages approach. It is proposed to split the works in the following packages:

- 1 One international tender for cold storage equipment, and sorting, grading and packaging equipment;
- 2 One local tender for the construction of the wholesale market and infrastructure;
- 3 Various local tenders for smaller supply contracts, such as furniture, tools, ICT systems and mobile equipment.

The proposed tender strategy is presented in the following figure.



Governance, Management and Operations Plan

Several options exist for setting up and operating wholesale markets in the country.

As the proposed market is being established with public funding, it will be necessary to ensure that a proper governance and management framework is in place to ensure fulfilment of commercial objectives of the market as well as development goals of the Government and funding development partners. Considering various factors and based on feedback received during stakeholder consultations (July 2022, December 2022), it is proposed that the wholesale market in Butwal will be set up and operated under the Development Board Act, 2013 BS.

The financial affairs of the market should be handled independently. The Government or the Market Management Committee will prepare policies for financial management. A key focus should be on creating a Reserve Fund to support long term market development.

It is advised that the operations of the wholesale market will be contracted to a number of experienced companies or cooperatives. The market will be headed by a market committee which will comprise several organisations including the following:

- Government (ministries involved);
- Farmers;
- Private companies;
- Cooperatives.

The Market Committee will assign a Chief Executive Officer (plus support staff) who will oversee and coordinate all activities of the market including administration and finance. The Chief Executive Officer can be a government official, but can also be privatised.

A proper maintenance plan shall be developed during the construction period.

To assure that any breakdowns of critical equipment can be repaired as soon as possible a proper spare part strategy shall be developed. Spare parts supply should be carried out at regular intervals, in particular for the mechanical and electrical components for the potato/onion/cabbage and the banana storage.



The spare parts and maintenance strategy shall be developed after construction once it is known which equipment and facilities will be installed.

During the implementation of the project, a sound management information system (MIS) shall be put in place to address the need to monitor implementation progress, effectiveness and outcome. We also recommend that an Environmental Management System is developed in line with ISO 14001 to set environmental, social, health and safety policies, management plans and procedure to manage the operation of the future market.

Financial Assessment

It is estimated that the planned market will require total investment of EUR 40 million. Out of this capital expenditure estimates, € 2.5 million is planned to be incurred in 2030 for market expansion. Capital expenditure of EUR 5 million is planned in Year 16 to replace equipment and other assets.

The market will generate income from multiple sources. Following will be the major sources of income for the wholesale market:

- Rent from wholesale shutters
- Concession for processing, packaging and cold storage concession
- Concession for Guesthouses and Restaurant
- Rental income from Godowns after start of operations in 2031
- Fees from Banana processing and handling facility
- Rent from commercial spaces, such as Farmers Retail Area (Krishak Chautari), Auction Centre, Bank, Agroveter, Grocery Shop, Canteen, etc.
- Other income will be generated from parking, holding yard charges, utilities and income from commercialization of waste management operations.

From a commercial standpoint the project is not feasible without public support. Based on the projected cashflows of the project and the proposed discount rate, the required grant to meet the hurdle rate is equal to NPR 5.7 billion or nearly EUR 40 million to be distributed in line with Capex.

The fact that the required grant exceeds the initial investments is due to a number of reasons:

- The grant is based on the project meeting the hurdle rate calculated using cash flows during the entire reference period; this includes the expansion and replacement Capex as well.
- Even though the project generates revenues, these revenues largely occur in later years which weigh less in terms of present value due to the discount rate.
- During the first 4 years of the project, operational cash flows are negative as revenues are insufficient to cover Operational Expenditures. These years weigh heavily on the NPV.

The project does not pursue commercial objectives alone. Despite the negative result of the financial assessment, recommendation is made to proceed with project on following grounds:

- The project is public service oriented and only semi-commercial in nature.
- There are tremendous commercial and development opportunities for the market to tap into beyond the revenue streams identified in the current assessment. There is a strong case for this investment to be seen as seed funding for development impact.
- The results of the Cost Benefit Analysis presented in the next section are highly positive and provide strong justification for funding.



With regards to financing, potential options include:

- a) DRIVE Program of Invest International: Invest International (II), current development partner funding the D2B technical assistance project, are able to fund up to 50% of capex costs.
- b) International Fund for Agriculture Development (IFAD): Through an upcoming new project, IFAD is in a position to extend support for construction of the new market in Butwal. This will align with their ongoing VITA Project which will complement the planned market in Butwal.
- c) Government of Nepal: The export oriented Butwal market is a priority of the Government as announced in various policies including the annual national budget. The need for a new wholesale market in Semlar Butwal has been confirmed with various level authorities and key stakeholders during engagements conducted in October 2021, July and December 2022. The Government may consider co-investing in the project or leverage other development partners in case needed funding cannot be sourced from DRIVE or IFAD alone.

Presently, no funding or financing has been committed by any partner, nor have any terms or conditions been defined. The actual funding and financing of the project therefor remains unknown, and the financial analysis has been performed on the basis of assumptions on potential funding by concerned stakeholders.

Cost Benefit Analysis

Agriculture plays a crucial role in Nepal's economy, as it provides one-third of the national output. It also serves as a major source of food and employment. However, mostly due to storage inefficiencies the production remains below capacity. Therefore, according to local experts, the current market of food and agricultural products is characterized by shortage and dependency on Indian food imports. India has a heavily subsidised agriculture industry; however, it first serves its domestic markets, therefore their exported volumes are volatile and often the imports are not enough to meet Nepali demand. Nepali agricultural products are of better quality than the imports but are also more expensive in price.

A CBA is a systematic approach that is generally deployed to support decisions on allocating public resources to projects which need such a contribution to be financially viable. It evaluates project alternatives and measures the resulting welfare change compared to the world without project in monetary terms. The following three benefits were identified and incorporated into the analysis, namely: increased production due to lower risk, lower post-harvest losses for handled volumes and lower post-harvest losses for stored volumes. The increased production effect was found to have the most significant positive impact.

Overall, the results of the analysis were positive, with the project having a positive NPV and ERR, and the results are robust with high switching values found in the sensitivity analysis.



1 Introduction

1.1 Background

Invest International on behalf of the Government of Nepal (GoN) has selected Royal HaskoningDHV (RHDHV) and its partners Agriplan Consultants, Nepal Agribusiness Innovation Centre (NABIC) and Total Management Services (TMS) to undertake a Feasibility Study (FS) for the development of the agricultural value chain infrastructure in Nepal (the Project). The FS is being financed as part of Invest International's Develop to Build Program (D2B) which aims to identify and develop suitable and sustainable public infrastructural measure(s) in Nepal throughout the value chain in order to improve domestic supply, to reduce import reliance and increase export potential. The Client for this project is the GoN, Invest International (II) is the financier, whereas the primary beneficiary is the Ministry of Agriculture and Livestock Development (MoALD).

IFAD and II are both interested to contribute to the construction of the wholesale market and some of the required additional interventions. The investment decision will be informed by the Feasibility Study. In addition, the Government of Nepal, IFAD and Invest International share the goal of strengthening the Agricultural value chains in Nepal. With the combined expertise of the three, the financing decision will likely be embedded within the broader VITA programme.

1.1.1 Scope of Works

The scope of the FS includes the following:

- Assess the problems and needs in the context of the Nepalese agricultural value chain infrastructure;
- Identify public infrastructure bottlenecks in the Nepalese agricultural value chain, determine the related costs to address them, the benefits and associated risks to implement them;
- Identify possible funding sources for the implementation phase of the project;
- Identify opportunities for synergy or possible overlap with programs by other donors ongoing in Nepal;
- Assess each project option in a (pre) feasibility; and
- Consider options (solutions) that focus on improving quality preserving infrastructure such as cold storage, scientific storehouse, fumigation chamber, quality certification facilities and accredited modern laboratories.

In order to identify the critically needed (public) infrastructure, several aspects have been investigated, e.g.:

- Selection of priority commodities for this project, including those with export potential and define the (public) infrastructural barriers of these commodities and the one that prevent an increase of export;
- Definition of the infrastructural measures along the agriculture value chain to overcome existing constraints and infrastructural barriers, including its capital investment as well as operating and maintenance cost;
- Assessment of technical, financial, economic, environmental and social feasibility of the proposed infrastructure measures;
- Development of a financing scheme/strategy for the selected infrastructure measures based on public and/or private financing instruments;

- Investigation of such financing tools, e.g., DRIVE¹, NL Business and /or other tools to be involved in the finance of the future infrastructure project.

1.1.2 Approach and methodology

General

The scope of Work for the FS is split into 2 phases (see figure below).

Figure 1-1: Feasibility study Phase 1 & 2 scope overview



Phase 1 of the project is completed. During Phase 1, the existing agriculture value chains have been reviewed and assessed in terms of bottlenecks and potential solutions. Only fruits and vegetables value chains have been analysed in detail, the livestock and fish are only considered from the marketplace perspective.

A preliminary technical, financial, economic, environmental, and social assessment has been conducted for the selected sites during Phase 1 of the project. A finance plan/strategy has been developed and an Environmental and Social Scoping Report has been produced. Based on this information Invest International together with the key stakeholders decided to proceed with Phase 2 of the project and the actual feasibility assessment.

Phase 1

Phase 1 of the project has been undertaken between September 2020 and November 2021 and resulted in the Pre-Feasibility Study Report.

During Phase 1, the development of wholesale markets have been identified as one main intervention to help boost agricultural production and productivity, play an important role to improve the livelihood of farmers and provide for an efficient management of agriculture products once harvested. These are trading centres, where commodities are brought from the collection centres, where commodities can be properly stored, graded and packed. Wholesale markets provide market access for farmers and may even facilitate import and trade of commodities to retail vendors and even facilitate exports. This is a place where market information is being generated and can be shared to providers of agro-logistic and/or phytosanitary services.

¹ DRIVE is a programme of the Minister for Foreign Trade and Development Cooperation through which subsidies, guarantees and loans can be furnished for the financing of development related public infrastructure in countries on the DRIVE list of eligible countries. The DRIVE programme is managed by Invest International, an executing agency of the Ministry of Economic Affairs.

As part of this study, 9 Detailed Project Reports (DPRs) for the development of new wholesale markets in Nepal have been reviewed: Pokhara, Barbardiya, Banganga, Butwal/ Semlar, Hetauda, Birgunj, Bardibas, Itahari and Rangeli.

Figure 1-2: Map of Nepal with the locations of the proposed market developments



An initial assessment resulted in a short list of sites that have been visited by the team, i.e.: Pokhara, Butwal/Semlar, Birgunj and 2 sites in Kathmandu Valley.

Based on the Pre-Feasibility Study in Phase 1, it has been decided that the Phase 2 Feasibility Study of the project will focus on the development of an agricultural wholesale market in Butwal/Semlar, Rpandehi district, including a set of identified interventions.

The main reasons for selection of Butwal/Semlar as priority location is as follows:

- The existing Butwal Wholesale market which was established in September 2010 and upgraded only few years back, is not able to cope with the existing demand while expansion is not possible since the market is in the centre of city. As such there are a lot of fragmented markets over the city.
- The current market is operating as a transit market and catering service to the entire country. A new modernized wholesale market (including appropriate storage, grading packing facilities) with ample area for further expansion is required to meet the demand of Butwal and surrounding area, reduce commodities loss and promote agro sector development.
- The Semlar/Butwal location has a great scope of developing as a provincial wholesale market for Province 5 and beyond.
- Butwal location is attractive because:
 - The location enables distribution of agri-products from all across the country.
 - The proximity to India border eases handling and distributing imported agri-products.
 - Gautam Buddha International Airport (26.5 km away at Bhairahawa) offers opportunity to export agri-commodities.
 - The location of Semlar market is adjacent to a main highway (east-west highway) with more than one point of access.
 - The proposed site is near to bus routes which is essential.
 - No human resettlement, physical or economic displacement is involved for the proposed site.
- The marketing opportunity of agricultural products in the western part of Nepal is comparatively less than the eastern side. Therefore, the establishment of wholesale market in Semlar of Butwal sub-



metropolitan will promote agricultural marketing, motivating district and neighbouring district's farmers to be more commercial and market oriented, will ensure farmers access to information and increase awareness in sector business opportunities.

- The development of a new wholesale market in Butwal is on a priority list of GoN and Provincial Government.
- There are opportunities to develop the project in cooperation with donors and financial institutions active in the country.

Phase 2

Phase 2 of the project has commenced in January 2022. Due to the plan to develop the wholesale market at a different location than considered in the DPR for Butwal/Semlar, phase 2 of the project started with the preparation of a new Master Plan Layout study for the selected site in Butwal/Semlar.

The purpose of the Master Plan study was to develop the general layout of the new wholesale market in Butwal/Semlar for the year 2040. During the Feasibility study a phased construction approach will be considered to ensure that the facilities are not overdesigned for the first operational years and left unused. The proposed market is envisaged to be involved in collection, processing and branding of agricultural products for distribution in domestic and international markets and will replace the existing wholesale market in Butwal city. Once the new wholesale market is in operation, the existing market will be transformed to a consumer market. The final Masterplan report was issued on 1 September 2022. This Masterplan report was used as the basis for this Feasibility Study.

1.1.3 Structure of the Technical and Financial Feasibility Study Report

The Technical and Financial Feasibility Study Report for the Export-oriented Agriculture Wholesale Market in Butwal is structured into following chapters:

- Chapter 1: Provides a general project introduction
- Chapter 2: Provides the Basis of Design for the wholesale market
- Chapter 3: Provides the Project Plan
- Chapter 4: Provides the Financial, economic and commercial feasibility

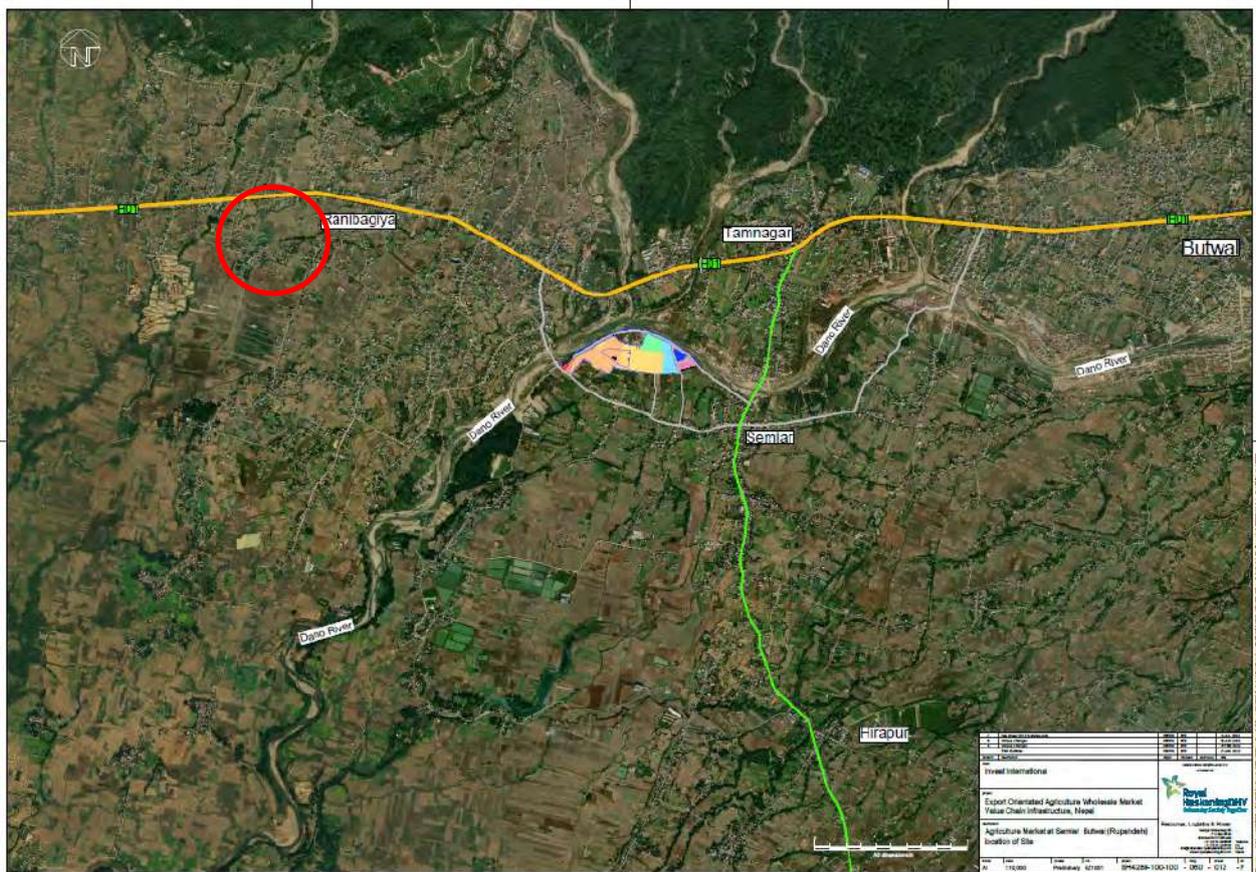
2 Basis of Design

2.1 Project Location

The site for the proposed Export-oriented Agriculture Wholesale Market is located in Butwal Sub-metropolitan City-15, Semlar, Karsaghat, Rupandehi District. The site is locally known as Karshaghat, situated at the bank of the Dano River.

The site is public land in name of the Municipal Government which is created by changes in the river course. The local government in Butwal provided commitment to ensure acquisition of land for the infrastructure project. The selection of this specific plot derives from the fact that land is scarce in Nepal (especially of sufficient size for an infrastructure project), expensive and difficult to identify and acquire. The location of the proposed site is about 10 km west from Butwal and about 1 km southern side of Bankatta Bazar located at East-West Highway (GPS coordinates 27°40'21.48"N, 83°22'33.80"E). The location is linked to Sunauli-Butwal-Pokhara-Kathmandu, Pokhara Lomanthang, and east-west Highway.

Figure 2-1: Location new wholesale market (GPS coordinates 27°40'21.48"N, 83°22'33.80"E) [Source Google Earth]

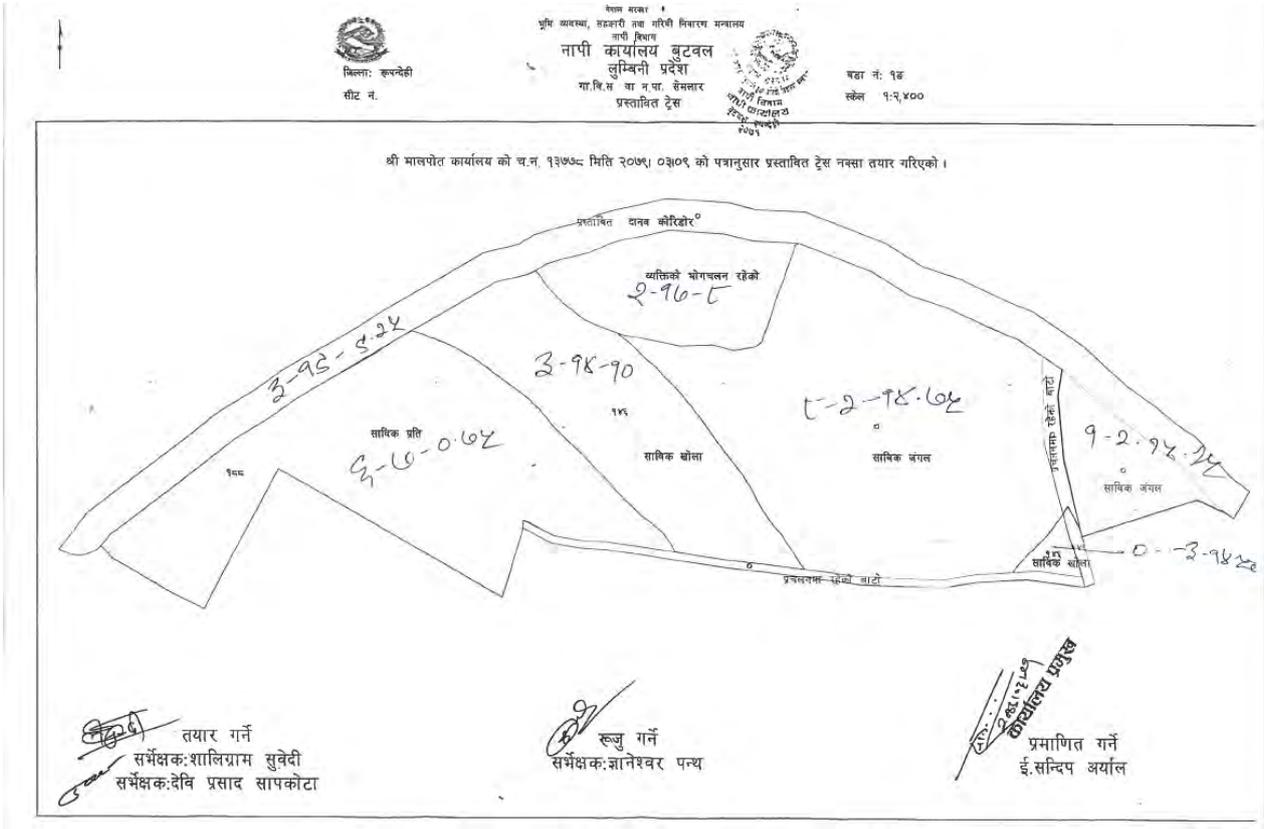


The land proposed for project covers an area of 12.5 Ha, including the land proposed for relocation of the football ground.

The official site demarcation was established by the Cadastre in June 2022. For the map, reference is made to Figure 2-2. Unfortunately, the cadastral map was only received as a hard copy, without scale bar

and exact coordinates. In this respect the official site boundaries shall be set out and measured once again before start of construction.

Figure 2-2: Map with official site demarcation



The proposed site is currently accessible by an earthen road from the East-West Highway. . A new bridge has been constructed over the Dano river and a new road is planned as part of the Dano River Road Corridor project.

Because of the Dano River Road Corridor project, the site at Ward 15 is accessible from two directions, spreading the traffic intensity on the access roads.

The site at Ward 15 further benefits from the Dano River Road Corridor project as it will separate the wholesale market from the river. This road will be built on a 1m high dike with riverbank protection and will act as a first line of defence against flooding.

The site contains a relative young community forest. According to local government officials, the existing trees were planted for the following reasons:

- to prevent squatters from occupying land;
- as protection against erosion;
- as future income source (source of timber).

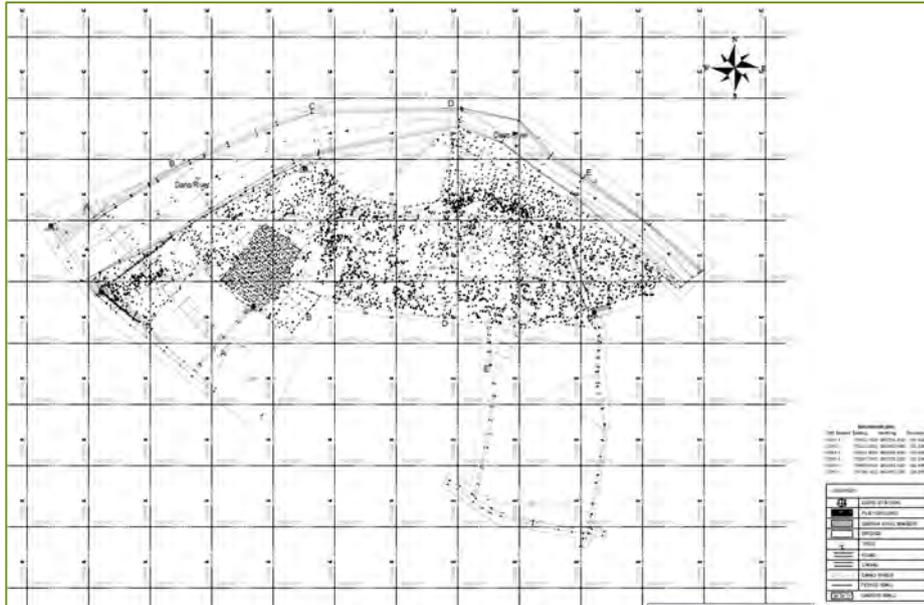
Please refer to the Environmental Impact Assessment study (as part of the Feasibility Study package) for more information on the site, direct surroundings and details on the community forest.

2.2 Technical Surveys

2.2.1 Topographic survey

Immediately after establishment of the official site boundaries RHDHV has conducted a topographic survey. For this survey RHDHV hired a local subconsultant called Apex Techno Consult & Consultancy Pvt. Ltd. The survey was undertaken with GPS instruments and the results are depicted in Figure 2-3.

Figure 2-3: Topographic survey



From the topographical survey it is observed that the altitude of the site varies between 133.0 and 136.5m above Mean Sea Level (MSL). Average ground level is around 134.5m above Mean Sea Level.

2.2.2 Geotechnical soil investigations

In addition to the topographic survey, soil investigation work till a depth of 20m has been carried out by Apex at the site allocated for the Development of the Agricultural Value Chain Infrastructure at Semlar, Butwal Sub Metropolitan, ward no 15, Rupandehi.

The exploratory geo-technical investigation was performed to characterize the subsurface conditions at the site, to evaluate the bearing capacity of foundation soil and to recommend the safe bearing capacity for different type of foundation, including the settlement analysis and the potential of liquefaction.

During soil investigation the water table was found at 2.0m below the ground level.

As per the site investigation results and then analysis associated for the measure of liquefaction, it shall be noted that there is no possibility of liquefaction.

On the basis of ultimate bearing capacity and allowable settlement, the following allowable bearing pressures in KN/m² for isolated foundation have been recommended.

Table 2-1: Overview of result of exploratory soil investigations

| Footing size in m x m | Depth of Footing in m | Allowable bearing capacity by Terzaghi's method in KN/m ² | Settlement in mm | Minimum Allowable bearing capacity in KN/m ² | Modulus of Subgrade reaction in KN/m ³ |
|-----------------------|-----------------------|--|------------------|---|---|
| 2.0 X 2.0 | 1.5 | 132.1 | 37.2 | 132.1 | 10,653 |

The complete exploratory geotechnical soil investigation report can be found in appendix 4 of this report. Prior to start of detailed design and construction, a detailed soil investigation survey shall be undertaken.

2.2.3 Flood risk assessment

The project area is located on the bank of the Dano River, which is a distributary of the Tinau River. It bifurcates near a bridge over East-West highway on Tinau River and eventually meets it again farther (more than 40 km) downstream. There are four tributaries (joining Dano river from the north side) within the reach between the bifurcation point and the project area, creating two three-way confluences as shown in Figure 2-4. It appears that these tributaries are morphologically dynamic as well.

Figure 2-4: An overview of the river system near the project site (GE image of 12/2022).



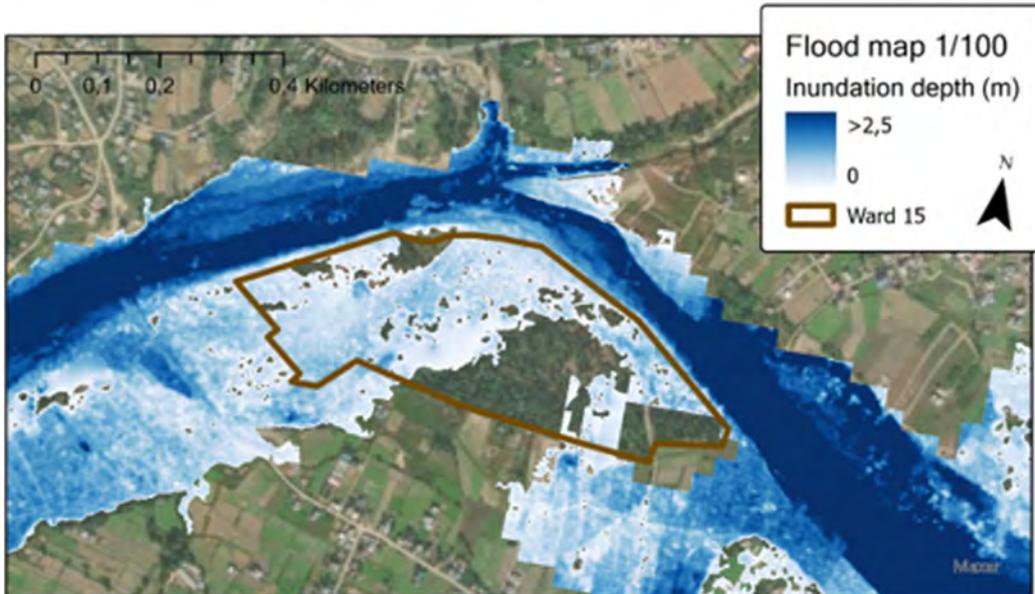
A flood risk assessment has been performed in a separate report to support the development of the wholesale market. For the report, reference is made to the EIA study and the Flooding Risk Assessment Study appendix to the EIA.

Flood risk has been assessed for four scenarios – 1 baseline and 3 alternatives:

1. A baseline scenario without any adaptation measures
2. Alternative A: A scenario with building elevation of 0.8m
3. Alternative B: A scenario with a landfill equalizing the lower parts of the site
4. Alternative C: A scenario with a landfill equalizing the lower parts of the site and building elevation of 0.8m

Flood risk assessment maps were made, resulting in the flood maps as shown in Figure 2-5 for a 100-year flood. As seen in the figure, inundation depths for the site for a 100-year flood range up until a little over 1 meter for certain depressions in the landscape, but on average an inundation depth of about 0.8 m.

Figure 2-5: Flood map with a return period of 100-years



Flood risk in the baseline scenario is deemed too significant to leave unmitigated, with an expected risk of about 588,000 EUR per year. Already alternative A is highly effective at reducing damages: all the damage scenarios are at least a factor 10 lower in damages, up to factor 70 for the 1/2 per year chance flood scenario. Total risk for alternative A is assessed at about 27,600 EUR per year. Alternatives B, with only the landfill has an expected annual damage of about 401.000 EUR per year but combining the landfill with the elevation of buildings in alternative C further reduce flood risk to about 15.000 EUR per year. The road corridor could be elevated to act as a dike structure, potentially also in combination with elevation of buildings. However, as the road corridor is not being developed as part of the wholesale market, care should be taken as it may not be built in line with international standards.

A rough estimation of indirect damage is made, of about 41.000 EUR to 153.900 EUR from reference year 4 to year 25 respectively for the baseline scenario. Compared to the direct damages in the baseline scenario, the indirect damage is considered very low. For Alternative C, indirect damage is almost completely mitigated to about 4100 EUR in year 4, increasing to 15.400 EUR in year 25.

When landfill or the road corridor as a dike are applied as the primary adaptation measures, it should be noted that the system is highly dynamic. As stated in the concluding remarks and recommendations of the rapid analysis of river morphology, addition analysis is required to build these measures robust and sustainability.

Moreover, to improve the flood risk assessment, it is recommended to commence a high-resolution hydrological and hydraulic model to simulate:

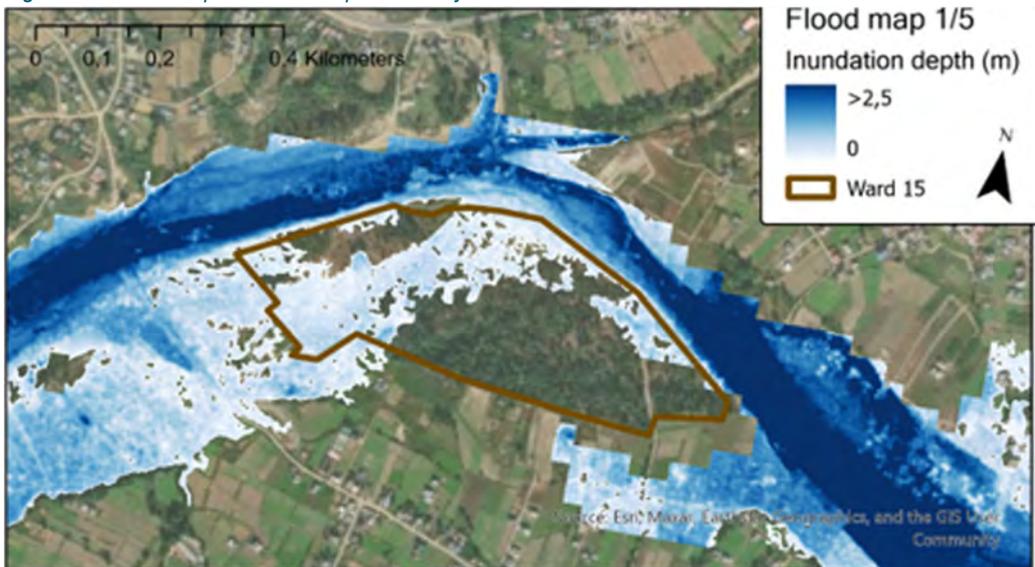
- 1 Impacts of increased precipitation because of climate change.
- 2 If a landfill or dike could potentially worsen the impacts of floods on the north side of river, as it is obstructing peak flow of the river resulting in higher water levels in upstream adjacent areas but also at the project site itself (backwater effect).
- 3 The impact of the newly build bridges on the East and West side of the site.
- 4 The impact of additional discharge from the two tributary rivers north of the site.

The terms of reference of the update of the Flood Risk Assessment, covering both hydrological and hydraulic aspects is included as appendix to the EIA Study. It is also advised to align such analysis with

the Road department in relation to the road corridor. This shall be done during the detailed design phase of the project. A financial provision has been made for this purpose and included in the costs of the project.

Based on the results of the flood risk assessment conducted at the Feasibility Stage of the project it is advised to fill the main depressions in the landscape as presented in Figure 2-6 below for a 5-years return period, in combination with the elevation of the main buildings and facilities with 0.8 m.

Figure 2-6: Flood map with a return period of 5-years



2.3 Design Criteria

2.3.1 General

Building planning and construction in Nepal is regulated at two levels, i.e. federally and by local governments. The construction of the wholesale market in Butwal shall comply with all relevant and applicable federal and local policies, acts and regulations. Key elements of the legal and policy framework that shall be taken into account by the project include:

- Land Use Policy (2015);
- Nepal Land Act, 2021 (1964);
- Land Rule, 2021 (1964);
- Building Act, 2055 (1998);
- Fundamental Construction Standards for Settlement Development, Town Planning and Building Construction, Urban Development Ministry, 2072;
- Building Construction and Planning Standards, Butwal Sub Municipal City, 2072.

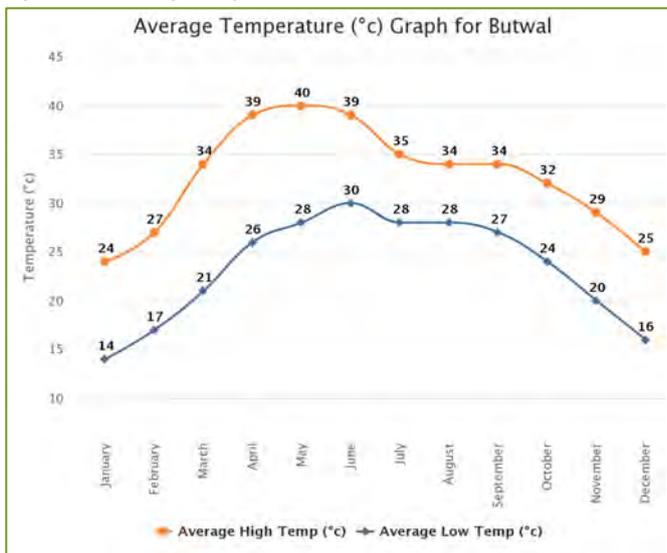
Applicable building codes at the Federal or local level shall also be complied with as required. Examples include:

- Nepal National Building Code, NBC 206: 2015: Architectural Design Requirements;
- Nepal National Building Code, NBC 105: 2020: Seismic Design of Building of Nepal;
- Nepal National Building Code, NBC 202: 2015: Load bearing masonry.

2.3.2 Climate

The climate in the project area is subtropical monsoon type. The winter is dry and mild and the summer is hot and moist. The highest temperature reaches up to 43.40 °C around May-June. However, the minimum mean temperature of the area is 18.20 °C. The lowest temperature goes down below 6 °C in winter.

Figure 2-7: Average temperatures

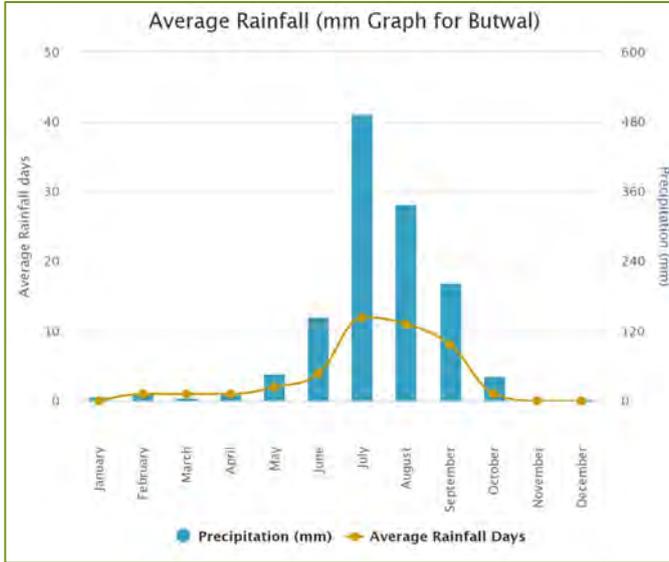


[Source: www.worldweatheronline.com]

The average annual rainfall recorded is 1,174 mm, of which 80% precipitation occurred during the monsoon period in the four summer months from June to September.



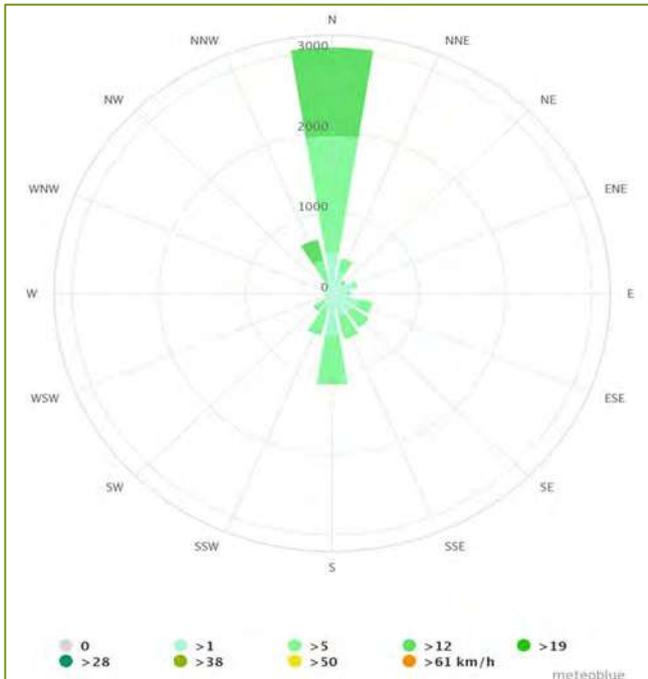
Figure 2-8: Average rainfall



[Source: www.worldweatheronline.com]

The maximum windspeed is less than 19 km/h. The wind rose for Butwal shows how many hours per year the wind blows from a certain direction.

Figure 2-9: Wind rose Butwal



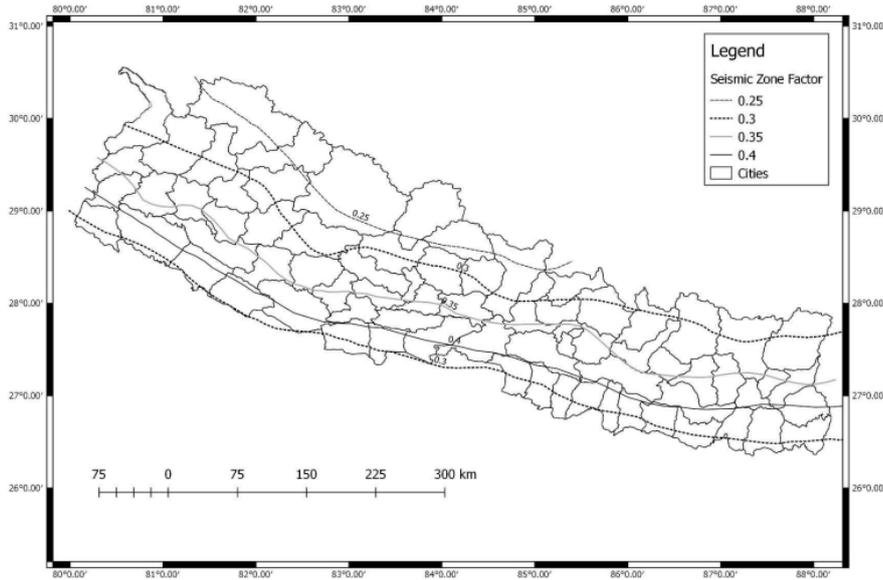
[Source: Meteoblue]

For more climate information, please refer to climate risk assessment as part of the EIA Study.

2.3.3 Earthquake loads

The country is subdivided into different seismic zones based on the local seismic hazard. The seismic hazard within each zone is assumed to be constant. The Seismic Zoning Factor (Z) represents the Peak Ground Acceleration (PGA) for a 475-year return period. The value of Z for Butwal is 0.3.

Figure 2-10: seismic zoning map



[Source: NBC 105]

2.3.4 Structural design of buildings

The wholesale market buildings are essentially simple sheds and, in their design, the most important element to consider in the structure will be the choice of an appropriate system of roof construction. The selection of cladding materials is important, but equally influential will be the decisions made about how the roof is to be supported. Ideally the span and width of structural bays has been kept as large as possible to provide an unobstructed operating space. Buildings with depths greater than the maximum practical spans are designed by providing intermediate supports.

Design Philosophy

Structural design of civil infrastructures shall be based on following philosophies:

- Working Stress Method: This method is based on the assumption that the load-bearing materials (steel, concrete etc) are stressed within their elastic limit. This is achieved by dividing the ultimate strength of materials by a factor of safety as stipulated by the codes and prevalent practices.
- Limit State Philosophy: Limit State Philosophy allows the use of ultimate strength of the materials, but with appropriate partial factors of safety applied to both the loads and the material strength. Since the structural behaviour of Reinforced Cement Concrete, and steel structures, and the associated materials' behaviour have been sufficiently studied, this method is almost exclusively used nowadays, except for hydraulic structures which are sensitive to cracking. There are two type of principal limit states:
 - Ultimate Limit State: This requires that the structure must be able to withstand, with an adequate factor of safety against the maximum load.

- Serviceability Limit States: This limit state requires that despite the structural adequacy of members against ultimate limit state, the members must also full the various serviceable criteria to ensure their functional adequacy. Deflection, cracking, durability, excessive vibration, fatigue, fire resistance etc are the major serviceable limit states.

Design Methodology

The Structural design of any structure essentially consists of following parts:

- Analysis;
- Design;
- Detailing.

For the building structures, the analysis shall primarily be carried out using commercially available structural software. For the analysis, the member sizes are initially assumed based on current practices and some serviceability criteria (for example deflection), and subsequent analysis is carried out till a safe configuration is finalized. With the results obtained from the analysis, the design shall be carried out using the design spreadsheets. Once the design is finalized, the detailing of connections and reinforcement can be carried out to ensure optimal design.

RCC Members and Steel Members

Dead loads are assumed to be produced by slab, beams, columns, walls, parapet walls, and staircase. The weight of building materials shall be taken as per IS 875: latest version (Part 1).

Table 2-2: Specific Weight of Materials

| Materials | Unit Weight(γ) |
|--------------------------|-------------------------|
| Reinforced Concrete | 25 KN/m ³ |
| Brick Masonry | 19.2 KN/m ² |
| Floor Finishing | 1.0 KN/m ² |
| Cement Sand Plaster | 0.5 KN/m ² |
| Floor Finishing (Marble) | 26 KN/m ³ |

Table 2-3: Live loads

| | |
|-----------------------|------------------------|
| Rooms | 3.00 kN/m ² |
| Corridors | 3.00 kN/m ² |
| Stairs | 3.00 kN/m ² |
| Balcony | 3.00 kN/m ² |
| Roof (accessible) | 1.50 kN/m ² |
| Roof (non-accessible) | 0.75 kN/m ² |
| Toilet | 2.00 kN/m ² |



Seismic Load calculation as per IS 1893: 2002 part-I

Once the class of structure is identified, the importance Factor, Zoning Factor and Soil Profile Type are correspondingly noted from the code. The base shear shall further be calculated with the following:

Design Base Shear

Design Base Shear $V_B = A_h W_i$ [7.5.3, IS: 1893 (part 1)-2002]

Where:

Design horizontal seismic coefficient = $A_h = Z * I * (S_a/g) / 2R$

Where:

Z = Zone Factor

I = Importance Factor

R = Response Reduction Factor

S_a/g = Average response acceleration coefficient

$T = 0.075 h^{(0.75)}$, For moment resisting frame with brick infill panel

H = total height of the structures considered in analysis

W_i = Seismic Weight of Building, that includes total dead load plus the following appropriate amount of live load [7.4, IS: 1893 (part1)-2002]:

- The percentage of live load to be taken for calculating seismic weight = 25% for live load intensity upto and including 3.0 KN/m² and 50% for live load intensity above 3.0 KN/m². [Table 8, IS: 1893 (part1)-2002].
- The live load on roof need not be considered for calculating the seismic weight of the building. [7.3.2 IS: 1893 (part1)-2002].

The seismic forces shall be applied on the Finite Element Model for the purpose of seismic analysis.

Load Cases

Various load cases shall be considered in the analysis of the building as per IS 456-2000 and IS 1893-2002.

Load Combination

The load combinations have been adopted as per IS 1893-2002.

Structural Loading Assumptions

Standards code and software shall be used for structural calculation and loading assumption for the design of proposed structures. Mainly following codes and software are to be used for the structural analysis:

- Structure Analysis Software - ETBS 2017 V17.0.1;
- Code used for Seismic Analysis of Building - IS 1893:2002;



- Code used for Concrete Frame Design - IS 456:2000;
- Code used for Steel Frame Design - IS 800:2007;
- Code of practice for Design Live Load - IS: 875 (part 2);
- Code of practice for Design Wind Load - IS: 875 (part 3).

Roof Structures

Common construction materials for roof structures proposed in the design are steel trusses and reinforced concrete, supported on masonry and concrete column. Tubular steel truss with corrugated galvanized sheets shall be designed for storage units and cold store building and RCC roof has been proposed for main office building, guest house, canteen, etc.

All inclined steel roof structures of the whole sale shutter, agrovet and storage and processing buildings shall be designed to bear the load of (future) solar panels.

Roof Cladding

For markets, the most important building component that shall be considered is the cladding material selected for the roof. Market roofs must be durable, non-combustible, and easily maintainable and must be able to perform under all the internal and external climatic conditions imposed on the buildings.

2.4 Marketable volumes²

2.4.1 Catchment area

Supply of agricultural commodities from the wholesale market to different places depends on many factors such as quantity, quality, price, transportation and handling cost, handling loss, demand, etc. Local products can also catch global market if they meet the required quality standard and are of reasonable price. It is therefore hard to predict the places of destination. However, based on the study of past trend and discussion held with the concerned local authorities and market management committee, catchment area of proposed wholesale market in terms of distribution can be stated as Rupandehi, Salyan, Dang, Palpa, Syangja, Gulmi, Arghakhanchi, Rolpa, Dhading, Makwanpur, Chitwan, Kapilvastu and Nawalparasi, India.

2.4.2 Import of agricultural products from Sanauli

Many agricultural commodities are traded in Nepal after being imported from India and some other countries. Data on these imports, therefore, bear great importance in determining the volume of trade and therefore the design of the proposed wholesale markets. Import data was collected from the Bhairahawa quarantine check post of the district.

The import details for the district for the fiscal year 2017/18 are given in the next table. Among the imports potato ranks first followed by major fruits, onion and fruit vegetables. Leafy vegetables are not imported in the district.

Table 2-4: Overview of imports via Sanauli border in 2017/2018

| Crop category and name of crop | Total Annual Import from Sunauli border in 2017/18 (mt) |
|--------------------------------|---|
|--------------------------------|---|

² This chapter is based on Detailed Project Report (DPR) Preparation for the Infrastructure Development of Agriculture Market - Package 3: Semlar Butwal (Rupandehi), Barbardiya (Bardiya) and Banganga (Kapilbastu)

| | |
|---|----------------|
| Onion | 51,322 |
| Spice crops (garlic, ginger, turmeric, chili), excl. onion | 462 |
| Major fruits (orange, junar, lemon, mango, banana, guava, papaya, jackfruit, pineapple, litchi, pomegranate, apple, pear, plum, watermelon, bayar, grape) | 34,842 |
| Fruit Vegetables (cauliflower, cabbage, broccoli, tomato, peas, beans, okra, brinjal, cucumber, pumpkin, squash, bittergourd, bottle gourd, sponge gourd, ridge gourd, snake gourd, ash gourd, pointed gourd, capsicum, cowpea) | 825 |
| Leafy Vegetables (broad leaf mustard, coriander leaf, spinach, fenugreek leaf, amaranthus, fennel leaf, cress, swiss chard) | - |
| Tuber Vegetables (colocasia, reddish, carrot, turnip, yam, sweet potato) | 89 |
| Potato | 99,794 |
| Total | 187,334 |

2.4.3 Current and future potential of agricultural commodities

Nepal seems leaning towards dependency from the state of self-reliance in meeting the food (cereals, oilseeds, legumes, fruits, vegetables and spices) requirement of the growing population of the country. This is indicated by the import record of these commodities from different countries. Thus prime concern of the contribution of these proposed wholesale markets should be in contributing to import substitution. Potato, onion, major fruits like apple, banana, pomegranate, grape, orange, watermelon, lemon, papaya and fruit vegetables are imported in large amount. All these imported commodities are possible to be grown in Nepal in different agro-ecological conditions prevailing in the district of the proposed wholesale market and the neighbouring districts as well. What is needed is the motto for promoting the production of these commodities with proper marketing planning extension and marketing education. Agro-ecologically feasible crops with comparative advantage as mentioned above can drive farmers towards earning more along with successful operation of the wholesale markets. The proposed Semlar wholesale market being in the terai belt will have the opportunity of linking mountain and high hill products to the plains and plain products and imported agricultural goods to high hills and mountain districts.

2.4.4 Marketable volume of agricultural commodities in Semlar

A total of surplus of total annual production of the district, part of import from the nearby border and possible collection from other districts is assumed as the total possible present annual tradable volume of agricultural commodities in the proposed wholesale market.

The commodities mostly traded in the agricultural wholesale market in the western part of Nepal seem as spices (onion, garlic, ginger, turmeric, chilli), fruits (orange, junar, lime/lemon, mango, banana, guava, papaya, jackfruit, pineapple, litchi ,pomegranate, apple, pear, plum, peach, watermelon, bayar and grape), fruit vegetables (cauliflower, cabbage, broccoli, tomato, peas, beans, okra, brinjal, cucumber, pumpkin, squash, bitter gourd, bottle gourd, sponge gourd, ridge gourd, snake gourd, ash gourd, pointed gourd, capsicum and cow pea), leafy vegetables (broadleaf mustard, coriander leaf, spinach, fenugreek leaf, amaranthus, fennel leaf, cress, swiss chard) and tuber vegetables (colocasia, radish, carrot, turnip, yam, sweet potato) and potato.

These commodities are either produced in the district or imported or collected from the neighbouring districts. Therefore, in order to calculate the marketable surplus of these commodities in the proposed wholesale market in the district, addition of these three figures is made. The requirement of fruits and vegetables along with the spices is assumed as 132 kg per person per year (361 gm per person per day). Available data indicates that average intake of vegetable in Nepal was 257 grams per capita per day (Feasibility Study Report of Agricultural Wholesale Market at Butwal, B&B Research Center Private Limited, Kathmandu). Daily intake of fruits is recommended to be 200 grams per capita per day. However, information on fruit consumption pattern in Nepal is not available. Therefore, based on the discussion it is assumed that the consumption of fruits will be 75 grams per capita per day. Likewise, because of unavailability of spices consumption data in Nepal, it is assumed that the consumption of spices will be 29 grams per capita per day.

The production projection of 23 years of marketable surplus of spices, fruits and vegetables for the Semlar wholesale market is presented in the next table.

Table 2-5: Forecast marketable volume of Agricultural commodities in Semlar

| Projection category | 2016/17 | 2021/22 | 2026/27 | 2031/32 | 2036/37 | 2040/41 |
|--|---------|-----------|-----------|-----------|-----------|-----------|
| Population | 982,851 | 1,091,034 | 1,177,926 | 1,255,541 | 1,324,141 | 1,381,710 |
| Annual production catchment area (MT) | 194,406 | 208,401 | 223,403 | 239,485 | 256,725 | 271,406 |
| Annual requirement (MT) | 129,736 | 144,016 | 155,486 | 165,731 | 174,787 | 182,386 |
| Annual marketable surplus from district production (MT) - A | 64,670 | 64,385 | 67,917 | 73,754 | 81,938 | 89,020 |
| Assuming 50% of annual import from Sanauli Border (MT) - B | 93,667 | 108,586 | 125,881 | 145,930 | 169,173 | 190,406 |
| Annual collection from other neighbouring districts (MT) - C | 11,909 | 19,180 | 30,889 | 49,747 | 80,118 | 117,300 |
| Total annual marketable surplus for the proposed market (MT) - A+B+C | 170,246 | 192,151 | 224,687 | 269,431 | 331,229 | 396,726 |
| Daily tradable amount available for the wholesale market (MT) | 466 | 526 | 616 | 738 | 907 | 1,087 |

Notes:

- Annual requirement is calculated at 132 kg per capita
- Total import (spices, fruits and vegetables) from Sanouli border as per quarantine data was 187,334 MT in 2016/17
- Import from Sanouli border is assumed to increase with 3% per annum
- Annual collection from other neighbouring districts assumed to be increased with 10% per annum

Based on the above table it is calculated that the total tradable volume per day in Semlar comes out to be likely 466 mt per day. This amount will increase to up to 1,000 mt per day in 2040.



Remark:

Reportedly, the annual transaction of spices, fruits and vegetables in the existing Butwal wholesale market in 2018/19 amounts 91,702 mt, which is equal to 251 mt per day. However, considering that the wholesale and retail market in Butwal is currently fragmentated, it is considered that the total potential could indeed be up to around 466 mt per day.



2.5 Project Description

2.5.1 Wholesale market

In Nepal wholesale markets with properly functioning marketing system are increasingly seen as a solution to help boost agricultural production and productivity, play an important role to improve the livelihood of farmers and provide for an efficient management of agriculture products once harvested. Wholesale markets are seen as one of the solutions to address the urbanisation problem which places tremendous pressure on existing larger cities. These are trading centres, where commodities are brought from the collection centres, where commodities can be properly stored, graded and packed. Wholesale markets may even facilitate import and trade of commodities to retail vendors and even facilitate exports. This is a place where market information is being generated and can be distributed to providers of agro-logistic and/or phytosanitary services.

The rapidly expanding cities like Itahari, Pokhara, Hetuda, Birgunj and Butwal are already lagging adequate market related infrastructure. As of 2016 there were 27 wholesale markets of various sizes, some catering for vegetables only, others for fruit alone and some for both. Different scales and nature of agricultural markets are started along with the population increase and urbanization process on need based. However, these are lacking storage facilities which are sized and equipped with appropriate equipment based on actual demand and supply of commodities, trading facilities and proper utilities.

Considering the GoN current efforts on doubling the agricultural production in the coming 5 years, market assurance is seen as the major driving force and as the next pre-condition for a properly functioning value chain. In the light of this, the GoN has prioritized building up market infrastructures, e.g. from collection centres to wholesale and retail markets at different locations with the cooperation from all three tiers of government. Once the production level starts increasing, other value chain infrastructures, along with markets will be required, e.g. cold storages, seed banks, post-harvest centre, etc.

The pre-Feasibility study identified the wholesale markets as one of the main interventions required to address the agriculture value chain bottlenecks. Wholesale markets are public infrastructure that fit well with the Nepal ADS and D2B goals. The aim of the wholesale markets is to facilitate trade and provide market access for the farmers. The size and type of facilities on the wholesale market are depending on the product volumes that will be traded.

In assignment of the Government of Nepal (Ministry of agriculture and livestock development, department of Agriculture, Centre for Agriculture Infrastructure Development and Mechanization Promotion) a study for a new wholesale market in the Semlar was conducted by CMS Engineering Consultant Pvt. Limited in 2019. This study resulted in a DPR (Detailed Project report) for the Semlar wholesale market. This study has been used as the basis for the masterplan development.

The DPR propose to start with the provision of an area to install market stalls and the provision of water, electricity, public toilets, sewerage, parking and waste collection. In case the market throughput gets higher, the market stalls will be replaced by wholesale shutters and the market shall be run more professionally. The market area shall be fenced and provided with an office, canteen, guard house, weighbridge and storage, washing, sorting, grading and packaging facilities. A next step would be the introduction of cold storages, testing facilities and (automated) washing, grading and packaging equipment. Upon requirement, the wholesale market can be completed with complementary services such as an ATM, banks, restaurants, guest house, power generators, etc.

2.5.2 Priority products

One of the initial steps of the pre-Feasibility study was the selection of the priority commodities for potential additional interventions.

A selection of priority produce has been made in consultation with the MoALD and the PSC. It has been agreed that the market study report and sub-sequent work on this project should focus on the commodities listed in Table 2-6 below.

Table 2-6: Agreed list of priority produce

| Sub-sector | Priority produce |
|------------|------------------|
| Vegetables | Potato |
| | Tomato |
| | Cauliflower |
| | Onion |
| | Cabbage |
| | Cucumber |
| Fruits | Lime |
| | Banana |
| | Mango |
| | Orange |
| Spices | Ginger |
| | Cardamom |

The priority vegetables are Potato, tomato, cucumber, cauliflower, onion and cabbage. Potato is listed as a cash crop in the Statistical Information book by the Ministry of Agriculture and Livestock Development³. Removing potato and only counting onion, cucumber, cabbage, cauliflower and tomato gives a value of almost 42% of the total vegetable production.

The priority fruits for this Market Study are Banana, Lime, Mango and Orange. Together, they represent more than 76% of production.

2.5.3 Additional interventions Semlar/Butwal

Development of the wholesale market has been identified as the main intervention.

Based on the market study report, discussions with key stakeholders, a supply and demand exercise has been conducted. The aim of the exercise was to identify surplus of commodities for which infrastructural interventions could be developed. Interventions identified based on supply-demand exercise are called additional interventions. The idea is that these interventions shall address and connect to the supply chain bottlenecks as identified in the market report and validated during the site visits.

The following set of priority interventions are suggested as part of the D2B programme, supporting the greenfield market development at Semlar/Butwal. These additional interventions shall be developed as part of the wholesale market infrastructure.

³Statistical information on Nepalese Agriculture 2075/76, Ministry of Agriculture & Livestock Development, Planning & Development Corporation Coordination Division, Statistics and Analysis Section

Table 2-7: List of suggested sub-set of priority interventions

| Priority product | Butwal/ Semlar | |
|------------------|--------------------|---|
| | Cold storage in MT | Others |
| Potato | 4,500 | Cleaning, sorting & packaging |
| Onion | 800 | Cleaning, sorting & packaging |
| Onion | 1,500 | (Optional) |
| Tomato | - | |
| Cucumber | - | |
| Cauliflower | - | |
| Cabbage | 1,000 | Cleaning, sorting & packaging |
| Banana | 35 | Ripening chambers, sorting & packaging (optional) |
| Mango | - | |
| Lime | - | |
| Orange | - | |
| Ginger | - | |
| Cardamom | - | |

It is considered that the above interventions will strengthen the agricultural value chain, by reduction of food waste and post-harvest losses, this will make more product available for local consumption and reduce import from other countries. It also provide conditions to further increase local production by creating a market for the (smaller) producers.

It is advised to construct the above set of priority interventions as a separate logistic center adjacent to the proposed Butwal wholesale market development. Here, produce can be collected, stored and packed and directly brought to the market via the adjacent wholesale market upon requirement. By combining the logistic center with the wholesale market they will strengthen each other. In addition, certain services such as workshops, offices, accommodation, etc. can be combined and/or shared with each other.

It is advised to construct the facilities in such way that they can be constructed in a phased and flexible way, with room for other potential interventions in future.

Other interventions would be the installation of testing facilities, laboratories, farmer services, etc.

For the background to proposed additional interventions, reference is made to Appendix 2 of this report.

2.5.4 Sustainability

The proposed set of interventions will deliver sustainability at various levels of the agro supply chain as well as the level of resource use and efficiency, e.g.:

- The proposed interventions will create a stable environment for the farmers to support and increase production of commodities demanded by the market.
- Increase of commodities volumes at the farm level will stimulate and generate opportunities for the farmers associations, developing and strengthening their long-term position and relations in the supply chain

- Specifically, the value chain of commodities for the additional interventions, e.g. potato, onion, cabbage and banana will be further developed and strengthened on the local and export market.
- Resource efficiency and future climate proof infrastructure will be achieved through design of the market and practices implemented and promoted by the market. A few examples are provided bellow:
 - **Water efficiency:** water will be required for the washing lines (e.g. banana) and other processes at the market. Water consumption shall be reduced as much as possible and the effluent shall be recycled as much as possible.
 - **Energy efficiency:** the wholesale market may require high levels of thermal energy consumption in process heating, cooling, and refrigeration. The design of the market will include insulation of refrigeration room/areas and use of automatically closing doors and airlocks.
 - **Material efficiency:** storage, sorting, grading and other production processes may generate significant volumes of organic, putrescible solid waste and rejected products. Practices will be introduced to prevent and/or reduce waste generation.

An important part of sustainability of the market is that it will be maintained well and that people are trained to operate it correctly.

2.6 Description of proposed facilities

2.6.1 Wholesale market

The development of the Export-oriented Agriculture wholesale market has been identified as the main intervention.

After the site investigation, discussion with stakeholders, analysis of the present market, situation of the trade in and out of the commodities in the existing market and present transaction volumes of the commodities and their future projection, a master plan layout has been prepared and agreed upon for the Semlar Agricultural Wholesale Market to be constructed at Karshaghat, Ward no 15 of Butwal Sub-Metropolitan.

The masterplan, including all facilities is designed for the anticipated throughput in the year 2040. To ensure that the facilities will not be overdesigned for the first operational years and left unused, a phased construction approach is proposed. The master plan includes the facilities as indicated in the table below. In addition the table provides an estimate of the maximum number of persons that will be available at any time, the number of shifts, the required number of toilets⁴ per building or public and required number of car parks.

Table 2-8: Proposed facilities at Semlar Agricultural Wholesale Market

| Nbr | Units | Nbr | Persons | Shifts | Toilets | Public toilets | Car parking |
|-----|-------------------------------|--------|---------|--------|---------|----------------|-------------|
| 1 | Guard house | 2 | 4 | 3 | 1 | | |
| 2 | Electronic Display Board | 3 | na | | | | |
| 3 | Weighbridge house | 1 | 2 | 2 | 1 | | |
| 4 | Weighing Scale (100 MT) | 2 | na | | | | |
| 5 | Car park building | 1 | 2 | 2 | 1 | 0.1 | |
| 6 | Generator building (1 future) | 4 (+1) | na | | | | |

⁴ One toilet is assumed per 15 persons

| Nbr | Units | Nbr | Persons | Shifts | Toilets | Public toilets | Car parking |
|-----|--|--------|------------|--------|-----------|----------------|-------------|
| 7 | Office/Admin Building (2 storey) including pesticide residue lab, training hall, agriculture subservice center, childcare centre, primary health care centre, cooperatives office, CCTV surveillance room, office rooms and car park | 1 | 194 | 1 | 13 | | 46 |
| 8 | Canteen | 2 | 10 | 2 | 1 | | |
| 9 | Wholesale Shutters (1 future) | 6 (+1) | 252 | 2 | | 16.8 | 252 |
| 10 | Toilet Block, with locker room | 3 (+1) | 3 | 2 | | 0.2 | |
| 11 | Bank with ATM | 1 | 8 | 1 | 1 | | 4 |
| 12 | Central waste collection centre | 1 | 2 | 2 | | 0.1 | |
| 13 | Farmer's Auction Centre | 1 | 2 | 2 | | 0.1 | |
| 14 | Washing, sorting, grading and packaging block | 1 | 30 | 2 | 2 | | |
| 15 | Agrovet building | 1 | 18 | 2 | | 1.2 | |
| 16 | Onion/Potato/Cabbage intake, storage and processing building | 1 | 50 | 2 | 4 | | |
| 17 | Workshop building | 1 | 15 | 2 | 1 | | |
| 18 | Power intake station | 1 | n.a. | | | | |
| 19 | Water Supply System and fire fighting station | 1 | 2 | 2 | | 0.1 | |
| 20 | Waste water treatment plant | 1 | 2 | 1 | | | |
| 21 | Multi purpose go-down (future) | (2) | 4 | 2 | | 0.3 | |
| 22 | Banana storage and processing building (future) | (1) | 25 | 2 | 2 | | 5 |
| 23 | Guest House | 2 | 127 | 1 | 9 | | 20 |
| 24 | Grocery shop | 1 | 2 | 2 | 1 | | 5 |
| 25 | Krishak Chautari (small market stalls area) | 1 | 20 | 2 | | 1.3 | |
| 26 | Parking for deliveries | 1 | 1 | 2 | | 0.1 | |
| 27 | Bus stop | 1 | na | | | | |
| 28 | Football ground with covered grandstand and water tap | 1 | 50 | 1 | | 3.3 | |
| 29 | Changing room football ground | 1 | na | | | | |
| 30 | Retail market | 1 | 20 | 2 | | 1.3 | |
| 31 | Fumigation container | 1 | na | | | | |
| 32 | Dressing room football ground | 1 | 30 | | 2 | | |
| 33 | Truck wheel washing station | 1 | 2 | 2 | | 0.1 | |
| | Total | | 847 | | 37 | 25.2 | 332 |

The master plan layout drawings are attached in appendix 5 of this report. It includes one drawing with the final masterplan layout for 2040 and one masterplan drawing with the facilities that are proposed for the first phase. The future facilities are located at the border between the wholesale area and collection centre. As such in future this area can be used for the expansion of the whole sale market or collection centre, depending on the future needs. Also the football ground could be used for expansion of the wholesale area or car park in future when required.

Important note:

The site boundaries were determined based on a hard copy drawing from the Cadastral office. This drawing did not have a scale bar, nor did it provide an orientation to the north. We did not receive the coordinates of the official site demarcation points. As such the site boundaries assumed in the masterplan layout drawing are based on our best assumption and shall be reviewed prior to start of construction.

The descriptions of the major components designed for the proposed market are provided below. For the architectural layout drawings reference is made to appendix 6 of this report.

Administration Building

The admin block shall be constructed in two floors and has a total floor area of 1,400m². The ground floor shall be provided with reception area, childcare center with outdoor play area, primary health care center, CCTV surveillance room, pesticide laboratory, cooperative office, male and female toilets and 200 capacity meeting cum training hall. The play area, primary health centre and CCTV surveillance room shall be separated from the office block and accessible via a separate entrance from the outside. Similarly, the first floor shall be designed to accommodate Manager's office with PA room, account and admin staff rooms, IT room, record room, meeting room, Traders organization's office room, farmer's representative office room and toilets block. The admin block shall be fully equipped with IT and telecommunication system. Electronic display boards located at different places will be controlled from the IT room. A separate generator will also serve for the administration block as a backup power supply, which will start up automatically in case of failure of electric supply. It has been envisaged that operation of the market will be controlled by the admin block through manager, administrative staff and management committee with roles and responsibilities assigned to them. In front of the administration building there is room for the parking of 46 passenger cars.

Commercial bank

To facilitate trade, the construction of a full-service bank building is anticipated on the site of the wholesale market.

The bank shall be constructed in one floor with total area of 230 m². The floor shall be provided with ATM, waiting area, service counter, manager's room, vault and public toilets.

Wholesale Shutters

The wholesale shutters are designed in 7 blocks as indicated in the table below.

Table 2-9: Overview of wholesale shutters

| Block | Nbr. of shutters | Produce | Size of shutter | Total size |
|---------------|------------------|---------------------|-----------------|------------------|
| Block A | 18 | Fruits | 50 sqm | 900 sqm |
| Block B | 18 | Fruits/ vegetables | 50 sqm | 900 sqm |
| Block C | 18 | Vegetables | 50 sqm | 900 sqm |
| Block D | 18 | Spice crops/ potato | 50 sqm | 900 sqm |
| Block E | 18 | Potato | 50 sqm | 900 sqm |
| Block F | 18 | Potato | 50 sqm | 900 sqm |
| Block G | 18 | Potato (future) | 50 sqm | 900 sqm |
| Totals | 126 | | | 6,300 sqm |



Each block will have 18 shutters with size of 50 m². The shutters shall be designed in such way that they can easily be combined to larger shutter of 100 m².

In final stage there will be a total of 126 shutters with total area of 6,300 m².

Considering a daily trade of about 1,087 MT in 2040, this amounts a daily throughput of $1,087/126 = 8.6$ MT per shutter.

Benchmark:

The existing wholesale market in Butwal has an annual throughput of 91,000MT and measures a total area of shutters of around 2,600m², which results in 35MT of annual sales per m² of shutter.

The Kalimati market has an annual turnover of 245,000 MT, with total area of market stalls of 5,500 m², which results in 45MT of annual sales per m² of market stall.

For the new wholesale market the expected turnover will be $224,000\text{MT} / 5,200\text{m}^2 = 40$ MT per m² of shutter in 2025. In 2031 this will be $269,000\text{MT} / 5,200\text{m}^2 = 50$ MT per m² of shutter and in 2040 this will be $396,000\text{MT} / 6,300 = 60$ MT/m².

The higher turnover per m² of shutter compared to the existing wholesale market is justifiable as the new market has a more regional/ national function with larger shutters and larger customers. Also it is assumed that part of the products will be directly sold via the collection centre and auction centre without passing the wholesale market.

Initially it is proposed to build only 6 blocks. As daily trade till 2031 amounts 738 MT (see Table 2-5), which requires $738/1087 * 7 = 4.8$ blocks and in 2036, $907/1087 * 6 = 5.9$ blocks and considering that 6 blocks are built back to back, which is cheaper, it is considered to construct 6 blocks initially and the 7th when needed between 2031 and 2036. If not leased as market shutter initially, these rooms can also be rented as temporary storage room instead of the go-downs.

The wholesale shutters are provided in such a way that all the shutters face the main roads providing equal opportunities to traders in terms of accessibility to their shop by the potential customers. The shutters are designed as single storey masonry frame structures at a raised floor level with flat reinforced concrete ceiling. The roof of the wholesale shutters consists of steel trusses with single steel cladding and ventilation provisions provided with louvres and bird protection screen. The area between the ceiling and roof shall be accessible and is intended to be used as technical room. This is where the electric power supply systems and refrigeration systems shall be installed. Each stall shall be provided with its own electricity meter to be able to charge the users based on their actual energy consumption.

A 6 m wide corrugated galvanized steel sheet roofing with attractive truss is provided in front of whole blocks, to facilitate loading and unloading of the commodities to and from the vehicles. The space can also be utilized for temporary storage of the commodities before staking them into the shutters in a managed way.

The shutters are designed in such a way that they can easily accommodate a cold storage room to improve storage life of the agricultural products. It is however considered that these installations will be installed by the users of the stalls upon requirement.

All shutters shall be provided with high quality rollers shutter doors in the front of the building and covering the entire opening.



Agrovet

The Agrovet is intended to sell agricultural necessities to farmers, such as tools, seeds and fertilizer. The Agrovet has a total area of 450 m² and consists of 9 shutters of 50 m² each. The shutters are designed as single storey masonry frame structures at a raised floor level with flat reinforced concrete ceiling.

Central waste collection center

A facility for the removal of waste shall be located at a central location in the vicinity of the wholesale market. The waste collection center shall have two compartments with the possibility to separate different types of waste, such as organic waste, plastic and carton.

From this central waste collection center the waste shall be removed using a front loader and tractor with trailer.

The waste collection center shall be at ground floor level and have a total area of 384 m² (24 x 16m) The waste collection center shall be covered with a roof consisting of a steel truss and corrugated galvanised steel sheeting.

Canteen

Two canteen units with kitchen are proposed in the market area. The canteen building is designed as single storey building with plinth area of 293 m² (14.8x19.8m).

Each canteen shall be designed with cooking facilities and should be able to serve around 80 guests at a single time. The canteen shall accommodate a kitchen store and dedicated toilet and changing facilities for its own kitchen staff.

Guest Houses

Two units are proposed as guest house opposite of the market area. The guest house building is designed in three floors with plinth area of 391 sqm.

There will be 2 types of guesthouses. Type A shall accommodate a restaurant and recreation area on the ground floor. Type B on the other hand will have guest rooms on the ground floor. The first and second floor of both types of guesthouses are similar accommodating guest rooms only.

The ground floor of type A consists of recreation, reception, lobby, kitchen with store changing room and wash area, dining for about 70 people and toilets for male female and disabled.

The ground floor of type B consists of reception, lobby, 4 rooms with single 2 beds, 1 dormitory with 3 single beds, 2 dormitories with 4 single beds, 1 dormitory with 6 single beds. All guest rooms on the ground floor are provided with attached bathroom.

Guest rooms are provided on the first floor consisting of 4 rooms with single 2 beds, 1 dormitory with 3 single beds, 2 dormitories with 4 single beds, 1 dormitory with 6 single beds and one staff room. All rooms are provided with attached bathroom.

Similarly, there 9 rooms provided on the second floor with same layout as the first floor.

All rooms are provided with an electric fan. The double rooms are also provided with air conditioning units.

Washing, sorting, grading and packaging block

The washing, sorting, grading and packing block is designed as a multifunctional warehouse with area of 1,500 m² (60x25m) with a free height of 6 meter. This building is intended for the receipt and processing of all kinds of product, except onions, potatoes and cabbage

The building is designed as raised rectangular single storey reinforced concrete frame structure with steel roof truss and corrugated galvanized steel sheeting. The building is provided with a 6m wide loading and unloading platform in front of the building for the receipt and delivery of agricultural products.

Considering that it is proposed to build the banana storage and processing building in future once there is a proven demand, it is proposed to build cold storage rooms for bananas and a ripening chamber in the

washing, sorting, grading and packaging block. In addition it is proposed to build 2 smaller cold storage rooms that can be applied for multiple products.

Fumigation room

It is proposed to install a fumigation room for the export of ginger and cardamom at the collection center.

Considering that the container should be gas tight, it is proposed that the fumigation room will consist of a dedicated container with certified equipment.



Multifunctional go-downs (future)

The masterplan includes the space to construct 2 multipurpose go-downs at the wholesale market in future. In the initial phase, it is considered that the washing, sorting, grading and packaging block can be partly used as storage building. Also it is considered that not all the market shutters will not be leased from day one. Also the spare wholesale shutters can initially be applied for temporary storage. The multifunctional go-downs can be built once the traded volumes at the wholesale market are increasing in future.

Farmer's Auction centre

The farmer's auction center is designed as a 12m x 12m square single storey reinforced concrete frame structure with corrugated galvanized steel sheet roofing with plinth area of 144 m². The block is a semi open type of structure. Proper pavements are provided around the block for easy pedestrian movement and a ramp shall be provided for wheelchair access.

Toilet Blocks

Two nos. of toilet blocks with plinth area of 58 m² (12.75 x 4.5m) shall be provided at appropriate places within the site. Each block is designed as a single storey reinforced concrete frame structure and it consists of 5 nos. of WC and 5 nos. of wash basin for female toilet and 3 nos. of WC, 3 nos. of urinal and 5 nos. of wash basin for male toilet. One unit in both male and toilets has been designed to incorporate differently able people with proper provision of ramp for wheelchair access. Out of the 5 nos. of WC in female toilet 3 nos of Indian style pan has been provided and 2 nos. of Indian style pan has been provided in male toilet considering the comfortable use of the users in the comparatively rural setting.

Adjacent to the toilet blocks there will be a cleaning closet and small changing room with 2 showers and lockers for general use with total area of 12 m² (3 x 4m).

Weighing bridge and weighbridge building

Two nos. of weighing scales with size of 16m x 3.0m and capacity of 100MT are located near the main gate for weighing heavy vehicles. The weighbridges shall be pit mounted and provided with a reinforced concrete weighbridge deck.

The weighing scales are operated from a single storey control room located at the weighbridge building in close proximity. All weighbridges shall be provided with an electronic display to read the weight by the driver. The outgoing weighbridges shall also be provided with a ticket printer, indication the date and time of weighing, vehicle license number, gross weight and net weight.

Truck wheel washing station

To reduce dust at the wholesale market site, it is advised to install a wheel washing installation at the truck entrance. The wheel wash shall be a fully automated system with water recycling. The system should provide thorough cleaning of the vehicle's wheels, sides and undercarriage delivered by an array of powerful jet spray nozzles. All the water should be collected and filtered back through the system with all heavy sediment and debris separated in a collection area.



Maintenance and repair workshop

One workshop with plinth area of 650 m² (40*16m) shall be provided for the maintenance and repair at the wholesale market. The workshop is divided into 2 sections and shall have a minimum free height of 6 meters.

One section consists of the carpentry workshop that shall be designed to assemble and repair the wooden boxes required for the cold storage. The other section consists of the general mechanical/ electrical workshop and vehicle workshop.

Each section has its own tool storage and general/ spare parts storage. Between the 2 sections shall be the general facilities, including canteen, kitchen, lavatory and changing room with lockers.

Grocery shop

A grocery shop is anticipated outside the wholesale market in front of the pedestrian entrance. The grocery intends to provide refreshments for the visitors of the wholesale market. The grocery has a floor area of 330 m².

Retail market

A small retail market for agricultural products is anticipated outside the wholesale market next to the grocery shop. The retail market consist of 10 shutters of 4 x 8m².

Krishak Chautari (market stalls for small farmers)

A small area outside the wholesale market will be reserved for farmer Cooperatives and nearby small Farmers allowing them to sell their product directly. This area will be covered with a canopy consisting of a steel truss with single cladding. The Krishak Chautari will be located outside the wholesale market in front of the pedestrian entrance.

Football ground

The existing football ground shall be relocated to a new location Northeast of the wholesale market. The new football ground will be located on land of the wholesale market, but outside its fence so that it can be accessed all time independently. The development of the new football ground is considered part of the project.

The football field shall meet the stipulations from FIFA and should have the following minimum dimensions:

- The length (touch line) must be minimum 90 metres
- The width (goal line) must be minimum 45 metres

The football ground shall be provided with dressing room with showers and small covered grandstand. In addition there shall be a catch net for balls between the football ground and car parking.



Bio-composting

It was requested by the chairman of Ward 15 to process any organic waste outside the facility because of the risk for odour nuisance. As such, the organic waste from the wholesale market shall be processed at a location outside the wholesale market by a private company that has extensive experience with bio composting.

Parking for passenger cars

A tree level car park is anticipated near the entrance of the wholesale market. The car park provides 98 parking positions at each parking level summarizing to a total of 294 parking lots. The total floor area of the parking lot is $3 \times 3,000\text{m}^2 = 9,000\text{m}^2$.

Roads and truck parking

With the exception of areas designated to buildings, landscaping or reserves for future facilities, the entire area within a market site will be paved in order to provide the maximum degree of traffic manoeuvrability and to facilitate site cleaning.

The road system of the market need to accommodate a wide range of vehicle types, from the smallest cars and pick-ups to large trucks, fire appliances and refuse collection vehicles. Appropriate geometrical design criteria shall be adopted for the design of the roads, including the design of the main junctions at the site, entry and exit, parking and loading bay arrangements.

It is considered that incoming trucks will have an average load of 10 tons, while the outgoing trucks have an average load of 2.5 tons. In this respect an average of 5 truck/cars are required to handle 10 tons of product (in- and out).

Each shutter has a width of 5m and allows at least one truck to be parked in front of it at a single time, which means that more than 126 trucks can be parked simultaneously at the whole sale market any time. Based on an annual turnover of 8.6 MT per shutter ($1,087\text{MT} / 126$), each truck parking will be used $8.6/10 \times 5 = 4.3$ times per day.

Considering that loading/ unloading of a truck will take 1 hour in average, the truck parking occupancy will be $4.3/12 = 36\%$ based on 12 operational hours per day. Based on this conservative approach it can be concluded that the number of parking positions for trucks is more than sufficient to handle the anticipated market throughput.

Pavement Design

A high standard of road construction is required in the wholesale market, so the road pavement shall be designed on the basis of the California Bearing Ratio (CBR) data for wet conditions, obtained during the site investigations, and the peak projected traffic levels. Accordingly the thickness of the road pavement and road foundation shall be designed.

Adequate supplies of local crushed stone is assumed to be available near the project site so "Macadam" construction has been considered, with a compacted sub-grade, sub-base and base courses, finished with a tar coat and surfaced with pre-mixed bitumen based material for the approach road outside of the compound of the market.

For the rigid pavement within the compound of the market concrete block pavement has been designed for the parking areas.

2.6.2 Additional interventions

Buildings

The supply and demand pattern has seasonality effects and will differ between harvest season and the rest of the year. During harvest, majority of the products will be put in the warehouse for long-term storage. A certain part of products will be packed and directly sold during harvest.

In Appendix 3, the proposed process from harvest up to expedition is described. Also, the required conditions associated with each product category will be given.

Onion/ Potato/ Cabbage intake, storage and processing building

It is considered that the intake, storage and processing for onions, potatoes and cabbage will be undertaken in one dedicated building that combines all proposed interventions for these products. The building includes the following cold storage facilities:

| Product | Number of cells | Capacity per cel in MT | Total storage capacity in MT |
|--------------|-----------------|------------------------|------------------------------|
| Potato | 13 | 345 | 4,500 |
| Onion | 8 | 275 | 2,300 |
| Cabbage | 3 | 336 | 1,000 |
| Total | | | 7,800 |

One of the storage rooms for potatoes shall be suitable for heating of product after cold storage.

Banana storage and processing building (future)

Considering the expected throughput of bananas, it would be justified to build a dedicated building for the intake, storage and processing of bananas. Eventually, the building can also be used for the manually packaging of other fruits. However, because of ethylene producing and sensitivity of fruits, it is not possible to store all products in the same storage as the bananas.

Initially however, it is considered that bananas will be stored and handled in the general washing, sorting, grading and packing block. As such the cold storage room and ripening room for bananas will be anticipated in this building. Once this building is fully occupied, it is advised to build a separate building for the storage and processing of bananas.

Processing capacities

Based on a total volume of 7,800 MT/180 days intake to the cold storages will be 43 MT/day based on 30 working days per month. This is questionable as commonly operations are 5 days/week sometimes 6 days/week. As a result daily throughput could be 10-20% higher.

Ventilated/cooled crops (potato, onion, cabbage):

- Potato, onion, cabbage maximum intake per day shall be 43 MT which is corresponding with 1,290 MT/month.
- A one-month period for drying and curing of these crops shall be assumed (some of the crops can be cured in 2 weeks, but to allow sufficient handling time a period of 1 month is assumed)
- For the crops that need to be stored long term (50%) it is assumed that these will be stored for maximum 4 months and a storage capacity of 7,800 MT is needed
- Direct shipment is assumed another 50% and this produce will also have to be sorted and packed
- Storage of crops plus direct shipment is $2 \times 7,800 \text{ MT} = 15,600 \text{ MT}$ per annum.



Cooled crops (cabbage):

- With 1,000 MT annually, cabbage is a relatively small volume, requiring only a storage capacity of 1,000 MT.
- Direct shipment (thus only handling and packing) will be another 1,000 MT.

Pre-cooled crops (banana)

- The pre-cooled crops will enter the facility just for 1 or 2 days to be pre-cooled, packed and shipped, and as a result no dedicated storage capacity will be needed, except for the pre-cooling cell
- The pre-cooling cell has 35 MT storage capacity based on a weekly turnover. In addition a ripening room will be installed of 10 MT which is sufficient as only part of the bananas will have to be ripened (green bananas).

Intake equipment capacities

For the equipment capacity it is assumed that all intake capacities will be based on a one-month intake period (except bananas):

- Potato: all manual at 18.75 MT/hr in a 1 shift operation and 9 MT/hr in a 2-shift operation (preferred). The harvest season is probably longer. That means that intake capacity in practice can be lower.
- Onion 9.6 MT/hr in a 1 shift operation and 4.8 MT in a 2-shift operation (preferred). The harvest season is probably longer. That means that intake capacity in practice can be lower.
- Cabbage: due to small volume 1,000 MT is 33 MT day = 2 MT/hr all manual.
- Banana: 35 MT/week. Intake in one day is 5 MT/day = 0.3 MT/hr all manual.

Sorting and packing equipment capacities

- Potato: for sorting and grading at a line of 10-15 MT/hr in a 1 shift operation, approx. 2 months will be needed to sort and grade the anticipated volumes. Packing will be done in plastic foil bags of 2.5 to 5 kg and will be carried out with a semi-automatic machine of 10 MT/hr.
- Potato: final distribution will be done in plastic crates of 25 kg instead of palletizing. Firstly client have no forklift to handle the pallets, secondly the product will not be damaged during transport and finally the clients are familiar with handling plastic crates. Disadvantage is the return system that will have to be established.
- Onion: for sorting and grading at a line of 5 MT/hr in a 1 shift operation, approx. 2 months will be needed to sort and grade such volumes. Packing will be done in plastic foil bags of 1.0 to 2.5 kg and will be carried out with a semi-automatic machine of 5 MT/hr. Packing time will be longer as compared to potato as the packaging size will be smaller.
- Onion: final distribution will be done in plastic crates of 25 kg instead of palletizing. Firstly client have no forklift to handle the pallets, secondly the product will not be damaged during transport and finally the clients are families with handling plastic crates. Disadvantage is the return system that will have to be established.
- Cabbage: sorting and grading will be done with an air compressed machine (see Appendix). First labour is used to remove the leaves with air and subsequently the cabbages are passing the grading machine which grades the produce into 3 different sizes. Haulage to final client will be directly in plastic crates of 25 kg.



- Banana: Is all manual handling. Hang the bunches overnight in the packing house to reach a uniform temperature. In the intake the bunches are hanged on a rail system (steel with grease) with gliders/hook (pvc/steel) and where the bunches are inspected for diseases and other irregularities. The good bunches are then de-handed (very sharp knife to reduce disease infection) ready for washing with water, soap and bleach (0.5 to 1%). After this the fruits are dried on a rotating table after which the fruits are packed manually in carton boxes (20-25kg) for distribution to final client.

2.6.3 Site logistics and traffic flow

For the Master Plan layout design, reference is made to Appendix 5 of this report.

Site entrance

The site of the wholesale market can be easily reached via the new (still to be constructed) Dano River Road corridor and the newly constructed bridge over the Dano river.

To prevent the blockage of the Road corridor and bridge because of traffic queuing in front of the main entrance gate, it is advised that vehicle access to the site will be provided at the secondary road that is anticipated in the special development plans at the East side of the wholesale market site.

This secondary road is splitting the available area for the wholesale market in two separate plots. In this respect, it is proposed to use the smaller Eastern plot opposite of the entrance for the guest houses, public farmers market and grocery. Having these facilities outside the wholesale market area provides the opportunity to attract private investments.

The main vehicle access gate will be provided with 2 entrance lanes and 2 exit lanes. One of either lanes will be provided with an incoming and outgoing weighbridge. The gate will be provided with a separate guard house that can be used 24/7 for security. At the opposite site of the wholesale market a second exit is anticipated for emergency situations.

For safety reasons it is proposed to have a separate entrance for pedestrians. Next to the pedestrian entrance it is proposed to have a parking for passenger cars, motor bikes and bicycles. A bus stop is anticipated at the Dano River Road corridor to allow staff to arrive by bus.

The main administrative office will be located between the vehicle gate and pedestrian gate. The main administrative office will be provided with an additional parking for passenger cars.

Collection centre

Traffic entering the site has to follow the main road corridor that extends till the secondary exit at the West side of the wholesale market. As this road bypasses the wholesale market on the South, limited number of pedestrians have to cross this road, which leads to better safety.

The main corridor road will lead to the collection centre in the back of the site. This area will provide all necessary facilities for the farmers. This where intake of agricultural products, sorting, washing, storage and packaging takes place. This area will also include an Agroveter, where farmers can buy necessities such as tools, seeds, fertilizers, etc. It is also proposed to have the farmers action building here at the boundary with the wholesale market.

Wholesale market

Also the traffic for the collection centre will follow the main road corridor towards the collection centre without interfering with passengers.



Before the collection centre, the traffic will follow the road Northwards to a secondary road that enters the wholesale market. As the traffic in the wholesale market must share the area with pedestrians, it is proposed to have one-way traffic only at the wholesale and retail market to increase pedestrian safety. All traffic will exit the wholesale and retail market again via the main access on the East side of the wholesale market.

It is considered that the masterplan layout drawing is further self-explanatory and therefore not further discussed.

2.6.4 General utilities

This section provides a general overview of the utility requirements.

Water supply

Water supplies to markets are required for drinking and sanitation purposes, for general cleaning and, for the washing of produce.

The supply of potable water for the proposed market will be through a pumped supply from a deep tube well. Water is pumped from the well and passed through the closed mechanical filtration unit before filling the overhead water tank. The water will be chemically treated with a chlorination unit before feeding to the distribution system. The water will need to be to a similar standard to that for drinking water.

Two deep borings will be installed in the system so that another one can be used in case of breakdown or repair and maintenance of the well and pump. A diesel generator for power backup is proposed in case of power failure.

An approximate estimate for water demand at ultimate development of a typical wholesale market, is as follows:

Table 2-10: Water demand estimation

| Description | Demand |
|--|-----------------------|
| Basic Requirement: 12,5 ha x4,000 litre/ ha/ day | 500,000 litres |
| Cold Storage requirements @ 10 litres per ton (7,800 mt) | 78,000 litres |
| Basic Requirements | 578,000 litres |
| Add 30 % contingency, including washing of produce | 174,000 litres |
| Estimated average daily water demand | 752,000 litres |

From the calculation above the required size of the overhead reservoir is estimated at 200 m³ capacity with an estimated deep tube well discharge of 16 lps. The water will be pumped from the deep tube well and collected in the overhead reservoir tank through a mechanical filtration unit.

The overhead water tank is a 24.6m high reinforced concrete frame structure with 200 m³ capacity. The enclosed tank has an internal diameter of 7m and is 4.65m high.

From the tank, the water is distributed by an underground pipeline system laid all around the market area. The water shall be supplied 24 hours so there is no need to install separate water tanks for the different units.

Water supply provisions in different units with adequate discharge shall be designed accordingly. The main objectives are to make adequate water supply available (without any interruption) for the purpose of drinking, bathing, washing, flushing toilets and any other industrial use. The piping systems to distribute



the water within the market area through the different fixtures shall be designed to provide uniform flows and pressure in all areas and floors within certain practical limitations.

The sizes of the distribution pipes depend on:

- The maximum rate of discharge required;
 - The length of pipes;
 - The head loss due to friction in that length and
 - The roughness of the interior surface of the pipe.
- Each separate building shall be provided with a dedicated water meter.

Firefighting system

As large amounts of organic material are supplied and stored in the market, there is always a substantial fire risk and special provision shall be made as a fire-fighting measures.

The market site shall be provided with a series of above ground fire hydrants, spaced at approximately 30 meters intervals in a loop system encircling the main buildings and around the site periphery. The hydrants shall be protected from damage by vehicles.

In designing the water supply system a minimum fire-fighting flow of 34 litres per second shall be adopted. The fire fighting system shall be fed via a dedicated fire pump station. To secure the water supply there shall be 2 fire water tanks of 120 m³ capacity each. One of the 120 m³ water tanks shall be dedicated for fire fighting and be filled any time providing sufficient water for one hour of firefighting.

The other 120 m³ tank will be applied for rainwater harvesting from the roof of the onion, potato and cabbage intake, storage and processing building and provided with an overflow towards the rainwater drainage system. A minimum water level shall be maintained in this tank by feeding it via the overhead water reservoir during dry periods. Water from this tank can be used for irrigation or cleaning activities in the wholesale market by using the fire hose reels. Only in case of an actual fire, the dedicated fire water tank will be applied by opening the valve to the fire water pumps.

Smoke detection and alarm systems will be installed in all the main market buildings. Cold storage buildings will also be fitted with gas detection equipment.

All buildings should be provided with internal emergency equipment to the following minimum standards:

- 1 fire extinguisher per 600 m² of floor area (or part).
- first aid kits and tools (asbestos blanket, hatchet, gloves, etc.) for each building or compartmented section; and
- internal fire hydrants to open-market sheds, served from overhead gravity fed tanks to a minimum pressure of 3 kg/cm².
- The hydrants will be provided with wall-mounted hose reels to serve a maximum radius of 30 metres.
- Manually operated fire pump for supplying water from the overhead tank.
- Fire Hydrant and Fire Hose Reel at Each floor for supplying water to all over the buildings for Emergency.
- Suction Valve, Check Valve and Landing Valve used for Fire Department Connectivity.
- Design shall be according to the NBC 208:2003.



Rainwater drainage

Rainwater from the roof of the onion, potato and cabbage intake, storage and processing building shall be harvested in a dedicated underground water tank for general cleaning purposes. The tank shall have a water storage capacity of 120 m³ and be connected to a dedicated pump near the fire water pump station.

All other rainwater falling on roofs, paved areas and other open areas must be collected and disposed-off efficiently and quickly. A provision shall be made for a separate and in-dependent storm water disposal system.

Since the site is located at the bank of the Dano river, the sub surface rainwater drainage system shall be designed to drain the sub surface flow into the river. Considering that the site is low lying, the outlet shall be provided with non-return valves and a block valve.

A detailed layout plan of the drainage system has to be designed to collect the storm water from roofs, roads and pavement and subsequently dispose to the Dano River through a proper outlet system. The total peak discharge of water from the site shall be calculated using the formula below:

$$Q = C \cdot I \cdot A$$

Where:

C = run-off coefficient

I = rainfall intensity in mm per hour

A = catchment area in hectares, including the site.

The run-off coefficient is selected from standard tables and will depend on the extent of paved areas and building coverage. For markets this is normally taken as a high value, such as 0.9, because the sites are normally flat, impermeable and have fully paved surfaces.

Comprehensive historical information on rainfall intensity shall be obtained from the Department of Hydrology and Meteorology. For the rainfall intensity per hour at least a 1 in 25 years return period shall be adopted to ensure that during major storms there is no inundation of the market buildings and that road access is still possible.

Covered reinforced concrete and masonry rectangular drains shall be adopted for the design of drains, with a small dry weather flow channel in the bed of the larger drains to cater for a self-cleansing velocity. A freeboard of 10 per cent of the channel depth is used in design as a safety margin to cope with high intensity short duration storms. The calculation of drain sizes is based on the use of the Continuity of Flow Formula as below:

Q (run-off:) = A x V where:

A - cross-sectional area of channel in m²

V = velocity of flow in m per second (taken as maximum of 3 and minimum of 1.8 m per second for self-cleaning) calculated by the Manning's Formula.

The alignment of main drains is to follow the pattern of buildings and roads, with a minimum of crossings. Some drains are likely to have only a minimal slope and wider cross-sections are provided, particularly at the outlet, to cater for back-water effects if the existing outlet is constricted and to provide a level of on-site storage at times of peak discharge.

Manholes shall be provided at regular intervals and at all pipeline crossings for maintenance.

Wastewater drainage

For removal of wastewater, all facilities shall be connected to a dedicated wastewater drainage system.

The Onion/ Potato/ Cabbage intake, storage and processing building, general washing, sorting, grading and packaging block and wheel wash installation shall initially drain the wash water into a settling tank. After settling, the water shall be discharged into the wastewater drainage.

The wastewater drainage system shall be connected to the wastewater treatment plant.

Wastewater treatment plant

Based on the requirements of the wholesale market a wastewater treatment plant (WWTP) for the treatment of the produced wastewater is preliminary designed. In this memo the preliminary designs of two scenarios, with adopted starting points and a techno-economical evaluation, are described.

Based on the techno-economical evaluation it is concluded that both a scenario with or without an additional sludge thickener would be possible. The operation of the treatment plant without sludge thickener will be slightly easier and would be the preferred scenario. This, however, requires the construction of rather large sludge drying beds. As required space for the sludge drying beds is not available on site, it is decided to opt for a WWTP with additional sludge thickener.

The treated wastewater will be discharged into surface water and its quality should meet the IFC requirements. Based on the location of the wholesale market, it is most likely that the effluent is discharged into River Dano. The discharge requirements are presented in Table 2-11.

Only the discharge requirement on the Total Coliform parameter is derived from the Nepal requirements⁵ because it was stricter compared to the IFC requirement and therefore becomes leading.

Table 2-11: Discharge requirements for discharge into surface water

| Parameter | Unit | Discharge requirement (maximum value) |
|------------------------------|------------|---------------------------------------|
| COD | mg/l | 125 |
| BOD | mg/l | 30 |
| Total nitrogen | mg/l | 10 |
| Total phosphate | mg/l | 2 |
| Oil and grease | mg/l | 10 |
| Total suspended solids (TSS) | mg/l | 50 |
| Total coliform* | MPN/100 ml | 400 |
| pH | - | 6 – 9 |

* The discharge requirement for the Total Coliform parameter is according to the Nepal requirements¹

⁵ Nepal Gazette, 2060/3/9 Bs (2003), Country Environmental Analysis for Nepal, ADB 2004.

Domestic- and industrial wastewater from the wholesale market will be collected and transported to the WWTP. At the WWTP the wastewater will be pumped from the inlet works into the different treatment steps. First step in the treatment is screening to remove coarse material, like leaves, branches, tie-raps and all kinds of other rather large debris.

The second step is a Fat Oil and Grease (FOG) removal unit, which also will remove grit. Both steps (preliminary treatment) are to protect the subsequent treatment from clogging, blockage, or other damage.

The third step is the aeration (secondary treatment). In the aeration tank a surface aerator will dissolve sufficient oxygen into the wastewater and sludge mixture for the conversion of the dissolved pollutants such as carbohydrates (COD, BOD) and nitrogen compounds by bacteria in the sludge.

For the chemical removal of phosphorus ferric chloride dosing equipment will be installed. The treated wastewater from the aeration tank will overflow to the final sedimentation tank, in which treated effluent and biological sludge will be separated.

Chlorination is the last step (tertiary treatment) to meet the effluent requirements regarding the total coliform parameter before it is discharged into the river.

Part of the biological sludge from the final sedimentation tank will be returned to the aeration tank to maintain a sufficiently high sludge concentration. The other part must be wasted because of bacterial growth. This will be pumped to a sludge thickener for thickening before it is dried at sludge drying.

In a sludge thickener the waste sludge is thickened from around 1% DS (dry solids) to 3% DS. This will significantly reduce the volume of the waste sludge and so the necessary surface area required for the sludge drying beds. After a sufficiently long drying period on the sludge drying beds, the remaining sludge will have a concentration of around 30% DS and can be removed for further treatment, disposal, or agricultural purposes. This last option must be studied because there might be strict guidelines and requirements for the use of waste sludge as fertilizer. This is beyond the scope of this report.

In proposed configuration a sludge thickener will be constructed due to lack of space for large sludge drying beds. Although this results in some more operational complexity of the plant, the surface area needed for the sludge drying beds will be significantly less.

Figure 2-11: Schematical representation of the WWTP with sludge thickening

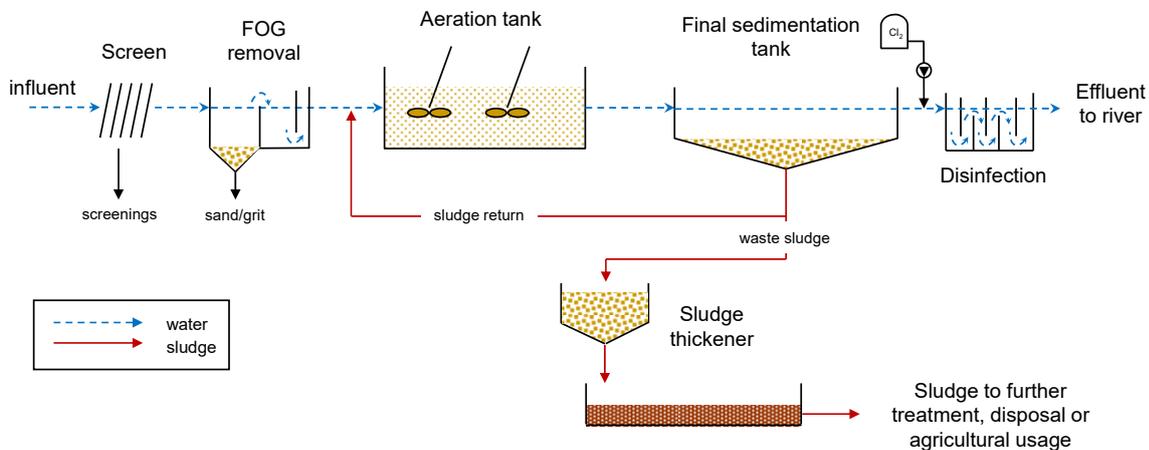


Table 2-12 shows the general design principles for the preliminary design used for the studied scenario.

Table 2-12: Design principles for both wastewater treatment configurations.

| Element | Unit | Scenario with sludge thickener |
|-------------------------------|-------------------------|--------------------------------|
| Aerobic treatment | | |
| - Sludge concentration | kg/m ³ | 4 |
| - Sludge retention time (SRT) | d | 12 |
| - Me/P ratio | - | 1.3 |
| - SVI | ml/g | 120 |
| - Surface aeration | kg O ₂ /kWh | 2 |
| Sedimentation | | |
| - Surface loading rate | m/h | 0.5 |
| - DS percentage output | % DS | 1.0 |
| Sludge thickening | | |
| - Energy demand | kWh/ton DS | 80 |
| - Surface loading rate | kg/m ² .d | 25 |
| - Dry solids (DS) output | % | 4 |
| Sludge drying beds | | |
| - Surface loading rate | kg DS/m ² .d | 1.2 |
| - Hydraulic loading rate | cm/d | 2,1 |

In Table 2-13 the main design specifications of the required process units are presented. The preliminary design of the WWTP scenario is applied to calculate the tentative Capex and Opex costs.

Table 2-13: Design specifications of required process units

| Element | Unit | Scenario with sludge thickener |
|---------------------------|-------------------|--------------------------------|
| Aerobic treatment | | |
| - Flow | m ³ /d | 528 |
| - Total volume | m ³ | 1,070 |
| - Depth | m | 6 |
| - Type aeration | - | Surface aeration |
| Sedimentation | | |
| - Amount | pcs | 1 |
| - Surface area | m ² | 49 |
| - Return flow | m ³ /h | 25 |
| Chlorination | | |
| - Amount | pcs | 1 |
| - Contact time | min | 10 |
| Sludge thickener | | |
| - amount | pcs | 1 |
| - Surface area | m ² | 15 |
| - diameter | m | 4.3 |
| Sludge drying beds | | |
| - Surface area | m ² | 3 x 200 |



The final capacity of the WWTP shall be revised during the detailed design based on the final water balance of the project. This shall be done during the detailed design and is included in the project costs.

Power supply

A three-phase electrical supply shall serve the market with a transformer.

The transformed low voltage supply will run in encased cable ducts to a main switch board, with distribution cables to sub-switch boards in the individual buildings. For ease of maintenance all external cables will be ducted through cable trenches and internal wirings will be concealed in conduit wherever possible.

An outdoor type of transformer with low loss type approved by NEA shall be provided to meet the three-phase power demand. The capacity of the transformer shall be designed with 10% additional capacity to cater future load. The capacity of transformer shall be designed considering full load of AC systems.

The distribution boards shall be designed as per the NNBC cone 207: 2003. As a minimum there shall be one main panel board and each building block shall contain a block distribution board on each floor.

Back-up generators

Back-up generators are anticipated for the following facilities:

- 1 for full load of the refrigeration plant for storage of potato/ onion cabbage.
- 1 for full load of the refrigeration plant for storage of bananas.
- 1 for full load of water supply and treatment plant.
- 1 near the administration building for essential loads (computers, security lights, and basic important load).

Solar panels

It is considered that solar panels will be installed on the roofs of cold storage buildings and the wholesale market stalls to lead the way to zero emissions and reduce the costs of energy.

In our cost estimate an amount is included to install solar panels on the entire roof of the cold storage and processing building for onions, potato and cabbage.

Lighting and socket outlets

The wholesale market, buildings, flat stores and mechanical equipment shall have a lighting system to work safely during 24 hours per day.

The following table gives an overview of the intensity of illumination at work level for various locations.

Table 2-14: Minimum illumination levels

| Location | Illumination level (lux) |
|---|--------------------------|
| Regular vehicle traffic outside (max. 40 km/h) | 20 |
| Pedestrian passages, vehicle turning, loading and unloading points, parking | 50 |
| Minimum inside | 50 |
| Hallways and stairways, entrance, walkways and platforms | 100 |
| Public rooms (canteen, mess), waiting rooms | 200 |
| Offices | 300 |

| Location | Illumination level (lux) |
|-----------------------------------|--------------------------|
| Control room / Electrical Room | 400 |
| Groceries, laboratories, kitchens | 500 |

All accessible rooms and spaces (buildings and mechanical equipment) shall be provided with lighting fixtures for the purpose of emergency lighting. These fixtures may be combined with the normal lighting fixtures. The lighting fixtures shall have their own battery. The capacity of the battery shall be enough for at least 60 minutes or more. In case of power failure emergency lighting shall switch on automatically and the illumination shall be sufficient to leave or enter equipment or buildings in a safe way.

Single phase socket outlets shall be of local type with two contacts plus earth.

As a general requirement, as many sockets shall be installed in a room or place as the intended functions of this room or place requires. As a minimum, two double socket outlets shall be installed in every room. Offices shall have at least two double sockets per place of work.

CCTV system

CCTV System has been designed using Dome security cameras, IP and PTZ camera for Safety and Security.

Telephone and IT systems

The telephone is essential for a modern wholesale market. It allows rapid communication between wholesalers, retailers and exporters and also acts a management and extension tool. With the development of market information systems the telephone is the major means by which price information is transmitted to producers.

The market requires the installation of its own switchboard (PABX system) which would be housed in the main management office. It will have sufficient external lines for the installation of computer modems and facsimile equipment. Public telephones shall be provided within the market for better communication facility in the market.

A telephonic provision shall be provided on each working desk, station, cabin with intercom. Also a Personal Announcement (PA) system shall be provided for general announcements. The market shall be provided with a local area Network (LAN) available at each office/working desk.

2.7 Capex Cost Estimate

For an overview of the capex costs reference is made to Table 2-15 below.

Table 2-15: Capex costs estimate (price level 2022, excl. VAT)

| Nbr. | Description | Subtotal | Total |
|----------|--|-------------|---------------------|
| A | Direct construction costs | | € 26,865,400 |
| A.1 | New buildings, incl. building installations | € 8,511,000 | |
| A.2 | Infrastructure and utilities | € 7,400,000 | |
| A.3 | Additional interventions | € 8,656,000 | |
| A.4 | Furniture, computers, laboratory equipment, etc. | € 250,000 | |

| Nbr. | Description | Subtotal | Total |
|----------|--|-------------|---------------------|
| A.5 | Future expansion (2030 costs) | € 2,048,400 | |
| B | Indirect construction costs | | € 5,410,000 |
| B.1 | Contractor's site establishment, supervision, hoisting facilities, etc. (12% of A1 and A2) | € 1,909,000 | |
| B.2 | Contractor's general overhead costs (7% of A1 and A2) | € 1,114,000 | |
| B.3 | EPC risk contingency (10% of A1 and A2) | € 1,591,000 | |
| B.4 | General profit and risk (5% of A1 and A2) | € 796,000 | |
| C | Design fees, project management, site supervision, etc. | | € 4,519,000 |
| C.1 | Design fee (6% of A+B) | € 1,937,000 | |
| C.2 | Surveys and investigations (1,5% of A+B) | € 484,000 | |
| C.3 | Project management, supervision and quality control (6% of A+B) | € 1,937,000 | |
| C.4 | CAR insurance (0,5% of A+B) | € 161,000 | |
| | | | |
| D | Contingencies | | |
| D.1 | Contingencies (10% of A+B+C) | | € 3,679,000 |
| | TOTAL INVESTMENT COSTS EXCL. VAT (+/- 25%) | | € 40,473,400 |

The total Capex costs for the construction of the wholesale market are estimated at **Euro 40,473,400** (+/- 25%), excl. VAT, consisting of Euro 37,905,000 for the initial construction phase and another Euro 2,568,400 for future expansion of the wholesale market in 2030.

For a detailed breakdown of the Capex cost estimate, reference is made to Appendix 7. The above Capex costs exclude the costs for land acquisition, project financing and taxes.

For the capex cost estimate, a currency exchange rate of 1 Euro = 126 NPR is applied.

It is considered that approximately 30 % of the total capex investment will be procured from outside Nepal and needs to be paid in foreign currency. Remaining amount will be in NPR.

The Capex estimate includes an amount of 1.5 m€ for the installation of solar panels on the roof of the cold storages for potatoes, onion and cabbage.

2.8 Opex Cost Estimate

2.8.1 Summary

The total annual operation costs for the base year of 2022 are estimated at NPR 75,300,000 as shown in Table 2-16 below.

Table 2-16: Summary of annual Opex costs



| Description | Amount (NPR) |
|---------------------------------|-------------------|
| Personnel Cost | 16,200,000 |
| Overhead and Office Expenses | 10,000,000 |
| EMP and EHS monitoring | 10,000,000 |
| Energy Cost | 7,200,000 |
| Maintenance Cost | 31,800,000 |
| Total Annual Cost in NPR | 75,200,000 |

For a breakdown of operational costs, reference is made to the sections below.

2.8.2 Personnel costs

It is considered that the market requires a total staff of 53 employees as can be seen in the table below. It can be considered to outsource the support staff, in which case a total of 25 staff is required. This, however, will not influence the overall operational costs.

The assumed annual salary requirements are presented the table below.

Table 2-17: Overview of annual personnel costs

| Categories | Designation | No | Salary | Amount (NPR) |
|-------------------------|-------------------------------|----------------------------|---------|-------------------|
| Management | Director | 1 | 750,000 | 750,000 |
| | Operational manager | 1 | 650,000 | 650,000 |
| | Marketing manager | 1 | 600,000 | 600,000 |
| | Technical manager | 1 | 500,000 | 500,000 |
| | EHS manager | 1 | 500,000 | 500,000 |
| | Senior account officer | 1 | 500,000 | 500,000 |
| | Senior administrative officer | 1 | 400,000 | 400,000 |
| | Operations | Market operations officers | 3 | 300,000 |
| Account officers | | 3 | 300,000 | 900,000 |
| Planning officers | | 2 | 300,000 | 600,000 |
| Monitoring officer | | 1 | 300,000 | 300,000 |
| Administration officers | | 3 | 300,000 | 900,000 |
| IT Technicians | | 2 | 300,000 | 600,000 |
| Maintenance | | Technicians | 5 | 300,000 |
| Support | Guards/ security | 20 | 250,000 | 5,000,000 |
| | Helpers | 3 | 200,000 | 600,000 |
| | Cleaners | 5 | 200,000 | 1,000,000 |
| Total | | 54 | | 16,200,000 |



2.8.3 Office and overhead expenses

An amount of NPR 10,000,000 is included in the Opex for general office and overhead expenses. The costs include amongst others the costs for insurance, telephone, internet, printing, marketing, waste management, etc.

2.8.4 EMP and monitoring

An annual amount of NPR 10,000,000 is included for overall E&S auditing and reporting, engagements, and oversight of the EMP implementation by the Wholesale Market Operator.

2.8.5 Energy costs

Based on a benchmark with the Kalimati market and Butwal wholesale market, the annual energy costs are estimated at 36 NPR/MT of annual market turnover.

These costs are excluding the energy costs that are required for the market facilities and cold storages. It is considered that these costs will be directly charged to the users of these facilities.

2.8.6 Maintenance costs

Based on benchmark figures we assumed that the maintenance costs for buildings and infrastructure amounts of 0.5% the capex investment costs. The maintenance costs of cold storage equipment and cleaning sorting, grading, and packaging equipment are considered at 2.0% of the capex investment costs.

Based on the above, total annual maintenance costs for the wholesale market are estimated at NPR 28,900,000 as can be seen in Table 2-18 below.

Table 2-18: Overview of annual maintenance and repair costs

| Designation | Amount (NPR) |
|--|-------------------|
| Buildings and infrastructure (0,5% of capex) | 10,000,000 |
| Equipment (2.0% of capex) | 21,800,000 |
| Total of Maintenance Cost in NPR | 31,800,000 |

3 Project Plan

3.1 Structure of the Project Plan

The Project Plan for the Export-oriented Agriculture Wholesale Market in Butwal is structured into following chapters:

- Chapter 3.2: Provides the procurement Plan
- Chapter 3.3: Provides the Implementation Plan
- Chapter 3.4: Provides the Governance, Management and Operations Plan
- Chapter 3.5: Provides the Monitoring and Evaluation Plan

3.2 Procurement Plan

3.2.1 Introduction

Since the Basis of Design is completed and the scope of the project is clear, the procurement strategy can be defined. The procurement strategy aims to achieve the economic most favourable offers for the construction of the project.

The project has the following main characteristics:

- Large construction project;
- Specialized technology/ knowledge required for additional interventions;
- Design available up to the level of Basis of Design;
- Small project owners' team.

The project implementation needs to follow the following project phases:

- 5 Basis of Design;
- 6 Basic Design;
- 7 Detailed Design;
- 8 Construction;
- 9 Testing, commissioning and start-up.



The project approach determines the required project organization and which party executes which part of the scope.

3.2.2 Potential tender strategies

The preferred procurement strategy is depending amongst others on:

- The risks MoALD and potential investors accept to take in relation to the investment costs;

- The influence MoALD wants to have on design and quality of the works during all phases of the project;
- How the procurement of the project can be carried out in a transparent and competitive way, in accordance with the laws of the country;
- How the project can be split logically in different procurement packages (basic and detailed engineering / construction / equipment deliveries) to ensure best value for money of the goods, works and services purchased;
- The experience, capacities and knowledge of (local) contractors and suppliers.

For this project, the following three procurement strategies are identified:

10 EPC (Engineering, Procurement and Construction) Lumpsum Turnkey;

11 Packages approach;

12 EPC management approach.

Depending on the procurement strategy and considering the small project team, it is considered that MoALD needs to hire a PM (Project Management) Consultant or EPCm (Engineering, Procurement and Construction management Contractor) to act as employer’s representative. These above procurement strategies are illustrated in the following figures.

Figure 3-1: Overview EPC Lumpsum Turnkey approach

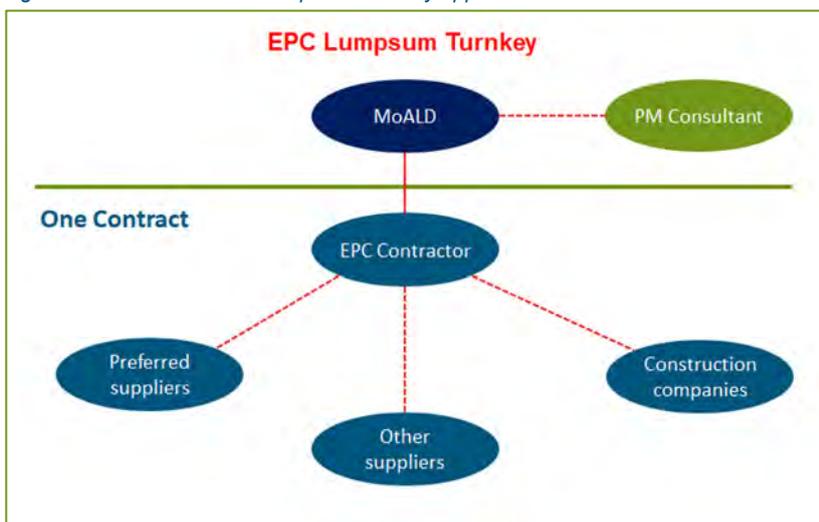


Figure 3-2: Overview packages approach

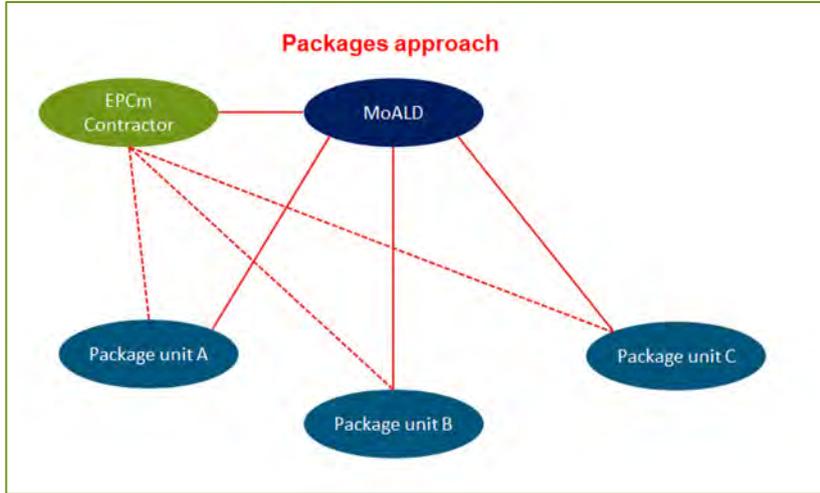
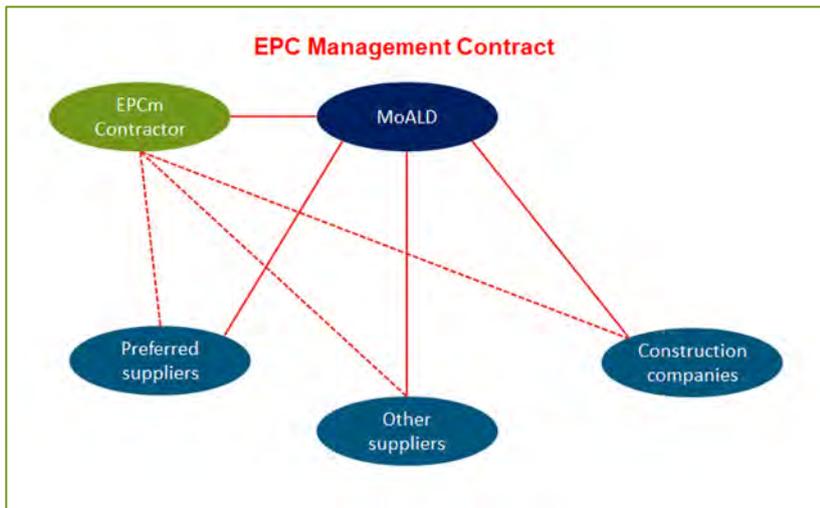


Figure 3-3: Overview EPC Management approach



3.2.3 Overview of tasks and responsibilities

For an overview of the tasks and responsibilities and comparison of the different tender strategies, reference is made to the tables below.

Table 3-1: Overview of tasks and responsibilities

| EPC Lumpsum Turnkey | Packages approach | EPC Management approach |
|--|--|--|
| Procurement based on functional specifications | Basic engineering for balance of plant and interfaces by MOALD / EPCm Contractor | Basic engineering by MOALD/ EPCm Contractor |
| Basic Engineering by EPC Contractor | Procurement based on functional specifications MOALD / EPCm Contractor | Procurement based on detailed tender specifications (and bill of quantities) |

| | | |
|---|--|--|
| Detailed engineering by EPC contractor | Extended basic and detailed engineering of packages by package suppliers | Detailed engineering by EPCm Contractor |
| Construction by one EPC Contractor | Construction by various package suppliers | Construction by various Contractors |
| Project Management and supervision by MOALD / PM consultant | Construction Management and supervision by EPCm Contractor | Construction Management and supervision by EPCm Contractor |

Table 3-2: Comparison of tender strategies

| EPC Lumpsum Turnkey | Packages approach | EPC Management approach |
|---|---|--|
| Advantages: | | |
| Total project costs “fixed” in early stage of the project | Installation quality determined in early stage by choice of suppliers | Lowest project costs |
| All liabilities at one Contractor | Engineering provided to suppliers early as possible (based on functional engineering) | Reduced project duration |
| Small project team MOALD required to manage the project | Early input of experts from suppliers | Much influence on the project by MOALD |
| | Own experts only to review the work of suppliers | Transparency |
| Disadvantages: | | |
| High Project costs (risk coverage by EPC contractor) | Early commitment to specific suppliers | More risk MoALD due to coordination responsibility |
| Limited influence on the project by MOALD | Interface control and project coordination | More risk on initial budget overrun |

Considering that only a Basis of Design is available to provide ready-to-tender documents, it would be logical to opt for an EPC Lumpsum Turnkey contract in which the basic design, detailed design, interface management and construction will be undertaken by one single EPC contractor.

It is understood that a legal framework for EPC tendering and construction is present in Nepal, but experience from contractors with this method is limited. Also, there is no local knowledge available on the proper design and operation of specialized equipment and technology required for the additional interventions, such as modern cold storage technology and cleaning, sorting, grading and packaging equipment. To assure the proper design and quality of additional interventions, this EPC Lumpsum Turnkey procurement strategy requires international tendering, which would result in very high construction costs. Still MoALD has limited influence on the design and quality of the works, so the higher price will provide no absolute guarantee for a high quality of works. As such the EPC Lumpsum Turnkey tender strategy is not advised by us.

In the packages approach, the scope of works will be split in different (EPC) packages. This approach allows the possibility to split the civil construction works of the whole market from the supply of equipment for the additional interventions. In this case, the civil works can be contracted to a local construction company, while the supply of equipment for the additional interventions can be ordered by specialized international companies.

Each party will be responsible for the complete engineering, procurement and construction of his scope of work. The task of the EPCm contractor is to execute the interface management between the parties. This method will provide MoALD more influence on the quality of the equipment for the additional interventions as selected suppliers can be invited for tendering. In addition the total investment costs will be lower than the option for a single EPC lumpsum Turnkey contractor.

The EPCm approach is comparable with the packages approach, with the only difference that the Basic Design and Detailed Design will be undertaken by the EPCm contractor instead of the construction contractor. This method provides MoALD more influence on the design of the works. Elaboration of the Basic Design prior to tendering also provides the construction companies more detailed information during the tender process and thus reducing their risks. As a result this tender strategy will result in most influence on design and quality of the works at the lowest price.

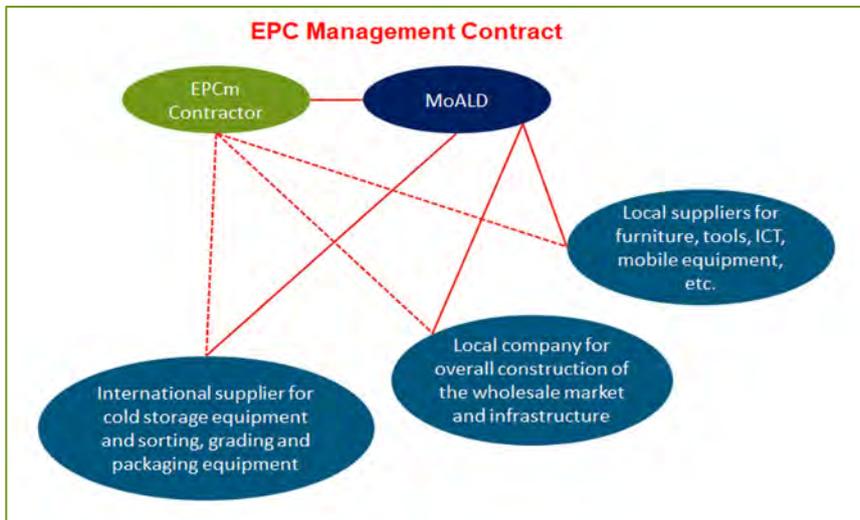
3.2.4 Proposed tender strategy

Our proposed tender strategy is a combination of the EPCm approach and packages approach. It is proposed to split the works in the following packages:

- 1 One international tender for cold storage equipment, and sorting, grading and packaging equipment;
- 2 One local tender for the construction of the wholesale market and infrastructure;
- 3 Various local tenders for smaller supply contracts, such as furniture, tools, ICT systems and mobile equipment.

The proposed tender strategy is presented in Figure 3-4.

Figure 3-4: Overview proposed tender strategy



Main process equipment

The international tender for cold storage equipment, and sorting, grading and packaging equipment should be based on the FIDIC contract conditions for Plant and Design-Built (FIDIC Yellow Book) or similar. As each supplier uses its own design standards, it does not make sense to prepare a basic design for tendering this type of equipment. The tender can be issued based on functional equipment specifications. Reputable suppliers for this type of equipment are based in The Netherlands, Germany, Belgium and the



United Kingdom. By pre-selection of reputable suppliers, the quality of these works can be secured in an early stage of the project.

Design responsibilities for the main process equipment are provided in the schedule below.



Construction of the wholesale market and infrastructure

The construction works of the wholesale market and infrastructure are assumed to be tendered to local construction companies. This could be either on EPC contract basis (option 1) or based on a construction contract (option 2).

In case of an EPC contract, the overall design responsibility will be at the EPC contractor, providing limited control of MoALD on the outcome of the design. Because only limited information is available, this EPC contractor is also not able to accurately estimate the scope of works during tendering. As such he will at a premium to his price offer to cover for any scope risks. These additional costs are estimated by us in the Capex estimate at 1.3 mEuros.

For EPC tendering, it is advised to use the Standard Bidding Document (SBD) for Procurement of Works (EPC method of contract as Lumpsum) that has been prepared by Government of Nepal (GoN), Public Procurement Monitoring Office (PPMO) to facilitate bidding procedures used for the procurement of works through National Competitive Bidding (NCB). As an alternative, the FIDIC conditions of contract for EPC/Turnkey Projects (FIDIC Silver Book) can be applied.

The additional costs for scope risks can be saved in case the design is further elaborated into a basic design by the EPCm contractor. If tendering takes place based on a basic design, the contractor knows better what is expected from him without any scope risks, which allows him to offer his best price. In addition this option has the advantage that MoALD is fully in control of the design so that there won't be any surprises during construction.

For such construction contract, the Standard Bidding Document (SBD) for Procurement of Works can be applied which has been prepared by the Government of Nepal (GoN), Public Procurement Monitoring Office (PPMO). As an alternative the FIDIC contract conditions for construction can be used (FIDIC Red Book).

Design responsibilities for tender option 1 and 2 are illustrated in the figure below.

Option 1 - EPC Contract:



Option 2 – Construction Contract:



Option 2 implies that the EPCm contractor should perform the basic engineering prior to tendering. This means that tendering will start at a later stage. This time, however, will be recovered in reduced construction time because the contractor does not have to do this work and can immediately commence with procurement and construction.



The detailed design shall be undertaken after contract award and can be performed by the EPCm contractor as well as the Construction contractor.

Comment RHDHV:

Considering that the scope risks for the EPC contractor will be mitigated, resulting in lower overall construction costs and more design control by MoALD, RHDHV advise to opt for option 2 (Construction Contract) and hire an EPCm contractor to prepare the basic design prior to tendering.

Smaller supply contracts

It is considered that certain smaller parts of the works can be best purchased under a separate order, such as the supply of furniture, computers, tools, etc. For these supply contracts no extensive contract conditions are required. These items are not critical in delivery time and can be purchased at a later stage during construction based on a relatively simple purchase order.

For the smaller supply contracts, the Standard Bidding Document can be applied that has been prepared by Government of Nepal (GON), Public Procurement Monitoring Office (PPMO) for use in the procurement of Goods.

Breakdown of costs per tender package

For the proposed type of contract per activity and an activity wise cost breakdown per tender package, reference is made to the Capex estimate in appendix 7 of this report. This shall be further elaborated in the implementation plan.

3.3 Implementation plan

The purpose of the Project Implementation plan is to provide guidelines on how the project implementation will be managed and administered during the project construction phase. It should describe amongst others:

- The required project organisation;
- Tasks, roles, responsibilities and involvement of stakeholders;
- Decision making structure;
- Implementation schedule;
- Contract management;
- Payment of the works;
- Safety management;
- Review of Contractor's submissions;
- Cost control;
- Progress control;
- Meetings;
- Record keeping;
- Progress reporting

The Project Implementation Plan is excluded from the scope of RHDHV. This section needs to be further elaborated.

3.4 Governance, Management and Operations Plan

3.4.1 Introduction

Review of existing practices and consultations point to governance, management and operations of the proposed wholesale agriculture market as key issues of concern among all stakeholders. Several options exist for setting up and operating wholesale markets in the country.

As the proposed market is being established with public funding, it will be necessary to ensure that a proper governance and management framework is in place to ensure fulfilment of commercial objectives of the market as well as development goals of the Government and funding development partners.

3.4.2 Policy and Legal Framework

Annual Budget Statement for Fiscal Year 2079/80

The annual budget statement for Fiscal Year 2079/ 2080 (2022/23) of the Hon. Finance Minister in the Federal Parliament includes plans for commencing construction of a modern export-oriented agriculture market in Karsaghat (project site) in Butwal, Rupandehi. Construction of the market in Butwal was also included in the budget statement for the previous fiscal year. The Government has allocated funds for preparatory activities which shows serious commitment of the Government to the project.

Fifteenth Plan (National Planning Commission), Fiscal Year 2019/20 – 2023/24

The current Fifteenth Plan formulated by the National Planning Commission (Fiscal Year 2019/20 – 2023/24) targets 10.5 per cent average annual economic growth. The annual average growth rate for agriculture is estimated at 5.5 per cent.

The vision of the Fifteenth Plan for the agricultural sector is "a sustainable, competitive and prosperous agricultural economy with food and nutrition security and food sovereignty". The goals of the plan are to achieve inclusive and sustainable economic growth through the transformation of the agriculture sector into a competitive, climate-resilient, self-reliant, and export-oriented industry. The objectives are i) to ensure food and nutrition security by increasing the production and productivity of the agriculture sector; ii) to increase employment opportunities and income by developing agriculture-based industries. iii) to achieve trade balance in the agriculture sector by building capacities for commercialization and competitiveness.

Agriculture Development Strategy, 2015-2035

The guiding policy document in the agriculture sector in Nepal is the Agriculture Development Strategy (ADS). The twenty years ADS envisions the following impacts which align with the plan for construction of the wholesale market in Butwal:

- Food and Nutrition Security;
- Poverty Reduction;
- Agricultural Trade Competitiveness;
- Higher and more equitable Income;
- Farmers' rights ensured and strengthened.

Promoting agriculture sector competitiveness is a key expected outcome of the ADS. Developing market infrastructure is planned as a key output under this goal.

The ADS intends to promote and develop market infrastructure through a combination of public investment, private and cooperative sector investment, PPP, and community participation, focused on the



development of prioritized value chains. Examples of PPP involving different types of infrastructure include:

- Promotion of on-farm storage, cool/cold/CA storage;
- Creation of new markets and improvement of existing ones;
- Network of collection centers linked by hub and spoke system to wholesale markets;
- Agro-processing plants;
- Creation of agro-industrial parks to facilitate access of agroindustry enterprises to land and basic infrastructure to conduct agro-processing activities.

Furthermore, the ADS also envisages the following measures with regards to agriculture market infrastructure:

- capacity building programs for market infrastructure management and governance;
- identification of strategic locations for market development and undertake feasibility studies;
- developing rules and regulations and standard operating procedures for improved market management.

Agribusiness Promotion Policy, 2063 B.S

The following objectives of the Agribusiness Promotion Policy (APP) also align with plans to build the wholesale market in Butwal:

- support market oriented and competitive agricultural production;
- promote domestic market and export promotion for development of agro industries;
- poverty reduction through commercialization of agriculture.

The APP emphasizes development of agricultural markets and encourages collaboration with the private sector, cooperatives and non-governmental organisations (NGOs).

Agricultural Market Development and Management Directives, 2073

The Agricultural Market Development and Management Directives, 2073 was issued when the country was under a unitary political framework. The directives continue to be applicable for markets set up earlier with support of the Ministry of Agriculture and Livestock Development (MoALD). The directives also serve as the legal basis in cases where the Federal Government collaborates with Provincial or Local Government to establish and operate new agricultural markets. In recent days, Provincial and Local Governments have also commenced formulating their own policies and guidelines for promoting agriculture and livestock markets.

In view of the broad objectives and scope of the proposed market in Butwal, it is envisaged that the new market in Butwal will need to be based on an alternative legal framework.

Development Board Act, 2013 BS

The Development Board Act is enacted to implement development initiatives in a proper and timely manner. The Act authorizes the Government to issue Formation Orders to constitute Committees to implement development projects or to pursue development activities. Any committee formed under the act will be a body corporate with the status of a legal person. The Kalimati Fruits and Vegetable Market operates under this Act.

Nepal Company Act, 2063 BS

Most privately set up wholesale markets operate as limited liability companies. Thus, they fall under the purview of the Nepal Company Act. 2063 B.S.



Act for Management of Agribusiness Promotion and Commercialization (Proposed)

A new act is in the process of being passed to promote agribusinesses and commercialization. The draft act emphasizes access to markets for produce of farmers and requires local governments to support establishment of markets. The act classifies agriculture markets into Local Agriculture Markets and Provincial Agriculture Markets.

The proposed act also provides for the Federal Government to establish agriculture markets in situations where special expertise is required, when there is strategic importance and infrastructure to be built is large and requires high investment.

3.4.3 Institutional overview

The planning, construction and operations of the new agriculture market will require the involvement of multiple actors. Major actors envisaged to be involved in the new initiative are as follows:

Ministry of Finance (MoF): The planned project will require endorsement and support of the federal Ministry of Finance (MoF) in view of the expected involvement of development partners. It is anticipated that MoF will be the Executing Agency of the project. MoF will sign the required financing arrangements with development partners and take lead in ensuring a proper financing model for the project. MoF is also expected to arrange for ensuring adequate funding for the project should there be any shortfalls in the initial phase or during the early years of operations.

Ministry of Agriculture and Livestock Development (MoALD): The proponent of the Project will be MoALD. Policy level decisions will be made at the Ministry level while two other key entities under MoALD – Department of Food Technology and Quality Control (DFTQC) and Centre of Agriculture Infrastructure Development and Mechanization Promotion (CAIDMP) - will actively be involved in the construction and operational phases of the project. MoALD will lead and coordinate with relevant stakeholders for successful project implementation and handover to the operating entity. It is suggested to set up a Project Steering Committee chaired by the Secretary, MoALD to oversee and guide implementation of the Project.

Invest International (II): Invest International is a state-owned Dutch private company which passed the House of Representatives and the Senate of the Netherlands in 2020-2021. In accordance with the 'Oprichtingswet Invest International' two strategic objectives for Invest International are: 1) to contribute to the future earning capacity of the Netherlands and 2) to create impact on the Sustainable Development Goals. Invest International is funding the technical assistance supporting preparation of the project to construct the export oriented wholesale agriculture market in Butwal in Lumbin Province of Nepal. Following successful evaluation of the final Feasibility Study, it is anticipated that II, through its DRIVE mechanism – will fund up to 50% of the capital costs of the planned project.

International Fund for Agriculture Development (IFAD): The International Fund for Agricultural Development (IFAD) is a specialized agency of the United Nations. IFAD supports smallholder agriculture development and rural transformation by pursuing three strategic objectives: SO1: Increase poor rural people's productive capacities; SO2: Increase poor rural people's benefits from market participation; and SO3: Strengthen the environmental sustainability and climate resilience of poor rural people's economic activities. Nepal is a member state of IFAD which has completed or has ongoing 19 projects to the value of US\$ 946.2 (with IFAD funding of US\$417.77 million). IFAD is considering partial financing of the market in Butwal through a planned new project, Resilient High Value Agricultural Programme (R-HVAP).

Ministry of Forestry and Environment (MoFE): The proposed project site is situated in a community forest. Hence, due to the nature of the project and its location, the compliance with Environmental Protection Act (2019) and Environment Protection Rules (2020) will be required. Review and approval of



the Environment Impact Assessment Report by MoFE is critical for progress implementation. Coordination with the regional Divisional Forest Office, Bhairawa and the Forest Office, Sainamaina will be required for local level coordination and approvals during the final planning and construction phases.

Ministry of Land Management, Agriculture and Cooperatives (MoLMAC), Lumbini Province:

Agriculture is listed under Concurrent Powers of Federation, State, and Local Level according to the Constitution of Nepal (2015). As such, MoLMAC will be a key actor in the implementation of the project. The exact role of MoLMAC in project finalization, implementation and operation will be determined through dialogue between MoF, MoALD and development partners. MoLMAC's market initiatives in the province to enhance agriculture production and improve productivity will help feeding products into the planned new market.

Butwal Sub Municipal City: The planned market is located in Ward 10 of Butwal Sub Municipal City. The Municipality will provide the required planning and building permits. Furthermore, promoting agriculture and economic development also is a mandate of local governments. Important divisions within the Municipality related to the planned market include the City Infrastructure Division, Economic Development Division and Environmental Monitoring Division. The exact role of the municipality in project finalization, implementation and operations will be determined through dialogue between concerned stakeholders.

Ward No. 15, Butwal Municipality: The proposed site is in Karsaghat, Ward 15 of Butwal Sub Municipal City. This is the location that will be most impacted by the project. The local community of this area will bear the brunt of the adverse impacts of the project as well as reap benefits from the new market. The local Ward Office Chair and Ward members will have an important role in championing the project among local stakeholders and in advocating with external stakeholders. The support of other political and community leaders will also be important.

Ratanpur Community Forest User Group (RCFUG): The project site is currently utilized by members of the RCFUG. Members of the forest users group stand to be impacted by the new project. However, keeping the long-term development benefits of the market project, RCFUG has wholeheartedly endorsed the project. Continuing support of the RCFUG will be essential for project success.

Centre of Agriculture Infrastructure Development and Mechanization Promotion (CAIDMP): This centre under MoALD has acted as Focal Point for the Develop to Build TA Project. It is expected that CAIDMP's will continue to play a key coordinating role during the planning and construction phase of the project. CAIDMP have established numerous agriculture markets across the country. Existing connections and accumulated knowledge can the new market in Butwal to network with satellite markets and to benefit from the centre's accumulated knowledge.

Department of Food Technology and Quality Control (DFTQC): The department is one of three major departments under MoALD (the other two being the Department of Agriculture and the Department of Livestock Services). The new market in Butwal will be pursuing dual objective of ensuring healthy and safe food for consumers and promoting exports at the same time. Thus, there are plans to have lab testing facilities in the market to ensure that imported and exported food products comply with relevant standards. DFTQC will play a key role in ensuring that appropriate policies, processes and facilities are in place at the new market to ensure statutory compliance within the country and in target export markets.

Division Roads Office, Butwal: A road is currently being built along the banks of the Dano River adjacent to the planned market site. Proper and timely construction of this road will improve access to the market and contribute to flood risk mitigation. The current road that leads up to the market is unpaved and



needs improvement. Coordination with and support of the Division Roads Office, Butwal will help improve access to the market and help in protecting the market from flood hazard.

Lumbini Fruits and Vegetables Traders Association: This business association of fruits and vegetable entrepreneurs are active in the existing market in Butwal as well as across the province and throughout the country. The new market will need to closely work with this group of entrepreneurs to ensure that the functions and facilities provided in the new market are fully utilized. A key objective of the market will be to work with fruits and vegetable traders to increase domestic production and supply working with farmers and satellite markets.

Butwal Fruits and Vegetables Market/ Market Management Committee: A key rationale behind construction of the new market is the space constraints at the existing market in Butwal city centre. The new market will seek to relocate the services and entrepreneurs operating in the current market. For this, coordination with and support of Management and entrepreneurs at the existing market will be critical.

Agriculture Cooperatives: The new market will strive to provide wide access to markets for small farmers. Provision has been made for small farmers and cooperatives to access buyers through the market. Thus, agriculture cooperatives will be another important stakeholder group for successful operations of the new market.

Kalimati Fruits and Vegetables Development Board (KFVDB): The fruits and vegetables operated in Kalimati is the largest and most prominent agriculture wholesale market in Nepal. KFVDB operate a second market in Balaju, Kathmandu and have constructed a dedicated flower wholesale market in Chovar, Kirtipur. The learning and experiences of KFVDB can be useful in planning and implementing the new project as well as in operating the new market. The Board can also play an important role in fostering linkages between entrepreneurs operating in Kalimati and Balaju markets and those based in the Butwal market.

3.4.4 Suggested Model for Semlar Wholesale Market

3.4.4.1 Trends and practices globally

Various market models are adopted in different countries based on investment cost and operations. In least developed and developing countries, the Government usually initiates construction and many stakeholders then show interest during the operation and management stages. The advantage is that Government can control all activities and private sector does not have to invest in it. The disadvantage of this is limited ownership from other sectors and there is complete dependency on government for administrative, operational and maintenance costs.

Experiences of developed countries also show gradual shift of management and operation responsibility to the private sector including producers and traders while the Government remains strictly engaged in regulatory function including quality control and compliance.

Challenges during operation stages of a newly established wholesale markets can include:

- Supply of fresh vegetables, fruits and spices product may be limited from the market catchment area leading to underutilization of established infrastructure;
- Already existing small but scattered markets, "haatbazaars" may pose threat to new wholesale market particularly management of market and transaction volumes;
- Management and smooth operation of wholesale market is always challenging from various types of conflicts and complicated issues arising from stakeholders (various tiers of Government, traders, producers, vendors, local people, etc). For example Government may want to exercise regulatory



power, traders' bargain for facilities; producers claim for higher prices and some other stakeholders may have vested interests;

- Maintaining operation cost including staff management and regular maintenance of the market structures;
- Conflict on benefit sharing issues.

There are three major models for establishing and operating wholesale agriculture markets.

Government led model: Keeping the public interest in mind, Governments often take the the lead in setting up, operating and controlling agriculture markets. For example, the largest agriculture commodity market in Asia, the Azadpur Mandi in Delhi, operates under legislation of the state government of Delhi (National Capital Territory).

Private sector model: Wholesale agricultural markets are also a commercial venture in their own right. The Tallad Thai Market in Thailand is said to be the largest fresh agricultural market in Asia with 1 million sq. mtr. of market area, 3,500 traders and annual market turnover of US\$ 6 Billion. This market is owned and operated by Thai Agro Exchange Co., Ltd.

Cooperative model: There are also examples where cooperatives play a leading role in organising and operating agriculture wholesale markets. Examples of this are found in Japan (e.g., Japan Agricultural Cooperatives), Philippines and other countries.

3.4.4.2 Trends and practices in Nepal

Agriculture markets in Nepal are set up and operated in a number of ways.

Government led model: In Nepal, the Kalimati Fruits and Vegetable Market represents the Government led model. This market was set by the Government and operates under the Development Board Act, 2013 B.S. A Joint Secretary of MOALD chairs the multi-stakeholder Market Management Committee.

Collaborative/ Mixed model: Markets operating under the Agriculture Market Development and Management Directives 2073 generally have involvement of traders, farmers and in some cases federal and local governments as well. Prominent examples include the Butwal Fruits and Vegetable Wholesale Market and the Pokhara Fruits and Vegetable Wholesale Market. In Butwal, the Public Private Partnership (PPP) model was adopted with some cost-sharing from traders during market construction.

Privately owned: There is now an increasing number of well functioning wholesale agriculture markets set up and operated entirely with private funding. Such markets are constructed on privately owned or leased land. The markets are run by the owners with little involvement or engagement of Government and other stakeholders. Most of the large markets set up in this manner are established under the Nepal Company Act, 2063 B.S. Prominent examples of such privately owned and operated agriculture market are located in Balkhu (Kathmandu), Tilottama (Rupandehi) and Bharatpur (Chitwan).

3.4.4.3 Key considerations in determining a suitable model

Key issues to be considered in determining the appropriate model for governing, managing and operating the planned market in Butwal include:

Land ownership and control: Ownership and control over land utilized by the market is a critical issue for long term viability and sustainability of the market. Land leases have proved to be a constraining factor for operations of the existing wholesale markets in Butwal and Pokhara. Uncertainties around land ownership need to be avoided and long-term access to land (if leased) needs to be ensured.

Balancing commercial objectives, development impact and public good: The governance and management framework should balance commercial objectives with development impact and public good. The interests of and benefits for farmers and consumers should be accorded high priority in the governance and management of the market. Addressing issues such as waste management, noise pollution, safety and traffic congestion need to be given due importance.

Representation of multi-stakeholder stakeholder groups: Any new public infrastructure should not only fulfil its primary purpose - in this case, the distribution of agriculture commodities - but should also address issues and concerns of all relevant stakeholder groups. As such, involvement of all key stakeholder groups in major policy decision-making will be necessary.

Ensuring efficient and effective operations of the market: An experienced and Knowledgeable Board/Committee will contribute to success of the market. A professionally qualified Chief Executive Officer (CEO) should be recruited to ensure that the market's business plan is executed properly.

Arrangements for covering potential operating losses: The market is expected to be self-funding. However, losses are expected in the initial years. Thus, there should be clarity and commitment for ensuring that operational funding gaps are covered in the initial years of market operations.

3.4.4.4 Recommended Organisational form, governance and management structure

Considering various factors and based on feedback received during stakeholder consultations, it proposed that the wholesale market in Butwal will be set up and operated under the Development Board Act, 2013 BS. Following this approach should lead to the following advantages:

Land ownership: Land could be registered in the name of either national, provincial or municipal government. This arrangement will ensure that market has long term access to the land.

Agricultural value chain coordination on country-wide basis: The proposed market's catchment area extends country-wide. Thus, having the Federal Government take the key role will ensure value chain coordination between the provinces and local governments.

Balanced commercial and development agenda: Having the market under the purview of the Federal Government will also ensure that the market will pursue both commercial as well as development agenda. Issues such as farmers' access to markets, quality control, consumer rights, etc. will receive due attention.

Stakeholder participation: The proposed arrangement for the market will also ensure participation and engagement of all relevant major stakeholders.

Coordination of functions to support export enhancement: Various public services and coordination with multiple Government and private entities will be required for successful functioning of the market, particularly with regards to quality control and regulatory compliance for exports. An entity set up under the Development Board Act will be well placed for the required undertaking the required coordination. Key elements of the governance and management structure is expected to include:

Market Management Committee (Market Governing Board): This entity will be set up in line with arrangements set out in the Formation Order for the Market Management Committee. The Market Management Committee will approve various policy documents to guide and control operations of the market.



Strategic Advisory Committee: It is also recommended to form a Strategic Advisory Committee to provide input and support to the MMC. This committee will have representation from diverse subject matter specialists with capacity to support development of the market. It is recommended that the committee meet at least on bi-annual basis.

Chief Executive Officer (CEO): It is suggested to recruit a professionally qualified CEO through open competition.

Management and staff: Management and other personnel should also be recruited competitively. A performance-oriented work culture should be promoted to make the market operate in a business-line manner.

3.4.4.5 Financial management, deployment of surplus funds and strategies and plans to address potential financial deficits

The financial affairs of the market should be handled independently. The Governing or the Market Management Committee will prepare policies for financial Management. A key focus should be on creating a Reserve Fund to support long term market development.

3.4.4.6 Leveraging the Public and Private Sectors to Support Market Operations

The new market will require several types of services. These services will be market- specific as well as public and private in nature.

- **Public services:** Required public services include lab testing for pesticide residues, extension service to farmers, information on commodity prices, etc. Arrangements will need to be put in place for relevant government entities to provide these services at the market.
- **Business and allied services:** A number of private services are also planned for the market. These include banking, hospitality (guest house), food services, cold storage, etc.
- **Contracting out to the private sector:** Some of the business services mentioned above and other functions such as godown and cold storage management, car parking, security, cleaning, waste management, maintenance, etc. can be contracted out to private parties. This will reduce administrative burden and also contribute to revenue enhancement.

Project related



Figure 3-5: Overview of wholesale market departments



3.4.5 Operational plan

It is advised that the operations of the wholesale market will be contracted to a number of experienced companies or cooperatives. The market will be headed by a market committee which will comprise several organisations including the following:

- Government (ministries involved);
- Farmers;
- Private companies;
- Cooperatives.

The Market Committee will assign a Chief Executive Officer (plus support staff) who will oversee and coordinate all activities of the market including administration and finance. The Chief Executive Officer can be a government official, but can also be privatised.

It is considered that the wholesale market will be split in several departments

It is advised that the above departments will be operated as follows:

- Guesthouse, canteens, supermarket and toilets: A private party has to be involved coming from the commercial sector involved in the hotel/restaurant business and with experience in supermarkets;
- Entrance/exit control, weighbridge and security: A party will have to be identified from the security sector and entrance/exit control. They will carry out weighing operations, common checking of trucks/cargo, tractors, carts, etc. Activities will have to be properly documented, recorded and digitally filed;
- Wholesale shutters: These shall be rented out to multiple wholesale traders and companies as there will be many traders involved. A procedure will have to be established for selection of the traders who will be involved;
- Bank: A commercial bank shall be selected to carry out the banking operation on the market;
- Waste collection and composting: A local waste collection company shall be selected to carry out the waste collection. The solid waste will be separated from the organic waste which will be either collected, composted (on-site or somewhere else) or digested for energy production (future);
- AgroVets: This involves the commercial sales of seeds, tools, chemicals, fertilisers, etc. to the farming community. The selection of the AgroVets will have to be done carefully as these companies will have to sell good quality seeds. A number of rooms are available so multiple companies can be selected;
- Godowns: A number of godowns (1 washing, sorting, grading and packaging building) and future multi-purpose godowns (2) are projected. Private parties will have to be identified to operate these godowns;
- Banana operations: Banana operations (future) will have to be outsourced to a private operator or cooperatives of bananas. This will be largely a manual operation as there is not so much to mechanize for the quantities handled. It will be an organisation having experience in banana handling and sales;
- Potato, onion and cabbage: This will be a complex operation and it is of importance that a professional partner with wide experience will be identified to carry out the operations. The facility will be equipped with cooling and ventilation technology (first of its kind in Nepal) for storage in pallet boxes. Also the grading and packing equipment will be of importance. The company/staff that will operate this complex shall be well-trained by an international consultant to be able to efficiently operate these facilities;



- Laboratory: A laboratory will be established on the premises to check especially the incoming produce on Minimum Residue Levels (MRL) of crop protection chemicals. The laboratory can be operated by the government or by staff hired from a private company.

Decision making process

The decision-making process will be as follows:

- The Market Management Committee will make the decisions on:
 - Appointment of the Chief Executive Officer;
 - Support staff;
 - Lease contracts.
- The Chief Executive Officer will make the following decisions:
 - Daily operations of the market;
 - Finance and administration;
 - Access and exit control procedures;
 - Hiring of staff;
 - Market Rules and Regulations;
 - All other activities required to operate the market in an efficient manner.

Operational hours

The following hours of operation and number of shifts are advised

- The wholesale market: It is considered that the wholesale market will be operated in 2 shifts of 9 hours per shift. The hours of operation will be from 04:00 until 22:00 hrs.
- The additional interventions:
 - during peak season in 2 shifts from 04:00 until 22:00 hrs;
 - During the regular season in 1.5 shifts from 06.00 until 19.00 hrs.

Security, first aid and access control

Procedures for access control, first aid and weighing shall be established. It will include the following:

- Security and first aid: 24/7;
- Access control for incoming and outgoing traffic;
- Truck weighing: Digital with print out for driver.

Operational procedures, monitoring and control

To be set up and discussed after establishment of the management organisation during the construction period.

Sales volume control

Control of sales volume shall be done daily. Information shall be collected from the farmers and traders.

Financial administration

A department shall be set up for the finance and administration:

- As far as possible automated and digitalised;
- This will be housed inside the administrative building;



This is only for the overhead activities. For the outsourced activities the finance and administrative department will have to be developed by them.

3.4.6 Maintenance Plan

A proper maintenance plan shall be developed during the construction period. The maintenance approach shall be based on the different assets:

- Physical infrastructure: For the buildings the maintenance shall be conducted yearly. An annual budget shall be established which will indicate the requirements;
- Equipment and electrical: This will be done in accordance with the maintenance manuals of the suppliers;
- Water supply and sanitation: This shall be monitored and maintained daily by on-site staff.

To assure that any breakdowns of critical equipment can be repaired as soon as possible a proper spare part strategy shall be developed.

- Buildings: No spare parts are foreseen for buildings;
- Mechanical and electrical: Suppliers will be requested to include a two year's spare parts package in their offer. After two years the wholesale market will be responsible for own spare parts supply being directly in contact with the suppliers of the equipment. Also the market will then be much more aware of which spare parts they will need.

Spare parts supply should be carried out at regular intervals, in particular for the mechanical and electrical components for the potato/onion/cabbage and the banana storage.

The spare parts and maintenance strategy can only be developed after construction (as we do not know which equipment and facilities will be installed).

3.5 Monitoring and Evaluation Plan

3.5.1 Key performance parameters

The Project Management will be responsible for ensuring effective, periodic monitoring of beneficiaries within their areas of operation. The major components are as follows:

During construction

- Main focus will be on the construction period and the related issues;
- The construction for each activity will be mentioned separately and the related issues will be described;
- An estimation of the completion date will be given.

During operations

Main focus will be on the collection of information on:

- Number of outsourced activities;
- Number of farmers participating;
- Number of traders renting;
- Volume stored, graded and packed;
- Turnover of the wholesale market;



- Turnover of the grading and packing centres (potato, onion, cabbage and banana).

3.5.2 Data collection

The data collection will be every three months and shall be done by an independent Monitoring and Evaluation Company.

3.5.3 Reporting

Management Information System (MIS)

During the implementation of the project, a sound management information system (MIS) shall be put in place to address the need to monitor implementation progress, effectiveness and outcome.

We also recommend that an Environmental Management System is developed in line with ISO 14001 to set environmental, social, health and safety policies, management plans and procedure to manage the operation of the future market.

Reporting

The information contained in the MIS will be used to report to a wide range of stakeholders, many of whom might have different interests and needs. The reporting system will therefore be inherently flexible and allow sorting by a range of host variables under different activities result (see Table 3-3). This will allow identification of individual progress activity per activity and flag out those that are running particularly well and those that are problematic or lagging behind and thereby enable investigation into the causes and address them in a timely fashion.

Transparency and Accountability

The market management will be expected to demonstrate full transparency and accountability during the implementation process, ensure that the agreed plan and budget, underlying principles and cross-cutting issues and guidelines are applied at field level and guide all decision-making related to project implementation.

The table as presented below will have to be filled out every 3 months. The progress reporting shall also have to be done three-monthly.

Table 3-3: Monitoring and Evaluation

| Subject | Unit | Number | Remarks |
|--|--------|--------|---------|
| During construction | | | |
| Construction period | Months | | |
| <ul style="list-style-type: none"> ■ Per activity ✓ ... ✓ ... ✓ ✓ ... ✓ ... | Months | | |
| <ul style="list-style-type: none"> ■ Issues | Text | | |
| <ul style="list-style-type: none"> ■ Completion date | Date | | |
| During operations | | | |
| <i>Farming community</i> | | | |
| <ul style="list-style-type: none"> ■ Number of farmers | Nr | | |

| Subject | Unit | Number | Remarks |
|--|---------|--------|---------|
| ▪ Number of farmers trained at training centre | Nr | | |
| ▪ Catchment area (nr of districts) | Nr/name | | |
| ▪ Type of produce | Name | | |
| ▪ Volume of produce | MT | | |
| <i>Wholesale market management</i> | | | |
| ▪ Staffing | Nr | | |
| ▪ Nr. of departments | Nr | | |
| ▪ Nr. of lease agreements | Nr | | |
| ▪ Turnover from lease agreements | €/NPR | | |
| <i>Wholesale market operators</i> | | | |
| ▪ Guesthouse/canteen/supermarket/toilets | | | |
| ✓ Turnover guesthouse/canteen | €/NPR | | |
| ✓ Turnover supermarkets | €/NPR | | |
| ▪ Entrance control/weighbridge/security | | | |
| ✓ Nr. of trucks | Nr | | |
| ✓ Nr of security guards | Nr | | |
| ▪ Wholesale shutters | | | |
| ✓ Nr of wholesale shutters | Nr | | |
| ✓ Turnover of produce | €/NPR | | |
| ▪ Bank | | | |
| ✓ ... | | | |
| ✓ ... | | | |
| ▪ Waste collection/composting | | | |
| ✓ Volume of waste collection | MT | | |
| ✓ Volume of compost | MT | | |
| ▪ Agrovets | | | |
| ✓ Turnover of shops | €/NPR | | |
| ✓ ... | | | |
| ▪ Godowns | | | |
| ✓ Turnover of godowns | €/NPR | | |
| ✓ ... | | | |
| ▪ Bananas | | | |
| ✓ Volume of produce | MT | | |
| ✓ Turnover of facility | €/NPR | | |
| ▪ Potato/onion/cabbage | | | |
| ✓ Volume of produce | MT | | |
| ✓ Graded packed | MT | | |
| ✓ Turnover of facility | €/NPR | | |
| ▪ Workshop/carpentry/general | | | |
| ✓ ... | | | |
| ✓ ... | | | |



| Subject | Unit | Number | Remarks |
|--|----------------|--------|---------|
| <ul style="list-style-type: none"> ▪ Laboratory <ul style="list-style-type: none"> ✓ Nr of samples taken/analysed ✓ Turnover of facility | Nr €/NPR | | |
| <ul style="list-style-type: none"> ▪ Temple | | | |
| Distribution of final produce | | | |
| <ul style="list-style-type: none"> ▪ Nr of clients ▪ Volume per client ▪ Nr of districts | Nr MT Nr | | |

4 Economic and Financial Analysis

4.1 Structure of the Economic and Financial Analysis

This chapter on the economic and financial analysis for the export-oriented Agriculture Wholesale Market in Butwal is structured in the following sections:

- Chapter 4.24.3 provides the Financial Analysis to discuss the commercial viability of the project.
- Chapter 4.3 presents the Cost Benefit Analysis (CBA) to discuss the economic viability.

4.2 Financial Analysis

4.2.1 Background and Summary

This section of the report provides a financial assessment of the Project over a period of 25 years. The projections and analyses are based on information and assumptions from related studies, namely the Market Report, Pre-feasibility Study, Basis for Design Report and the Master Plan (which are integrated in the current document). The financial assessment also draws on information and inputs obtained during site visits to several wholesale fruits and vegetable markets, including the two relevant key markets in Kalimati (Kathmandu) and Butwal. The annual reports of these two markets have also been reviewed. Information from discussions with private sector cold storage operators has been taken into account. Inputs received in the course of consultations with various stakeholder groups in Butwal and Kathmandu have also been incorporated in the assessment.

Key assumptions in the financial assessment are as follows:

- There is no information on whether the project will either be funded with equity and/ or financed with a loan. The current premise is that a grant will provided to the project to ensure the hurdle rate is met. In the absence of a financing structure, the financial analysis is unlevered and no financial statements (balance sheet, profit and loss account) are presented.
- The estimated Capital Expenditure of the Project are EUR 40 million, which includes EUR 2.5 million for expansion in 2030. Details are provided in section 2.7. With the exception of energy, all operational expenditures are expected to be fixed (details in section 2.8).
- Detailed design and tendering will take place in 2024, followed by two full years of construction in 2025 and 2026. The year 2027 will be the first and a full year of operations. Replacement of assets is planned after 15 years of operations. The operational period of the market for assessment purposes is defined as 25 years (last year of operations is 2051). The market will likely continue beyond this period and the project may have a terminal value. However, this is not considered in the analysis.
- It is presumed that land will be owned by the Government and provided for use to the market without any rent. Hence, costs for land purchase or land lease payments have not been included.
- It is assumed that the Market Management Committee will provide concessions and contacts for the operations of various market related services and administrative functions.
- In view of the governance model proposed – an entity set up under the Development Board Act 2013 B.S. - it is assumed that the market will be exempt from payment of income taxes. For that reason, the financial analysis does not include taxes and depreciation.
- Income and expenses are expressed in nominal prices, using an expected long-term inflation rate of 5% (source: IMF). As the revenues and operational expenditures are denominated in local currency, the financial analysis has been expressed in NPR. The economic analysis is expressed in EUR. Since



the CBA uses real prices whereas the financial analysis uses nominal prices, the impact of the currency selected is much more pronounced in the financial analysis.

- Tax deduction at source for rental income is assumed to be borne by the tenants.

4.2.2 Investment – Capital Expenditure

The Capital Expenditures for the project (initial and expansion) are estimated at EUR 40 million. This is further detailed in Table 2-15. These are prices in price level 2022, excluding VAT. The financial model applies 2% p.a. escalation to Capex as the prices are largely subject to international price developments. Cost estimates in EUR are converted in the model to prices in NPR based on the projected exchange rate in the applicable year.

Details of the construction and facilities are described in Section 2 of this report covering Basis of Design. The expansion is planned to be constructed in 2030. In addition to these Capital Expenditure an amount of nearly EUR 5 million (price level 2022) is planned in 2041 to replace equipment and other assets.

The financial analysis determines the grant based on the required funding to meet the hurdle rate including the initial Capex, as well as Capex for expansion and the replacement of equipment.

4.2.3 Income/ Revenue

The market will generate income from multiple sources. Following will be the major sources of income for the wholesale market (all price levels 2022):

Rent from wholesale shutters: The most important source of income for the market will be rent from wholesale shutters. In the first phase, six blocks of wholesale shutters of 900 square meters each (totalling 5,400 square meters) will be constructed. It is assumed that 80% of available space will be rentable with balance being used as common area. In the first year 80% occupancy rate is expected, thereafter the occupancy rate is assumed at 90%. In order to attract traders to the new market, the initial rental rate will be NPR 80 per square feet per month. This is well below the rate at the Kalimati market which is around NPR 140. Annual increment of 5% is assumed in line with expected inflation. Furthermore, given the relatively low starting rates to promote the market in early stages, an additional increase of 5% every five years is expected as contracts are to be reviewed. Capacity and income will increase when a new block of 900 square meters is constructed and becomes operational in the sixth year. Occupancy of the additional capacity is expected to be 50% in the first year and 100% in following years.

Concession for processing, packaging and cold storage concession: The second most important source of income will be from interventions for selected commodities. These operations will be assigned to a private sector firm or cooperative based on competitive bidding. This type of activity within a wholesale market will be a new concept. A concession fee of NPR 16,660,000 has been forecast based on processing throughput volumes and expected revenues. Concession fees will increase annually by 5% with an additional 5% every 5 years as explained above.

Concession for Guesthouses and Restaurant: Concession for operations of two Guest Houses and Restaurants is projected to yield revenue of NPR 4.8 million p.a.. Concession fees will rise by 5% annually with an additional 5% every 5 years as explained above. The concessions will be awarded through open tender.

Rental income from Godown: Two new Godowns will come into operations in 2031. Income from this facility in is forecast at NPR 6,720,000 annually and will rise by 5% annually with an additional 5% every 5 years as explained above.



Fees from Banana processing and handling facility: bananas are handled from the start of the project. Once the general washing, sorting, grading and packaging building is fully occupied, a dedicated facility for the cold storage and ripening of bananas will be realised (2031). Subsequently the cold storage in the "general" washing, sorting, grading and packaging building can be used for other products. Note that economic benefits applicable to volumes of bananas handled at the market commence from the first day of operations, while the financial revenues of this dedicated facility start once the building becomes operational. This intervention is expected to contribute NPR 2.8 million p.a. The concession fee will rise annually by 5% with an additional 5% every 5 years as explained above.

Rent from commercial spaces: Commercial spaces such as Farmers Retail Area (Krishak Chautari), Auction Centre, Bank, Agrovat, Grocery Shop, Canteen, etc. will generate further income for the market. Income from these sources is expected to add up to NPR 11,260,776 p.a. The rent will rise annually by 5% with an additional 5% every 5 years as explained above.

Other income: Other income will be generated from parking, holding yard charges, utilities and income from commercialization of waste management operations. This is estimated at NPR 14,476,000 p.a. rising annually by 5% with an additional 5% every 5 years as explained above.

A review of the income streams of wholesale agriculture markets in Nepal indicates reliance on a variety of revenue sources. However, the key revenue stream of the markets is rent income from wholesale shutters. Other agricultural trade related activities include space for farmers, cooperatives, and retail rental. Markets also generate income from vehicle entry fees, holding yard charges, rental of commercial space (e.g. for food outlets), service charges, etc. The wholesale shutter and commercial rental agreements are based on legally binding contracts of at least five years duration and payment is based on fixed monthly rental rates. Some markets also earn non-operating income through fixed deposits of surplus funds. Multiple sources of revenue and the balanced revenue mix point to stable earnings for the Butwal market.

4.2.4 Operational Expenses

The annual operating costs for the project are explained in detail in section 2.8 of this report. With the exception of energy costs, which are volume dependent, all Operational costs are fixed. The financial model converts cost estimates in EUR to prices in NPR based on the projected exchange rate in the applicable year. Cost escalation is applied according to projected long term local inflation rate in Nepal of 5% (source: IMF).

4.2.5 Financial discount rate

The financial analysis is based on Discounted Cash Flows, which requires a discounted rate to convert future cashflows to their present value. As no specific financial discount rate is prescribed for projects in Nepal by the Government of Nepal or by potential donors/ financiers, an appropriate discount rate for the financial analysis has to be determined as part of the feasibility study.

In business case analysis, the common methodology set a financial discount rate is to estimate an appropriate Weighted Average Cost of Capital for companies in the sector where the project is implemented. As will be discussed in section 4.2.6, this project relies largely on public funding. Nevertheless, the basic premise for choosing an appropriate discount rate for this project is that a market-based discount rate should be used. This is in line with the guidance issued by the Dutch Ministry of Finance in 2020 (*'Handreiking publieke business case'*), which prescribes three methods to achieve a discount rate for public business cases:

1. The benchmark method, which can be used in cases where a reliable discount rate is available for a comparable project. There is no information on discount rates for comparable projects in this case.
2. Estimating the WACC for a company which is active in the sector where the project is implemented; this method is applied in this study as explained below.
3. If both methods cannot be applied, an standard (officially published) discount rate can be used. The result of applying this method is also presented below for reference.

Weighted Average Cost of Capital (WACC) method

A market based WACC for an agricultural project in Nepal has been estimated based on the parameters below. Data is sourced from the publicly available database provided by Prof. Damodaran at Stern Business School, New York University.

| WACC Parameter | Value | Source / comments |
|-----------------------------------|---------------|---|
| Nepal Country Risk Premium | 9.09% | Damodaran, July 2022 (based on countries with similar credit rating in the absence of a Country Risk Premium for Nepal) |
| Global Equity Market Risk Premium | 6.01% | Damodaran, July 2022 |
| Equity Risk Premium | 15.10% | |
| Beta for Agricultural industry | 0.99 | Damodaran, July 2022 |
| Risk-free Rate | 3.02% | Damodaran, July 2022 (USD 10y) |
| Cost of Equity | 17.97% | Risk-free rate + Beta * Equity Risk Premium |
| Avg. cost of debt (pre-tax) | 15.47% | Damodaran, July 2022 (agriculture in emerging countries) |
| Marginal tax rate Nepal | 25% | |
| Cost of debt (after-tax) | 11.60% | (Risk-free rate + Country Default Spread + Basis spread) x (1-tax) |
| Leverage (debt / debt + equity) | 32% | Damodaran, 2022 (Agriculture, emerging countries) |
| WACC | 16% | Cost of equity x (Equity / (Debt + Equity)) + Cost of debt x (Debt / Debt + Equity)) |

Standard discount rate

As explained above, the market based WACC method is the preferred approach. For reference, the result using the standard discount rate approach is also presented here. No official financial discount rate is available, but as a starting point the social discount rate can be used. For this project in Nepal, the potential donors / financiers have advised a rate of 9 or 10%. This is a real discount rate meant to be applied on real cash flows, excluding inflation. As the financial analysis uses nominal prices, including inflation, the standard discount rate must be increased with the expected inflation rate used in the financial analysis. As mentioned above, this is assumed to 5%. The result is a nominal discount rate of 14-15%.



While the WACC based discount rate of 16% is used in the financial analysis, the standard discount rate approach creates a more robust substantiation for the 16%.

4.2.6 Viability Gap Funding

Based on the projected cashflows of the project and the proposed discount rate, the required grant to meet the hurdle rate can be determined using a goal seek approach. The result is a grant of NPR 5.7 billion or nearly EUR 40 million (at the current exchange rate). This grant is modelled to be distributed in line with Capex.

The fact that the grant exceeds the initial investments is due to a number of reasons:

- The grant is based on the project meeting the hurdle rate calculated using cash flows during the entire reference period; this includes the expansion and replacement Capex as well.
- Even though the project generates revenues, these revenues largely occur in later years which weigh less in terms of present value due to the discount rate.
- During the first 4 years of the project, operational cash flows are negative as revenues are insufficient to cover Operational Expenditures. These years weigh heavily on the NPV.

4.2.7 Financial Analysis: Discussions, Conclusions and Recommendations

From a commercial standpoint the project is not feasible without public support. The project does not pursue commercial objectives alone. Despite the negative result of the financial assessment, recommendation is made to proceed with project on following grounds:

- The project is public service oriented and only semi-commercial in nature.
- There are tremendous commercial and development opportunities for the market to tap into beyond the revenue streams identified in the current assessment. There is a strong case for this investment to be seen as seed funding for development impact.
- The results of the Cost Benefit Analysis presented in the next section are highly positive and provide strong justification for funding.

With regards to financing, potential options include:

- a. DRIVE Program of Invest International: Invest International (II), current development partner funding the D2B technical assistance project, are able to fund up to 50% of capex costs.
- b. International Fund for Agriculture Development (IFAD): Through an upcoming new project, IFAD is in a position to extend support for construction of the new market in Butwal. This will align with their ongoing VITA Project which will complement the planned market in Butwal.
- c. Government of Nepal: The export oriented Butwal market is a priority of the Government as announced in various policies including the annual national budget. The Government may consider co-investing in the project or leverage other development partners in case needed funding cannot be sourced from DRIVE or IFAD alone.

Presently, no funding or financing has been committed by any partner, nor have any terms or conditions been defined. The actual funding and financing of the project therefor remains unknown, and the financial analysis has been performed on the basis of assumptions on potential funding by concerned stakeholders.

4.3 Economic Analysis

4.3.1 Background

Agriculture plays a crucial role in Nepal's economy, as it provides one-third of the national output. It also serves as a major source of food and employment. However, mostly due to storage inefficiencies the production remains below capacity. Therefore, according to local experts, the current market of food and agricultural products is characterized by shortage and dependency on Indian food imports. India has a heavily subsidised agriculture industry; however, it first serves its domestic markets, therefore their exported volumes are volatile and often the imports are not enough to meet Nepali demand. Nepali agricultural products are of better quality than the imports but are also more expensive in price.

To improve this situation, a wholesale market is planned. As part of phase 2 of the underlying feasibility study, a Cost Benefit Analysis (CBA) is carried out to evaluate the costs and benefits associated with the project.

4.3.2 Reader's guide

The report is structured as follows:

- Introduction on CBA methodology;
- Overview of main assumptions included in the model;
- Overview of Capital Expenditures (CapEx);
- Overview of Operational Expenditures (OpEx);
- Benefits included in the CBA;
- Presentation of results;
- Results of sensitivity analysis;
- Conclusion.

4.3.3 CBA Methodology

4.3.3.1 What is a Cost-Benefit Analysis?

A CBA is a systematic approach that is generally deployed to support decisions on allocating public resources to projects which need such a contribution to be financially viable. It evaluates project alternatives and measures the resulting welfare change compared to the world without project in monetary terms.

4.3.3.2 Analytical Framework

CBA processes are mostly standardized. This analysis will be carried out according to the most recent Dutch guideline, as funding by the Dutch government is anticipated. Although the Dutch methodology is used, the parameters in the analysis are specific for the local context where necessary (e.g. the discount rate and shadow pricing).

4.3.3.3 Types of effects

The CBA methodology distinguishes between three types of effects: direct, indirect and external. Direct effects concern the costs and benefits that occur on the market(s) where the measure (implementation of the project alternative) intervenes. Indirect effects concern costs and benefits that occur on secondary markets. External effects are costs and benefits that arise due to other parties or markets' actions and also affect an uninvolved party. In line with CBA guidelines, no indirect effects are included in this CBA.



4.3.4 Assumptions

The CBA has been executed based on several generic and project-specific assumptions and premises. The generic assumptions and premises follow the Dutch CBA methodology.

4.3.4.1 Project timeline assumptions

The start and end dates for the construction and operation dates are shown below and are the same for both the financial and cost benefit analysis. Construction is assumed to take place over 2 years for the period 2024-2025. A future expansion is also assumed to take place in 2030. The market becomes operational in 2026 for a duration of 25 years until 2050.

Table 4-1 Model Timeline Assumptions

| Timeline | Construction | Expansion | Operation |
|------------|--------------|-----------|-----------|
| Start Year | 2025 | 2030 | 2027 |
| End Year | 2026 | 2030 | 2051 |
| Duration | 2 years | 1 year | 25 years |

4.3.4.2 Volumes

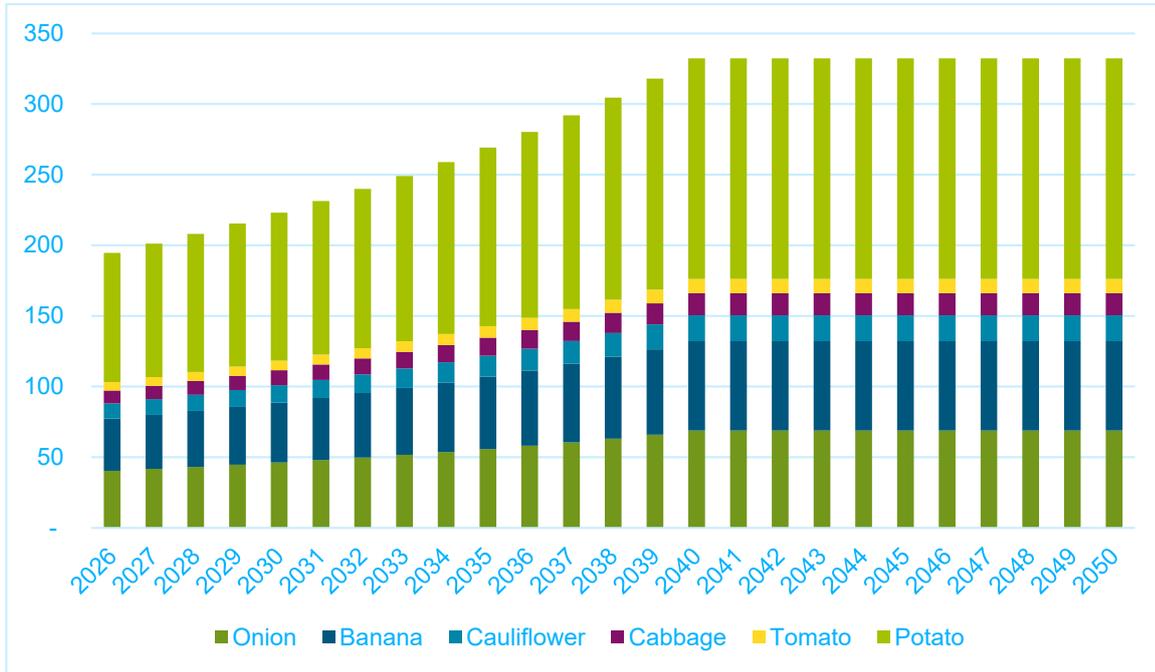
The following commodities to be handled at the new market are included:

- Onion;
- Banana;
- Cauliflower;
- Cabbage;
- Tomato;
- Potato.

Even though other commodities are also likely to be handled, for the purposes of this analysis, we have focused only on the commodities representing the majority of the market's volumes. The forecast for these commodities is shown in Figure 4-1.



Figure 4-1 Projected Volumes of the wholesale market, thousand tonnes



4.3.4.3 Commodity Prices

The assumed sales price for each of the selected commodities is shown in Table 4-2. They are sourced from prices in the Kalimati market for the period April 2021-April 2022 (Nepal calendar year 2078). Average annual prices are used for the analysis.

Table 4-2 Annual average price of each commodity, NPR / ton

| Commodity | Average |
|-------------|---------|
| Onion | 50,722 |
| Banana | 61,496 |
| Cauliflower | 59,159 |
| Cabbage | 31,881 |
| Tomato | 47,373 |
| Potato | 38,673 |

4.3.4.4 Storage capacity

There is a provision in the wholesale market to store potatoes, onions and cabbage and the storage capacity for each is shown in Table 4-3. This is assumed to be the total amount that can be stored in the year (no turnover).

Table 4-3 Storage Capacity of each commodity, tonnes

| Commodity | Storage capacity |
|-----------|------------------|
| Potato | 4,500 |
| Onion | 2,300 |
| Cabbage | 1,000 |

4.3.4.5 Post-harvest losses

The CBA considers post-harvest losses which would naturally occur throughout the supply chain. Table 4-4 summarises the current losses assumed for each commodity i.e., without the presence of the wholesale market.

Table 4-4 Current post harvest losses for each commodity, %

| Commodity | Losses |
|-------------|--------|
| Onion | 30% |
| Banana | 22% |
| Cauliflower | 26% |
| Cabbage | 23% |
| Tomato | 30% |
| Potato | 25% |

Table 4-5 presents our assumptions regarding post-harvest losses when the wholesale market becomes operational. For the volumes being handled at the market but not stored (hereafter called handled volumes), we assume a reduction of 5% in post-harvest losses compared to current levels (Table 4-4).

For the volumes that will be stored in the market according to the capacity, we assume that post-harvest losses will drop to 10%.

Table 4-5 Post harvest losses reduction with wholesale market, %

| Conditions | Losses |
|----------------|---------------|
| Handled volume | 5% reduction |
| Stored volume | 10% end value |

4.3.4.6 Social discount rate

The Social Discount Rate (SDR) serves the same purpose in the CBA as the financial discount rate does in the financial analysis, i.e., it is used to discount future cash flows to their present value and therefore enable the calculation of important metrics (Economic Net Present Value).

We have applied an SDR of 9% for Nepal as advised by IFAD (and also commonly used by ADB).

4.3.4.7 Shadow Correction Factor

The shadow correction factors, needed to convert market prices into economic prices for the CBA, are presented in Table 4-6. The factor used for personnel incorporates a split between skilled and unskilled labour while the factor used for the capex considers the difference between foreign and local input.

Table 4-6 Shadow Correction Factors

| Shadow Correction Factor | Value |
|--------------------------|-------|
| Capex | 0.95 |
| Opex – personnel | 0.98 |
| Opex – overhead | 1.00 |
| Opex – energy | 0.93 |
| Opex - maintenance | 0.93 |

4.3.4.8 Inflation

Inflation is not included in the CBA, only real values are used throughout. This is in line with CBA guidelines.

4.3.5 Costs

4.3.5.1 Capex & Opex

This section presents the capital and operational expenditures for the wholesale market included in the CBA. The values presented in Table 4-7 and Table 4-8 are already adjusted by the shadow correction factor and therefore are lower than the values used in the financial analysis. Contingency is removed from the cost estimates for the CBA in line with CBA guidelines.

The capex costs are split equally across the two years of the construction phase, 2025 and 2026. As previously mentioned, the future expansion is assumed to take place in 2030. Replacement costs are assumed to be incurred in 2041.

Table 4-7 Capital expenditures CBA (EUR, price level 2022)

| Cost (EUR) | Initial Capex | Future Expansion | Replacement Costs |
|---|-------------------|------------------|-------------------|
| Direct construction costs | 23.466.955 | 1.936.967 | |
| Indirect construction costs | 5.115.696 | - | |
| Design fees, project management, site supervision, etc. | 4.001.571 | 271.175 | |
| Contingencies | - | - | - |
| Total | 32.584.222 | 2.208.142 | 4.616.608 |

Table 4-8 Operational expenditures

| Cost | Opex (EUR p.a.) |
|------------------------------|-----------------|
| Personnel Cost | 109.878 |
| Overhead and Office Expenses | 69.565 |
| EMP and monitoring | 67.826 |
| Energy Cost* | |
| Maintenance Cost | 205.250 |
| Total | 452.519 |

*Energy Costs are estimated at EUR 0.23 per metric ton of product.

4.3.6 Benefits

This section presents the benefits of the wholesale market identified in this analysis and the way they have been incorporated in the analysis.

4.3.6.1 Increased production – all volumes

As a result of the new wholesale market, the local supply chain can improve and offer more price stability and more predictable revenues at a lower risk.



RHDHV assumes that these will motivate the domestic farmers to increase their production and therefore their profits. Eventually, this reduces the uncertainty around food supplies in the region. We still assume that the demand for Indian imports will remain, as the regional production boost is not enough to affect the entire national market.

The wholesale market could also aid the spread of advanced technologies, for example, better seeds. Furthermore, IFAD is promoting training and education for the farmers in the region. This knowledge transfer could further boost production and improve agricultural productivity in general.

Considering the above, we have assumed that volumes being traded at the market will increase by 2% per year, compounded. The marginal costs of this additional production are assumed to be 70% of the average price of each commodity. Therefore, the additional margin to the producers is assumed to be 30% and only this portion of the market price is included as an incremental benefit in the CBA.

Before calculating the revenue gain for farmers, post-harvest losses are applied as per section 0.

4.3.6.2 Reduced post-harvest losses – handled volumes

The wholesale market is assumed to reduce post-harvest losses (PHL) for all handled volumes (i.e., volumes going through the market without being stored). As discussed in section 0, this reduction is assumed to be 5% of current post harvest losses. For example, post-harvest losses for onion would be reduced from 30% to 25%. The avoided post-harvest losses are calculated using the volumes without the increase discussed in the previous section.

4.3.6.3 Reduced post-harvest losses – stored volumes

The planned cold storage facilities will improve the region's storage capacity. The increased capacity will also be of higher quality than the existing infrastructure. We assume therefore that farmers will gain significantly from reduced post-harvest losses for the volumes stored. As discussed in section 0, post-harvest losses are assumed to be reduced to 10%. For example, post harvest losses for onion would be reduced from 30% to 10%. As a direct effect for the suppliers, this translates into additional revenues.

4.3.7 Employment and Indirect Effects

The new wholesale market will employ local people. The effect of this is included in the CBA as a 'cost reduction'. The reason for this is that wages to be paid in the future are to be considered as costs. These costs need to be valued at the opportunity cost of the employers working elsewhere. If it is assumed that those people would be unemployed without this project, then the opportunity costs of their wage are lower than the market price. This is currently approximated by adjusting the project costs by the shadow correction factors (section 4.3.4.7). Therefore, the impact of the project on employment is considered as an adjusted cost in the CBA and not a benefit.

The analysis does not include the possible effects of CO₂ emissions, as this would require detailed modelling of trade flows and logistics corridors for both the "with project" and "without project" scenarios required for the CBA, which is not within the scope of this study.

Additional to the above-described direct effects there are certain indirect and side effects that we identified and are important to discuss. However, these effects are also difficult to quantify. To remain consistent with the Dutch CBA guidelines, these effects are not included in the analysis.

A further indirect implication to mention is the increasing supply in the market and its effects on consumer utility levels. This effect is derived from the increasing production levels, rather than from the establishment



of the wholesale market, thus it is an indirect effect. As currently there is a shortage in the market it is fair to assume that the utility of consumers will increase if more of their demand is met. However, domestic production is more expensive than cheaper Indian imports and therefore some of this effect will be offset.

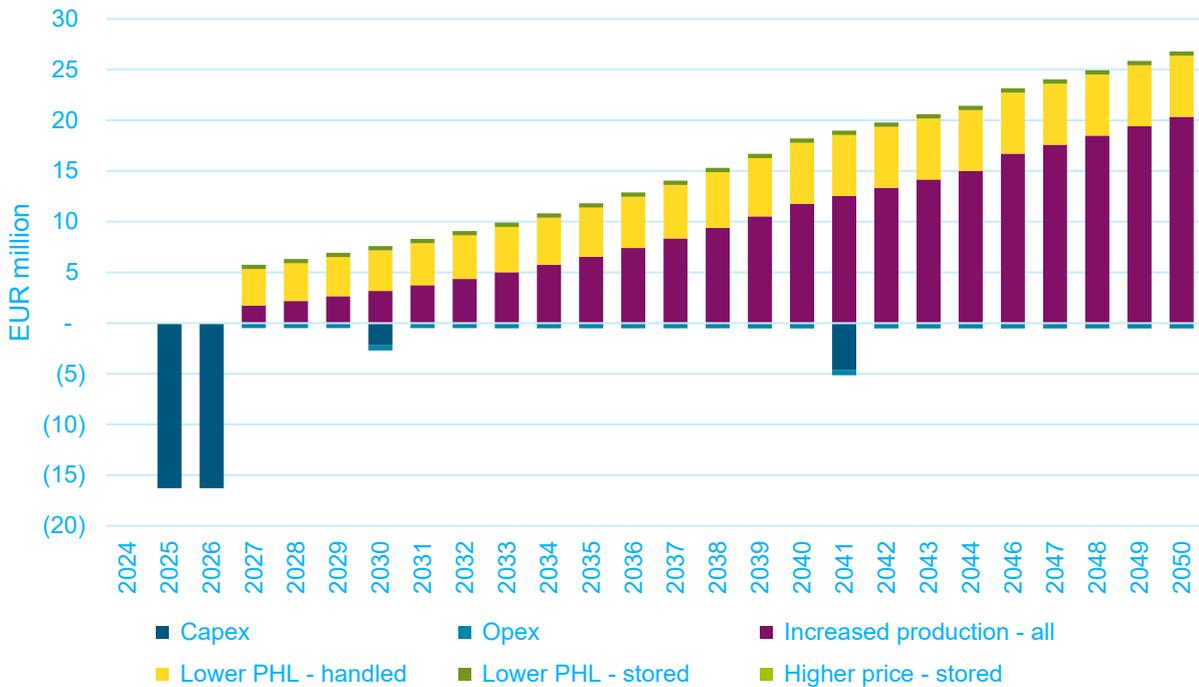
Another side benefit worth mentioning is that due to the inefficient post-harvest processes green waste is currently being dumped. If the supply chains worked more efficiently, the waste could be used as animal feed. With higher volumes, composting or digestion becomes an option. As this is a spill over, it would be difficult to quantify the actual magnitude of this benefit.

4.3.8 Results

4.3.8.1 Base Case Results

The resulting economic costs and benefits from the CBA using the assumptions outlined above are shown in Figure 4-2.

Figure 4-2 Projected Economic cashflows



*PHL: Post harvest losses

The project has a very positive NPV and ERR as shown in Table 4-9. This results from a combination of relatively low capital and operational expenditures in relation to significant social benefits the market is expected to deliver. The largest benefit stems from the wholesale market increasing production by lowering the risk for producers for all commodities. Significant benefits also stem from the market lowering post-harvest losses for the handled commodities.

Table 4-9 Summary Metrics - CBA

| | |
|--------------|----------------|
| Economic NPV | EUR 61 million |
| ERR | 22.6% |

4.3.9 Sensitivity Analysis

Sensitivity analysis is performed on the scenario presented above, by varying the following parameters one at a time, while keeping the rest of the parameters the same.

1. Commodity prices
2. Capex and Opex
3. Volumes

4.3.9.1 Commodity prices

The commodity prices used in the base case were reduced until the project NPV = 0. This was done to determine the degree to which prices would have to fall for the project to stop being economically viable (switching value) In order for NPV = 0, commodity prices would need to be reduced to 35% of their original value as shown in Table 4-10.

Table 4-10 Sensitivity Analysis - Commodity prices

| Commodity Price (EUR) | Base Case | NPV = 0 |
|-----------------------|-----------|---------|
| Onion - average | 403 | 139 |
| Banana - average | 488 | 169 |
| Cauliflower -average | 470 | 162 |
| Cabbage - average | 253 | 87 |
| Tomato - average | 376 | 130 |
| Potato - average | 307 | 106 |

4.3.9.2 Capex and Opex

Similar to the previous section, switching values are determined for the capex and opex (both growing by the same percentage). The capex and opex reported in this section have been converted by the shadow correction factor and therefore slightly differ from the original model inputs reported in the assumptions section. To reach the switching value, capex and opex would have to increase by 289% as shown in Table 4-11. The Capex include the initial construction, expansion and replacement of equipment. The Opex include fixed as well as variable costs.

Table 4-11 Sensitivity Analysis - Capex and Opex

| | Base Case | NPV = 0 |
|-----------------------|--------------|-------------|
| Capex (EUR) | 39.4 million | 114 million |
| Opex fixed (EUR/p.a.) | 476,254 | 1.3 million |
| Opex variable (EUR/t) | 0.23 | 0.67 |

4.3.9.3 Volumes

The switching values for the commodity volume forecasts are shown in Table 4-12. Volumes are at 32.6% of their original levels.

Table 4-12 Sensitivity Analysis - Volumes

| Commodity Price (EUR) | Base Case | NPV = 0 |
|-----------------------|-----------|-----------|
| Onion | 1,479,149 | 564.793 |
| Banana | 1,358,277 | 518.640 |
| Cauliflower | 394,396 | 150.595 |
| Cabbage | 336,577 | 128.517 |
| Tomato | 217,026 | 82.868 |
| Potato | 3,355,064 | 1.281.087 |

4.3.10 Conclusion CBA

The CBA examined the social costs and benefits of the planned wholesale market in Butwal. The following three benefits were identified and incorporated into the analysis, namely: increased production due to lower risk, lower post-harvest losses for handled volumes and lower post-harvest losses for stored volumes. The increased production effect was found to have the most significant positive impact.

Overall, the results of the analysis were positive, with the project having a positive NPV and ERR, and the results are robust with high switching values found in the sensitivity analysis.

5 Risk Analysis

The project risks are presented in the table below. These have been collected based on the results of this FS.

Table 13: Risks, impacts and mitigation measures

| | Risks | Impacts | Mitigation measures |
|---|---|---|---|
| Pre-construction stage (tendering, detailed design) | | | |
| | Unclear site boundaries | The market will be built outside the legal boundaries | <ul style="list-style-type: none"> ■ Confirm the market boundaries as established during the Feasibility Study before start construction ■ Involve local authorities in this process, and a representative of the Community Forest |
| | Land acquisition, land transfer to project | Land acquisition is complex in Nepal and may take longer time | <ul style="list-style-type: none"> ■ Land acquisition process is explained in the EIA and shall be followed ■ Ensure close follow up and consultation on this process ■ Start on land transfer as soon as possible (preferably after confirming the site boundaries) |
| | Tree compensation and replantation | The process is not done properly and/or takes to long and affects the start of construction | <ul style="list-style-type: none"> ■ Tree compensation shall be done before any works on site can start. This is already included in the project costs ■ Ensure that the Division Forest Office is involved in this process and Ratanpur Community Forest |
| | Project Proponent has insufficient resources and knowledge to lead the project into implementation | Start of construction of the wholesale market may be delayed | <ul style="list-style-type: none"> ■ Project Proponent shall acquire sufficient resources to manage the project ■ Project Proponent shall receive training and capacity building to manage such activities as detailed design, tendering, and selection of the construction contractor |
| | Funding risk | Start of construction may be delayed due to lengthy decision-making procedures | <ul style="list-style-type: none"> ■ Ensure close coordination between proposed funding/ financing institutions and key stakeholders in Nepal involved in the project |
| | Poor quality of detailed design | Poor quality of works affecting proper market operations | <ul style="list-style-type: none"> ■ Select an experienced company to undertake the detailed design ■ Check if the selected company has previous experience with such works in Nepal and experience in designing infrastructure in line with Environmental, Social, Health and Safety best practices |
| | Insufficient expertise to manage the purchase of specialized equipment for additional interventions | Improper functioning of additional interventions | <ul style="list-style-type: none"> ■ Hire an experienced international company to procure specialized equipment for additional interventions ■ The company shall help draft the contracts, operation and maintenance conditions, training, supply of spare parts, performance assurance |
| | Execution of the detailed design may take longer than anticipated | Start of construction of the wholesale market may be delayed | <ul style="list-style-type: none"> ■ Select an experienced company (as stated above) ■ Continue stakeholders engagement and alignment between parties on timeline, inputs, roles and responsibilities |
| | The detailed design results are not translated into construction plans | Certain impacts are not mitigated Flooding risk may be still actual | <ul style="list-style-type: none"> ■ Update the Flooding risk assessment and translate the results into the construction drawings, mitigation measures as listed in the Environmental Management Plans ■ Ensure that the results of the detailed design are aligned across, e.g., align the WWTP capacity based on the final water balance, power supply requirements, etc |
| | Additional surveys may be required to complete the detailed design | Surveys can not be completed and therefore certain impacts remained unmitigated | <ul style="list-style-type: none"> ■ We have reserved a provision for the update of the flooding risk, morphological study, including corresponding surveys. ■ Detailed design process may require additional surveys and tests. A certain provision is currently included in project costs. |
| | Construction Contract does not have a clear division of roles and responsibilities, division of risks between Project Proponent and Construction Contractor | Certain risks still remain, certain impacts are not mitigated | <ul style="list-style-type: none"> ■ With respect to the E&S, we recommend keeping stakeholders' engagement and resolution of community grievances with the project proponent during the construction phase of the project. ■ Add the EMP as a leading requirement for the construction contractor and ask the contractor to develop method statements and procedures to meet these requirements ■ Set up organisation and reporting requirements in the contract, from the Construction Contractor to the Project Proponent |

| Construction Phase | | |
|---|---|---|
| Improper implementation of E&S mitigation measures | <p>Pollution of natural resources due to unsustainable construction practices on site</p> <p>Social nuisance to stop construction of the market</p> | <ul style="list-style-type: none"> ■ Add the EMP as a leading requirement for the construction contractor and ask the contractor to develop method statements and procedures to meet these requirements ■ Provide training, so that Contractor understands the mitigation measures and the need to comply with them ■ Undertake auditing of Contractor Performance (by Project Proponent and separately independent audit on behalf of financiers) |
| Social unrest and nuisance due to labour influx | <p>Surrounding community opposing project construction</p> <p>Stop in construction works</p> | <ul style="list-style-type: none"> ■ Implement the social mitigation measures ■ Implement the Grievance Redress Mechanism ■ Engage regularly with the project key stakeholders via the Project Steering Committee as suggested in the EIA |
| Insufficient and/or unexperienced construction management supervision team | <p>Poor quality of work</p> <p>Delay of works</p> <p>Additional works and cost overrun</p> | <ul style="list-style-type: none"> ■ Hire experienced company for construction management and supervision. ■ Hire independent company to monitor the project on behalf of II and IFAD (this shall cover as minimum technical and E&S Due Diligence) |
| Completion risk | Construction is not completed, or completion is delayed | <ul style="list-style-type: none"> ■ Ensure proper EPC contract is in place with reputable and creditworthy contractor. |
| Cost overrun | <p>A cost overrun occurring while the grant is fixed hampers the financial sustainability of the project.</p> <p>Construction may be temporarily stopped, delayed</p> | <ul style="list-style-type: none"> ■ Ensure proper EPC contract is in place with reputable and creditworthy contractor. ■ Regularly review cost estimates and monitor budget for construction. |
| Operation Phase | | |
| Poor organisational setup of the body running the wholesale market | Poor functioning of the market | <ul style="list-style-type: none"> ■ Focus on identification of a strong market management organisation for O&M of the market/project. Initial training and capacity building of the anticipated public and private parties for the market management role shall be provided. |
| Improper implementation of E&S mitigation measures Health and Safety risks | <p>Pollution of natural resources due to unsustainable operation practices at the market</p> <p>Health and safety risks leading to temporary closure of the market (unsanitary conditions)</p> <p>Social nuisance opposing to the market operations</p> | <ul style="list-style-type: none"> ■ Add the EMP as a leading requirement for the market operator and require specific management plans and procedures to be developed to show how the mitigation measures will be implemented and monitored ■ Provide training, so that market operator understands the mitigation measures and the need to comply with them ■ Undertake auditing of the market operator (by Project Proponent and separately independent audit on behalf of financiers, this shall cover as minimum technical and E&S Due Diligence) |
| Social nuisance due to operation of the market | <p>Surrounding community opposing market operation</p> <p>Stop market operation</p> | <ul style="list-style-type: none"> ■ Implement the social mitigation measures ■ Implement the Grievance Redress Mechanism |
| Lack of technical capacity and skills to operate the cold storages | Loss of stored product | <ul style="list-style-type: none"> ■ Hire an experience international company to train staff in cold storage operations |
| Lack of technical capacity and skills to operate the integrated processing, packaging and godown facility which is a new concept for wholesale markets in Nepal | <p>Breakdown of equipment</p> <p>Poor quality of products</p> | <ul style="list-style-type: none"> ■ Hire an experience international company to train staff in processing and packaging |
| Rapid decay of assets due to poor maintenance | Loss of interest to use/visit the market | <ul style="list-style-type: none"> ■ Allow sufficient budget for proper maintenance |
| Volume risk | Substantially lower volumes for a prolonged period of time | <ul style="list-style-type: none"> ■ The results of the IFAD programs in Province 5 shall be used to review the project assessment as done in this FS |

Project related



| | | | |
|--|--|--|---|
| | | pose a risk to the financial sustainability of the project | <input type="checkbox"/> This shall be done during the detailed design or as soon as results are available |
| | Margin risk | Substantially lower prices or higher operational costs for a prolonged period of time pose a risk to the financial sustainability of the project | <input type="checkbox"/> The results of the IFAD programs in province 5 shall be used to review the project assessment as done in this FS <input type="checkbox"/> This shall be done during the detailed design or as soon as results are available |
| | Use of the market, occupation rate of the storage facilities | Entrepreneurs do not fully utilize market and facilities (keeping also in mind the new market in Tilotamma, close to Butwal) | <input type="checkbox"/> The results of the IFAD programs in province 5 shall be used to review the project assessment as done in this FS <input type="checkbox"/> This shall be done during the detailed design or as soon as results are available |

Appendix

A1. Annual Tradable volume of agricultural commodities for Semlar

Project related



| Crop category | Name of crop | 2073/74 (2016/17) | | | Maketable surplus (mt) | 50% of Import available for wholesale in semlar (mt) | Collection from other districts in Semlar (mt) | Total Annual Volume available for wholesale in semlar (mt) |
|------------------|--------------|-------------------|---------------|-----------------|------------------------|--|--|--|
| | | Area (ha) | Yield (mt/ha) | Production (mt) | A | B | C | A + B + C |
| Spice crops | Onion | 622 | 23 | 14,295 | 7,148 | 25,661 | - | 32,809 |
| | Garlic | 67 | 14.2 | 948 | 474 | 18 | 4 | 496 |
| | Ginger | - | - | - | - | - | 100 | 100 |
| | Turmeric | 38 | 8.6 | 325 | 163 | - | - | 163 |
| | Chilli | 94 | 6 | 545 | 273 | 213 | - | 486 |
| Major Fruits | Orange | - | - | - | - | 441 | 200 | 641 |
| | Junar | - | - | - | - | 133 | - | 133 |
| | Lemon/Lime | - | - | - | - | 1,715 | - | 1,715 |
| | Mango | 365 | 9 | 3,285 | 1,643 | 395 | 100 | 2,138 |
| | Banana | 666 | 22 | 14,820 | 7,410 | 11,480 | 11,480 | 30,370 |
| | Guava | 16 | 11 | 179 | 90 | 57 | - | 147 |
| | papaya | 45 | 15 | 653 | 327 | 810 | - | 1,137 |
| | jackfruit | 23 | 30 | 681 | 341 | - | - | 341 |
| | Pineapple | 8 | 15 | 119 | 60 | 3 | - | 63 |
| | Litchi | 179 | 5 | 933 | 467 | - | - | 467 |
| | Pomegranate | - | - | - | - | 836 | - | 836 |
| | Apple | - | - | - | - | 894 | - | 894 |
| | Pear | - | - | - | - | 2 | - | 2 |
| | Plum | - | - | - | - | 2 | - | 2 |
| | Watermelon | - | - | - | - | 584 | - | 584 |
| | Bayar | - | - | - | - | 5 | - | 5 |
| | Grape | - | - | - | - | 67 | - | 67 |
| Fruit Vegetables | Cauliflower | 957 | 24 | 22,956 | 11,478 | 6 | 6 | 11,490 |
| | Cabbage | 766 | 25 | 19,510 | 9,755 | 33 | 6 | 9,794 |
| | Broccoli | 25 | 7 | 175 | 88 | - | - | 88 |
| | Tomato | 465 | 26 | 12,090 | 6,045 | - | 200 | 6,245 |
| | Peas | 83 | 18 | 1,506 | 753 | 3 | - | 756 |
| | Beans | 185 | 12.75 | 2,263 | 1,132 | - | - | 1,132 |
| | Okra | 96 | 14 | 1,344 | 672 | 79 | - | 751 |
| | Brinjal | 139 | 16 | 2,147 | 1,074 | 5 | 5 | 1,084 |
| | Cucumber | 147 | 19 | 2,720 | 1,360 | 27 | 5 | 1,392 |
| | Pumpkin | 82 | 17 | 1,394 | 697 | 13 | - | 710 |
| | Squash | - | - | - | - | - | - | - |
| | Bitter Gourd | 181 | 16 | 2,932 | 1,466 | 22 | 2 | 1,490 |
| | Bottle Gourd | 119 | 17 | 1,964 | 982 | 121 | - | 1,103 |

Project related



| Crop category | Name of crop | 2073/74 (2016/17) | | | Maketable surplus (mt) | 50% of Import available for wholesale in semlar (mt) | Collection from other districts in Semlar (mt) | Total Annual Volume available for wholesale in semlar (mt) |
|------------------|-------------------|-------------------|---------------|-----------------|------------------------|--|--|--|
| | | Area (ha) | Yield (mt/ha) | Production (mt) | A | B | C | A + B + C |
| | Sponge Gourd | 120 | 16 | 1,932 | 966 | 8 | - | 974 |
| | Ridge Gourd | - | - | - | - | - | - | - |
| | Snake Gourd | - | - | - | - | - | - | - |
| | Ash Gourd | - | - | - | - | - | - | - |
| | Pointed Gourd | 28 | 11 | 294 | 147 | 15 | 1 | 163 |
| | Capsicum | 4 | 4 | 16 | 8 | 52 | - | 60 |
| | Cow pea | 72 | 15 | 1,098 | 549 | 34 | - | 583 |
| Leafy Vegetables | Broadleaf mustard | 72 | 20 | 1,442 | 721 | - | - | 721 |
| | Coriander leaf | 27 | 14 | 371 | 186 | - | - | 186 |
| | Spinach | 46 | 23 | 1,058 | 529 | - | - | 529 |
| | Fenugreek leaf | 9 | 21 | 198 | 99 | - | - | 99 |
| | Amaranthus | 12 | 19 | 222 | 111 | - | - | 111 |
| | Fennel Leaf | - | - | - | - | - | - | - |
| | Cress | 38 | 22 | 847 | 424 | - | - | 424 |
| | Swiss chard | - | - | - | - | - | - | - |
| Tuber Vegetables | Colocasia | 13 | 20 | 263 | 132 | 33 | - | 165 |
| | Radish | 240 | 37 | 8,844 | 4,422 | - | - | 4,422 |
| | Carrot | 56 | 18 | 986 | 493 | - | - | 493 |
| | Tunip | - | - | - | - | - | - | - |
| | Yam | 9 | 20 | 180 | 90 | - | - | 90 |
| | Sweet Potato | - | - | - | - | 12 | - | 12 |
| | Potato | 3,935 | 14,158 | 55,712 | 27,856 | 49,897 | - | 77,753 |
| Total | | | | 194,406 | 64,669 | 93,667 | 11,909 | 170,245 |

Appendix

A2. Background to proposed interventions for priority products

A.2.1 Local supply and demand Butwal/Semlar

For an analysis of local supply and demand at Butwal/Semlar, reference is made to Table 5-14 below. Considering the market to be established being of wholesale nature, the Rupandehi district is taken as the primary catchment area for the collection of tradable agricultural commodities.

Demand at the priority market is calculated by multiplying the annual consumption of vegetables, fruits and spices times the population of Rupandehi district, which is equal to 982,851 inhabitants.

Surplus and demand is subsequently determined by production in the catchment area less consumption.

Table 5-14: Overview of local supply and demand of priority produce in catchment area in MT

| Sub sector | Priority produce | Production 2016/17 | Production 2018/19 | Consumption | + = Surplus - = Demand |
|--------------------|------------------|--------------------|--------------------|----------------|---------------------------|
| Vegetables | Potato | 55,712 | 64,388 | 67,953 | -3,565 |
| | Onion | 14,295 | 10,481 | 7,334 | 3,147 |
| | Tomato | 12,090 | 12,942 | 8,963 | 3,979 |
| | Cucumber | 2,720 | 2,785 | 3,429 | -644 |
| | Cauliflower | 22,956 | 24,201 | 11,423 | 12,778 |
| | Cabbage | 19,510 | 19,908 | 10,311 | 9,597 |
| Fruit | Banana | 14,820 | 12,446 | 6,112 | 6,334 |
| | Mango | 3,285 | 3,460 | 6,134 | -2,674 |
| | Lime | 0 | 831 | 988 | -157 |
| | Orange | 0 | 0 | 1,058 | -1,058 |
| Spices | Ginger | 0 | 230 | 5,737 | -5,507 |
| | Cardamom | 0 | 0 | 63 | -63 |
| Total in MT | | 145,388 | 151,672 | 129,505 | 22,167 |

Although the catchment area for supply and demand is not exactly bounded by the district borders, this provides a good indication of the market situation.

Based on the results, the following observations can be made:

- In average, there is a nett surplus of priority produce in the catchment area;
- Production in the catchment area of lime, orange, ginger and cardamon is nil. These products need to be imported from other regions and/or countries;
- There is a surplus production of onion, tomato, cauliflower, cabbage, banana;
- There is a production shortage of potato, cucumber and mango.



A.2.2 Import from Sunauli Customs Office in Rupandehi

Many agricultural commodities are traded in Nepal after being imported from India and some other countries. Data on these imports, therefore, bear great importance in determining the volume of trade and therefore the design of the proposed wholesale markets. Import data is collected from the Bhairahawa quarantine check post of the district.

A comparison with Table 5-15 shows that import via Rupandehi district accounts for approximately 1/3 of Nepal's total import of priority produce from other countries (total 556,000 MT), which is much more than demand in Rupandehi district itself. As a result, it can be concluded that the Rupandehi district is largely responsible for transfer of imported produce to other regions in Nepal.

Project related



Table 5-15: Import priority produce through Sunauli Quarantine, Bhairahawa, Rupandehi, 2017/18

| Sub Sector | Priority Produce | Jul | Aug | Sep | Okt | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Total in MT | |
|--------------|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|--------------|--------------|----------------|-----------|
| Vegetables | Potato | 8,442 | 8,932 | 10,806 | 10,281 | 9,835 | 14,612 | 11,230 | 6,790 | 5,987 | 4,569 | 4,329 | 3,981 | 99,794 | |
| | Onion | 8,853 | 6,167 | 7,934 | 5,879 | 4,282 | 4,809 | 3,560 | 2,560 | 2,259 | 1,670 | 1,569 | 1,780 | 51,322 | |
| | Tomato | 174 | 583 | 713 | 593 | 390 | 619 | 325 | 224 | 290 | 302 | 227 | 180 | 4,620 | |
| | Cucumber | - | 1 | 34 | - | - | - | - | - | 2 | 6 | 5 | 2 | 3 | 53 |
| | Cauliflower | - | - | - | 11 | - | - | - | - | - | - | - | - | - | 11 |
| | Cabbage | 11 | 1 | - | 21 | 18 | 1 | 1 | - | - | - | 2 | - | 10 | 65 |
| Fruits | Banana | 1,190 | 3,448 | 5,256 | 2,027 | 971 | 1,751 | 1,325 | 1,250 | 1,280 | 1,398 | 1,452 | 1,612 | 22,960 | |
| | Mango | 201 | 19 | 13 | - | 1 | 3 | 5 | 3 | 5 | 9 | 220 | 310 | 789 | |
| | Lime | 497 | 478 | 333 | 350 | 344 | 309 | 220 | 170 | 155 | 175 | 189 | 210 | 3,430 | |
| | Orange | - | - | 87 | 107 | 149 | 447 | 21 | 18 | 12 | 20 | 12 | 8 | 881 | |
| Spices | Ginger | - | - | - | - | - | - | - | - | - | - | - | - | 0 | |
| | Cardamom | | | | | | | | | | | | | 0 | |
| Total | | 19,368 | 19,629 | 25,176 | 19,269 | 15,990 | 22,551 | 16,687 | 11,017 | 9,994 | 8,150 | 8,000 | 8,094 | 183,925 | |

A.2.3 Trading volumes existing Butwal wholesale market

In Rupandehi district, there is only one fruit and vegetable wholesale market located in Butwal sub-metropolitan constructed under the ministry of agriculture and livestock development and run in PPP principle (60:20:20). It started operations in 2010.

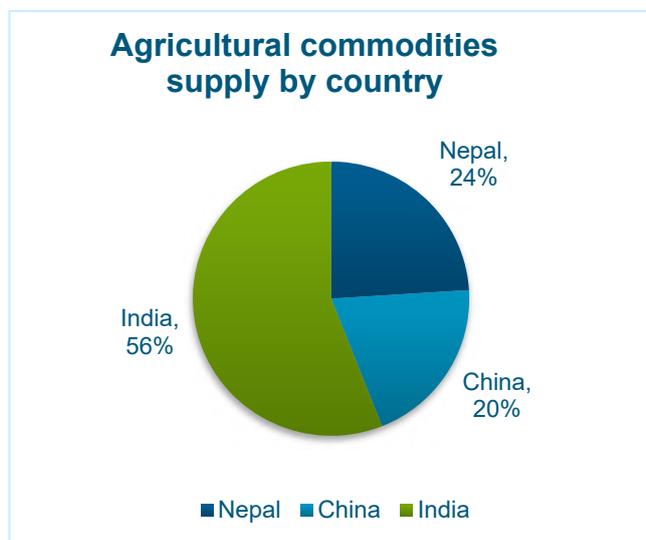
Annual transaction of spices, fruits and vegetables in the market in 2018/19 amounts 91,702 mt. A breakdown per commodity is listed in Table 5-16 below.

Table 5-16: Annual transactions of priority produce in existing Butwal Market 2018/19

| Sub Sector | Priority Product | Annual turnover (MT) | % of Total |
|------------------------------|------------------|----------------------|-------------|
| Vegetables | Potato | 29,211 | 32% |
| | Onion | 9,600 | 10% |
| | Tomato | 16,549 | 18% |
| | Cucumber | 1,430 | 2% |
| | Cauliflower | 2,494 | 3% |
| | Cabbage | 2,650 | 3% |
| Fruits | Banana | 5,831 | 6% |
| | Mango | 2,269 | 2% |
| | Lime | - | 0% |
| | Orange | 2,731 | 3% |
| Spices | Ginger | 3,085 | 3% |
| | Cardamom | - | 0% |
| Sub Total | | 75,850 | |
| Others | | 15,852 | 17% |
| Total Market turnover | | 91,702 | 100% |

The source of supply for these agricultural commodities, is shown in Figure 5-1.

Figure 5-1: Agricultural commodities Butwal Market by supply source



From the above it can be concluded that the Butwal Market works mostly as a transit market. Along with the import, commodities are collected from Salyan, Dang, Palpa, Syangja, Gulmi, Arghakhanchi, Rolpa, Dhading, Makwanpur, Chitwan, Jhapa, Kapilvastu and Nawalparasi.

The existing infrastructure was found insufficient for handling the increased volume of the products as the demand of those products has increased substantially with fast growing population and awareness of benefits of fruits and vegetables in human health.

A new modernized wholesale market with ample area for further expansion is required to meet the demand of Butwal and surrounding area that has great scope of developing as a provincial wholesale market for Province 5 and beyond. It is therefore required to develop a new market within periphery of the Butwal sub-metropolitan city.

In Rupandehi there are also around 98 Haatbazars and 12 collection centers. Haatbazars primarily meet the local requirement while collection centers also supply to the wholesale market. The annual transaction of these haatbazars was not found recorded.

For an overview of annual transaction in the collection centers, reference is made to Table 5-17.

Table 5-17: Annual transactions at collection centers in Rupandehi district

| Name of collection Center | Annual transaction (Mt) | Main markets |
|--|-------------------------|---------------------------------------|
| Hariyali Collection Center, Siktahan-6 | 32 | Dhakdhai, Butwal, Bhairahawa |
| Basantapur Collection Center, Basantapur-1 | 55 | Butwal, Bhairahawa |
| Suryapura Collection Center, Suryapura-3 | 65 | Butwal, Bhairahawa, lumbini |
| Parrhoa Collection Center, Parrhoa-4 | 59 | Butwal, Bhairahawa |
| Shivashankar Collection Center, aypaur-8 | 34 | Butwal, Bhairahawa, Raypur, Majhganwa |
| Semra Collection Center, karhiya-7 | 16 | Butwal, Bhairahawa |

| Name of collection Center | Annual transaction (Mt) | Main markets |
|---|-------------------------|---|
| Karuwani Collection Center | 13 | Butwal, Bhairahawa, Tthuti pipal |
| Rudrapur Collection Center, Haraiya | 36 | Butwal, Bhairahawa |
| Jogokuti Collection Center, | 64 | Butwal, Bhairahawa |
| Devdaha Collection Center, Devdaha-3 | 58 | Butwal, Bhairahawa |
| Lakadigadh Collection Center, Khudabagarr-9 | 17 | Butwal, Bhairahawa |
| Vegetable Collection Center, Sonbarsa | 26 | Butwal, Bhairahawa, Lumbini, Mahajidiya |
| Total: | 445 | |

The annual throughput of the collection centers is relatively very low. In this respect, we consider that potential interventions at the level of collection centers does not meet the objectives of the D2B program.

A.2.4 Potential interventions Butwal/Semlar

Introduction

In this section we assessed the possibilities for interventions per type of commodity.

In general, it is considered that potential interventions for this D2B programme have most effect when they will be implemented in vicinity of the local sources of production. This will improve the local agricultural infrastructure and market access.

Interventions in the sales area do not necessarily support local production and could also lead to increased import from other regions and/or countries.

Taking into account that local production of lime, orange, ginger and cardamom is nil, these priority produces are not further considered in our below assessment.

Potato

Potato is by large the major agricultural crops produced, traded and consumed in Nepal. Annual production in Rupadehi district amounts around 60,000 MT, which is less than local consumption of 68,000 MT. Also, on country level the annual production of 3,088,000 MT potatoes is insufficient to meet local demand.

With an annual amount of 330,000 MT, potato is also the major imported agricultural commodity in Nepal. From this amount around 1/3 is imported via Sunauli Border in Rupandehi. Potato export volumes are nil. Exact figures on post-harvest losses are not available, but various sources report losses of 20-30% for potato. Losses at farm level are about 5% and during grading and packaging additionally another 5-10% is added (Shrestha & Yadav, 2018).

The wholesale price of Potato (at the Kalimati Wholesale Market) is at its peak during September and October just before / during the festive season. From table 9.6 it can also be seen that during this period import of potatoes is at its peak.

The lowest price during April can be considered as a result of the increasing supply of the harvested Potato to the market from the Terai districts.

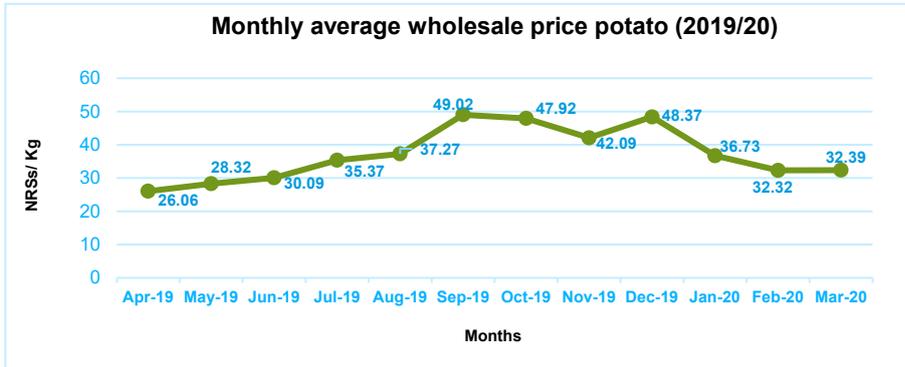


Figure 5-2: Potato monthly average wholesale price FY 2019/20

In well-designed storage facilities potatoes can be stored for 7 to 8 months. Like mentioned earlier in the report, reduction of the post-harvest losses could make Nepal self-sufficient regarding the supply of potatoes. One important intervention to achieve this would be the construction of controlled storage facilities.

The harvest window for the potato extends over several months. During the peak season, the potatoes should be collected and stored. Considering the long storage life of potatoes, outtake from the storage should take place during the low season in the months of September, October, November and December (i.e. the months with highest import and highest prices), which prevent that potatoes need to be imported. The investment costs of these facilities can likely be repaid by the price difference of the commodities between peak and low season.

Assuming potatoes to be delivered from cold storage for a period of 4 months, a total potato storage capacity of $4/12 \times 68,000 = 22,600$ Tons would be required in Rupandehi district. Assuming that the project will capture 20% of total requirement, there would be an opportunity for 4,520 MT of potato storage, which is equal to 7.5% of local production.

Potatoes should be stored in the special large boxes in the cold storage and should be cleaned, sorted and packed when taken out. For this it is proposed to also install proper cleaning, sorting and packaging facilities. These facilities can also be used for direct packaging during the harvest season.

Onion

Onion is also a very important product in Nepal, which is grown in all districts. On country level the annual production 291,000 MT.

Even though being an important crop, domestic production is not sufficient to meet the demand of the country resulting in unavoidable import. Annually 77,500 MT of onion is imported, which is around 20% of local consumption. Majority at this, at the amount of 50,000 MT is imported via Sunauli Border in Rupandehi. Export volumes of onion are nil.

Average annual production of onion in Rupandehi district amounts around 12,000 MT, which is more than local consumption of 7,500 MT.

Post-harvest losses of onion are also estimated at 30% of total production. During the festive season in Nepal i.e. September to November (which is also the plantation and production season) the price of the onion is at its peak, which reached to more than NRs 152 per kilogram.



After the harvest of the Onion starts and supplied to the market, January onwards, the price of the commodity starts to fall. It's during the month of April, where the price of the commodity is minimum (26.38/ Kg).

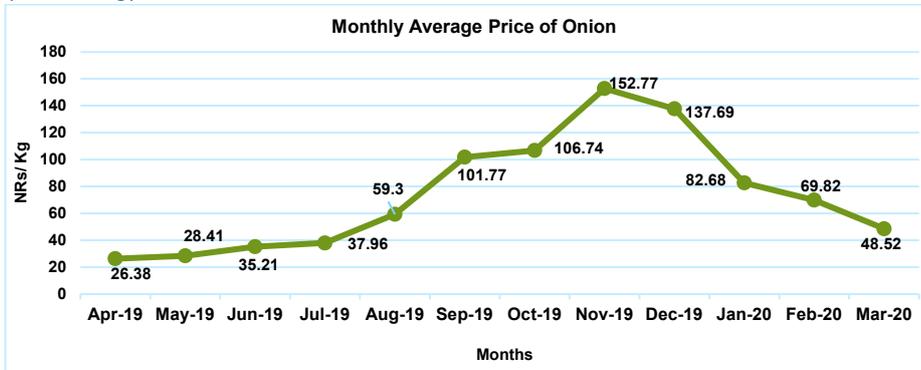


Figure 5-3: Monthly average prices of onion

Nepal is importing large quantities of onions each year from India and overseas to full fill the demand of the Nepalese consumer. One of the challenges identified with the production and sales of Onion is the storage problem. Due to high humidity and temperature, the storage of onions for long duration in ordinary conditions possess a great problem from June to September. Storage loss in this period consists of sprouting, rotting, rooting and shrinkage. This has compelled the farmers to sell their product at minimum price during harvesting time that results in scarcity of dry onion bulbs from September onwards.

Onion is a very lucrative crop for storage given the huge price differences between the high and the low season. In well-designed storage facilities onions can be stored for 6 to 8 months.

Assuming onions to be delivered from cold storage for a period of 4 months during low season, a total potato storage capacity of $4/12 \times 12,000 = 4,000$ Tons would be required in Rupandehi district. Assuming that the project will capture 20%, there would be an opportunity for 800 MT of onion storage, which is equal to 6.7% of local production.

However, considering that there is a surplus in production of onions in the Rupandehi district and the fact that there are huge price differences between low and peak season, the construction of additional storage capacity in the range of 1,500 MT (approx. 50% of the surplus) could be considered to provide a market for surplus produce and encourage the production of onions in the region.

Onions should be stored in the special large boxes in the cold storage and should be cleaned, sorted and packed when taken out. For this it is proposed to also install proper cleaning, sorting and packaging facilities. These facilities can also be used for direct packaging during the harvest season.

Tomatoes

Due to the geomorphology and climatic variables, the possibilities of tomato cultivation are found in almost all the terai and low hills of Nepal. Since Nepal possess diverse range of climate in its geography, the possibilities of Tomato production are almost year-round.

On country level the annual production 406,000 MT, while an amount of 46,000 MT is imported which is 10% of consumption.

Average annual production of tomatoes in Rupandehi district amounts around 12,500 MT, which is more than local consumption of 9,000 MT.

The post-harvest losses in the tomato subsector is high which is mainly due to improper harvesting, handling, packaging, and poor facilities at collection centres.



The wholesale price of tomato at the Kalimati Wholesale Market has several spikes in its price trend. The price seems to be at the higher end even though production peaks in summer in the Hills (from May to September). During that time, it is off-season in Terai.

The price of the commodity starts to decline as the production starts in Terai (from November to March) when it is too cold in the Hills.

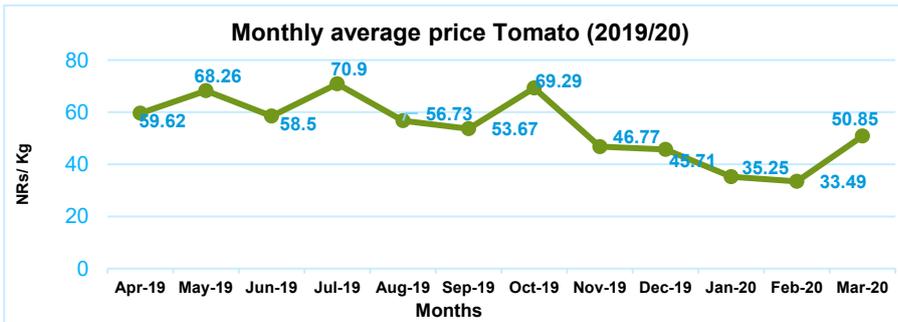


Figure 5-4: Tomato monthly average price FY 2019/20

Tomatoes can then be stored for a period of 14-15 days. The lower the temperature or the wider the temperature range when stored, the shorter the storage period. Tomatoes are very susceptible to chilling injuries and a moderate ethylene producer. It should not be stored with other fruits and vegetables. Considering that the annual transaction of tomatoes at the Butwal wholesale market amounts 16,500 MT, which is equal to all local production and all import via Sunauli Border and double the amount of consumption in the Rupandehi district, it appears that there is already a well-established market for tomatoes. As such intervention in this market is not considered a priority for the D2B programme.

Cucumber

Cucumber is one of the economically important vegetables that have high influence on the livelihood of the smallholder farmers of Nepal. Cucumber, originally regarded as summer crop, widely grows in many geographical locations of the country; namely Terai, Mid-Hills and Hills between an altitude range of 200-1500 meter above sea level. Regarding the suitability of the crop in Nepal, it is regarded that there is a high potential for increased productivity and income generation.

On country level the annual production 172,500 MT, while import and export can be neglected.

Average annual production of cucumbers in Rupandehi district amounts around 2,700 MT, which is less than local consumption of 3,500 MT.

Cucumber is found in the Kalimati Wholesale Market all year round. The average wholesale price of the vegetable is at its peak starting from October till early February.

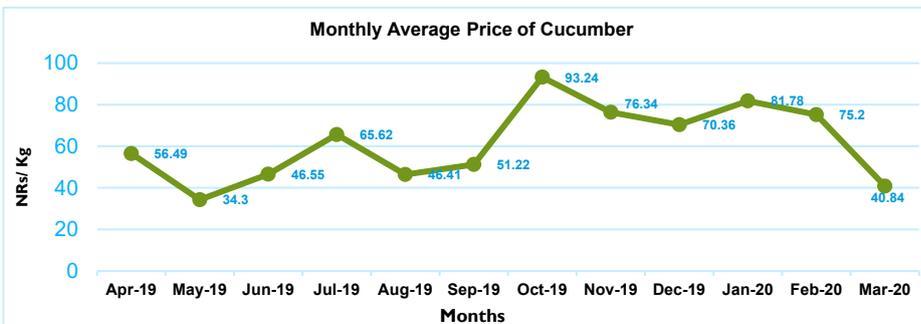


Figure 5-5: Cucumber monthly average price FY 2019/20



Cucumbers are one of the easy perishable products which usually have a short storage life. Cucumber can be stored for a maximum of 10 days at a temperature of 14°C. Cucumber is quite susceptible to chilling injuries. To increase the shelf life of the products several techniques and practices are conducted. They comprise of temperature control, controlled atmosphere storage (CA), and use of waxes and/or other coatings are the popular ones. However, these technologies are not yet existing in Nepal.

Cucumber cannot be stored long term and therefore no advantage can be taken from any price difference occurring during the year. Cucumber should be sold quickly (few days).

Around 1,400 MT of cucumber is traded via the Butwal Wholesale Market, which is 50% of local production. Likely the Haatbazars play another important role in the value chain of cucumbers.

Potential interventions for cucumber should focus on reduction of post-harvest losses and the provision of a market for smaller producers. This could be either via the construction of a collection center for cucumbers with cold storage facilities as a central point from where retail centers, wholesale markets and/or Haatbazars will be supplied and/or small refrigerators at retail centers or wholesale markets.

Considering that cucumber only has a limited storage life, it is considered that cucumbers will only be collected from the direct surroundings to prevent product loss due to long travel times. In case a collection center would be built for 10% of daily local production of cucumbers and considering an average storage period of 5 days, a total storage capacity of $5/365 \times 2,700 \times 10\% = 3,7$ tons would be required. The storage can be used all year round. Considering the limited storage requirement, it is considered that cucumber will be stored at the wholesale market in a general storage room. No additional interventions for cucumber are anticipated.

If cucumbers are supplied in suitable boxes, they can be stored directly in the cold storage without the need for re-packaging. Therefore, the provision of sorting and packaging lines should be further investigated.

Cauliflower

In Nepal Cauliflower is grown as both seasonal and off-seasonal vegetable throughout the country. Due to the geoclimatic condition of the country, it is grown during cool summer months in higher elevations and can be successfully grown in winter in the tropical regions.

Being one of the most popular vegetables of the country, the production of Cauliflower shows an increasing trend, even though its cultivation area hasn't expanded significantly.

On country level the annual production amounts 574,800 MT, while import and export can be neglected.

Average annual production of cauliflower in Rupadehi district amounts around 23,000 MT, which is double the amount of local consumption of 11,500 MT.

The supply chain of cauliflower is a well-established chain, where the market actors have their predefined roles to perform across the chain.

Cauliflower is found in the market in all seasons because of the possibility to grow it in different ecological zones. The average wholesale price of the vegetable is maximum during the festive season (September to November) in Kalimati Market Centre.

The Cauliflower price starts to decline as the production starts in the Terai from November onwards and it reaches its lowest point in February.

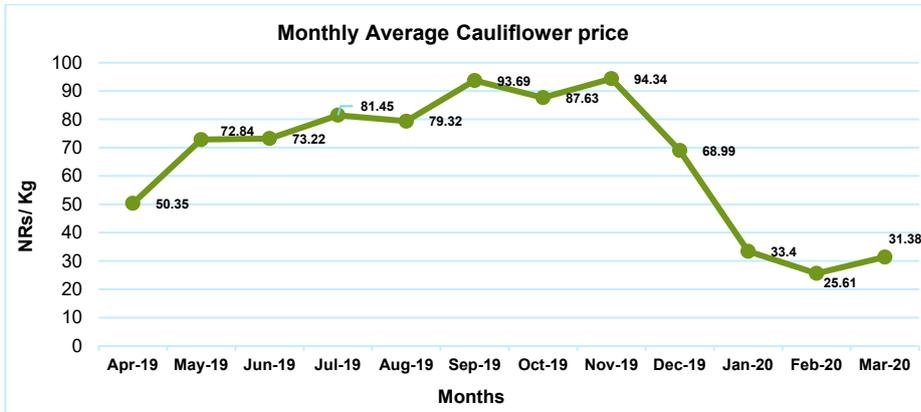


Figure 5-6: Cauliflower monthly average price

Cauliflower can be stored for approximately 40 days when stored at 0°C at a RH of 90-95%. The higher the storage temperature the shorter the storage period.

As cauliflower is not good for long term storage one cannot take advantage of the price difference between the months.

Only 2,500 MT of cauliflower is traded at Butwal Wholesale Market, which is almost 11% of local production. This seems to confirm that the supply chain of cauliflower is well established. As such intervention in this market is not considered as a priority for the D2B programme.

Cabbage

In Nepal, Cabbage could be found all year round. This is due to the geoclimatic and the varieties. There are three types of varieties namely short, mid and long duration, depending upon the climatic suitability of the cultivated areas in the country.

The Cabbage produced at the farmers or cooperatives level is aggregated at the collection centre and is supplied to the commission agents or collectors. At the commission agent's level, the produce from different sources is aggregated and supplied to the regional or national wholesalers. Through the wholesalers the cabbage reaches the consumers via the retailers. In addition, some of the cabbage is also supplied to the exporters by the agents or collectors. In another channel, a small portion of the produced Cabbage is sold by local trader directly to consumers.

On country level the annual production amounts 519,000 MT of which 7.500 MT is exported. Import can be neglected.

Average annual production of cauliflower in Rupadehi district amounts around 20,000 MT, which is double the amount of local consumption of 10,000 MT.

Post-harvest losses as several studies indicate that the losses are high up to 20-25% of the production volume.

The average wholesale price of cabbage in the Kalimati Wholesale Market is found to be quite low compared to other product even though the commodity is traded all the year round. Just before the festive season prices are at its peak.

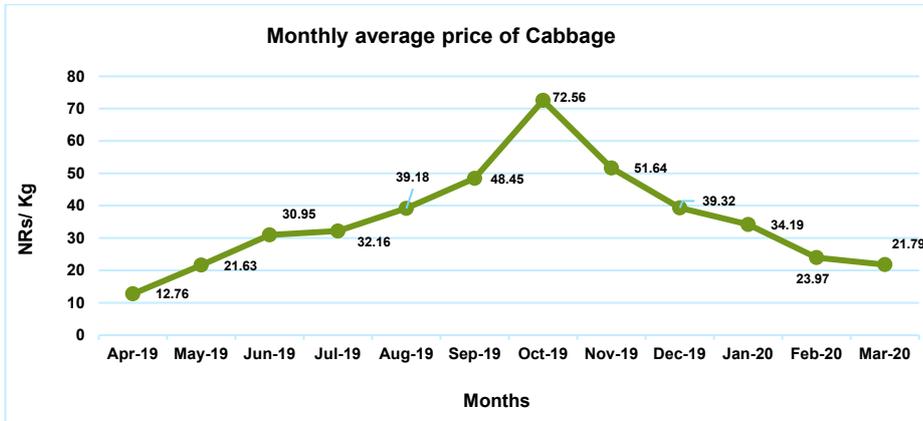


Figure 5-7: Cabbage monthly average price

Cabbage can be stored long term 200 days at 0 °C and 100 days at 2 °C at a RH of 90-95%. It is not very susceptible for chilling injuries and not a big ethylene producer.

Cabbage is also an excellent crop for storage because of its long storage life and large price difference. Only 2,650 MT of cabbage is traded at Butwall Wholesale Market, which is 13% of local production. This would suggest that the supply chain of cabbage is also well established.

Considering that there is a surplus production of cabbage and the fact that there seem to be a potential for export, it would make sense to intervene to reduce post-harvest losses and provide a market for surplus produce. This could be by the establishment of collection centers with proper storage facilities.

In case a collection center would be built for 10% of the surplus production of cabbage, this would require a storage capacity of $10,000 \times 10\% = 1,000$ MT. The stored product could be brought to the market in September to November.

Cabbage should be stored in the special large boxes in the cold storage and should be cleaned, sorted and packed when taken out. For this it is proposed to also install proper cleaning, sorting and packaging facilities. These facilities can also be used for direct packaging during the harvest season.

Banana

Banana is an important tropical fruit crop of Nepal which could be well cultivated in Terai and hills of the country. The Banana production trend in the country depicts that the sector is progressing in terms of both production and productivity.

On country level the annual production amounts 278,900 MT of which 53,500 MT is exported. On the other hand, an almost similar amount of 50,600 MT is being imported. Import over the year is steady, with a peak supply in the months August and September.

Average annual production of banana in Rupadehi district amounts around 13,000 MT, which is double the amount of local consumption of 6,500 MT.

Compared to other crops, the post-harvest losses seem to be low with an estimated 22%.

Unlike the other fruits, the price of Banana does not seem to have a high fluctuation in price, as shown below.

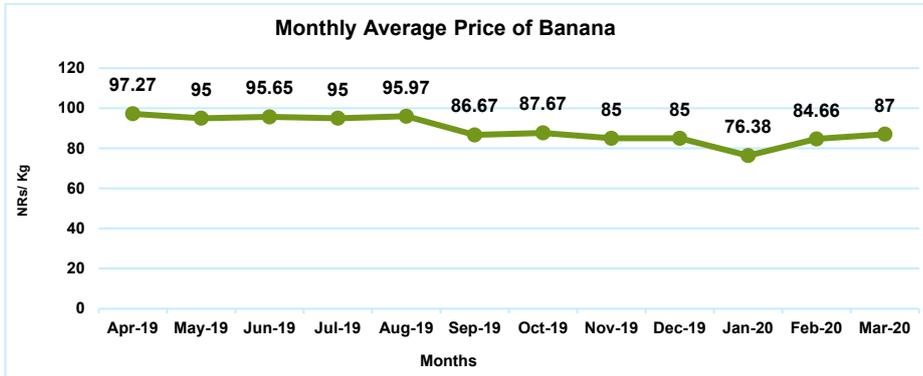


Figure 5-8: Banana monthly average price

Green bananas can be stored 2-3 weeks at 13 °C. A few varieties, e.g. Gros Michel, can be stored at 12°C for a shorter period. At 20°C the keeping quality is 4-8 days. Yellow bananas: 13°C 3-6 days. At 20°C the keeping quality is 1 to 2 days. All at 90-95% RH.

Only 5,800 MT of banana is traded at Butwall Wholesale Market, which is 45% of local production. The 23,000 MT of Banana that is imported via the Sunauli Border seem to largely pass the Butwall Wholesale Market.

In case a collection center would be built for 10% of daily local production of banana and considering an average storage period of 10 days, a total storage capacity of $10/365 \times 13,000 \times 10\% = 35$ tons of storage capacity would be required.

A.2.5 Summary Butwal/Semlar

Summarizing the following sub-set of priority interventions are suggested as part of the D2B programme, supporting the greenfield market development at Semlar.

Table 5-18: List of suggested sub-set of priority interventions

| Sub sector | Priority product | Cold storage in MT | Others |
|------------|------------------|--------------------|---|
| Vegetables | Potato | 4,500 | Cleaning, sorting & packaging |
| | Onion | 800 | Cleaning, sorting & packaging |
| | Onion (optional) | 1,500 | |
| | Tomato | - | |
| | Cucumber | - | |
| | Cauliflower | - | |
| | Cabbage | 1,000 | Cleaning, sorting & packaging |
| Fruits | Banana | 35 | Ripening chambers, sorting & packaging (optional) |
| | Mango | - | |
| | Lime | - | |
| | Orange | - | |
| Spices | Ginger | - | |
| | Cardamom | - | |

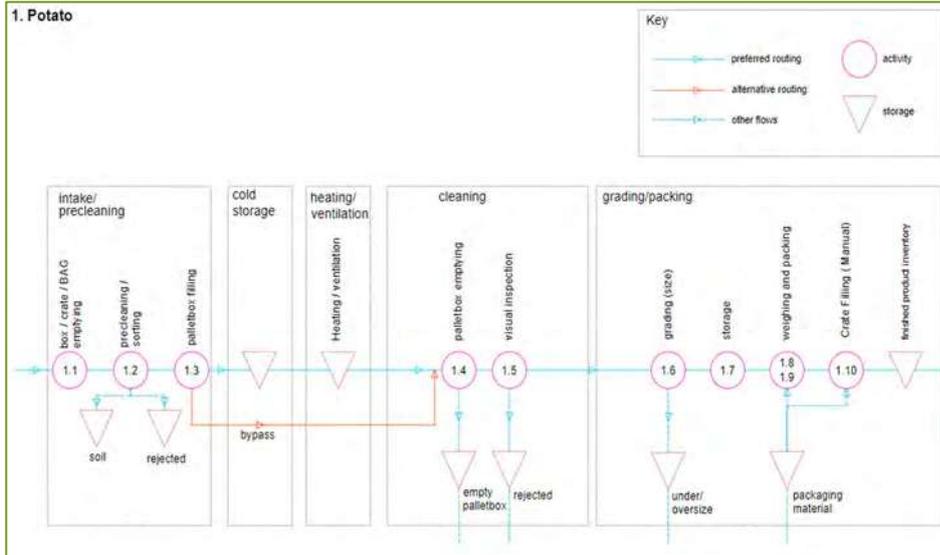
Appendix

A3. Description of additional interventions

A.3.1 Process description potatoes

The Product Flow Diagram for potatoes is presented in the figure below.

Figure 5-9: Product Flow Diagram potatoes



Intake

The manually harvested potato will require little pre-cleaning as the potatoes are expected to be supplied clean, i.e. without soil, stones, damaged and rotten as these are separated in the field. This compared to the machine harvested potato that may have clods/soil, stones, rotten and damaged and will require pre-cleaning. As potatoes may arrive in various ways of packaging (crates, bags, small pallet boxes), the following potato intake system is proposed⁶: Probably most of the times in 25-50 kg. bags.

Unloading the trucks is done by putting the bags on a platform. Followed by opening (cutting) the bags and discharging the crop on a flat conveyor belt. This belt or belts conveys the crop to the receiving hopper.

The receiving hoppers functions as a buffer for a gentle and constant flow of crop to the pre-grader. The pre-grader exists of rollers in order to take out the sand, broken tubers and eventually will do a sizing of the tubers.

The unloading belt will discharge the product onto a roller sieve which is installed at the end of the receiving hopper in order to reduce soil and undersize potatoes.

Subsequently potato will pass a propelled roller inspection table where labour (4 persons) will remove clods, green coloured, damaged and rotten potatoes (1.2) into waste pallet boxes.

After the visual inspection the potatoes will be loaded into wooden pallet boxes (1.3), which are stacked 2 high for onward transport to the climate-controlled storage cells⁷.

Proposed dimension of the especially designed wooden pallet boxes for storage is 1,6 x 1,2 x 1,24 m (l x w x h), having a volume of 2.4 m³. These pallet boxes will remain at the storage and can be used for



⁶ In general potato, prior to storage, should not be handled (transported/conveyed, sorted) too much, as it will damage skin and will cause discoloration (blue) after longer term storage

⁷ Please note that washing/brushing (when needed) and size grading will not be done upon intake, but will only be done shortly before packing

a minimum of 10 years. A small repair shop will be required to repair damaged boxes as part of the intervention.

Storage

A minimum 2.5 t electric forklift truck (based on the weight of two pallet boxes) transports these stacked pallet boxes into the storage cell, making stacks of 4 boxes high. Stacking pallet boxes 4 high requires use of high-quality pallet boxes. Precondition also is that the floor is flat for correct placement, which must be done with precision. Usage of pallet boxes with defects or placing them on an uneven floor leads to unstable stacks not fitting the air suction wall, which may induce safety risks and a badly functioning pressure system due to air leaks.

The forklift truck should have a mast of at least 4,0 m for lifting the highest stacked box.

A pair of stacks of 4 boxes high is placed in front of one pressure system. Between two rows, a gap of some 50 cm is required for air movement. This 50 cm gap is covered with an inflatable balloon. The inflatable balloon is suspended from the ceiling and will be empty during loading or unloading the room. After loading the balloon will be inflated by compressed air and will shut the opening between the 2 rows. Also the front of the two rows of equal length will be closed by an inflatable balloon. This provided pressure ventilation and gives the best air distribution over all boxes.

Each room is provided with 2 x 2 rows of boxes. By making a separation wall in the pressure chamber it is possible to address the air to the rows 1 and 2 or 3 and 4 or to all 4 rows. This gives more flexibility and separation and requires fewer small rooms. For positioning the boxes in the outer rows, especially the ones at the end of the rows it is difficult for the forklift driver. Often the cold room is entered via a small insulated door. For example 2,5 m wide and 3 m high. In this case 3 m storage space is lost, due to turning for the right position the box in the rows 1 and 4. The higher the stack the more difficult.

An alternative for the "small" insulated sliding door is the insulated sliding front wall. For the 8.0 m wide room 2 doors of 4.0 m wide and 6,5 m high can be mounted. Now full access, in straight line with rows of boxes is possible. The boxes can be stacked till 0,5 m behind the insulated sliding door wall. In this case, the rooms can be made 3 m shorter.

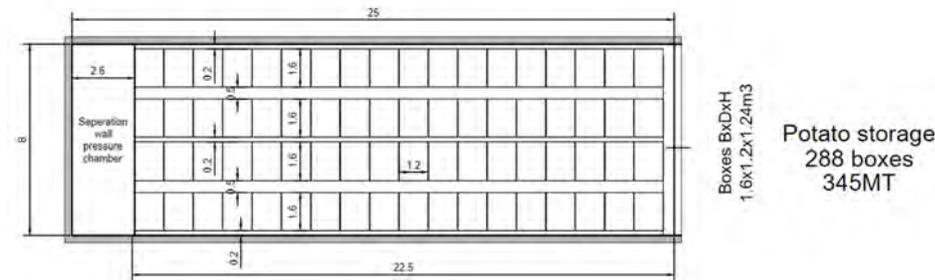
Depending on the harvest conditions and maturity, potatoes may require curing/wound healing. This means keeping the products at a temperature of approximately 15°C for two weeks, before slowly cooling them down to the desired long-term storage temperature of 4-6°C at 90-95% RH.

Prior to being cleaned, graded and packed, potatoes will require reconditioning. This means slowly warming the potatoes from the storage temperature of 4-5°C to a temperature of 15-20°C. This reconditioning period will require approximately two weeks if done for the whole cell. If a separate small drying wall is built for one day production the warming up can be done in one day.

For dimensions of a potato storage room, reference is made to the figure below.



Figure 5-10: Dimension of storage room potato



One potato storage cell measure 25 x 8.0 meters. A length of 30 meters is the maximum which the air ventilation system can bridge. When fully stacked and 4 high, one cell can store 288 boxes of approximately 1.2 MT resulting in 345 MT per cell (assuming a specific weight of 650 kg/m³). Hence 13 rooms are required to reach the total storage capacity of 4,500 MT.

Keep in mind that each storage room of 345 ton has a separation possibility for the quantity of air per half. So in fact the storage capacity of one room is 2 times 172.5 MT.

The internal width of the corridors should be minimum 8 m wide.

The 4 rows of boxes fit in such a way in the room, that there is no space for a walking path from the corridor to the pressure chamber. It is possible to go from the pressure chamber from storage room 1 into the pressure chamber of storage room 2. But for a long building it might be practical and requested for safety reasons to make some walking paths in for example every 4th or 5th storage room. Also in the long gables some escape doors might be required.

Storage cells and pressure systems for potatoes are designed identical and interchangeable with onions (and garlic and beet root).

During harvest season, incoming products can also be routed directly to the processing department, thereby entirely skipping the (long-term) storage.

Processing

The process is as follows:

Picking up a pallet box from the storage and placing it into a mobile box tipper (1.4) specifically designed for the handling of the pallet boxes. This is done by an electric forklift truck with a capacity of 2.5 MT. Empty pallet boxes are temporarily stored near the processing department and are transported to the washing (or repair facility, when needed) by means of a forklift truck. After washing empty pallet boxes are stored in an empty storage cells. Note that free space for storing the dry wooden pallet boxes is needed. The box tipper tips the box and unloads the contents into a receiving hopper. Optimally the receiving hopper is always full of product to avoid free rolling of the product and thus reducing damage. At the end of the receiving hopper the potatoes will be discharged onto a conveyor belt connected with a visual roller inspection table (1.5) where 4 labour will take damaged/rotten potato as well as larger clods (if any) that were not removed by the roller sieve. Rejected products and clods will be transported to the container central off-grade belt system for waste product or to a double pallet box filler for B-class product. Considering that the potatoes are harvested manually, washing and drying of potatoes is not considered necessary. In this respect a washing system is excluded.

After visual inspection potatoes will be transported by means of a conveyor to the size grading machine (1.6) for grading into 3 different sizes, pending market requirements. Should the packing machines not be available the potatoes will be stored in pallet boxes for a limited period after which they will be packed. An Intake hopper will be required before the packing machine.

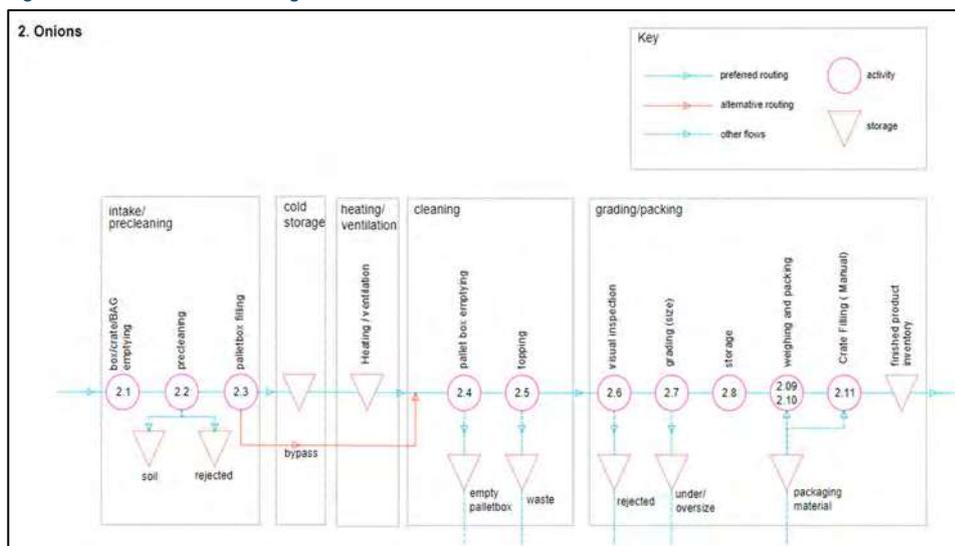
The size grader will sort the potatoes into 3 sizes of which the main size will go directly to the packing machine. The other sizes will be temporarily stored into pallet boxes.

We have foreseen one or two packing machines (1.9) for 2.5 to 5 kg plastic foil bags, (most common in Western European super-markets is 2.5 kg). This machine will pack approx. 75% of the total volume. Before packaging, the product is weighed (1.8)
After packing potatoes will be stacked in plastic crates (1.10) of 20-25 kg.

A.3.2 Process description Onions

The Product Flow Diagram for processing of onions is presented in Figure 5-11 below.

Figure 5-11: Product Flow Diagram Onion



Intake

As onions grow on top of the soil (thus not in the soil) commonly onions are harvested quite clean. Also, because onion is harvested and placed in rows in the field for drying and collected (either manually or by machine) a few days later. Due to this 2-stage harvesting system onions are harvested rather clean. If, due to wet harvesting conditions, onions enter the storage wet then these should be dried with the ventilation system in the cold store cells:

Keep in mind that the onions should be topped not directly at the bulb but 10 cm higher. So the stem of the plant can function as an enclosure for entrance of diseases.

In our opinion onions do not need pre-cleaning. Commonly the onions are stored in the pallet boxes as the produce comes in from the field. A mixture of small and large onions in a pallet box will provide better ventilation and therefore better storage results compared to long term storage of size graded onions. Too much handling/transport of onion will cause the shells being separated from the onion and thus will result in bald onions. This will result in fast quality deterioration of onion during long term storage.

Should the product enter the storage with too many rotten and damaged onions than a limited pre-grading can take place similar to the system as described for potato.

Upon arrival of small lots (small boxes/bags, 25 kg bags or middle-sized boxes), these will be discharged through means of a chute on a belt conveyor unloading in a receiving hopper (2.1). The hopper will be equipped with a roller sieve to take out loose soil.

When needed, a slow moving (wide) conveyor belt will be used (no vibrating sorter) to do visual inspection to remove rotten/damaged onion (2.2). At the end of the belt an automatic pallet box filler (2.3) will fill the pallet boxes (thus with onions that are neither graded nor topped).

Storage

During harvest season, incoming products can also be routed directly to the processing department, thereby entirely skipping the (long-term) storage. An unloading area and a small intermediate storage area shall be located near the processing area for this purpose.

A minimum 2.5 t electric forklift truck (based on the weight of two pallet boxes) transports these stacked pallet boxes into the storage cell, making stacks of 4 boxes high. Stacking pallet boxes 4 high requires use of high-quality pallet boxes. Precondition also is that the floor is flat for correct placement, which must be done with precision. Usage of pallet boxes with defects or placing them on an uneven floor leads to unstable stacks not fitting the air suction wall, which may induce safety risks and a badly functioning aspiration system due to air leaks. The forklift truck should have a mast of at least 4,0 m for lifting the highest stacked box.

A pair of stacks of 4 boxes high is placed in front of one pressure system. Between two rows, a gap of some 50 cm is required for air movement. This 50 cm gap is covered with an inflatable balloon. The inflatable balloon is suspended from the ceiling and will be empty during loading or unloading the room. After loading the balloon will be inflated by compressed air and will shut the opening between the 2 rows. Also the front of the two rows of equal length will be closed by an inflatable balloon. This provides pressure ventilation and gives the best air distribution over all boxes.

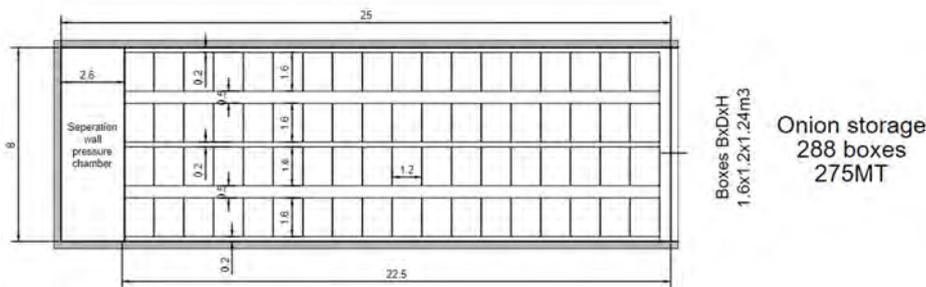
Each room is provided with 2 x 2 rows of boxes. By making a separation wall in the pressure chamber it is possible to address the air to the rows 1 and 2 or 3 and 4 or to all 4 rows. This gives more flexibility and separation and requires fewer small rooms.

For positioning the boxes in the outer rows, especially the ones at the end of the rows it is difficult for the forklift driver. Often the cold room is entered via a small, insulated door. For example 2,5 m wide and 3 m high. In this case 3 m storage space is lost, due to turning for the right position the box in the rows 1 and 4. The higher the stack the more difficult.

An alternative for the “small” insulated sliding door is the Insulated sliding front wall. For the 7,5 m wide room 2 doors of 3,8 m wide and 6,5 m high can be mounted. Now full access, in straight line with rows of boxes is possible. The boxes can be stacked till 0,5 m behind the insulated sliding door wall. The rooms can be made 3 m shorter.

For dimensions of an onion storage room, reference is made to the figure below.

Figure 5-12: Dimension of onion storage room



Prior to being cleaned, graded and packed, onions will require reconditioning. This means-warming the onions from the storage temperature of 0.5°C to a temperature of 15-20°C. This reconditioning period will require approximately one week if done for a whole cell. It is also possible to construct a separate small drying wall, then it will take one day.

One onion cell measures 25x8.0 meters. A length of 30 meters is the maximum which the air ventilation system can bridge. When fully stacked and 4 high, one cell can store 288 boxes of approximately 0.95 tons resulting in 275 ton per cell (assuming a specific weight of 550 kg/m³). Hence 3 rooms are required to reach a storage capacity of 800 t tons for Semlar and around 5 rooms should the “optional” capacity of 1,500 t also be required.

Processing

The process is as follows:

Picking up a pallet box from the storage and placing it into a box tipper specifically designed for the handling of pallet boxes. This is done by an electric forklift truck with a capacity of 2.5 t (2 pallet boxes should be transported simultaneously). Empty pallet boxes are temporarily stored near the processing department and are transported to the washing (or repair facility, when needed) by means of a forklift truck. After washing empty pallet boxes are stored in the empty storage cells.

The box tipper tips the box and unloads the contents into a receiving hopper (2.4). Optimally, the receiving hopper is always full of product to avoid free rolling of the product and thus reducing damage. At the end of the receiving hopper a propelled roller sieve is installed. This roller sieve removes any remaining loose soil and undersize onion (< 25 mm) which will be removed and discharged into soil collecting pallet boxes by means of a 2-way belt conveyor.

Once passed the roller sieve the onions will be topped by a topper (2.5), which cuts off the 'tails' of the onions with rotating knives, while the onions are vibrated over a sieve.

After visual inspection (2.6) onions will be transported by means of an inclined conveyor to the grading machine (2.7) for grading into 3 to 4 different sizes, pending market requirements.

Underneath the size grader 3 to 4 belt conveyors will discharge the different sizes into storage (pallet boxes).

One multi-purpose packaging machine is foreseen:

A packaging machines (2.9) for poly net bags⁸ comprising 1-2.5 kg. This machine will pack approx. 70-75% of the total volume (depending on growing season). As well as a packing machine (2.10) for 10-25 kg separate bags to pack the oversize onions (25-30% of total volume).

After packing onions can be placed manually in a crate (2.11) and then the full crates will be loaded into trucks for onward transport.



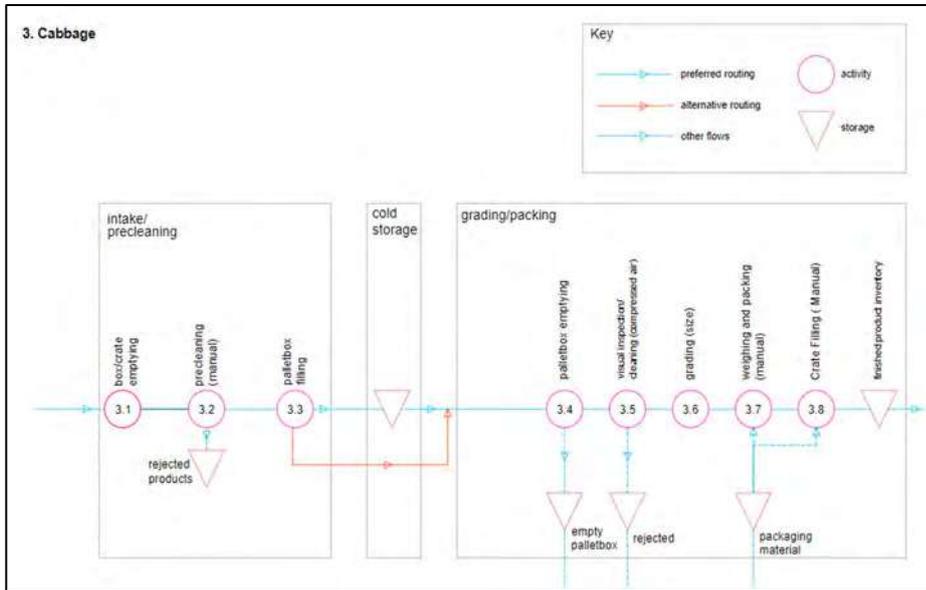
A.3.3 Process description Cabbage

Cabbage is harvested manually. As such cabbages will require little pre-cleaning as the cabbages will enter the storage facility clean, i.e. without soil, stones, damaged and rotten, as these are separated in the field. They should be handled with care to reduce/avoid damage the product. Cabbages destined for long term storage should be harvested as late as possible to ensure cabbages are fully mature.

The Process Flow Diagram is presented in Figure 5-13 below.

⁸ most common in Western European supermarkets is 2.5 kg

Figure 5-13: Product Flow Diagram Cabbage



Intake

Cabbage is a relatively simple system. Upon intake (3.1), when needed, cabbage can be pre-cleaned manually (e.g. damaged and bad quality cabbage will be removed) and limited size grading can also be done manually (3.2). Cabbages are placed manually in standard pallet boxes (3.3) after which these will be transferred to the cold store. All cabbages shall be clean before going into storage. Diseased heads have to be removed.

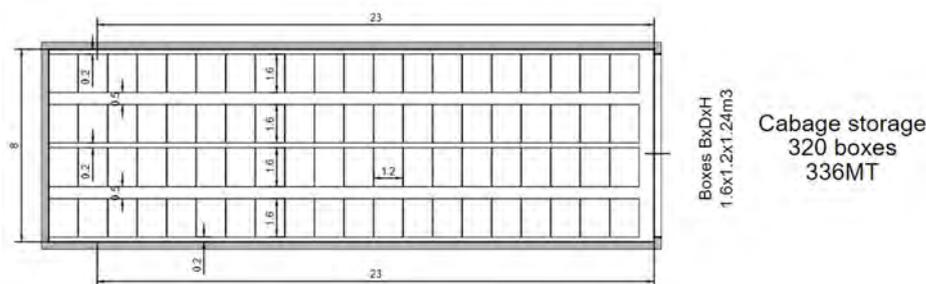
Storage

Cabbages are kept in cold storage at a temperature of approximately 0.5°C at a relative humidity of 90-95%. Cabbages will shrink during extended storage, and the outer leaves may shrivel. Very little ventilation is required (low air change factor). This reduces the load on the cooling system but requires atmosphere monitoring systems to prevent potentially dangerous situations with low oxygen or high carbon dioxide levels.

A 2.5 t electric forklift truck transports these stacked pallet boxes into the storage cell, making stacks of 4 high. Stacking pallet boxes 4 high requires use of high-quality pallet boxes. Precondition also is that the floor is very flat for correct placement, which must be done with great precision. Usage of pallet boxes with defects or placing them on an uneven floor leads to unstable stacks, which may induce safety risks. The storage cells will be equipped with a sliding wall, allowing stacking to the end of the cell. Also easy manoeuvring for the forklift trucks. The sliding wall will be for three cells and can be handled by one person.

For dimensions of a cabbage storage room, reference is made to the figure below.

Figure 5-14: Dimension of cabbage storage room





One storage cell measures 25x8.0 meters. When fully stacked and 4 high, one cell can store 320 boxes of approximately 1.05 ton resulting in 336 ton per cell (assuming a specific weight of 430 kg/m³). Hence 3 rooms are required to reach the total storage capacity of 1,000 MT⁹.

During harvest season, incoming products can also be routed directly to the processing department, thereby entirely skipping the (long-term) storage.

In case the evaporators are positioned correctly and the throw of the air is far enough a ventilation is less/not needed.

Processing

The cabbage processing line starts with unloading a pallet box with a box tipper onto a belt conveyor. This conveyor with an upwards slope moves the cabbages to another belt conveyor (3.4).

A team of workers, each at his/her own workstation, take the cabbages from the belt conveyor to carry out a visual inspection and cleaning the product using a compressed air jet (3.5). Outer leaves that are shrivelled during extended cold storage can be trimmed, increasing weight loss. Size grading of the cabbages (3.6) takes place using a grading machine which grades the cabbages in 3 or 4 different sizes.



Once cabbages are graded a team of workers, standing at packing/weighing tables (3.7), is packing the product in its final packaging (10 kg or 25 kg nets. If needed each cabbage could be shrink wrapped with plastic foil, but we have not foreseen this). Optionally cabbages can be filled into carton boxes.

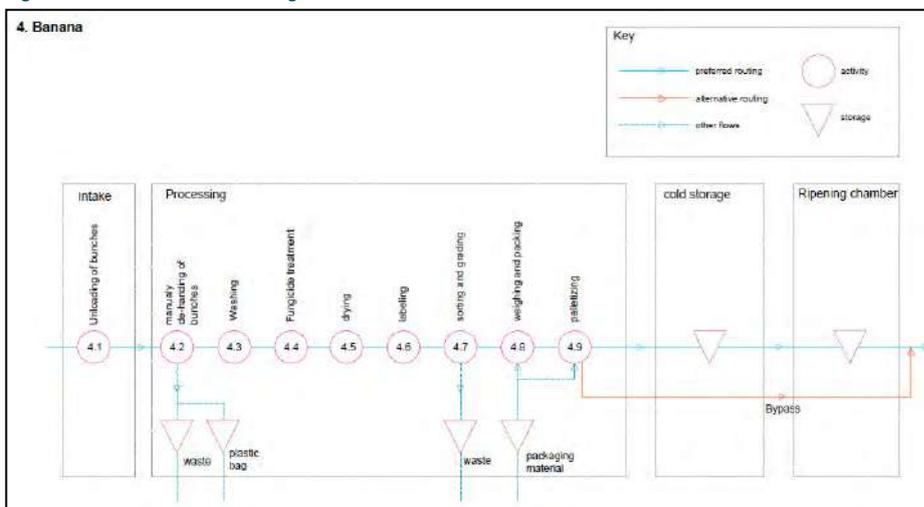
A.3.4 Processing of banana

The Process Flow Diagram for Banana is presented in Figure 5-15.

It is considered that banana arrive at the packing station as bunches (4.1). At the packaging station, they will be de-handled (4.2). When de-handling, the crown will be cut close to the main stem of the bunch. De-handling is done with a de-handling knife that is curved to fit the crown of the banana.

As soon as the hands of fruit have been removed from the bunch, they are placed in the wash tank (4.3) to remove dirt and latex, which exudes from the cut surface of the crown.

Figure 5-15: Product Flow Diagram Banana



⁹ Storage cells for cabbages are designed identical and interchangeably with carrots. They can also be used for the storage of cauliflower.

Next step will be the application of fungicide treatment to extend storage life of the bananas (4.3).

After drying (4.5), the bananas will be labelled (4.6) and sorted and graded (4.7)

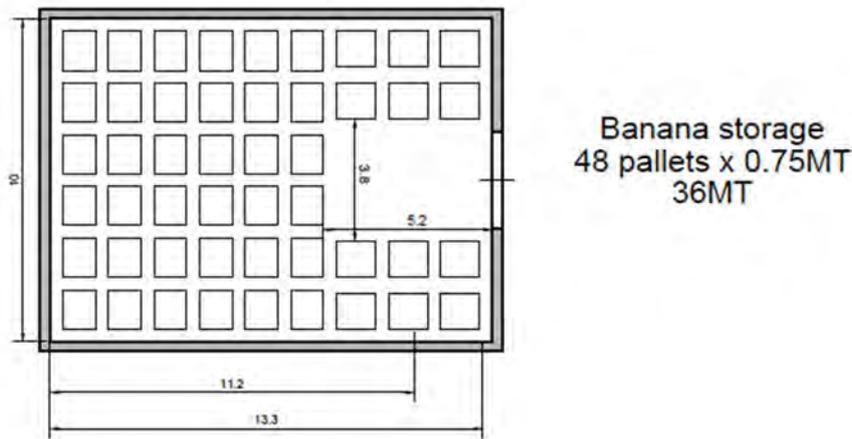
It is considered that the hands will manually be sorted and graded for size and quality on a packaging table.

The final handling of the bananas in the packing station involves the packing in the boxes (4.8) in which they are to be marketed. It is considered that the bananas will be packed in fibre board boxes holding an average weight of 16 kg. After packaging, the boxes will be manually placed on a pallet (4.9). Each pallet contains 48 boxes having a total weight of around 750 kgs. The bananas can be directly sold (depending on its maturity) or be placed in controlled storage.

Green bananas can be stored 2-3 weeks at 13 °C. A few varieties, e.g. Gros Michel, can be stored at 12°C for a shorter period. At 20°C the keeping quality is 4-8 days. Yellow bananas: 13°C 3-6 days. At 20°C the keeping quality is 1 to 2 days. All at 90-95% RH.

For dimensions of a banana storage room, reference is made to the figure below.

Figure 5-16: Dimension of banana storage room



It is considered that there is a requirement of approximately 35 MT of storage capacity in Butwal. It is proposed to allow for one cold storage rooms with a total of 48 pallet positions resulting in 36 tons of total storage. Ripening will be done only after storage; one ripening room will be sufficient (10 MT). It is optional to ripen bananas pending their stage of maturity.

Appendix

A4. Geotechnical soil investigation report

Geotechnical Investigation works

Final

Report

On

Soil Investigation Works

For

The Proposed Site

Of

Development of the Agricultural Value Chain Infrastructures

At

Butwal Sub Metropolitan, ward no 15, Rupandehi.

Consultant: - Apex Techno Concern & Consultancy Pvt. Ltd., Kamalbinayak, Bhaktapur

Client: Royal HaskoningDHV, HaskoningDHV Nederland B.V. Jonkerbosplein 52 6584 AB Nijmegen

PREPARED BY

Sanjujain Geotech Firm Pvt.Ltd.

Lalitpur -4, Bagdol

Cell: 9851118335

1. INTRODUCTION

This report is prepared on the basis of soil investigation carried out for the Soil Investigation at site allocated for the construction of Residential Building at Dillibazar, Kathmandu Developemnt of the Agricultural Value Chain Infrastructutes at Butwal Sub Metropolitan, ward no 15, Rupandehi. It presents the detail of the site investigation and laboratory tests of the sample drawn at site. The soil investigation comprises of percussion drilling, Standard Penetration Test (SPT), Laboratory tests and prediction of the allowable bearing capacity of the site under consideration. The details of test and findings are summarized in the respective sections and paragraphs.

Equipments were mobilized and drilling works for four (4) bore holes were carried out as per the contract agreement. The SPT were carried out along with drawing out of both disturbed and un-disturbed soil samples at locations and depth as shown in the relevant sections. The samples so drawn at site were immediately taken to the laboratory and appropriate tests were performed.

2. OBJECTIVE

The objective of the investigation is to determine the soil formation at the project site so as to derive engineering parameters for the design of the foundation of the proposed structures.

The specific objective of the consulting services subject to these TOR is:

- To do the detailed site investigation and geotechnical investigation of the site
- To submit the detailed site and soil investigation report including engineering properties, design parameters, bearing capacity, coefficient of sub-grade reaction etc.

3. SCOPE OF WORK AND INVESTIGATION

For the purpose of the foundation design and construction of the proposed building, the following data are to be provided:

- Type of foundation
- Depth below the ground level at which the foundation is to be placed
- Allowable bearing pressure at the foundation level
- Design parameters of sub-soil strata (sub-soil profile and engineering properties of the soil strata)

The scope of soil investigation is as follows for borehole advancement to 20.0m at bore hole locations respectively:

- Standard penetration tests at 1.5m interval
- Collection of disturbed and undisturbed samples at regular interval or as and when required
- Ground water table observation
- Laboratory test and analysis of data to determine the engineering properties
- Technical report of the investigation work.

4. METHODOLOGY

A. FIELD INVESTIGATION

The proposed geo-technical investigation was performed to characterize the subsurface conditions at the site, to evaluate the bearing capacity of foundation soil and to recommend safe bearing capacity for different type of foundation including the settlement analysis and the potential of liquefaction.

Field investigation work was carried out in 2079. Drilling works were carried out using one set of percussion drilling machine. The sides of the boreholes were lined with 150mm casing pipes.

Standard Penetration tests (SPT) were carried out in the boreholes at average depth intervals of 1.5 m. Spilt spoon sampler of 35 mm internal diameter and 50 mm external diameter coupled with a standard cutting shoe at its lower end was driven into the ground at the base of the borehole by means of a 63.5 kg hammer falling from a height of 760 mm. After an initial 150 mm seating penetration the sampler was driven to a further depth of 150 mm twice to reach the final depth. The sum of the number of blows required to reach the two last final 150mm depth was recorded as the N-value.

B. WATER TABLE MONITORING

The level of water was recorded in the borehole at least 24 hours after boring was completed to establish the ground water level. There were traces of water after 24 hours of observation thus it can be said that the water table was found at 2.0m below the ground level.

However it should be noted that ground water levels may change and can vary with seasonal rainfall patterns, long term climate fluctuations and with the influence of local site conditions such as drainage patterns and presences of ground water barriers.

LABORATORY INVESTIGATION

All the requisite laboratory tests were carried out in accordance with IS standard specifications. Standard laboratory test was carried out to characterize the soil strata. The laboratory test includes the following tests: Moisture Content, Grain Size Analysis including Hydrometer, Bulk Density, Specific Gravity, Atterberg Limits, Consolidation Tests, Unconfined Compression Test and Direct Shear Tests.

a. Natural Moisture Content and Bulk Density

The natural water content and bulk density was determined from samples recovered from the split spoon sampler.

b. Specific Gravity

The specific gravity test is made on the soil sample which was grounded to pass 2.0 mm IS sieve. Specific gravity is defined as the ratio of the weight of a given volume of soil particles in air to the weight of an equal volume of distilled water at a temperature

of 4 degree C. It is important for computing the most of the soil properties e.g., void ratio, unit weight, particle size determination by hydrometer, degree of saturation etc. This method covers determination of the specific gravity of soils by means of a pycnometer.

c. Grain size Analysis

Grain size distribution was determined by dry sieving process. Sieve analysis was carried out by sieving a soil sample through sieves of known aperture size (e.g., 4.75mm, 2mm, 1.18mm, 425, 300, 150 and 75 microns) by keeping one over the other, the largest size being kept at the top and the smallest size at the bottom. The soil is placed on the top sieve and shaken for 10 minutes using a mechanical shaker. The soil retained on each sieve was weighed and expressed as a percentage of the weight of sample.

d. Atterberg Limits

The physical properties of fine grained soils (clay and silt) get affected with water content. Depending upon the amount of water present in a fine grained soil, it can be in liquid, plastic or solid consistency states. The Atterberg Test was used for determining the consistency of a cohesive (fine) soil. The Liquid Limit is the water content at which a soil has a small shear strength that it flows to close a groove of standard width when jarred in a specified manner. The Plastic Limit is the water content at which a soil begins to crumble when rolled into threads of specified size i.e., 3mm. The water content determined at a stage when the rolled thread of soil just starts crumbling. Three such tests and the average value of water content were taken as Plastic Limit. The Plasticity Index is the numerical difference between the Liquid Limit and the Plastic Limit. The liquid limit of the fine grained soils was determined using the Casagrande liquid limit device. A Plastic limit was determined using the standard 'rolling the soil into a thread of 3mm' method. Casagrande plasticity chart was employed to determine the classification of fine grained soil according to the Unified Soil Classification System.

e. Consolidation

Consolidation of soil is the process of compression by gradual reduction of pores under a steadily applied pressure. Consolidation tests are conducted for obtaining data required for settlement analysis. Consolidation tests were performed on undisturbed samples of 60 mm diameter and 20 mm thick. Two-way drainage was provided. Each increment of load was maintained until sufficient period beyond the primary consolidation has been reached. The test results are presented in terms of the $e - \log \sigma$ curves in the attached figures.

f. Unconfined Compression Test

The unconfined compressive strength of a soil specimen is the ratio of failure load and cross-sectional area of the specimen (at failure) when it is not subjected to any confining pressure. It is conducted to measure the shear strength of a cohesive soil, collected in natural state (in undisturbed form) from the field. This test is mainly used for cohesive soils to check the short term stability of foundations and the sensitivity of

a soil. In this test, a circular soil specimen is compressed axially without any confining pressure. The cross-section of the specimen increases with decrease in length.

g. Direct Shear Test

The shear strength of a soil mass is its property against sliding along internal planes within itself and is determined in this case to compute the safe bearing capacity of the foundation soil. Direct shear tests were conducted on disturbed samples collected from the three boreholes. The samples were carefully extruded from the sampling tubes and molded using standard moulds of 6.0 x 6.0 cm² cross-sectional areas and trimmed to 2.5 cm high. Solid metal plates were placed on both surfaces of the samples to prevent the dissipation of pore water during shearing. The direct shear equipment is mechanically-operated and shearing is applied at more or less constant strain rate. If the samples are cohesive they will be sheared at a relatively fast rate (duration of tests less than 10 minutes) to maintain un-drained condition. The samples were sheared at three different normal stresses (i.e., 0.5 kg/cm², 1.0 kg/cm², 1.5 kg/cm²). The direct shear test results are presented in terms of the failure envelopes to give the angle of internal frictions (ϕ) and the cohesion intercepts (c).

5. ANALYSIS OF ALLOWABLE BEARING PRESSURE

The allowable bearing pressure (q_{all}) is the maximum pressure that can be imposed on the foundation soil taking into consideration the ultimate bearing capacity of the soil and the tolerable settlement of the structure. Analysis to determine the ultimate bearing capacity and the pressure corresponding to a specified maximum settlement were performed and the minimum pressure obtained from the two analyses were adopted as the allowable bearing pressure.

A. ALLOWABLE BEARING PRESSURE BASED ON ULTIMATE BEARING CAPACITY

Since the soil in the vicinity of the foundation level has been found to be grayish color very dense gravel at greater depth, grey silty clay with high plasticity at intermediate depth, the allowable bearing capacity has been analyzed using the angle of friction and cohesion values from direct shear test results. Empirical formula of Terzaghi applicable for this type of soils has been used to obtain the allowable bearing pressure with safety factor equal to 3.

a. Hansen's Method:

$$q_{ult} = cN_c s_c d_c i_c + qN_q s_q d_q i_q W_q + 0.5\gamma B N_\gamma s_\gamma d_\gamma i_\gamma W_\gamma$$

where,

$$N_q = e^{\pi \tan \phi} \tan^2(45 + \phi/2)$$

$$N_c = (N_q - 1) \cot \phi$$

$$N_\gamma = 1.5 (N_q - 1) \tan \phi$$

$s_c, s_q, s_\gamma, d_c, d_q, d_\gamma, i_c, i_q, i_\gamma$ are shape, depth and inclination factors.

b. Terzaghi's Method:

$$q_{ult} = cN_c s_c + qN_q W_q + 0.5\gamma B N_\gamma s_\gamma W_\gamma$$

where,

$$N_q = a^2 / a \cos^2(45 + \phi/2), a = e^{(0.75\pi - \phi/2)\tan\phi/2}$$

$$N_c = (N_q - 1) \cot\phi$$

$$N_\gamma = \tan\phi / 2 * (K_{p\gamma} / \cos^2\phi - 1)$$

$K_{p\gamma}$ is a factor

c. Effect of water table:

- i) If water table is likely to permanently remains at or below a depth of ($D_f + B$) beneath the ground level surrounding the footing then $W_q = 1$.
- ii) If the water table is located at depth D_f or likely to rise to the base of the footing or above then the value of W_q shall be taken as 0.5.
- iii) If the water table is likely to permanently got located at depth $D_f < D_w < (D_f + B)$, then the value of W_q be obtained by linear interpolation.

B. ALLOWABLE BEARING PRESSURE BASED ON TOLERABLE SETTLEMENT

The maximum allowable settlement for isolated footings in sand is generally 50 mm and for mat foundation in sand the allowable settlement is 75 mm (IS 1904: - 1978). For isolated footings in cohesive soil, allowable settlement is generally 75 mm and for mat foundation in cohesive soil the allowable settlement is 100 mm (IS 1904: - 1978).

a. Settlement Analysis using Schmertmann method:

The method proposed by Schmertmann (1970) states that the change in the Boussinesq pressure bulb was interpreted as related to strain. Since the pressure bulb changes more rapidly from about 0.4 to 0.6 B, this depth is interpreted to have the largest strains. Schmertmann then proposed using triangular relative-strain diagram to model this strain distribution with ordinates of 0, 0.6 and 0 at 0B, 0.5B and 2B respectively. The area of diagram is related to the settlement.

$$\text{Settlement } (\delta) = C_1 C_2 C_3 (q - \sigma'_{zd}) \Sigma I_\epsilon H / E_s$$

The Peak Value of the strain influence factor I_{ep} is

$$I_{ep} = 0.5 + 0.1 \text{Sqrt} ((q - \sigma'_{zd}) / \sigma'_{zp})$$

Square and Circular Foundation:

$$\text{For } z_f = 0 \text{ to } B/2 \quad I_\epsilon = 0.1 + (z_f/B) (2I_{ep} - 0.2)$$

$$\text{For } z_f = B/2 \text{ to } 2B \quad I_\epsilon = 0.667 I_{ep} (2 - z_f/B)$$

$$C_1 = 1 - 0.5 (\sigma'_{zd} / q - \sigma'_{zd})$$

$$C_2 = 1 + 0.2 \log (t / 0.1)$$

$$C_3 = 1.03 - 0.003 L/B \geq 0.73$$

SPT N Value Corrected for field procedures

$$N_{60} = E_m C_B C_S C_R N / 0.6$$

E_m = Hammer efficiency

C_B = Bore hole dia correction

C_S = Sampler correction

C_R = Rod Length Correction

SPT N value corrected for field procedure and overburden stress

$$(N_1)_{60} = N_{60} \sqrt{(100 \text{ Kpa} / \sigma'_z)}$$

The method of Teng (1988) can also be employed for determining settlement. This method is a modification of the method of Terzaghi and Peck (1948) such that the allowable bearing pressure could directly be obtained from the SPT values.

The allowable bearing pressure for a limiting settlement other than 25 mm (e.g. x mm) can be linearly interpolated from the allowable bearing pressure for 25 mm settlement.

$$q_a(x \text{ mm}) = q_a(25 \text{ mm})(x/25)$$

C. LIQUEFACTION:

The liquefaction resistance of an element of soil depends on how close the initial state of the soil is to the state corresponding to “failure” and on the nature of the loading required to move it from the initial state to failure state. It is evident from the literature that the failure state is different for flow liquefaction and cyclic mobility. The failure state for flow liquefaction is easily defined using the FS_L and its initiation is easily recognized in the field. Once the cyclic loading imposed by an earthquake and the liquefaction resistance of the soils has been characterized, liquefaction potential can be evaluated. The cyclic stress approach characterizes earthquake loading by the amplitude of an equivalent uniform cyclic stress and liquefaction resistance by the amplitude of the uniform cyclic stress required to produce liquefaction in the same number of cycles. The evaluation of liquefaction potential is thus reduced to a comparison of loading and resistance throughout the soil deposit of interest. Liquefaction can be expected at depths where the loading exceeds the resistance or when the factor of safety against liquefaction, expressed as, $FS_L = \frac{CSRL}{CSR}$ is less than 1.

Cyclic mobility failure is generally considered to occur when pore pressure become large enough to produce ground oscillation, lateral spreading, or other evidence of damage at the ground surface.

Maximum shear stress:

$$\tau_{\max} = a_{\max} / g * \sigma'_v * r_d$$

$a_{\max} / g = 0.2$ (Peak ground acceleration)

r_d = Stress reduction factor

The equivalent uniform cyclic shear stresses are simply taken as 65% of maximum shear stress.

$$\tau_{\max} = a_{\max}/g * \sigma'_v * r_d * 0.65$$

Triaxial cyclic stress ratio (CSR_L) from fig 9.31,

Cyclic shear stress required to cause liquefaction:

$$\tau_{\text{cyc,L}} = \text{CSR}_L * \sigma'_v$$

FS_L = $\tau_{\text{cyc,L}}/\tau_{\text{cyc}}$, is less than 1.

It should be noted that significant excess pore pressure can develop even if the computed factor of safety is greater than 1.

6. CONCLUSION

1. Soil investigation work has been carried out for the Soil Investigation at site allocated for the construction of Developemnt of the Agricultural Value Chain Infrastructutes at Butwal Sub Metropolitan, ward no 15, Rupandehi.
2. During soil investigation the water table was found at 2.0m below the ground level. Therefore, all the bearing capacity calculations have been done with the water table.
3. As per the site investigation results and then analysis associated for the measure of liquefaction, it shall be noted that there is no possibility of liquefaction.
4. On the basis of ultimate bearing capacity and allowable settlement the following allowable bearing pressures in KN/m^2 for isolated foundation have been recommended.

Bearing capacity for Mat foundation and settlement as per IS Code: 1904-1986, 65mm to 100mm on clay and 40mm to 75mm on sand. For Isolated footing 50mm for sand and hard clay, 75mm for clay, for load bearing wall 60mm.

| Footing size in m x m | Depth of footing in m | Allowable bearing capacity by Terzaghi's method in KN/m^2 | Settlement in mm | Minimum Allowable bearing capacity in KN/m^2 | Modulus of subgrade reaction in KN/m^3 |
|--------------------------|--------------------------------|---|---------------------|---|--|
| | | | 50mm | | |
| 2.0 X 2.0 | 1.5 | 132.10 | 37.2 | 132.10 | 10653.22 |

Sanjujain Geotech Firm Pvt. Ltd.

Bore Hole Log Sheet

| Project Name : | | Development of the Agricultural Value Chain Infrastructures | | | | | | | | | |
|----------------------------|--------------------|---|-----------|------|---------------------------------|------|---------|----|--------------|----------|------------|
| Location : | | Butwal Sub metropolitan, Ward no 15, Rupandehi | | | Bore Hole No: | | 1 | | | | |
| | | | | | Water Table, m : | | 2.00 | | | | |
| | | Diameter of Bore Hole : 6'' | | | | | | | | | |
| Depth | Thickne ss | Soil Description | Sampling | | Penetration Blow | | | N | Group symbol | | |
| | | | Depth (m) | Type | 15cm | 15cm | 15cm | | | | |
| | | DCPT @10cm | | | | | | | | | |
| 0.0-3.0 | 3.0 | Greyish Colour Gravels and Boulders. | 1.5 | DCPT | 6 | 9 | 11 | 20 | | | |
| | | DCPT @ 10cm | | | | | | | | | |
| | | | 3.00 | DCPT | 5 | 7 | 10 | 17 | | | |
| | | SPT | | | | | | | | | |
| 3.0-7.5 | 4.5 | Greyish Colour Silty Clay. | 4.50 | SPT | 9 | 12 | 18 | 30 | | | |
| | | SPT | | | | | | | | | |
| | | | 6.00 | SPT | 11 | 13 | 16 | 29 | | | |
| | | SPT | | | | | | | | | |
| | | | 7.50 | SPT | 12 | 16 | 16 | 32 | | | |
| | | SPT | | | | | | | | | |
| 7.5-9.0 | 1.5 | Greyish Colour Sand with Silt. | 9.00 | SPT | 10 | 14 | 14 | 28 | | | |
| | | SPT | | | | | | | | | |
| 9.0-12.0 | 3.0 | Greyish Colour Silty Clay. | 10.50 | SPT | 5 | 11 | 14 | 25 | | | |
| | | SPT | | | | | | | | | |
| | | | 12.00 | SPT | 6 | 17 | 18 | 35 | | | |
| | | SPT | | | | | | | | | |
| | | | 13.50 | SPT | 7 | 16 | 21 | 37 | | | |
| | | SPT | | | | | | | | | |
| | | | 15.00 | SPT | 9 | 18 | 26 | 44 | | | |
| | | SPT | | | | | | | | | |
| 12.0-20.0 | 8.0 | Greyish Colour Sand with Silt. | 16.50 | SPT | 6 | 14 | 24 | 38 | | | |
| | | SPT | | | | | | | | | |
| | | | 18.00 | SPT | 9 | 15 | 24 | 39 | | | |
| | | SPT | | | | | | | | | |
| | | | 19.50 | SPT | 11 | 19 | 25 | 44 | | | |
| | | SPT | | | | | | | | | |
| Total depth: 20.00m | | | | | | | | | | | |
| Type of soil | | | | | N, Value | | | | | | |
| Granular Soil | Compactness | | | | 0 to 4 | | 4 to 10 | | 10 to 30 | 30 to 50 | |
| | | | | | very loose | | loose | | med. dense | dense | very dense |
| Cohesive Soil | Consistency | | | | 0 to 2 | | 2 to 4 | | 4 to 8 | 8 to 16 | 16 to 32 |
| | | | | | Very soft | | Soft | | med.soft | stiff | very stiff |
| Logged by : | | Shiva | | | Verified by : S. K. Jain | | | | | | |
| Checked by : | | Rajya | | | | | | | | | |

Sanjujain Geotech Firm Pvt. Ltd.

Bore Hole Log Sheet

| Project Name : | | Development of the Agricultural Value Chain Infrastructures | | | | | | | | | | |
|----------------------------|--------------------|---|-------------|------|------------------|------------------------------------|---------|------------|--------------|------------|------------|--|
| Location : | | Butwal Sub metropolitan, Ward no 15, Rupandehi | | | | Bore Hole No: | | 2 | | | | |
| | | | | | | Water Table, m : | | 2.00 | | | | |
| | | | | | | Diameter of Bore Hole : 6'' | | | | | | |
| Depth | Thickne ss | Soil Description | Sampling | | Penetration Blow | | | N | Group symbol | | | |
| | | | Depth (m) | Type | 15cm | 15cm | 15cm | | | | | |
| 0.0-3.0 | 3.0 | Greyish Colour Gravels and Boulders. | DCPT @ 10cm | | | | | | | | | |
| | | | 1.5 | DCPT | 5 | 13 | 13 | 26 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 3.00 | DCPT | 7 | 8 | 11 | 19 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 4.50 | SPT | 6 | 9 | 16 | 25 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 6.00 | SPT | 8 | 11 | 14 | 25 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 7.50 | SPT | 11 | 13 | 15 | 28 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 9.00 | SPT | 9 | 12 | 14 | 26 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 10.50 | SPT | 7 | 15 | 17 | 32 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 12.00 | SPT | 10 | 14 | 19 | 33 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 13.50 | SPT | 13 | 15 | 19 | 34 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 15.00 | SPT | 9 | 16 | 18 | 34 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 16.50 | SPT | 11 | 17 | 19 | 36 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 18.00 | SPT | 12 | 17 | 20 | 37 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 19.50 | SPT | 14 | 16 | 20 | 36 | | | | |
| Total depth: 20.00m | | | | | | | | | | | | |
| Type of soil | | | | | N, Value | | | | | | | |
| Granular Soil | Compactness | | | | 0 to 4 | | 4 to 10 | | 10 to 30 | | 30 to 50 | |
| | | | | | very loose | loose | | med. dense | dense | very dense | | |
| Cohesive Soil | Consistency | | | | 0 to 2 | | 2 to 4 | | 4 to 8 | | 8 to 16 | |
| | | | | | Very soft | | Soft | | med.soft | stiff | very stiff | |
| Logged by : | | Shiva | | | | Verified by : S. K. Jain | | | | | | |
| Checked by : | | Rajya | | | | | | | | | | |

Sanjujain Geotech Firm Pvt. Ltd.

Bore Hole Log Sheet

| Project Name : | | Development of the Agricultural Value Chain Infrastructures | | | | | | | | |
|----------------------------|--------------------|---|-------------|------|------------------------------------|------|---------|----|--------------|----------|
| Location : | | Butwal Sub metropolitan, Ward no 15, Rupandehi | | | Bore Hole No: | | 3 | | | |
| | | | | | Water Table, m : | | 2.00 | | | |
| | | | | | Diameter of Bore Hole : 6'' | | | | | |
| Depth | Thickne ss | Soil Description | Sampling | | Penetration Blow | | | N | Group symbol | |
| | | | Depth (m) | Type | 15cm | 15cm | 15cm | | | |
| 0.0-3.0 | 3.0 | Greyish Colour Gravels and Boulders. | DCPT @ 10cm | | | | | | | |
| | | | 1.5 | DCPT | 8 | 11 | 12 | 23 | | |
| | | | DCPT @ 10cm | | | | | | | |
| | | | 3.00 | DCPT | 6 | 9 | 11 | 20 | | |
| | | | 4.50 | SPT | 7 | 13 | 17 | 30 | | |
| | | | 6.00 | SPT | 10 | 13 | 15 | 28 | | |
| | | | 7.50 | SPT | 13 | 16 | 20 | 36 | | |
| | | | 9.00 | SPT | 11 | 13 | 18 | 31 | | |
| | | | 10.50 | SPT | 9 | 13 | 17 | 30 | | |
| | | | 12.00 | SPT | 12 | 16 | 19 | 35 | | |
| | | | 13.50 | SPT | 12 | 15 | 20 | 35 | | |
| | | | 15.00 | SPT | 11 | 16 | 20 | 36 | | |
| | | | 16.50 | SPT | 10 | 17 | 21 | 38 | | |
| | | | 18.00 | SPT | 13 | 19 | 19 | 38 | | |
| | | | 19.50 | SPT | 12 | 20 | 20 | 40 | | |
| Total depth: 20.00m | | | | | | | | | | |
| Type of soil | | | | | N, Value | | | | | |
| Granular Soil | Compactness | | | | 0 to 4 | | 4 to 10 | | 10 to 30 | 30 to 50 |
| | | | | | very loose | | loose | | med. dense | dense |
| Cohesive Soil | Consistency | | | | 0 to 2 | | 2 to 4 | | 4 to 8 | 8 to 16 |
| | | | | | Very soft | | Soft | | med.soft | stiff |
| Logged by : | | Shiva | | | Verified by : S. K. Jain | | | | | |
| Checked by : | | Rajya | | | | | | | | |

Sanjujain Geotech Firm Pvt. Ltd.

Bore Hole Log Sheet

| Project Name : | | Development of the Agricultural Value Chain Infrastructures | | | | | | | | | | |
|----------------------------|--------------------|---|--------------|------|---------------------------------|-------|---------|---------------|--------------|------------|----------|------------|
| Location : | | Butwal Sub metropolitan, Ward no 15, Rupandehi | | | Bore Hole No: | | 4 | | | | | |
| | | | | | Water Table, m : | | 2.00 | | | | | |
| | | Diameter of Bore Hole : 6'' | | | | | | | | | | |
| Depth | Thickne ss | Soil Description | Sampling | | Penetration Blow | | | N | Group symbol | | | |
| | | | Depth (m) | Type | 15cm | 15cm | 15cm | | | | | |
| 0.0-1.5 | 1.5 | Greyish Colour Gravels and Boulders. | 1.5 | DCPT | 5 | 8 | 10 | 18 | | | | |
| 1.5-20.0 | 18.5 | Greyish Colour Sand with Gravels and Silt. | 3.00 | DCPT | 7 | 9 | 11 | 20 | | | | |
| | | | 4.50 | SPT | 9 | 12 | 15 | 27 | | | | |
| | | | 6.00 | SPT | 11 | 16 | 17 | 33 | | | | |
| | | | 7.50 | SPT | 8 | 14 | 17 | 31 | | | | |
| | | | 9.00 | SPT | 12 | 16 | 16 | 32 | | | | |
| | | | 10.50 | SPT | 10 | 15 | 15 | 30 | | | | |
| | | | 12.00 | SPT | 11 | 16 | 16 | 32 | | | | |
| | | | 13.50 | SPT | 9 | 17 | 17 | 34 | | | | |
| | | | 15.00 | SPT | 13 | 17 | 17 | 34 | | | | |
| | | | 16.50 | SPT | 10 | 18 | 18 | 36 | | | | |
| | | | 18.00 | SPT | 11 | 18 | 19 | 37 | | | | |
| 19.50 | SPT | 12 | 19 | 19 | 38 | | | | | | | |
| Total depth: 20.00m | | | | | | | | | | | | |
| Type of soil | | | | | N, Value | | | | | | | |
| Granular Soil | Compactness | | | | 0 to 4 | | 4 to 10 | | 10 to 30 | | 30 to 50 | |
| | | | | | very loose | loose | | med. dense | dense | very dense | | |
| Cohesive Soil | Consistency | | | | 0 to 2 | | 2 to 4 | | 4 to 8 | | 8 to 16 | 16 to 32 |
| | | | | | Very soft | | Soft | | med.soft | stiff | | very stiff |
| Logged by : | | Shiva | | | Verified by : S. K. Jain | | | | | | | |
| Checked by : | | Rajya | | | | | | | | | | |

Sanjujain Geotech Firm Pvt. Ltd.

Bulk Density Test

Project Name : Development of the Agricultural Value Chain Infrastructures

Consultant :

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Date :

| Sample No. | Depth m | Length cm | Weight gm | Volume cm ³ | Bulk Density gm/cm ³ |
|-----------------------|---------|-----------|-----------|------------------------|---------------------------------|
| Borehole No. 1 | | | | | |
| SPT | 6.00 | 10.00 | 172.60 | 96.21 | 1.79 |
| | 9.00 | 10.00 | 187.40 | 96.21 | 1.95 |
| | 12.00 | 10.00 | 189.30 | 96.21 | 1.97 |
| | 15.00 | 10.00 | 189.90 | 96.21 | 1.97 |
| Borehole No. 2 | | | | | |
| SPT | 4.00 | 10.00 | 187.80 | 96.21 | 1.95 |
| | 7.50 | 10.00 | 182.30 | 96.21 | 1.89 |
| | 10.50 | 10.00 | 176.10 | 96.21 | 1.83 |
| | 13.50 | 10.00 | 174.00 | 96.21 | 1.81 |
| Borehole No. 3 | | | | | |
| SPT | 6.00 | 10.00 | 180.10 | 96.21 | 1.87 |
| | 9.00 | 10.00 | 175.00 | 96.21 | 1.82 |
| | 10.50 | 10.00 | 172.80 | 96.21 | 1.80 |
| | 12.00 | 10.00 | 170.00 | 96.21 | 1.77 |
| Borehole No. 4 | | | | | |
| SPT | 3.00 | 10.00 | 183.20 | 96.21 | 1.90 |
| | 7.50 | 10.00 | 184.50 | 96.21 | 1.92 |
| | 10.50 | 10.00 | 178.00 | 96.21 | 1.85 |
| | 12.00 | 10.00 | 174.70 | 96.21 | 1.82 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil,Geotech Engg. USA)

Sanjujain Geotech Firm Pvt. Ltd.

Natural Moisture Content

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

| Sample | Depth m | Wt. of Cont. + Wet Soil gm | Wt. of Cont.+ Dry Soil gm | Wt. of Water gm | Wt. of Empty Container gm | Wt. of Dry Soil gm | Moisture Content % |
|------------------------|------------|-------------------------------------|------------------------------------|-----------------------|------------------------------------|--------------------------|--------------------------|
| Bore Hole No. 1 | | | | | | | |
| SPT | 6.00 | 174.70 | 144.80 | 29.90 | 3.60 | 141.20 | 21.18 |
| | 9.00 | 206.60 | 184.90 | 21.70 | 3.60 | 181.30 | 11.97 |
| | 12.00 | 211.40 | 177.90 | 33.50 | 3.60 | 174.30 | 19.22 |
| | 15.00 | 196.10 | 182.60 | 13.50 | 3.50 | 179.10 | 7.54 |
| Bore Hole No. 2 | | | | | | | |
| SPT | 4.00 | 223.30 | 201.40 | 21.90 | 3.50 | 197.90 | 11.07 |
| | 7.50 | 243.50 | 201.70 | 41.80 | 3.50 | 198.20 | 21.09 |
| | 10.50 | 267.50 | 231.60 | 35.90 | 3.50 | 228.10 | 15.74 |
| | 13.50 | 206.30 | 189.80 | 16.50 | 3.50 | 186.30 | 8.86 |
| Bore Hole No. 3 | | | | | | | |
| SPT | 6.00 | 182.80 | 165.60 | 17.20 | 3.50 | 162.10 | 10.61 |
| | 9.00 | 217.80 | 197.50 | 20.30 | 3.50 | 194.00 | 10.46 |
| | 10.50 | 247.40 | 238.00 | 9.40 | 3.50 | 234.50 | 4.01 |
| | 12.00 | 172.50 | 156.70 | 15.80 | 3.50 | 153.20 | 10.31 |
| Bore Hole No. 4 | | | | | | | |
| SPT | 3.00 | 251.10 | 214.70 | 36.40 | 3.50 | 211.20 | 17.23 |
| | 7.50 | 255.50 | 217.60 | 37.90 | 3.50 | 214.10 | 17.70 |
| | 10.50 | 245.30 | 216.40 | 28.90 | 3.50 | 212.90 | 13.57 |
| | 12.00 | 273.30 | 240.70 | 32.60 | 3.50 | 237.20 | 13.74 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Specific Gravity Test

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

| Borehole No. | | BH-1 | | | |
|--|----|---------|---------|---------|---------|
| Depth, m | | 6.00 | 9.00 | 12.00 | 15.00 |
| Sample No. | | SPT | SPT | SPT | SPT |
| Weight of Pycnometer W_1 | gm | 519.90 | 519.90 | 519.90 | 519.90 |
| Weight of pycnometer with dry soil W_2 | gm | 774.10 | 768.20 | 770.30 | 773.10 |
| Weight of pycnometer with dry soil and water W_3 | gm | 1613.50 | 1605.10 | 1611.20 | 1617.30 |
| Weight Pycnometer full of water W_4 | gm | 1480.20 | 1480.20 | 1480.20 | 1480.20 |
| Weight of dry Soil (w_2-w_1) | gm | 254.20 | 248.30 | 250.40 | 253.20 |
| Weight of an equal volume of water (w_2-w_1)-(w_3-w_4) | gm | 120.90 | 123.40 | 119.40 | 116.10 |
| Specific Gravity | | 2.10 | 2.01 | 2.10 | 2.18 |
| Borehole No. | | BH-2 | | | |
| Depth, m | | 4.00 | 7.50 | 10.50 | 13.50 |
| Sample No. | | SPT | SPT | SPT | SPT |
| Weight of Pycnometer W_1 | gm | 519.90 | 519.90 | 519.90 | 519.10 |
| Weight of pycnometer with dry soil W_2 | gm | 764.50 | 767.00 | 769.20 | 763.10 |
| Weight of pycnometer with dry soil and water W_3 | gm | 1630.40 | 1632.10 | 1634.00 | 1631.10 |
| Weight Pycnometer full of water W_4 | gm | 1480.20 | 1480.20 | 1480.20 | 1480.20 |
| Weight of dry Soil (w_2-w_1) | gm | 244.60 | 247.10 | 249.30 | 244.00 |
| Weight of an equal volume of water (w_2-w_1)-(w_3-w_4) | gm | 94.40 | 95.20 | 95.50 | 93.10 |
| Specific Gravity | | 2.59 | 2.60 | 2.61 | 2.62 |

Tested by : Bina (Lab Technician)

Checked by : Rajya

Verified by: S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Specific Gravity Test

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

| Borehole No. | | BH-3 | | | |
|--|----|---------|---------|---------|---------|
| Depth, m | | 6.00 | 9.00 | 10.50 | 12.00 |
| Sample No. | | SPT | SPT | SPT | SPT |
| Weight of Pycnometer W_1 | gm | 519.90 | 519.90 | 519.90 | 519.90 |
| Weight of pycnometer with dry soil W_2 | gm | 772.50 | 772.60 | 774.20 | 770.20 |
| Weight of pycnometer with dry soil and water W_3 | gm | 1626.80 | 1629.80 | 1634.60 | 1605.00 |
| Weight Pycnometer full of water W_4 | gm | 1480.20 | 1480.20 | 1480.20 | 1480.20 |
| Weight of dry Soil (w_2-w_1) | gm | 252.60 | 252.70 | 254.30 | 250.30 |
| Weight of an equal volume of water (w_2-w_1)-(w ₃ -w ₄) | gm | 106.00 | 103.10 | 99.90 | 125.50 |
| Specific Gravity | | 2.38 | 2.45 | 2.55 | 1.99 |
| Borehole No. | | BH-4 | | | |
| Depth, m | | 3.00 | 7.50 | 10.50 | 12.00 |
| Sample No. | | SPT | SPT | SPT | SPT |
| Weight of Pycnometer W_1 | gm | 519.90 | 519.90 | 519.90 | 519.90 |
| Weight of pycnometer with dry soil W_2 | gm | 769.40 | 773.20 | 774.00 | 772.80 |
| Weight of pycnometer with dry soil and water W_3 | gm | 1619.90 | 1629.10 | 1627.40 | 1623.20 |
| Weight Pycnometer full of water W_4 | gm | 1480.20 | 1480.20 | 1480.20 | 1480.20 |
| Weight of dry Soil (w_2-w_1) | gm | 249.50 | 253.30 | 254.10 | 252.90 |
| Weight of an equal volume of water (w_2-w_1)-(w ₃ -w ₄) | gm | 109.80 | 104.40 | 106.90 | 109.90 |
| Specific Gravity | | 2.27 | 2.43 | 2.38 | 2.30 |

Tested by : Bina (Lab Technician)

Checked by : Rajya

Verified by: S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

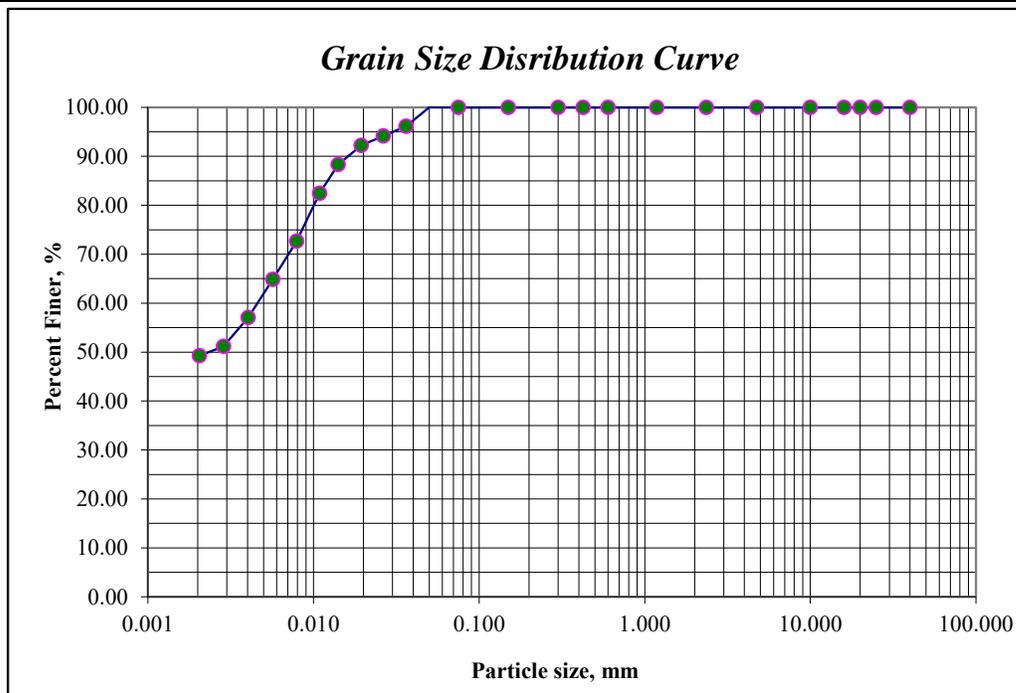
Bore Hole No : **BH - 1**

Depth (m) : 6.00

Wt. of Sample, gm : 141.10

Sample No : SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | | 0.00 | 0.00 | 100.00 |
| 2.360 | | 0.00 | 0.00 | 100.00 |
| 1.180 | | 0.00 | 0.00 | 100.00 |
| 0.600 | | 0.00 | 0.00 | 100.00 |
| 0.425 | | 0.00 | 0.00 | 100.00 |
| 0.300 | | 0.00 | 0.00 | 100.00 |
| 0.150 | | 0.00 | 0.00 | 100.00 |
| 0.075 | | 0.00 | 0.00 | 100.00 |



| | | | | |
|---------|-----------|------|---------|-------|
| Remarks | Gravel, % | 0.00 | Silt, % | 50.77 |
| | Sand, % | 0.00 | Clay, % | 49.23 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 1**

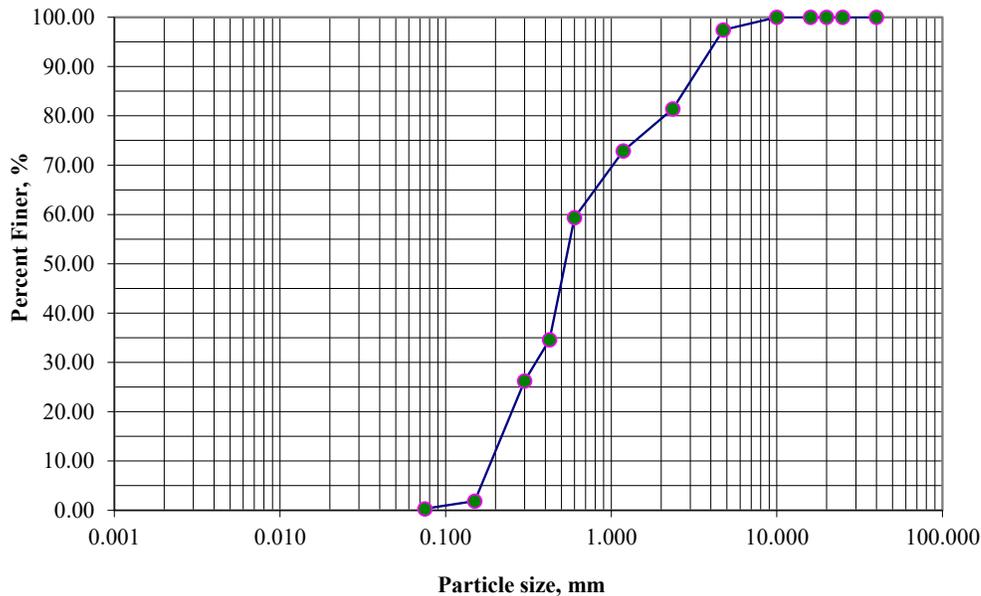
Depth (m) : 9.00

Wt. of Sample, gm : 180.30

Sample No : SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 4.60 | 4.60 | 2.55 | 97.45 |
| 2.360 | 28.90 | 33.50 | 18.58 | 81.42 |
| 1.180 | 15.40 | 48.90 | 27.12 | 72.88 |
| 0.600 | 24.40 | 73.30 | 40.65 | 59.35 |
| 0.425 | 44.60 | 117.90 | 65.39 | 34.61 |
| 0.300 | 15.10 | 133.00 | 73.77 | 26.23 |
| 0.150 | 43.90 | 176.90 | 98.11 | 1.89 |
| 0.075 | 2.80 | 179.70 | 99.67 | 0.33 |

Grain Size Distribution Curve



Remarks

| | | | |
|-----------|-------|---------|------|
| Gravel, % | 2.55 | Silt, % | 0.33 |
| Sand, % | 97.12 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 1**

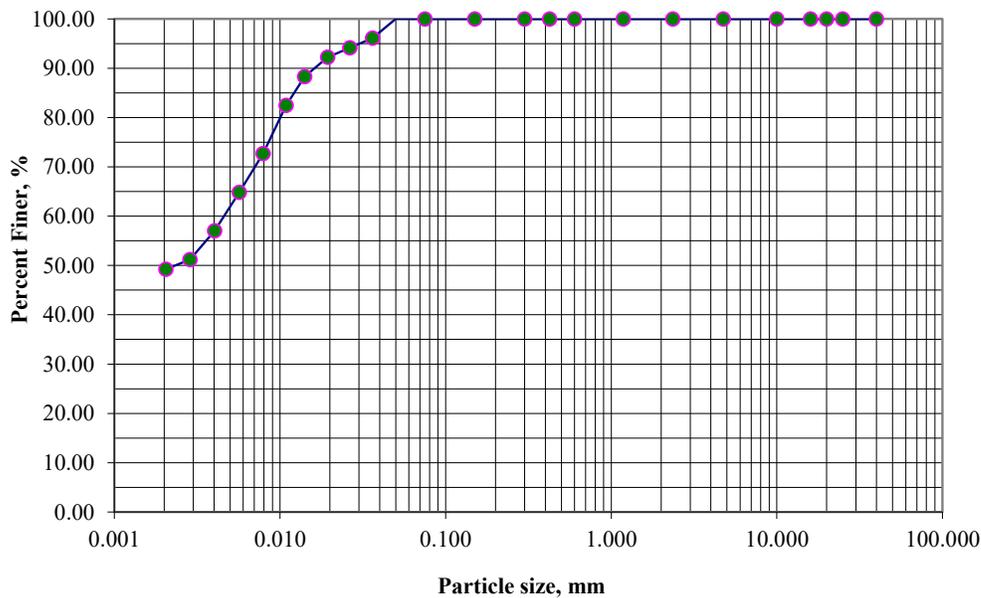
Depth (m) : 12.00

Wt. of Sample, gm : 151.40

Sample No : SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | | 0.00 | 0.00 | 100.00 |
| 2.360 | | 0.00 | 0.00 | 100.00 |
| 1.180 | | 0.00 | 0.00 | 100.00 |
| 0.600 | | 0.00 | 0.00 | 100.00 |
| 0.425 | | 0.00 | 0.00 | 100.00 |
| 0.300 | | 0.00 | 0.00 | 100.00 |
| 0.150 | | 0.00 | 0.00 | 100.00 |
| 0.075 | | 0.00 | 0.00 | 100.00 |

Grain Size Disribution Curve



| | | | | |
|----------------|-----------|------|---------|-------|
| <i>Remarks</i> | Gravel, % | 0.00 | Silt, % | 50.77 |
| | Sand, % | 0.00 | Clay, % | 49.23 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 1**

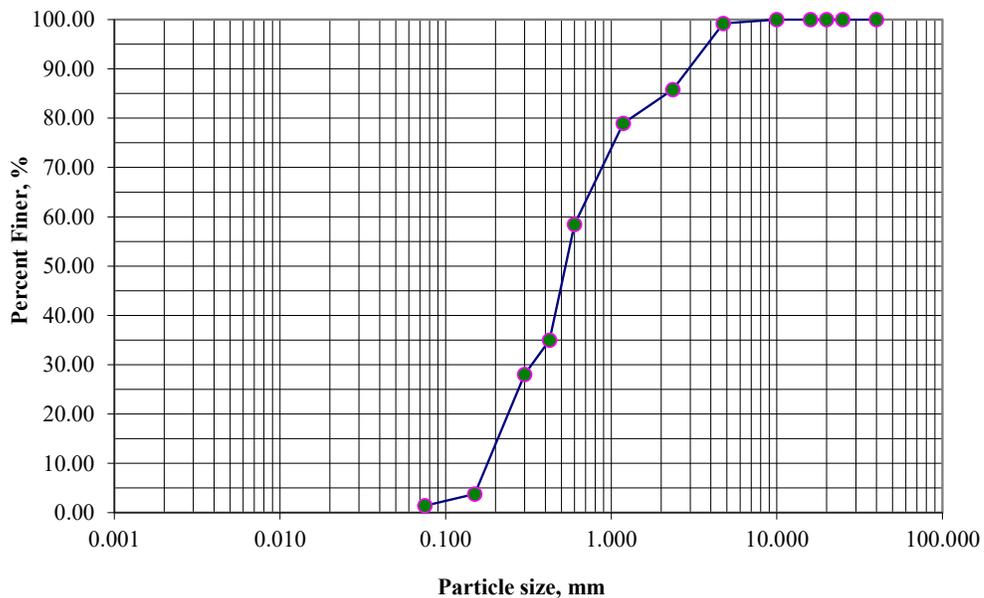
Depth (m) : 15.00

Wt. of Sample, gm : 178.90

Sample No : SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 1.40 | 1.40 | 0.78 | 99.22 |
| 2.360 | 24.00 | 25.40 | 14.20 | 85.80 |
| 1.180 | 12.30 | 37.70 | 21.07 | 78.93 |
| 0.600 | 36.60 | 74.30 | 41.53 | 58.47 |
| 0.425 | 42.00 | 116.30 | 65.01 | 34.99 |
| 0.300 | 12.40 | 128.70 | 71.94 | 28.06 |
| 0.150 | 43.40 | 172.10 | 96.20 | 3.80 |
| 0.075 | 4.30 | 176.40 | 98.60 | 1.40 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.78 | Silt, % | 1.40 |
| | Sand, % | 97.82 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 2**

Depth (m)

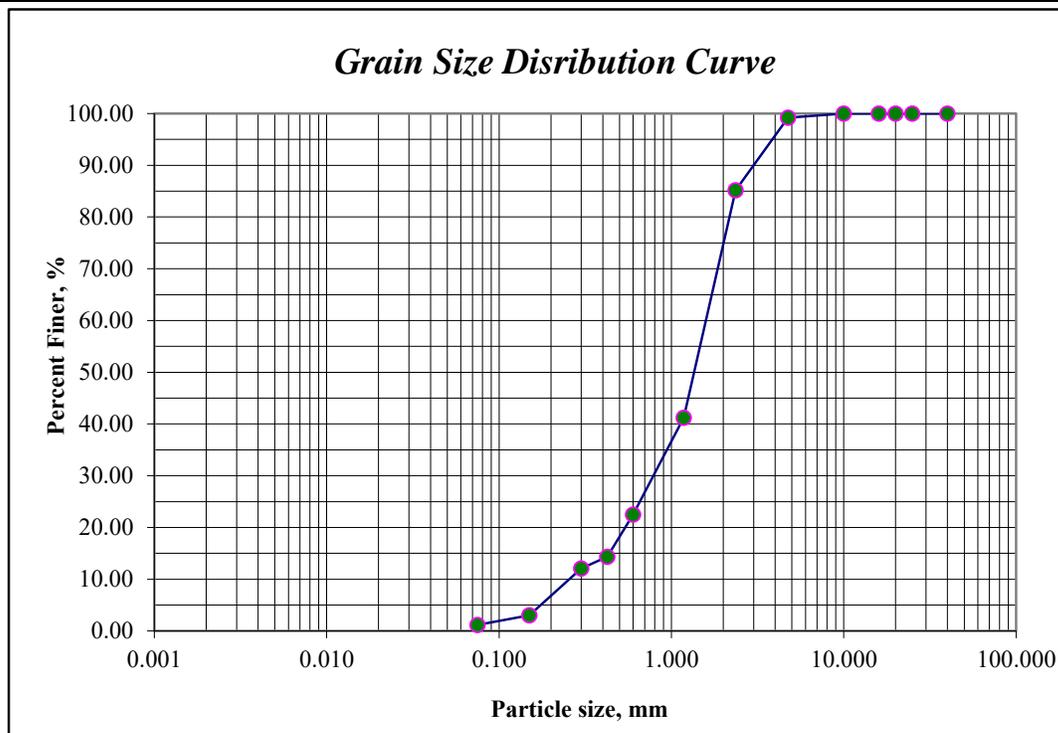
4.00

Wt. of Sample, gm : 197.70

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 1.60 | 1.60 | 0.81 | 99.19 |
| 2.360 | 27.70 | 29.30 | 14.82 | 85.18 |
| 1.180 | 86.90 | 116.20 | 58.78 | 41.22 |
| 0.600 | 37.10 | 153.30 | 77.54 | 22.46 |
| 0.425 | 16.10 | 169.40 | 85.69 | 14.31 |
| 0.300 | 4.40 | 173.80 | 87.91 | 12.09 |
| 0.150 | 17.90 | 191.70 | 96.97 | 3.03 |
| 0.075 | 3.70 | 195.40 | 98.84 | 1.16 |



| | | | | |
|---------|-----------|-------|---------|------|
| Remarks | Gravel, % | 0.81 | Silt, % | 1.16 |
| | Sand, % | 98.03 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 2**

Depth (m)

7.50

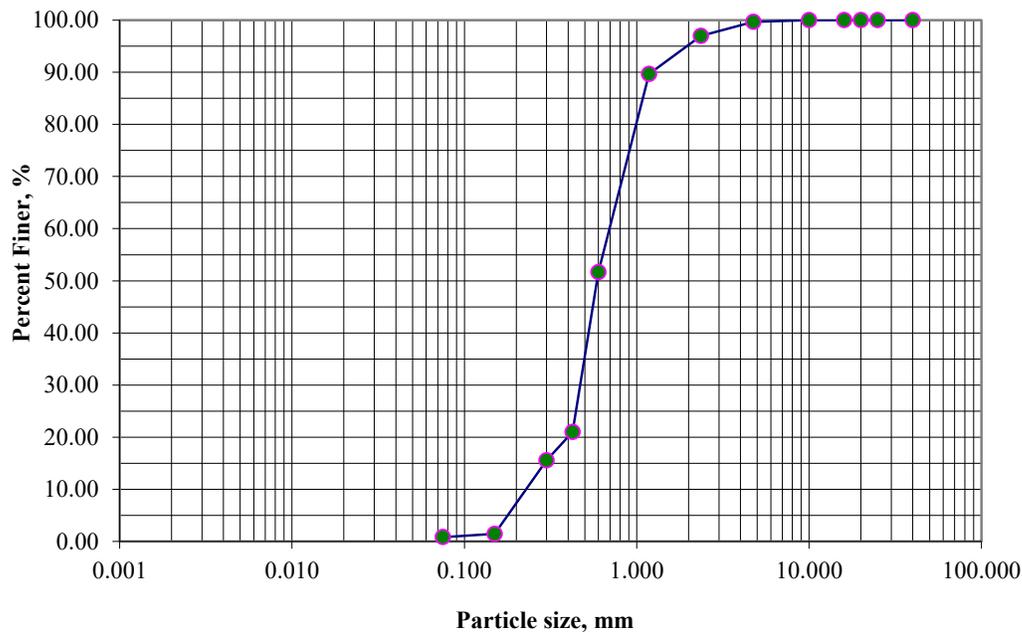
Wt. of Sample, gm : 197.10

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 0.60 | 0.60 | 0.30 | 99.70 |
| 2.360 | 5.40 | 6.00 | 3.04 | 96.96 |
| 1.180 | 14.30 | 20.30 | 10.30 | 89.70 |
| 0.600 | 75.00 | 95.30 | 48.35 | 51.65 |
| 0.425 | 60.40 | 155.70 | 79.00 | 21.00 |
| 0.300 | 10.70 | 166.40 | 84.42 | 15.58 |
| 0.150 | 27.80 | 194.20 | 98.53 | 1.47 |
| 0.075 | 1.30 | 195.50 | 99.19 | 0.81 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.30 | Silt, % | 0.81 |
| | Sand, % | 98.88 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 2**

Depth (m)

10.50

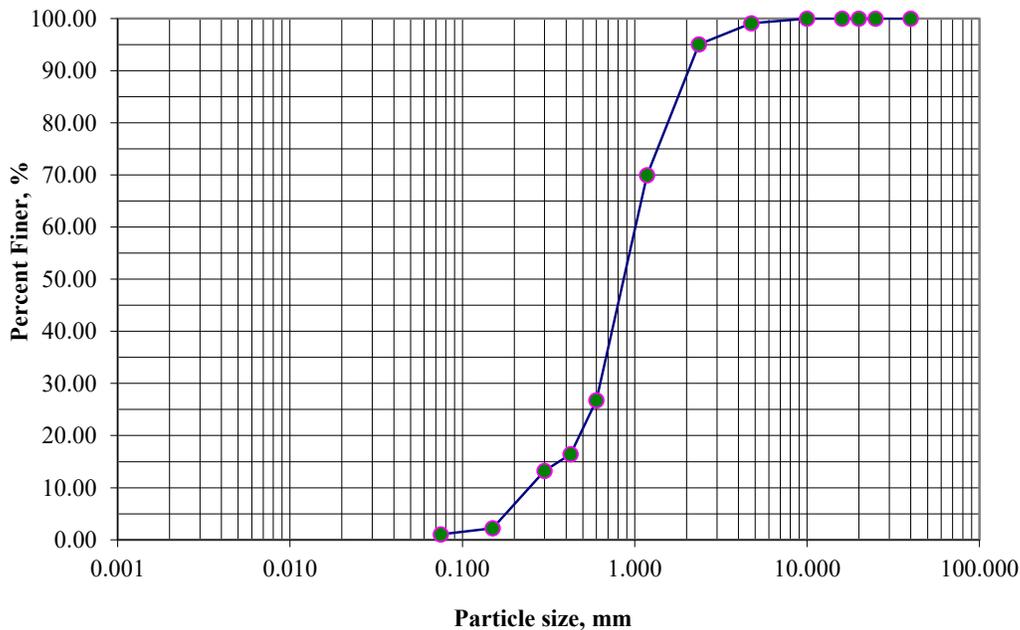
Wt. of Sample, gm : 227.60

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 2.00 | 2.00 | 0.88 | 99.12 |
| 2.360 | 9.30 | 11.30 | 4.96 | 95.04 |
| 1.180 | 57.10 | 68.40 | 30.05 | 69.95 |
| 0.600 | 98.30 | 166.70 | 73.24 | 26.76 |
| 0.425 | 23.50 | 190.20 | 83.57 | 16.43 |
| 0.300 | 7.30 | 197.50 | 86.78 | 13.22 |
| 0.150 | 25.10 | 222.60 | 97.80 | 2.20 |
| 0.075 | 2.60 | 225.20 | 98.95 | 1.05 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.88 | Silt, % | 1.05 |
| | Sand, % | 98.07 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 2**

Depth (m)

13.50

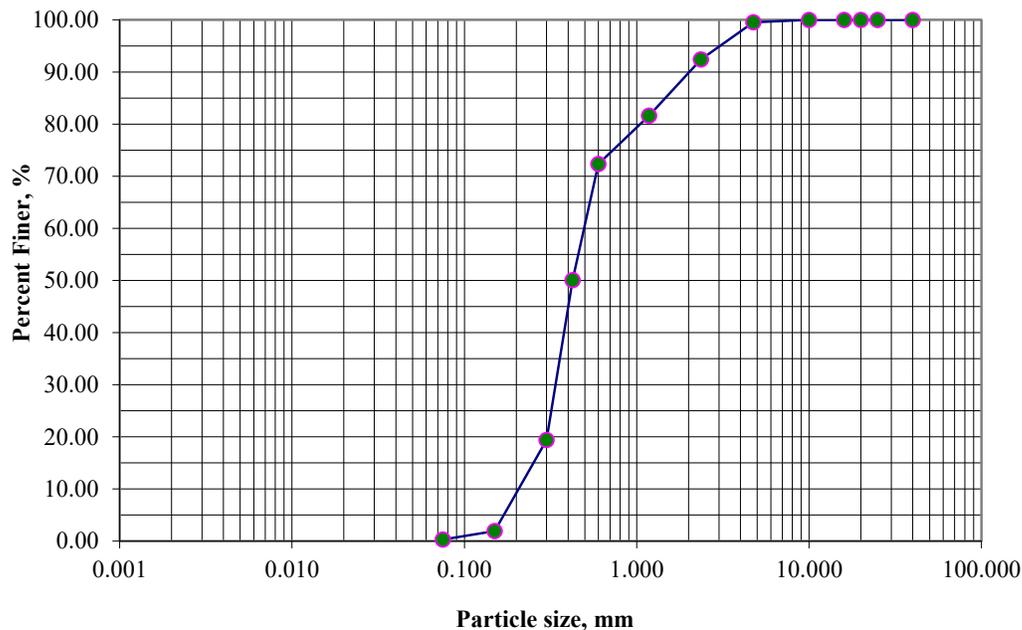
Wt. of Sample, gm : 186.10

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 0.90 | 0.90 | 0.48 | 99.52 |
| 2.360 | 13.30 | 14.20 | 7.63 | 92.37 |
| 1.180 | 20.00 | 34.20 | 18.38 | 81.62 |
| 0.600 | 17.30 | 51.50 | 27.67 | 72.33 |
| 0.425 | 41.40 | 92.90 | 49.92 | 50.08 |
| 0.300 | 21.10 | 114.00 | 61.26 | 19.40 |
| 0.150 | 65.00 | 179.00 | 96.18 | 1.91 |
| 0.075 | 6.00 | 185.00 | 99.41 | 0.30 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.48 | Silt, % | 0.30 |
| | Sand, % | 99.22 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 3**

Depth (m)

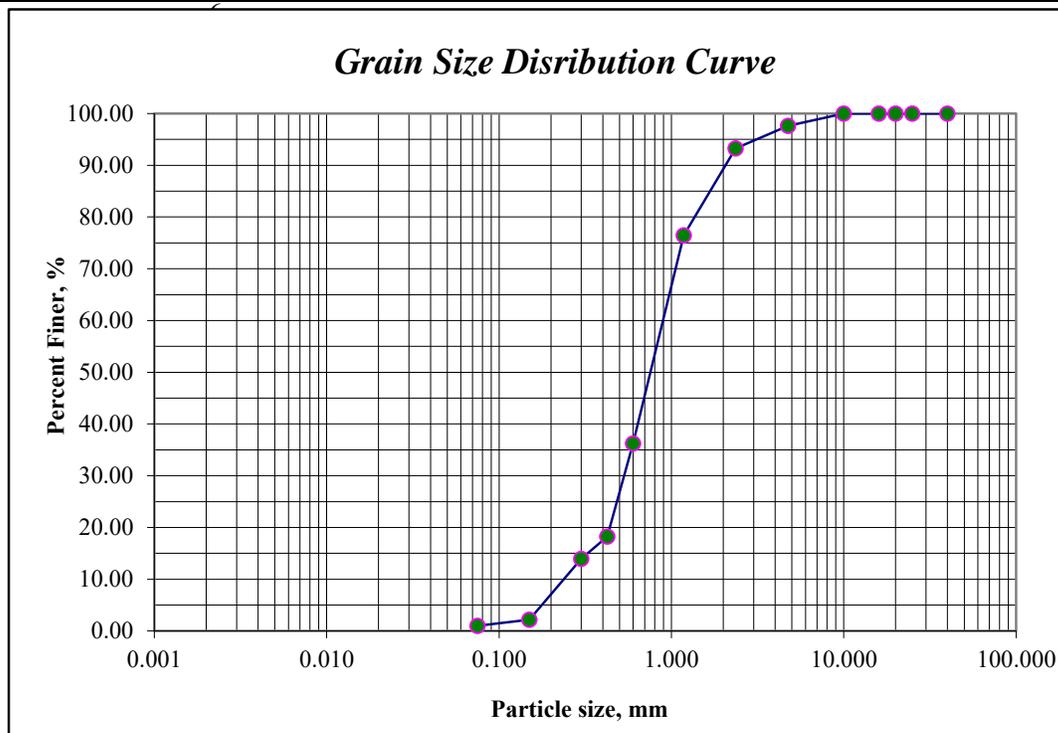
6.00

Wt. of Sample, gm : 161.60

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 3.80 | 3.80 | 2.35 | 97.65 |
| 2.360 | 7.10 | 10.90 | 6.75 | 93.25 |
| 1.180 | 27.10 | 38.00 | 23.51 | 76.49 |
| 0.600 | 65.00 | 103.00 | 63.74 | 36.26 |
| 0.425 | 29.10 | 132.10 | 81.75 | 18.25 |
| 0.300 | 7.00 | 139.10 | 86.08 | 13.92 |
| 0.150 | 19.00 | 158.10 | 97.83 | 2.17 |
| 0.075 | 1.90 | 160.00 | 99.01 | 0.99 |



| | | | | |
|---------|-----------|-------|---------|------|
| Remarks | Gravel, % | 2.35 | Silt, % | 0.99 |
| | Sand, % | 96.66 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 3**

Depth (m)

9.00

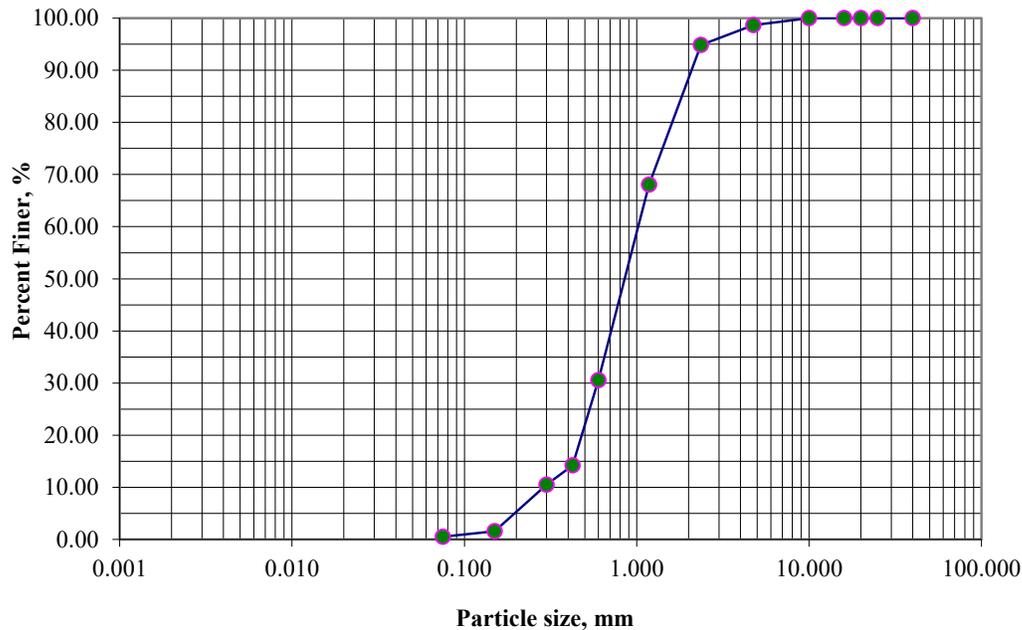
Wt. of Sample, gm : 193.90

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 2.60 | 2.60 | 1.34 | 98.66 |
| 2.360 | 7.40 | 10.00 | 5.16 | 94.84 |
| 1.180 | 51.90 | 61.90 | 31.92 | 68.08 |
| 0.600 | 72.80 | 134.70 | 69.47 | 30.53 |
| 0.425 | 31.70 | 166.40 | 85.82 | 14.18 |
| 0.300 | 7.10 | 173.50 | 89.48 | 10.52 |
| 0.150 | 17.40 | 190.90 | 98.45 | 1.55 |
| 0.075 | 2.00 | 192.90 | 99.48 | 0.52 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 1.34 | Silt, % | 0.52 |
| | Sand, % | 98.14 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 3**

Depth (m)

10.50

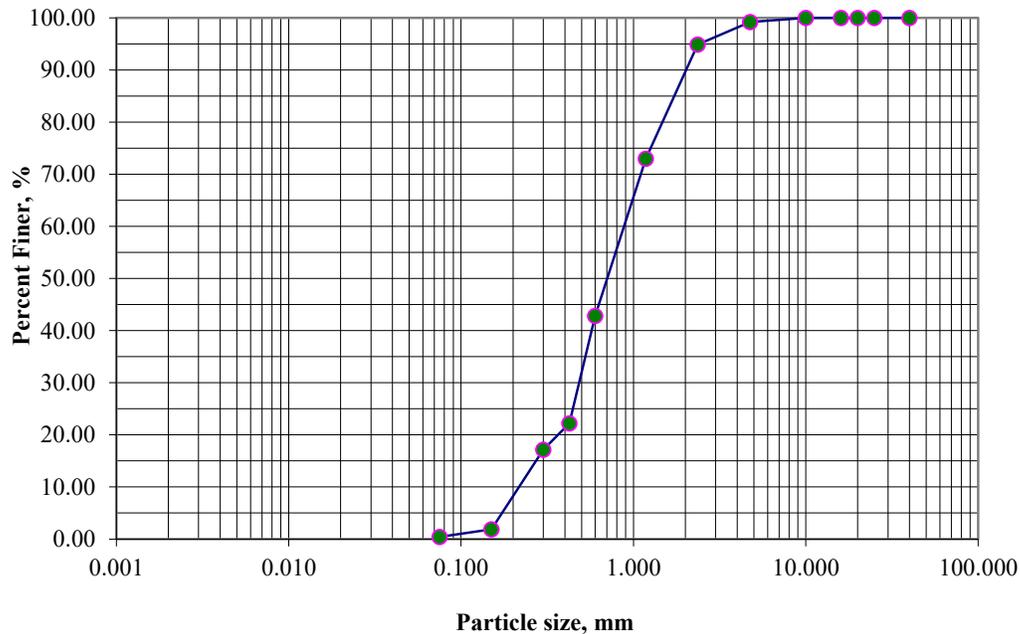
Wt. of Sample, gm : 233.40

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 1.80 | 1.80 | 0.77 | 99.23 |
| 2.360 | 10.10 | 11.90 | 5.10 | 94.90 |
| 1.180 | 51.20 | 63.10 | 27.04 | 72.96 |
| 0.600 | 70.30 | 133.40 | 57.16 | 42.84 |
| 0.425 | 48.20 | 181.60 | 77.81 | 22.19 |
| 0.300 | 11.70 | 193.30 | 82.82 | 17.18 |
| 0.150 | 35.70 | 229.00 | 98.11 | 1.89 |
| 0.075 | 3.40 | 232.40 | 99.57 | 0.43 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.77 | Silt, % | 0.43 |
| | Sand, % | 98.80 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 3**

Depth (m)

12.00

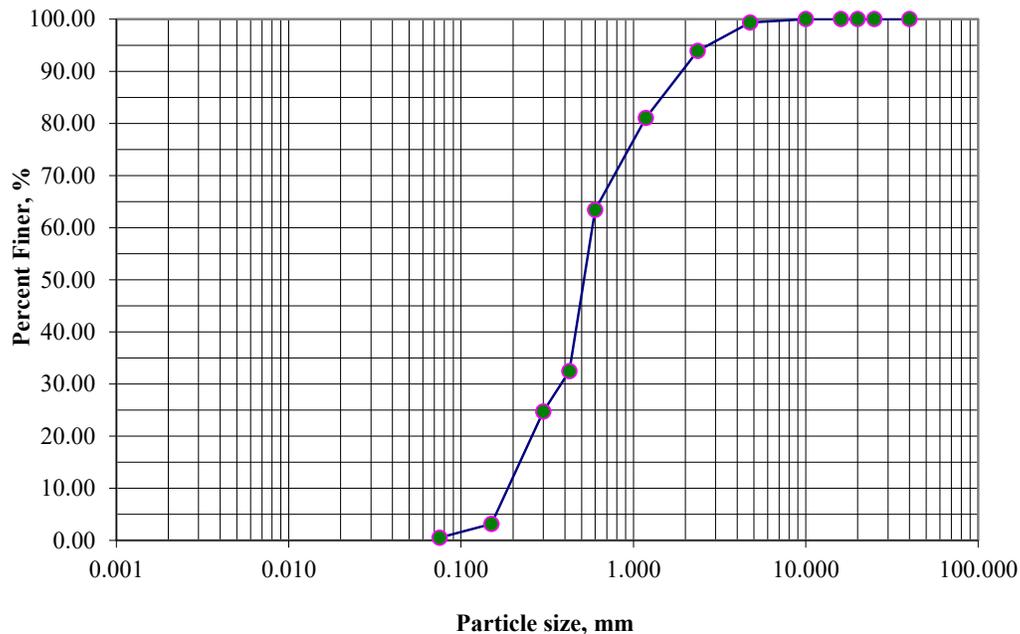
Wt. of Sample, gm : 152.50

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 1.00 | 1.00 | 0.66 | 99.34 |
| 2.360 | 8.30 | 9.30 | 6.10 | 93.90 |
| 1.180 | 19.60 | 28.90 | 18.95 | 81.05 |
| 0.600 | 26.90 | 55.80 | 36.59 | 63.41 |
| 0.425 | 47.20 | 103.00 | 67.54 | 32.46 |
| 0.300 | 11.80 | 114.80 | 75.28 | 24.72 |
| 0.150 | 32.90 | 147.70 | 96.85 | 3.15 |
| 0.075 | 4.00 | 151.70 | 99.48 | 0.52 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.66 | Silt, % | 0.52 |
| | Sand, % | 98.82 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 4**

Depth (m)

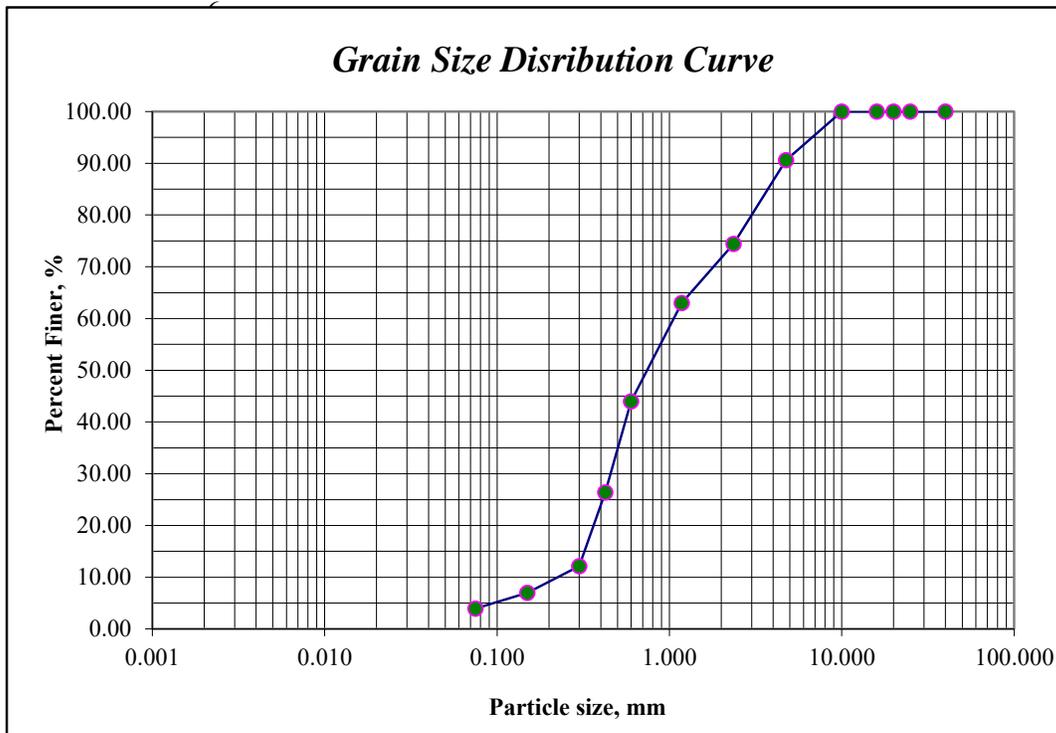
3.00

Wt. of Sample, gm : 175.10

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 16.40 | 16.40 | 9.37 | 90.63 |
| 2.360 | 28.40 | 44.80 | 25.59 | 74.41 |
| 1.180 | 20.00 | 64.80 | 37.01 | 62.99 |
| 0.600 | 33.30 | 98.10 | 56.03 | 43.97 |
| 0.425 | 30.80 | 128.90 | 73.62 | 26.38 |
| 0.300 | 25.00 | 153.90 | 87.89 | 12.11 |
| 0.150 | 9.00 | 162.90 | 93.03 | 6.97 |
| 0.075 | 5.30 | 168.20 | 96.06 | 3.94 |



| Remarks | Gravel, % | 9.37 | Silt, % | 3.94 |
|---------|-----------|---------|---------|---------|
| | | Sand, % | 86.69 | Clay, % |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 4**

Depth (m)

7.50

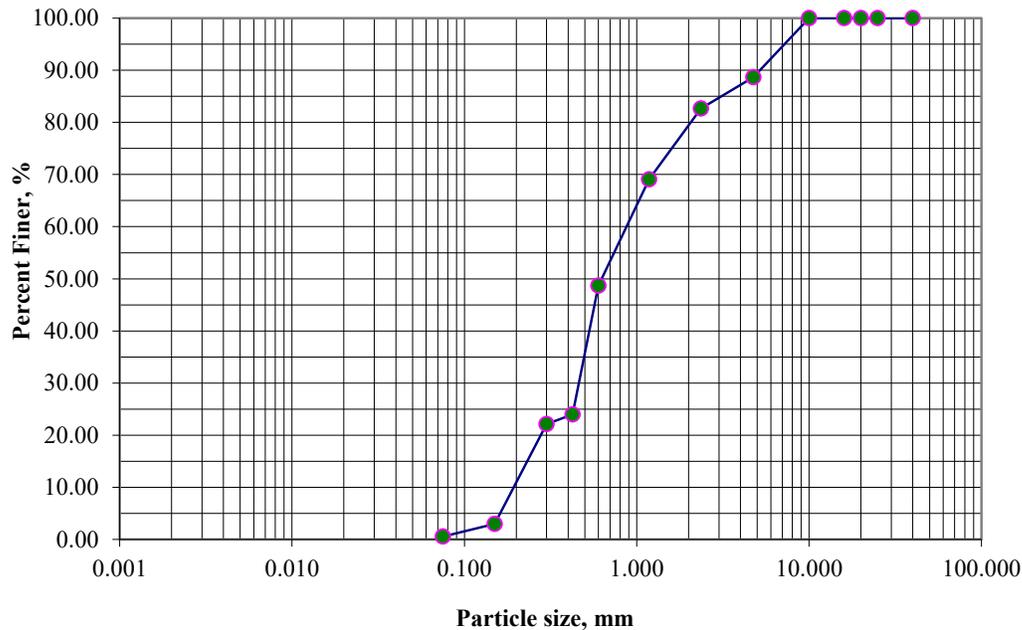
Wt. of Sample, gm : 165.30

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 18.70 | 18.70 | 11.31 | 88.69 |
| 2.360 | 10.00 | 28.70 | 17.36 | 82.64 |
| 1.180 | 22.40 | 51.10 | 30.91 | 69.09 |
| 0.600 | 33.70 | 84.80 | 51.30 | 48.70 |
| 0.425 | 40.90 | 125.70 | 76.04 | 23.96 |
| 0.300 | 3.00 | 128.70 | 77.86 | 22.14 |
| 0.150 | 31.70 | 160.40 | 97.04 | 2.96 |
| 0.075 | 4.00 | 164.40 | 99.46 | 0.54 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 11.31 | Silt, % | 0.54 |
| | Sand, % | 88.14 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 4**

Depth (m)

10.50

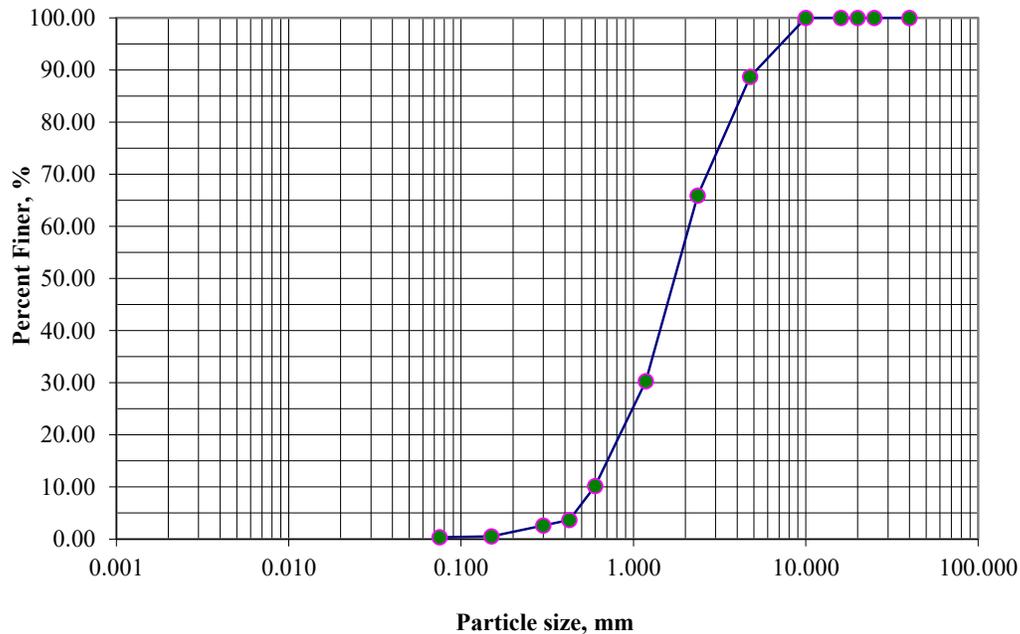
Wt. of Sample, gm : 200.60

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 22.70 | 22.70 | 11.32 | 88.68 |
| 2.360 | 45.70 | 68.40 | 34.10 | 65.90 |
| 1.180 | 71.40 | 139.80 | 69.69 | 30.31 |
| 0.600 | 40.40 | 180.20 | 89.83 | 10.17 |
| 0.425 | 13.00 | 193.20 | 96.31 | 3.69 |
| 0.300 | 2.20 | 195.40 | 97.41 | 2.59 |
| 0.150 | 4.10 | 199.50 | 99.45 | 0.55 |
| 0.075 | 0.40 | 199.90 | 99.65 | 0.35 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 11.32 | Silt, % | 0.35 |
| | Sand, % | 88.33 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 4**

Depth (m)

12.00

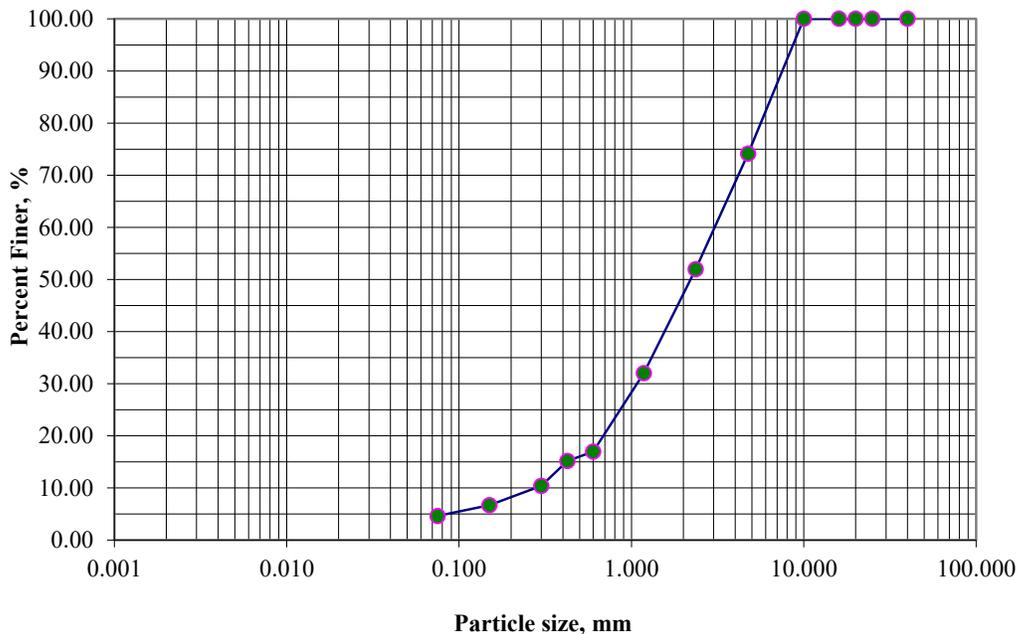
Wt. of Sample, gm : 170.60

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 44.10 | 44.10 | 25.85 | 74.15 |
| 2.360 | 37.90 | 82.00 | 48.07 | 51.93 |
| 1.180 | 34.00 | 116.00 | 68.00 | 32.00 |
| 0.600 | 25.60 | 141.60 | 83.00 | 17.00 |
| 0.425 | 3.10 | 144.70 | 84.82 | 15.18 |
| 0.300 | 8.20 | 152.90 | 89.62 | 10.38 |
| 0.150 | 6.30 | 159.20 | 93.32 | 6.68 |
| 0.075 | 3.50 | 162.70 | 95.37 | 4.63 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 25.85 | Silt, % | 4.63 |
| | Sand, % | 69.52 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjain Geotech Firm Pvt. Ltd.

Summary

| Bore Hole No. | Sample No. | Depth m | Natural Moisture Content % | Bulk Density gm/cm ³ | Grain Size Distribution, % | | | | Specific Gravity |
|---------------|------------|---------|----------------------------|---------------------------------|----------------------------|-------|-------|-------|------------------|
| | | | | | Gravel | Sand | Silt | Clay | |
| BH- 1 | SPT | 6.00 | 21.18 | 1.79 | 0.00 | 0.00 | 50.77 | 49.23 | 2.10 |
| | SPT | 9.00 | 11.97 | 1.95 | 2.55 | 97.12 | 0.33 | 0.00 | 2.01 |
| | SPT | 12.00 | 19.22 | 1.97 | 0.00 | 0.00 | 50.77 | 49.23 | 2.10 |
| | SPT | 15.00 | 7.54 | 1.97 | 0.78 | 97.82 | 1.40 | 0.00 | 2.18 |
| BH- 2 | SPT | 4.00 | 11.07 | 1.95 | 0.81 | 98.03 | 1.16 | 0.00 | 2.59 |
| | SPT | 7.50 | 21.09 | 1.89 | 0.30 | 98.88 | 0.81 | 0.00 | 2.60 |
| | SPT | 10.50 | 15.74 | 1.83 | 0.88 | 98.07 | 1.05 | 0.00 | 2.61 |
| | SPT | 13.50 | 8.86 | 1.81 | 0.48 | 99.22 | 0.30 | 0.00 | 2.62 |
| BH-3 | SPT | 6.00 | 10.61 | 1.87 | 2.35 | 96.66 | 0.99 | 0.00 | 2.38 |
| | SPT | 9.00 | 10.46 | 1.82 | 1.34 | 98.14 | 0.52 | 0.00 | 2.45 |
| | SPT | 10.50 | 4.01 | 1.80 | 0.77 | 98.80 | 0.43 | 0.00 | 2.55 |
| | SPT | 12.00 | 10.31 | 1.77 | 0.66 | 98.82 | 0.52 | 0.00 | 1.99 |
| BH-3 | SPT | 3.00 | 17.23 | 1.90 | 9.37 | 86.69 | 3.94 | 0.00 | 2.27 |
| | SPT | 7.50 | 17.70 | 1.92 | 11.31 | 88.14 | 0.54 | 0.00 | 2.43 |
| | SPT | 10.50 | 13.57 | 1.85 | 11.32 | 88.33 | 0.35 | 0.00 | 2.38 |
| | SPT | 12.00 | 13.74 | 1.82 | 25.85 | 69.52 | 4.63 | 0.00 | 2.30 |

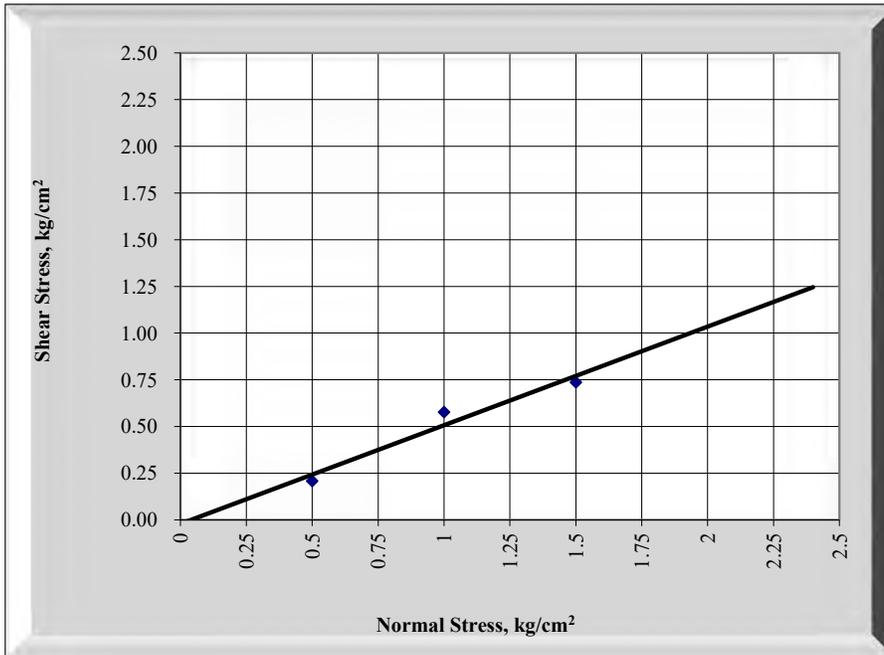
Sanjujain Geotech Firm Pvt. Ltd.

Direct Shear Test Results

Project : Development of the Agricultural Value Chain Infrastructures
 Location : Butwal Sub metropolitan, Ward no 15, Rupandehi Bina Shrestha (Lab. Technician)
 Hole No. : BH - 1 Checked by : Rajshree Shrestha, Geotech
 Sample : DS Verified by : **S. K. Jain**
 Depth, m : 4.5 : (M. E.Civil, Geotechnical Engg. USA.)

| SDT | cm | Test No. 1 | | Test No. 2 | | Test No. 3 | | Remarks |
|------|----|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|---------|
| | | Normal Stress | | Normal Stress | | Normal Stress | | |
| | | 0.50 kg/cm ² | | 1.00 kg/cm ² | | 1.50 kg/cm ² | | |
| | | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | |
| 0 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 0.05 | | 8.80 | 0.09 | 17.60 | 0.18 | 24.00 | 0.24 | |
| 0.1 | | 13.60 | 0.14 | 26.40 | 0.26 | 35.20 | 0.35 | |
| 0.2 | | 15.20 | 0.15 | 41.60 | 0.42 | 51.20 | 0.51 | |
| 0.3 | | 16.80 | 0.17 | 51.20 | 0.51 | 62.40 | 0.62 | |
| 0.4 | | 20.80 | 0.21 | 57.60 | 0.58 | 73.60 | 0.74 | |
| 0.5 | | | | | | | | |
| 0.6 | | | | | | | | |
| 0.7 | | | | | | | | |
| 0.8 | | | | | | | | |
| 0.9 | | | | | | | | |
| 1.0 | | | | | | | | |
| 1.1 | | | | | | | | |
| 1.2 | | | | | | | | |
| 1.3 | | | | | | | | |

Shear Diagram



Shear Parameters

ϕ , degree : 27.83
 C, Kpa : 2.13

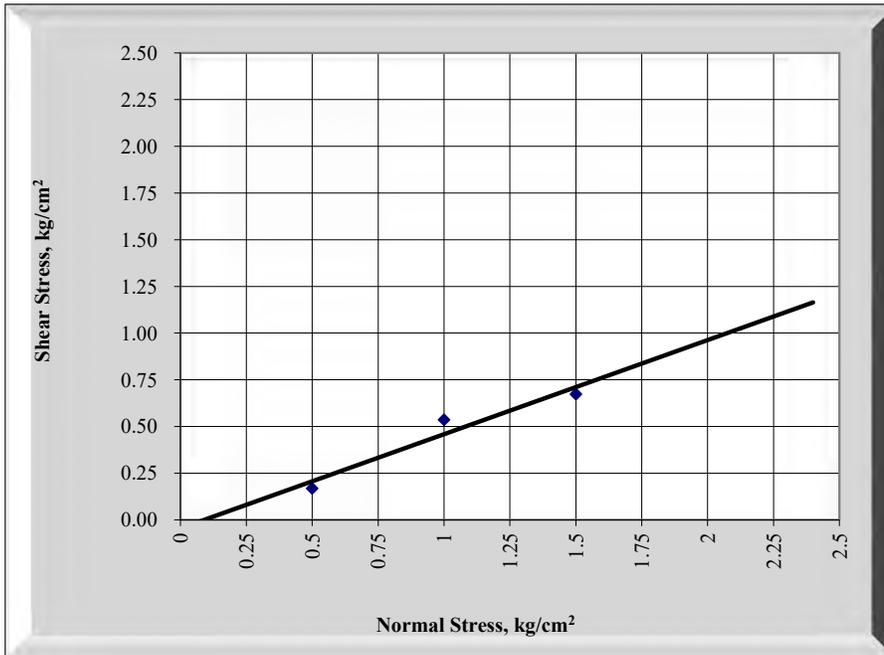
Sanjujain Geotech Firm Pvt. Ltd.

Direct Shear Test Results

Project : Development of the Agricultural Value Chain Infrastructures
 Location : Butwal Sub metropolitan, Ward no 15, Rupandehi Bina Shrestha (Lab. Technician)
 Hole No. : BH - 3 Checked by : Rajshree Shrestha, Geotech
 Sample : DS Verified by : S. K. Jain
 Depth, m : 4.5 : (M. E.Civil, Geotechnical Engg. USA.)

| SDT | cm | Test No. 1 | | Test No. 2 | | Test No. 3 | | Remarks |
|------|----|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|---------|
| | | Normal Stress | | Normal Stress | | Normal Stress | | |
| | | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | |
| | | 0.50 kg/cm ² | | 1.00 kg/cm ² | | 1.50 kg/cm ² | | |
| 0 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 0.05 | | 8.80 | 0.09 | 16.00 | 0.16 | 27.20 | 0.27 | |
| 0.1 | | 11.20 | 0.11 | 27.20 | 0.27 | 38.40 | 0.38 | |
| 0.2 | | 14.40 | 0.14 | 38.40 | 0.38 | 50.40 | 0.50 | |
| 0.3 | | 15.20 | 0.15 | 46.40 | 0.46 | 60.00 | 0.60 | |
| 0.4 | | 16.80 | 0.17 | 53.60 | 0.54 | 67.20 | 0.67 | |
| 0.5 | | | | | | | | |
| 0.6 | | | | | | | | |
| 0.7 | | | | | | | | |
| 0.8 | | | | | | | | |
| 0.9 | | | | | | | | |
| 1.0 | | | | | | | | |
| 1.1 | | | | | | | | |
| 1.2 | | | | | | | | |
| 1.3 | | | | | | | | |

Shear Diagram



Shear Parameters

ϕ , degree : 26.75
 C, Kpa : 4.53

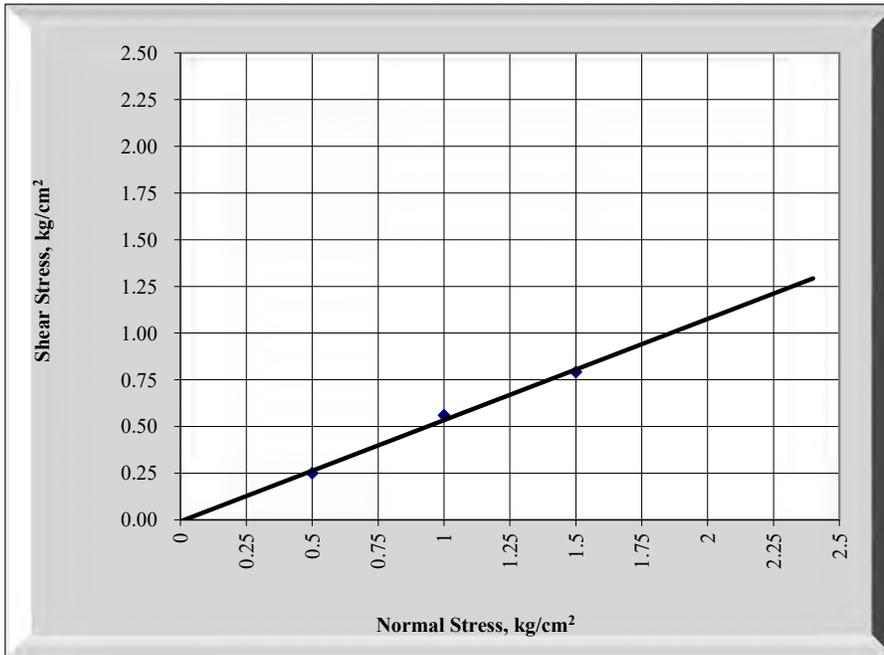
Sanjujain Geotech Firm Pvt. Ltd.

Direct Shear Test Results

Project : Development of the Agricultural Value Chain Infrastructures
 Location : Butwal Sub metropolitan, Ward no 15, Rupandehi Bina Shrestha (Lab. Technician)
 Hole No. : BH - 4 Checked by : Rajshree Shrestha, Geotech
 Sample : DS Verified by : **S. K. Jain**
 Depth, m : 6.0 : (M. E.Civil, Geotechnical Engg. USA.)

| SDT | cm | Test No. 1 | | Test No. 2 | | Test No. 3 | | Remarks |
|------|----|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|---------|
| | | Normal Stress | | Normal Stress | | Normal Stress | | |
| | | 0.50 kg/cm ² | | 1.00 kg/cm ² | | 1.50 kg/cm ² | | |
| | | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | |
| 0 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 0.05 | | 11.20 | 0.11 | 24.80 | 0.25 | 36.00 | 0.36 | |
| 0.1 | | 15.20 | 0.15 | 31.20 | 0.31 | 43.20 | 0.43 | |
| 0.2 | | 17.60 | 0.18 | 45.60 | 0.46 | 56.80 | 0.57 | |
| 0.3 | | 23.20 | 0.23 | 50.40 | 0.50 | 71.20 | 0.71 | |
| 0.4 | | 25.00 | 0.25 | 56.00 | 0.56 | 79.20 | 0.79 | |
| 0.5 | | | | | | | | |
| 0.6 | | | | | | | | |
| 0.7 | | | | | | | | |
| 0.8 | | | | | | | | |
| 0.9 | | | | | | | | |
| 1.0 | | | | | | | | |
| 1.1 | | | | | | | | |
| 1.2 | | | | | | | | |
| 1.3 | | | | | | | | |

Shear Diagram



Shear Parameters

ϕ , degree : 28.46
 C, Kpa : 0.8



LEGEND

| S.No. | DESCRIPTION | SIZE | Numbers |
|-------|---|----------------|---------|
| 1 | MAIN GATE | 17000 | 1 |
| 2 | SECURITY OFFICE/GUARD ROOM | 4000 X 5000 | 2 |
| 3 | TEMPLE | 5000 X 5000 | 1 |
| 4 | WEIGHING SCALE | 16000 X 3600 | 2 |
| 5 | PARKING | 5000 X8000 | 4 |
| 6 | GENERATOR HOUSE | 20000 X 25000 | 1 |
| 7 | INCOMING GODDOWN | 12000 X 25000 | 1 |
| 8 | WASHING/SORTING AREA | 39000 X 25000 | 1 |
| 9 | OUTGOING GODDOWN | 50000 X 25000 | 1 |
| 10 | ADMINISTRATIVE BLOCK | 148000 X 65000 | 1 |
| 11 | ONION AND CABBAGE STORE / POTATO STORAGE AND PROCESSING | 7500 X 7500 | 4 |
| 12 | TOILET | 80000 X 16000 | 10 |
| 13 | WHOLESALE SHUTTER | 25000 X 17000 | 2 |
| 14 | GUEST HOUSE | 25000 X 15000 | 1 |
| 15 | MULTI PURPOSE GODDOWN | 12000 X 15000 | 1 |
| 16 | AUCTION CENTER | | |
| 17 | SECONDARY GATE EXIT | | |

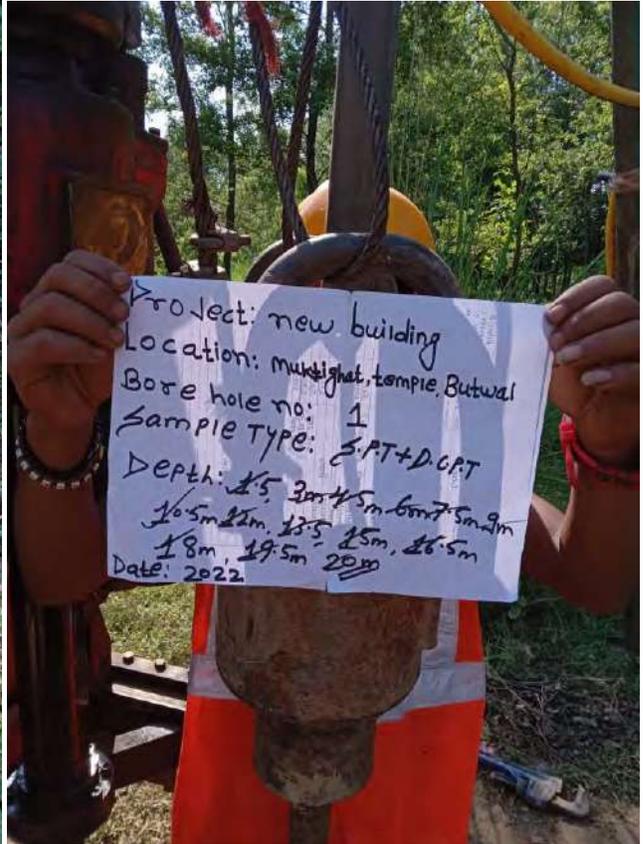
| S.No. | DESCRIPTION | SIZE | Numbers |
|-------|--|---------------|---------|
| 18 | STORAGE | 32000 X 15000 | 2 |
| 19 | CENTRAL WASTE COLLECTION CENTRE | | |
| 22 | BANANA STORAGE AND PROCESSING | 85000 X 27000 | 1 |
| 23 | CANTEEN | 25000 X 15000 | 2 |
| 24 | BUS STOP | | 1 |
| 25 | AGROVETS | 20000 X 15000 | 1 |
| 26 | BID COMPOSTING | 10000 X 10000 | 1 |
| 27 | SOLID WASTE DISPOSAL SYSTEM | 20000 X 10000 | 1 |
| 28 | BANK | 20000 X 12000 | 1 |
| 29 | ELECTRONIC SIGNAGE BOARD | 4000 X 5000 | 2 |
| 30 | LANDSCAPING | | |
| 31 | WATER SUPPLY SYSTEM WITH OVERHEAD WATER TANK | 25000 X 30000 | 1 |
| 33 | GENERAL WORKSHOP | 20000 X 10000 | 1 |
| 34 | CARPENTRY WORKSH-OP | 20000 X 10000 | 1 |
| 35 | SMALL MARKET STALLS AREA | | |
| 36 | SUPER MARKET | | |
| 37 | PARKING FOR DELIVERIES | | |

- Collection Centre
- Wholesale area
- General Facilities
- Guest house area
- Area reserved for small public farmers market and grocery
- Boundary from "GPS points of Ratanpur community forest user groups" (- assumed to be in meters not degrees)
- Boundary from PDF "proposed Agricultural Market Site Map Buiwal Sub-metropolitan"
- Road Buffer 2
- Truck Traffic
- Pedestrian Traffic



| | | |
|---|-------------|---|
| Invest International | Client | Invest International |
| Feasibility Study for Development of the Agricultural Value Chain Infrastructure, Nepal | Project | Feasibility Study for Development of the Agricultural Value Chain Infrastructure, Nepal |
| Agriculture Market at Semlar Buiwal (Rupandehi) | Location | Agriculture Market at Semlar Buiwal (Rupandehi) |
| North Plot Master Plan Layout Design | Task | North Plot Master Plan Layout Design |
| 1:1200 | Scale | 1:1200 |
| BH4289-100-100-060-001 | Project No. | BH4289-100-100-060-001 |
| Royal HaskoningDHV International Infrastructure & Energy | | |

Work in progress



Work in progress

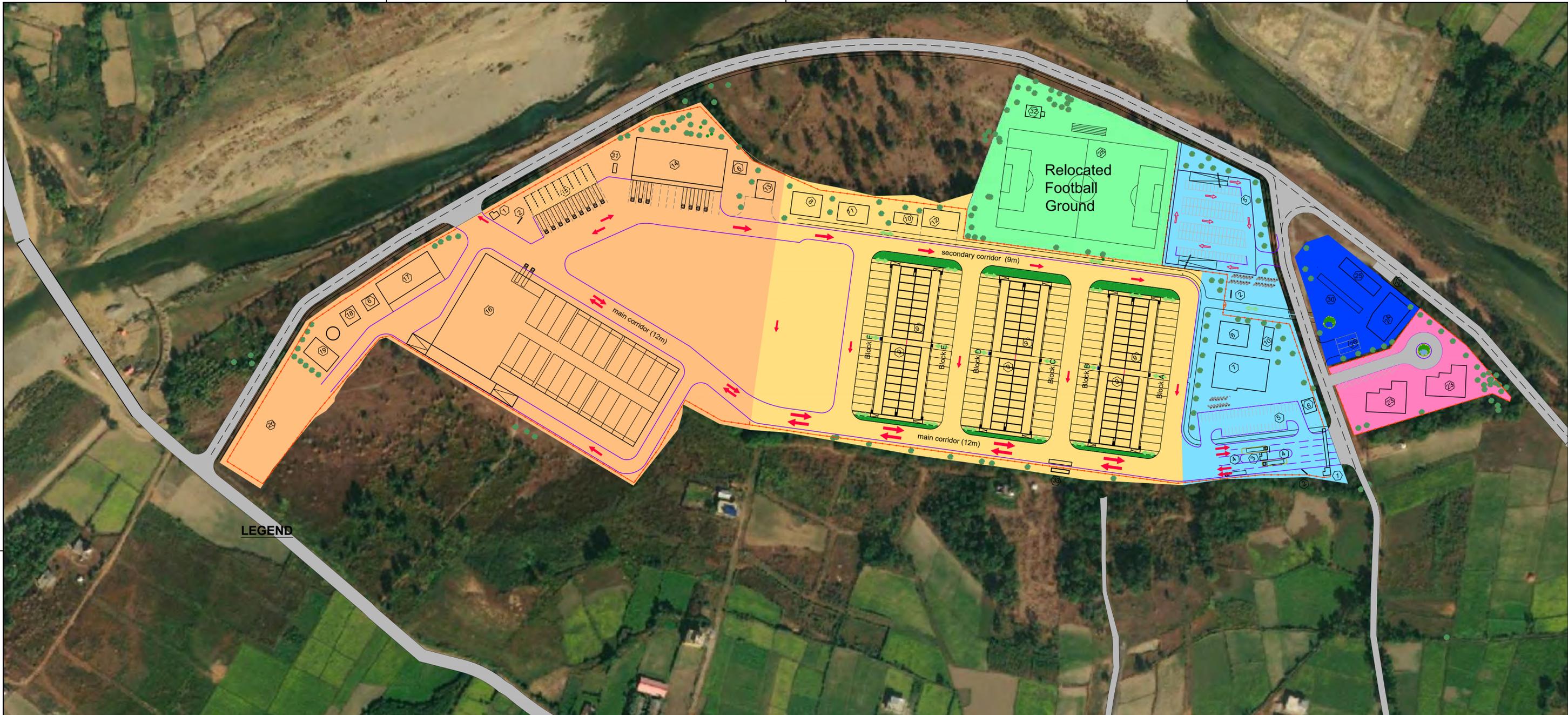


Work in progress



Appendix

A5. Masterplan layout drawing



LEGEND

| S.No. | DESCRIPTION | SIZE (mm) | Nos. |
|-------|---|----------------|--------|
| 1 | MAIN GATE | - | 1 |
| 2 | ELECTRONIC SIGNAGE BOARD | 2800 X 5800 | 3 |
| 3 | WEIGHBRIDGE HOUSE | 4250 X 6750 | 1 |
| 4 | WEIGHING SCALE (100 MT) | | 3 |
| 5 | PARKING | | 3 |
| 6 | GENERATOR HOUSE | | 4 (+1) |
| 7 | ADMINISTRATIVE BLOCK | 36900 X 23000 | 1 |
| 8 | CANTEEN | 19600 X 14800 | 2 |
| 9 | WHOLESALE SHUTTER | 98000 X 32000 | 6 (+1) |
| 10 | TOILET BLOCK | 12750 X 6620 | 3 (+1) |
| 11 | BANK WITH ATM | 18700 X 12800 | 1 |
| 12 | CENTRAL WASTE COLLECTION CENTRE | 16000 X 24000 | 1 |
| 13 | AUCTION CENTER | 12000 X 12000 | 1 |
| 14 | WASHING, SORTING GRADING AND PACKAGING BUILDING | 60000 X 28000 | 1 |
| 15 | AGROVETS | 42000 X 16000 | 1 |
| 16 | ONION / POTATO / CABBAGE INTAKE STORAGE AND PROCESSING BUILDING | 147500 X 68500 | 1 |

| S.No. | DESCRIPTION | SIZE (mm) | Numbers |
|-------|--|---------------|---------|
| 17 | MAINTANANCE AND REPAIR WORKSHOP | 40250 X 16200 | 1 |
| 18 | POWER INTAKE STATION | 10000 X 10000 | 1 |
| 19 | WATER SUPPLY SYSTEM WITH OVERHEAD WATER TANK | | 1 |
| 20 | WATER WASTE TREATMENT FACILITY | | (1) |
| 21 | MULTI PURPOSE GODOWN | | (2) |
| 22 | BANANA STORAGE AND PROCESSING | | (1) |
| 23 | GUEST HOUSE | 26000 X 20800 | 2 |
| 24 | GROCERY STORE | 18500 X 27500 | 1 |
| 25 | KRISHAK CHAUTARI (SMALL MARKET STALLS) | 40000 X 8000 | 1 |
| 26 | PARKING FOR DELIVERIES | - | 1 |
| 27 | BUS STOP | - | 1 |
| 28 | FOOTBALL GROUND | - | 1 |
| 29 | LANDSCAPING | - | 1 |
| 30 | RETAIL MARKET | 36000 X 8000 | 1 |
| 31 | FUMIGATION CONTAINER | - | 1 |
| 32 | DRESSING ROOM ON FOOTBALL GROUND | - | 1 |
| 33 | TRUCK WHEEL CLEANING | - | - |

- Collection Centre
- Wholesale area
- General Facilities
- Guest house area
- Area reserved for small public farmers market and grocery
- Reserved for connection to Dano Road Corridor
- Relocated football field
- Truck Traffic
- Pedestrian Traffic

WARD 15

WARD 16



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|-------------|-------------|----------------|-------------|----------|------|---|-----------------|--|--|--|-------------|---|-----------------|--|--|--|-------------|---|--|--|--|--|-------------|---|--|--|--|--|-------------|---|-------------------------|--|--|--|-------------|---|-----------------------|--|--|--|-------------|---|---|
| <table border="1"> <tr><td>revision</td><td>description</td><td>drawn</td><td>checked</td><td>approved</td><td>date</td></tr> <tr><td>A</td><td>Various Changes</td><td></td><td></td><td></td><td>25 FEB 2022</td></tr> <tr><td>B</td><td>Various Changes</td><td></td><td></td><td></td><td>03 JUN 2022</td></tr> <tr><td>C</td><td>New sheet 002 (zoomed in to wholesale area) and 000 (boundaries)</td><td></td><td></td><td></td><td>14 JUL 2022</td></tr> <tr><td>D</td><td>New Plot Boundaries Based on Cadastral Map</td><td></td><td></td><td></td><td>01 SEP 2022</td></tr> <tr><td>E</td><td>Update New Layout plans</td><td></td><td></td><td></td><td>10 NOV 2022</td></tr> <tr><td>F</td><td>Update After Comments</td><td></td><td></td><td></td><td>18 JAN 2023</td></tr> </table> | | revision | description | drawn | checked | approved | date | A | Various Changes | | | | 25 FEB 2022 | B | Various Changes | | | | 03 JUN 2022 | C | New sheet 002 (zoomed in to wholesale area) and 000 (boundaries) | | | | 14 JUL 2022 | D | New Plot Boundaries Based on Cadastral Map | | | | 01 SEP 2022 | E | Update New Layout plans | | | | 10 NOV 2022 | F | Update After Comments | | | | 18 JAN 2023 | <p>client Invest International</p> <p>project Export Orientated Agriculture Wholesale Market Butwal</p> <p>description Agriculture Market at Semlar Butwal (Rupandehi) North Plot Master Plan Layout Design Without Future Plans</p> | <p>HASKONING NEDERLAND B.V. A COMPANY OF</p> <p>Royal HaskoningDHV Enhancing Society Together</p> <p>Resources, Logistics & Power George Hirtzenweg 85 3009 AM ROTTERDAM P.O. Box 6520 +31 (0)10 4433666 Telephone +31 (0)10 4433688 Fax info@rotterdam.royalhaskoning.com E-mail www.royalhaskoningdhv.com Internet</p> |
| revision | description | drawn | checked | approved | date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | Various Changes | | | | 25 FEB 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | Various Changes | | | | 03 JUN 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | New sheet 002 (zoomed in to wholesale area) and 000 (boundaries) | | | | 14 JUL 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | New Plot Boundaries Based on Cadastral Map | | | | 01 SEP 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E | Update New Layout plans | | | | 10 NOV 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F | Update After Comments | | | | 18 JAN 2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| format | scale | phase | A.G. | project | dwg | sheet | rev | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A1 | 1:1250 | Preliminary | BZ1051 | BH4289-100-100 | - 060 | - 001 | - E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(+) ARE FOR FUTURE PLANS



| LEGEND | | | |
|--------|---|----------------|--------|
| S.No. | DESCRIPTION | SIZE (mm) | Nos. |
| 1 | MAIN GATE | - | 1 |
| 2 | ELECTRONIC SIGNAGE BOARD | 2800 X 5800 | 3 |
| 3 | WEIGHBRIDGE HOUSE | 4250 X 6750 | 1 |
| 4 | WEIGHING SCALE (100 MT) | | 3 |
| 5 | PARKING | | 3 |
| 6 | GENERATOR HOUSE | | 4 (+1) |
| 7 | ADMINISTRATIVE BLOCK | 36900 X 23000 | 1 |
| 8 | CANTEEN | 19600 X 14800 | 2 |
| 9 | WHOLESALE SHUTTER | 98000 X 32000 | 6 (+1) |
| 10 | TOILET BLOCK | 12750 X 6620 | 2 |
| 11 | BANK WITH ATM | 18700 X 12800 | 1 |
| 12 | CENTRAL WASTE COLLECTION CENTRE | 16000 X 24000 | 1 |
| 13 | AUCTION CENTER | 12000 X 12000 | 1 |
| 14 | WASHING, SORTING GRADING AND PACKAGING BUILDING | 60000 X 28000 | 1 |
| 15 | AGROVETS | 42000 X 16000 | 1 |
| 16 | ONION / POTATO / CABBAGE INTAKE STORAGE AND PROCESSING BUILDING | 147500 X 68500 | 1 |

| S.No. | DESCRIPTION | SIZE (mm) | Numbers |
|-------|--|---------------|---------|
| 17 | MAINTANANCE AND REPAIR WORKSHOP | 40250 X 16200 | 1 |
| 18 | POWER INTAKE STATION | 10000 X 10000 | 1 |
| 19 | WATER SUPPLY SYSTEM WITH OVERHEAD WATER TANK | | 1 |
| 20 | WATER WASTE TREATMENT FACILITY | | (1) |
| 21 | MULTI PURPOSE GODOWN | | (2) |
| 22 | BANANA STORAGE AND PROCESSING | | (1) |
| 23 | GUEST HOUSE | 26000 X 20800 | 2 |
| 24 | GROCERY STORE | 18500 X 27500 | 1 |
| 25 | KRISHAK CHAUTARI (SMALL MARKET STALLS) | 40000 X 8000 | 1 |
| 26 | PARKING FOR DELIVERIES | - | 1 |
| 27 | BUS STOP | - | 1 |
| 28 | FOOTBALL GROUND | - | 1 |
| 29 | LANDSCAPING | - | 1 |
| 30 | RETAIL MARKET | 36000 X 8000 | 1 |
| 31 | FUMIGATION CONTAINER | - | 1 |
| 32 | DRESSING ROOM ON FOOTBALL GROUND | - | 1 |
| 33 | TRUCK WHEEL CLEANING | - | - |

- Collection Centre
- Wholesale area
- General Facilities
- Guest house area
- Area reserved for small public farmers market and grocery
- Reserved for connection to Dano Road Corridor
- Relocated football field
- Truck Traffic
- Pedestrian Traffic

WARD 15

WARD 16



| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>revision</th> <th>description</th> <th>drawn</th> <th>checked</th> <th>approved</th> <th>date</th> </tr> </thead> <tbody> <tr> <td>E</td> <td>Update New Layout plans</td> <td></td> <td></td> <td></td> <td>10 NOV 2022</td> </tr> <tr> <td>D</td> <td>New Plot Boundaries Based on Cadastral Map</td> <td></td> <td></td> <td></td> <td>01 SEP 2022</td> </tr> <tr> <td>C</td> <td>New sheet 002 (zoomed in to wholesale area) and 000 (boundaries)</td> <td></td> <td></td> <td></td> <td>14 JUL 2022</td> </tr> <tr> <td>B</td> <td>Various Changes</td> <td></td> <td></td> <td></td> <td>03 JUN 2022</td> </tr> <tr> <td>A</td> <td>Various Changes</td> <td></td> <td></td> <td></td> <td>25 FEB 2022</td> </tr> <tr> <td></td> <td>First Edition</td> <td></td> <td></td> <td></td> <td>21 JAN 2022</td> </tr> </tbody> </table> <p>client Invest International</p> <p>project Export Orientated Agriculture Wholesale Market Butwal</p> <p>description Agriculture Market at Semlar Butwal (Rupandehi) North Plot Master Plan Layout Design Including Future plans</p> | revision | description | drawn | checked | approved | date | E | Update New Layout plans | | | | 10 NOV 2022 | D | New Plot Boundaries Based on Cadastral Map | | | | 01 SEP 2022 | C | New sheet 002 (zoomed in to wholesale area) and 000 (boundaries) | | | | 14 JUL 2022 | B | Various Changes | | | | 03 JUN 2022 | A | Various Changes | | | | 25 FEB 2022 | | First Edition | | | | 21 JAN 2022 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">  Royal HaskoningDHV <small>Enhancing Society Together</small> </td> </tr> <tr> <td style="font-size: 8px;"> Resources, Logistics & Power George Huismanweg 85 P.O. Box 6520 3009 AM ROTTERDAM T +31 (0)10 4433666 F +31 (0)10 4433688 E info@rotterdam.royalhaskoningdhv.com W www.royalhaskoningdhv.com </td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <td>format</td> <td>scale</td> <td>phase</td> <td>A.G.</td> <td>project</td> <td>dwg</td> <td>sheet</td> <td>rev</td> </tr> <tr> <td>A1</td> <td>1:1250</td> <td>Preliminary</td> <td>BZ1051</td> <td>BH4289-100-100</td> <td>- 060</td> <td>- 001</td> <td>- E</td> </tr> </table> |  Royal HaskoningDHV <small>Enhancing Society Together</small> | Resources, Logistics & Power George Huismanweg 85 P.O. Box 6520 3009 AM ROTTERDAM T +31 (0)10 4433666 F +31 (0)10 4433688 E info@rotterdam.royalhaskoningdhv.com W www.royalhaskoningdhv.com | format | scale | phase | A.G. | project | dwg | sheet | rev | A1 | 1:1250 | Preliminary | BZ1051 | BH4289-100-100 | - 060 | - 001 | - E |
|--|--|-------------|---------|----------------|-------------|-------|-----|-------------------------|--|--|--|-------------|---|--|--|--|--|-------------|---|--|--|--|--|-------------|---|-----------------|--|--|--|-------------|---|-----------------|--|--|--|-------------|--|---------------|--|--|--|-------------|---|---|---|--------|-------|-------|------|---------|-----|-------|-----|----|--------|-------------|--------|----------------|-------|-------|-----|
| revision | description | drawn | checked | approved | date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E | Update New Layout plans | | | | 10 NOV 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | New Plot Boundaries Based on Cadastral Map | | | | 01 SEP 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | New sheet 002 (zoomed in to wholesale area) and 000 (boundaries) | | | | 14 JUL 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | Various Changes | | | | 03 JUN 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | Various Changes | | | | 25 FEB 2022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| format | scale | phase | A.G. | project | dwg | sheet | rev | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A1 | 1:1250 | Preliminary | BZ1051 | BH4289-100-100 | - 060 | - 001 | - E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

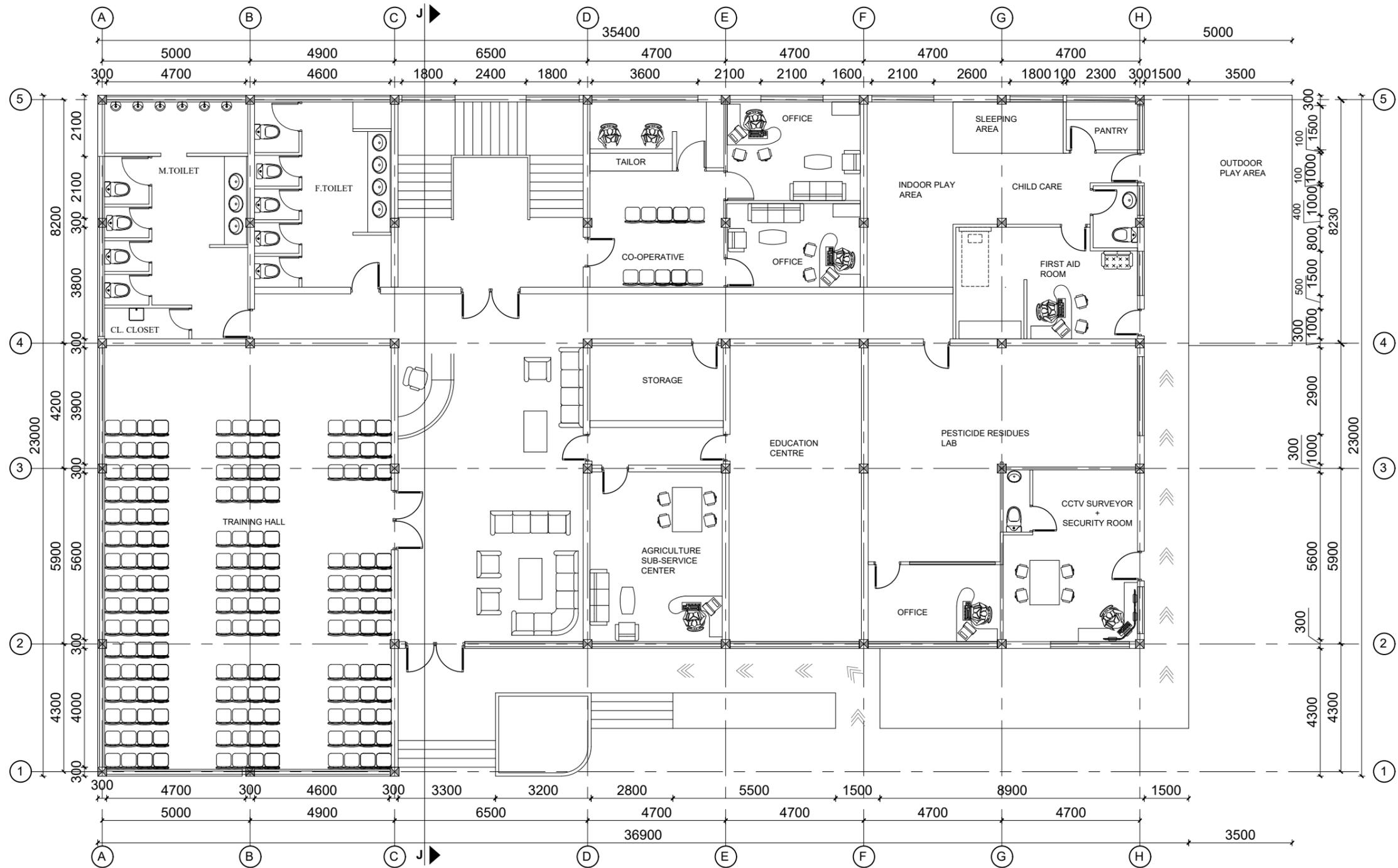
*) ARE FOR FUTURE PLANS

Appendix

A6. Architectural layout drawings

Drawing list

| # | Project | DrawingNumbers | Rev | name | Date |
|----|---------|----------------|-----|---|------------|
| 1 | BH4289 | 100-100_200 | A | Admin Building | 2023-01-03 |
| 2 | BH4289 | 100-100_201 | 0 | Auction House | 2022-11-04 |
| 3 | BH4289 | 100-100_202 | A | Bank | 2023-01-03 |
| 4 | BH4289 | 100-100_203 | A | Potato Onion and Cabbage Store | 2023-01-05 |
| 5 | BH4289 | 100-100_204 | A | Washing Sorting Grading and Packaging block | 2023-01-05 |
| 6 | BH4289 | 100-100_205 | 0 | Agrovets | 2022-11-10 |
| 7 | BH4289 | 100-100_206 | A | Guard House | 2023-01-05 |
| 8 | BH4289 | 100-100_207 | A | Public Toilet House | 2023-01-09 |
| 9 | BH4289 | 100-100_208 | A | _Supermarket | 2022-30-10 |
| 10 | BH4289 | 100-100_209 | a | Canteen Building | 2023-01-10 |
| 11 | BH4289 | 100-100_210 | 0 | Guest House A | 2022-11-06 |
| 12 | BH4289 | 100-100_211 | 0 | Wholesale Shutter | 2022-11-07 |
| 13 | BH4289 | 100-100_212 | 0 | Guest House B | 2022-11-07 |
| 14 | BH4289 | 100-100_213 | A | Workshop | 2023-01-10 |
| 15 | BH4289 | 100-100_214 | A | Weighing scale building | 2023-01-11 |
| 16 | BH4289 | 100-100_215 | A | Gate Design | 2023-01-11 |
| 17 | BH4289 | 100-100_216 | 0 | Water Supply Overhead Tank | 2022-11-04 |
| 18 | BH4289 | 100-100_217 | 0 | Water Supply Detail | 2022-11-04 |
| 19 | BH4289 | 100-100_218 | 0 | Electronic Display Board | 2022-11-04 |
| 20 | BH4289 | 100-100_219 | A | Market | 2023-01-11 |
| 21 | BH4289 | 100-100_220 | A | Waste Area | 2023-01-11 |
| 22 | BH4289 | 100-100_221 | 0 | Dressing Room | 2023-01-19 |
| 23 | BH4289 | 100-100_222 | 0 | Retail market | 2022-11-19 |
| 24 | BH4289 | 100-100_223 | 0 | Parking Garage | 2023-01-24 |



GROUND FLOOR PLAN

client
Invest International

project
**Export Orientated
Agriculture Wholesale Market**

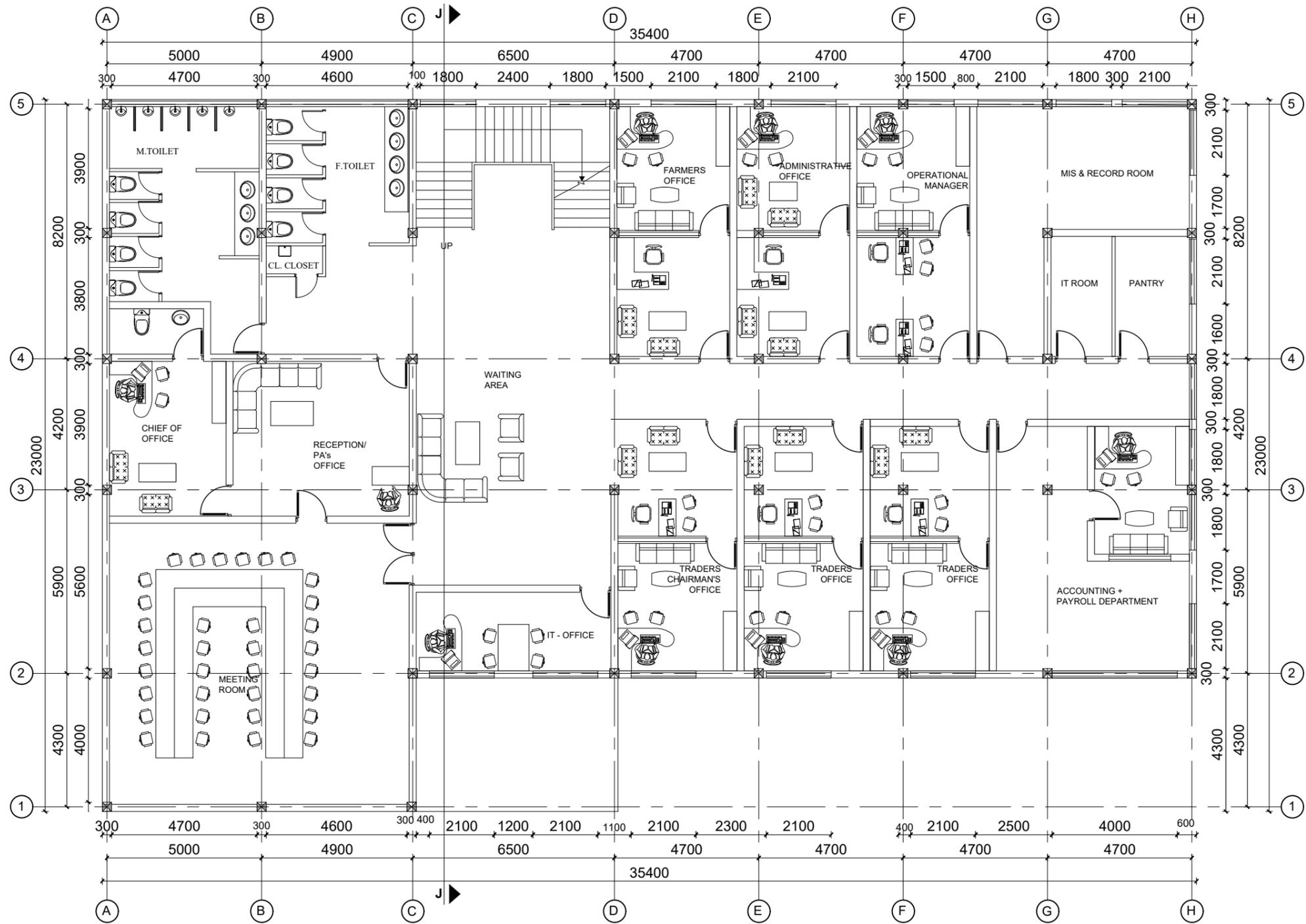
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| | | | | |
|---------------|-------------|-------|---------|------------|
| First Edition | | AGe | | 3 JAN 2023 |
| revision | description | drawn | checked | approved |

| | | | |
|---|-------|--------|-----|
| description Administrative Building Ground Floor Plan | | | |
| project | dwg | blad | rev |
| BH4289_100-100 | - 200 | - 0001 | - A |

HASKONING NEDERLAND B.V.
A COMPANY OF

+31 88 348 90 00 Telephone
info@rhdhv.com E-mail
www.royalhaskoningdnhv.com Internet



FIRST FLOOR PLAN

| | | | | |
|---------------|-------------|-------|---------|-------------|
| First Edition | | AGe | | 05 SEP 2022 |
| revision | description | drawn | checked | approved |

| | |
|--------|----------------------|
| client | Invest International |
| size | A3 |
| scale | 1:150 |
| phase | Preliminary |

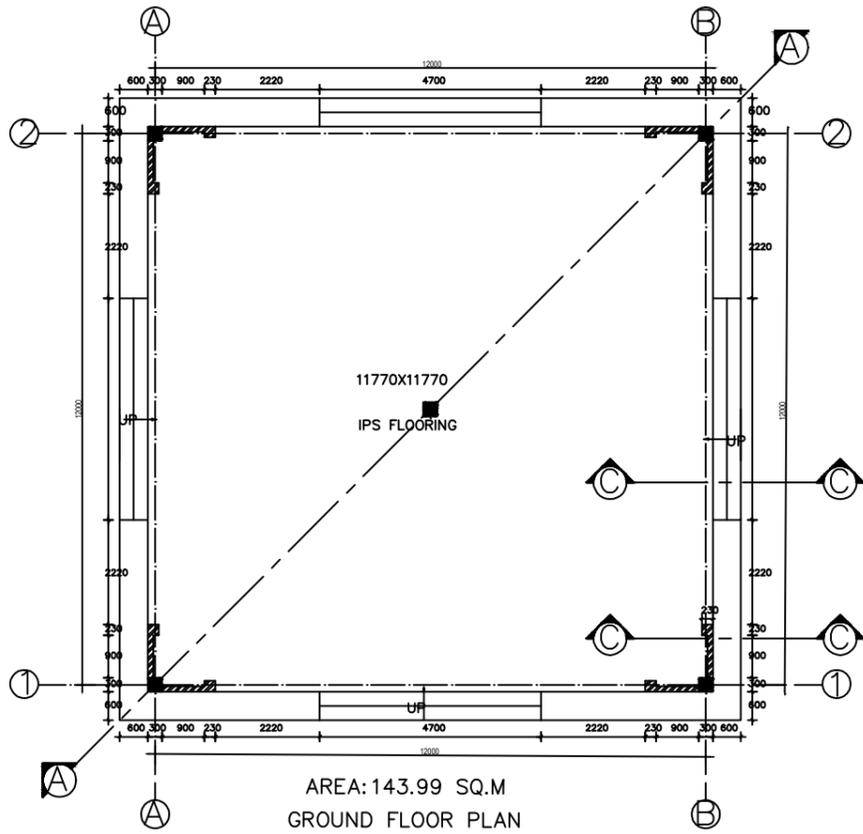
| | |
|---------|---|
| project | Export Orientated Agriculture Wholesale Market |
| A.G. | BZ1051 |

| | |
|-------------|---|
| description | Administrative Building First Floor Plan |
| project | BH4289_100-100 |
| dwg | 200 |
| blad | 0002 |
| rev | A |

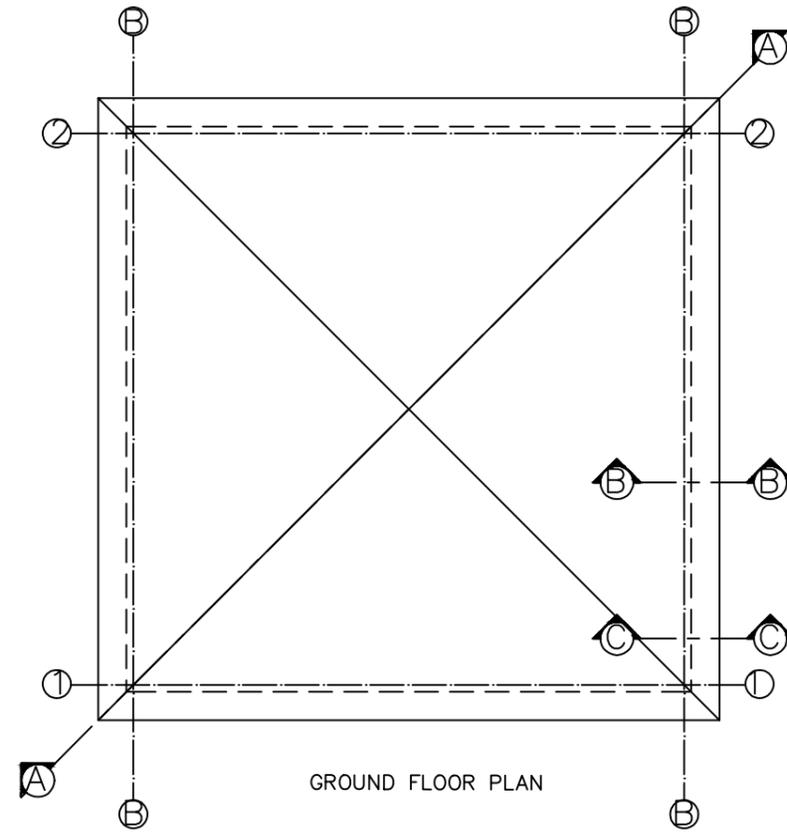
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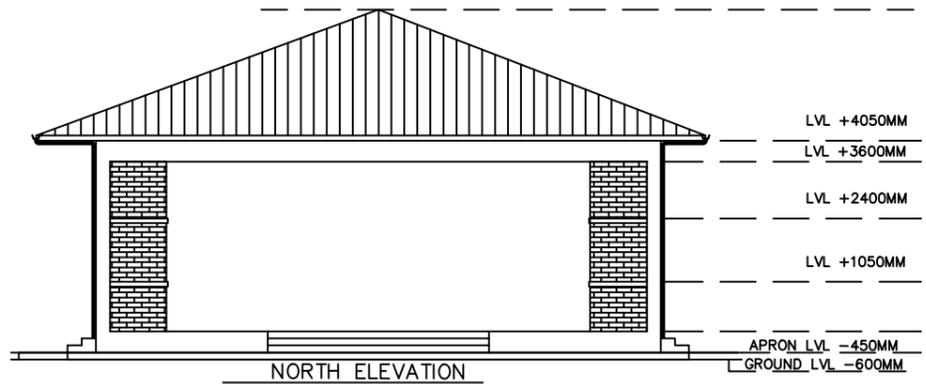
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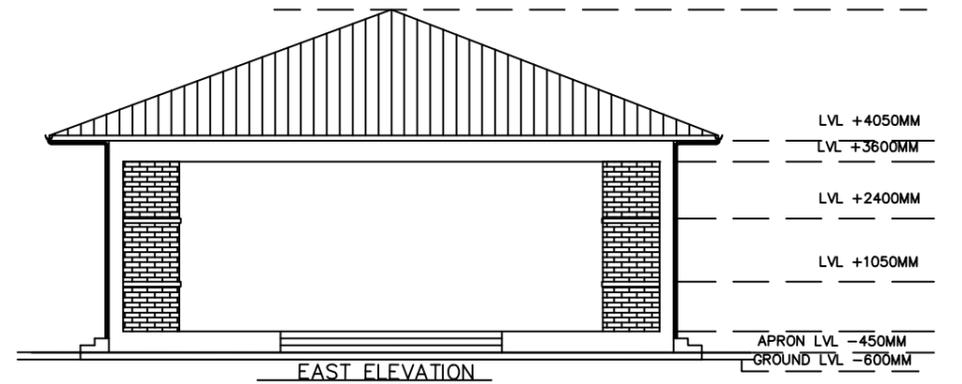
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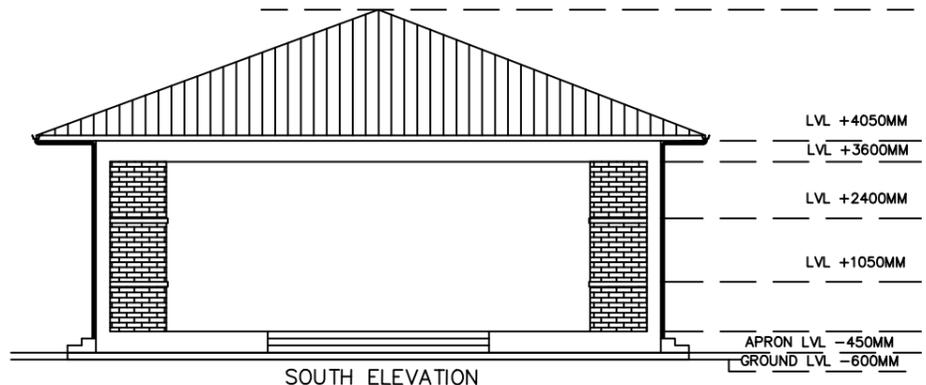
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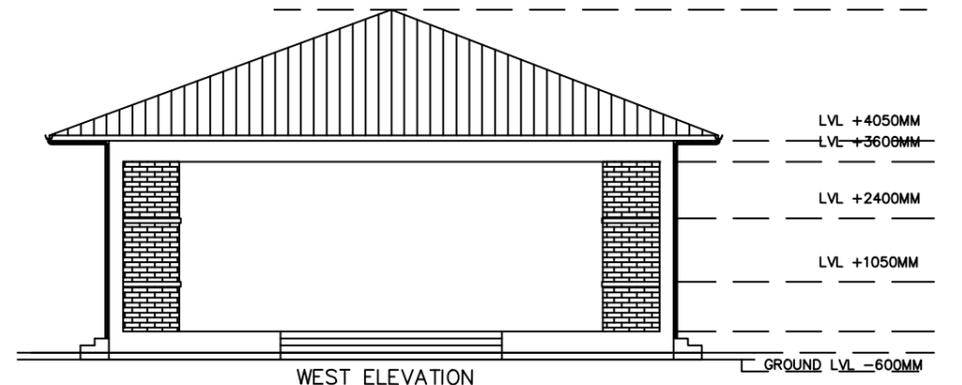
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| client | Invest International |
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| A.G. | BZ1051 |

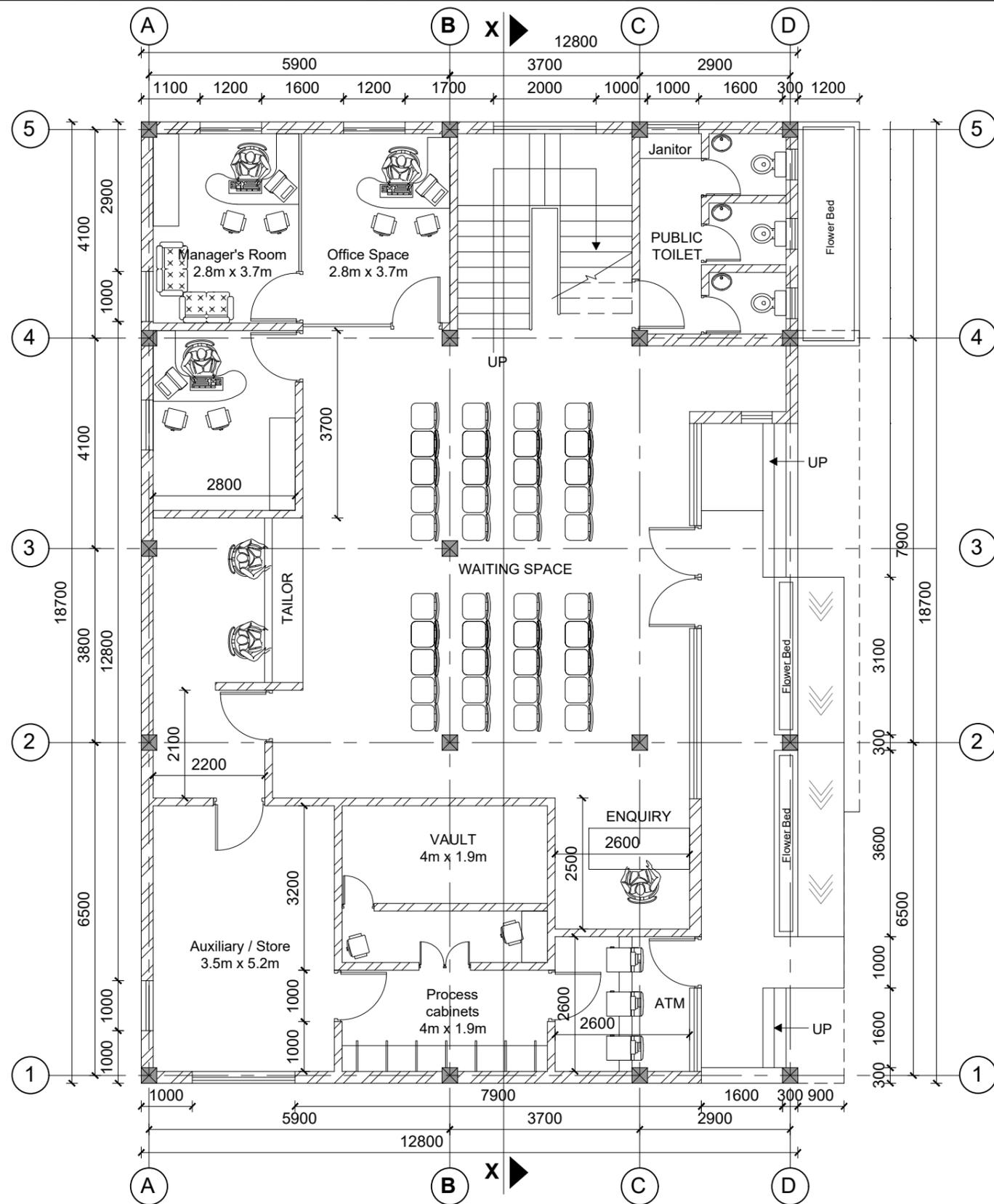
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GROUND FLOOR PLAN

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| A | Changes after remarks | AGe | | 03 JAN 2023 |
| | First Edition | AGe | | 05 SEP 2022 |
| revision | description | drawn | checked | approved |
| | | | | date |

client
Invest International

project
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Agriculture Wholesale Market**

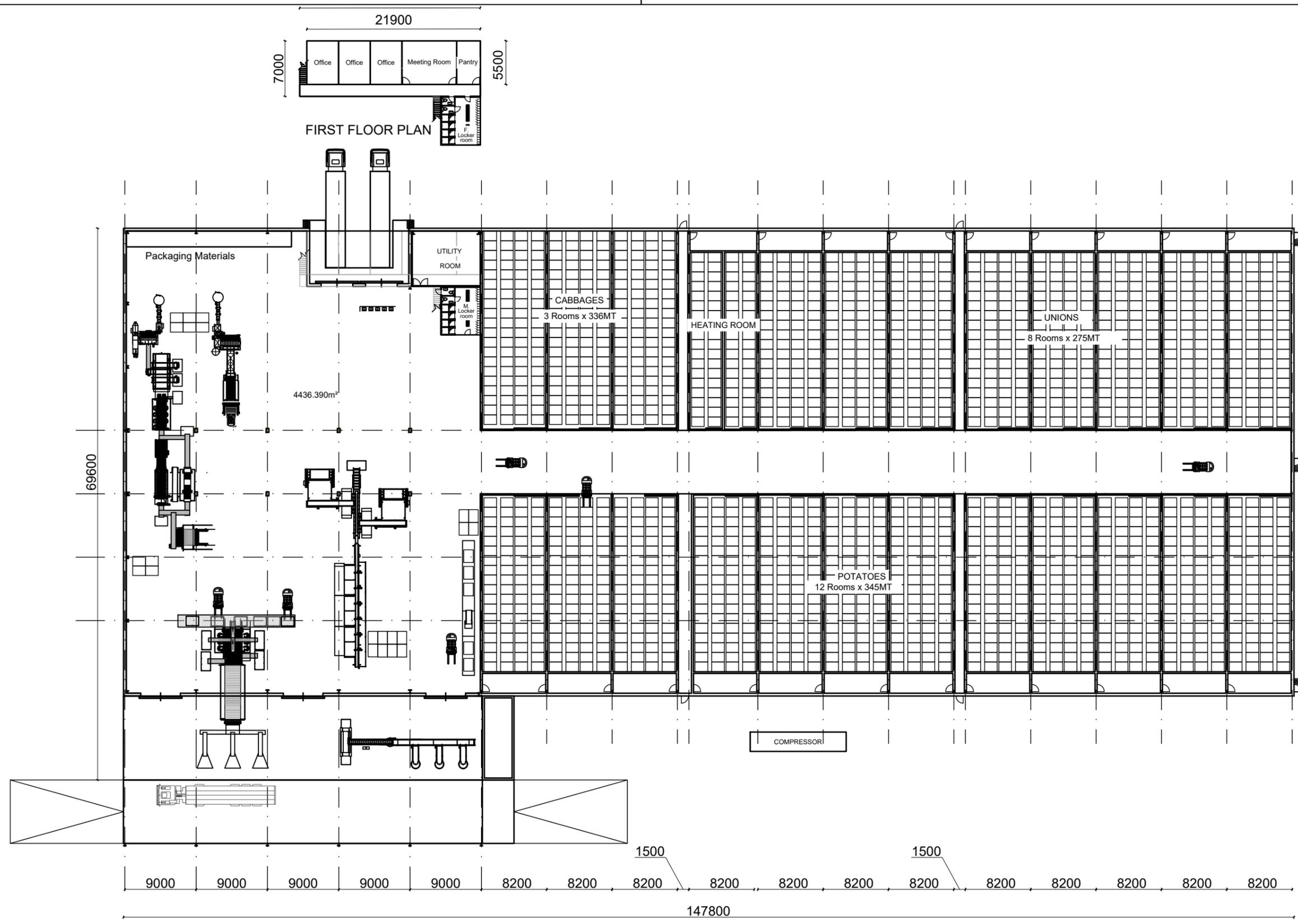
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Floor Plan**

size | scale | phase | A.G.
A3 | 1:150 | Preliminary | BZ1051

project | dwg | blad | rev
BH4289_100-100 | - 202 | - 0001 | - A

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GROUND FLOOR PLAN

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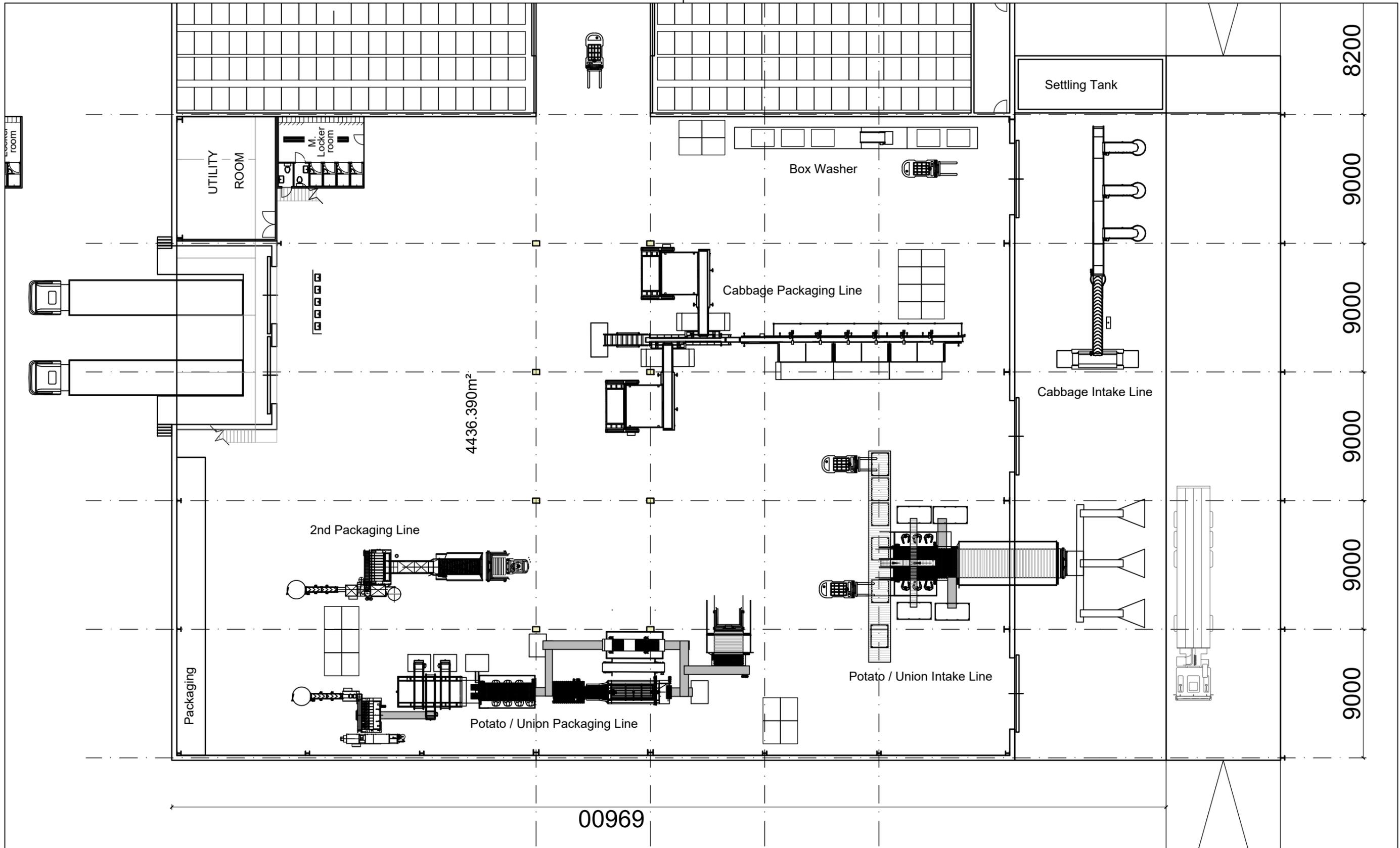
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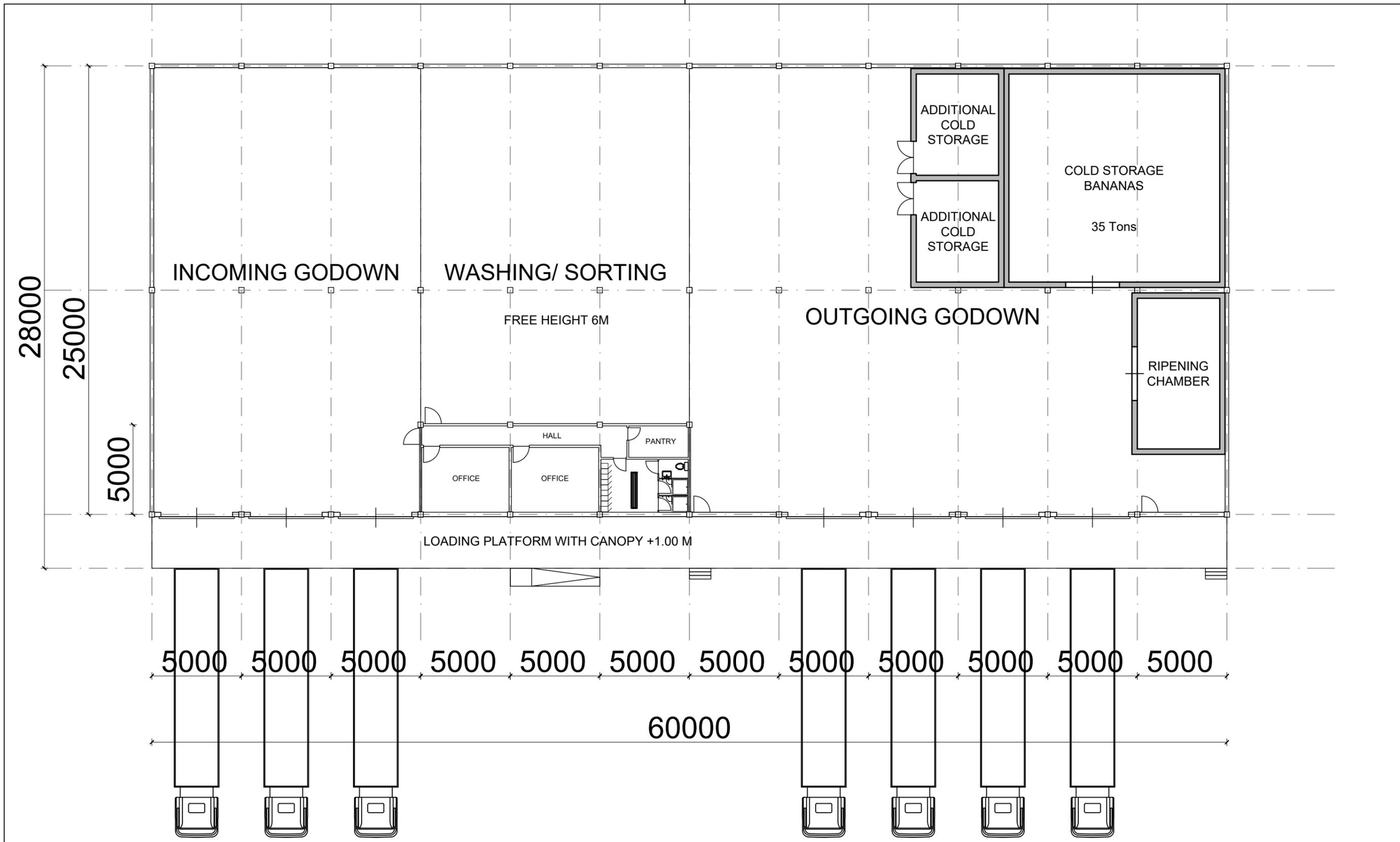
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| BH4289_100-100 | - 203 | - 0001 | - A | |

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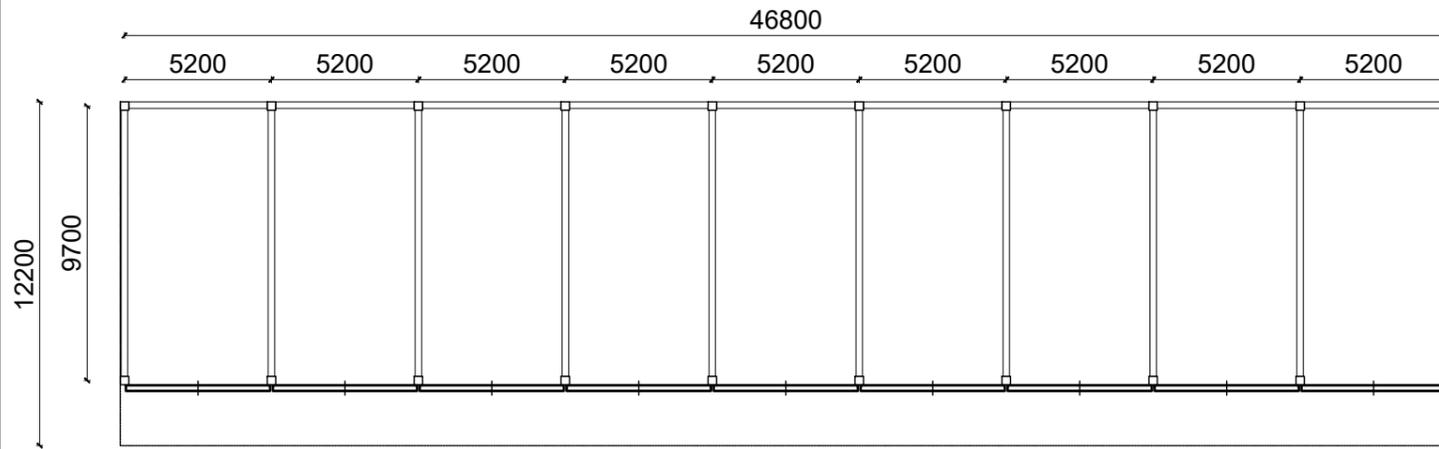
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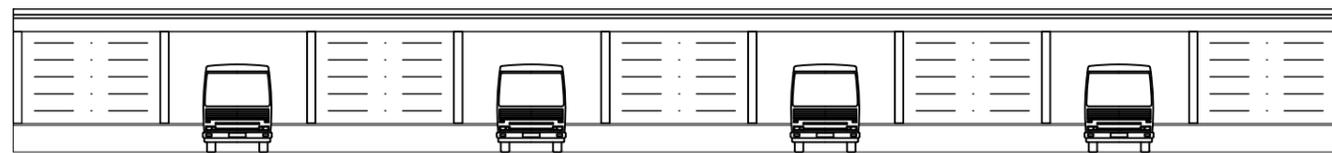
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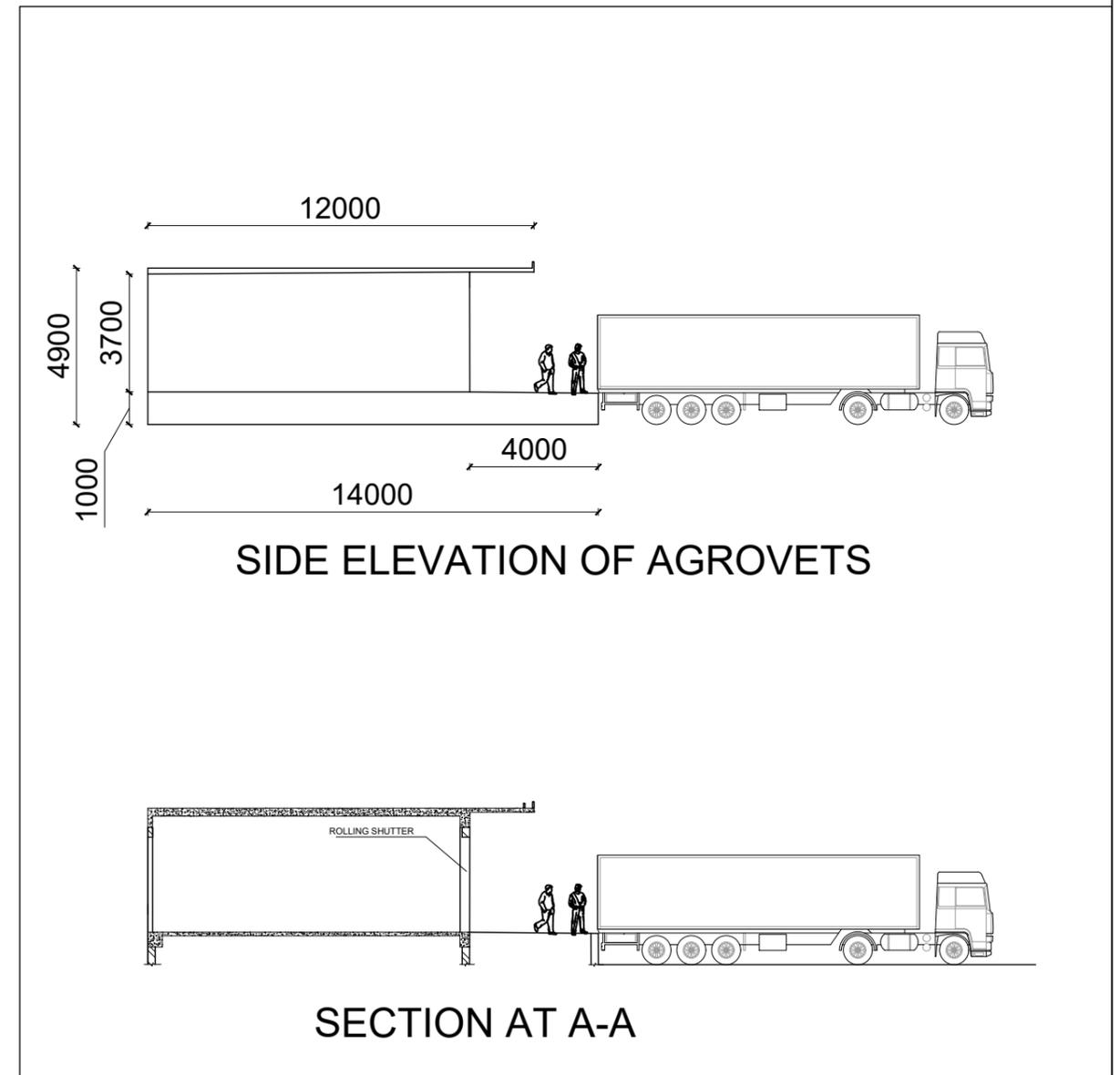




FLOOR PLAN OF AGROVETS



FRONT ELEVATION OF AGROVETS



SIDE ELEVATION OF AGROVETS

SECTION AT A-A

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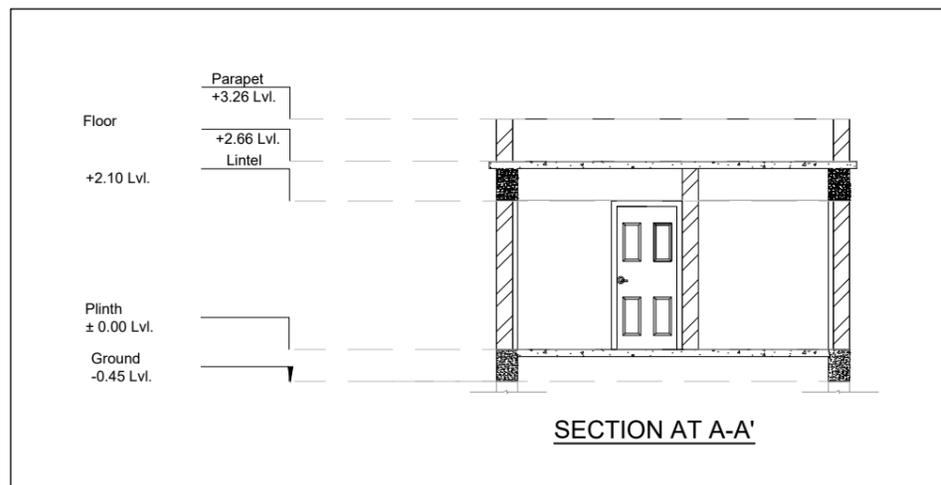
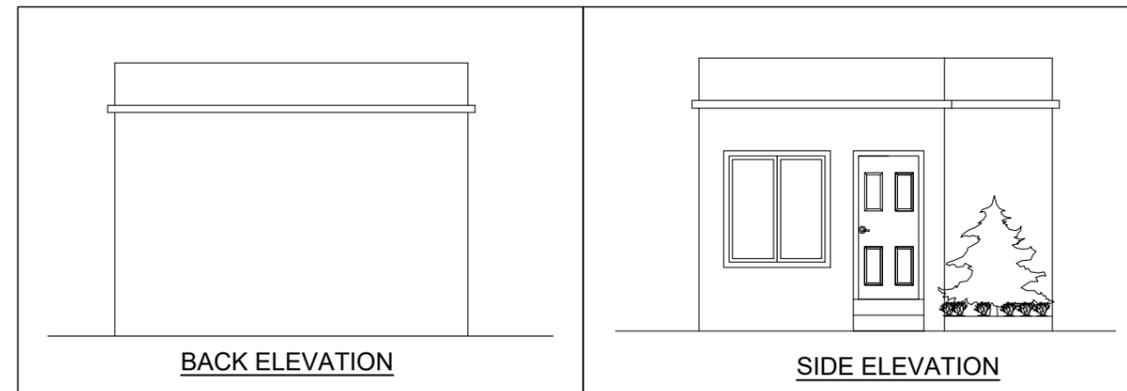
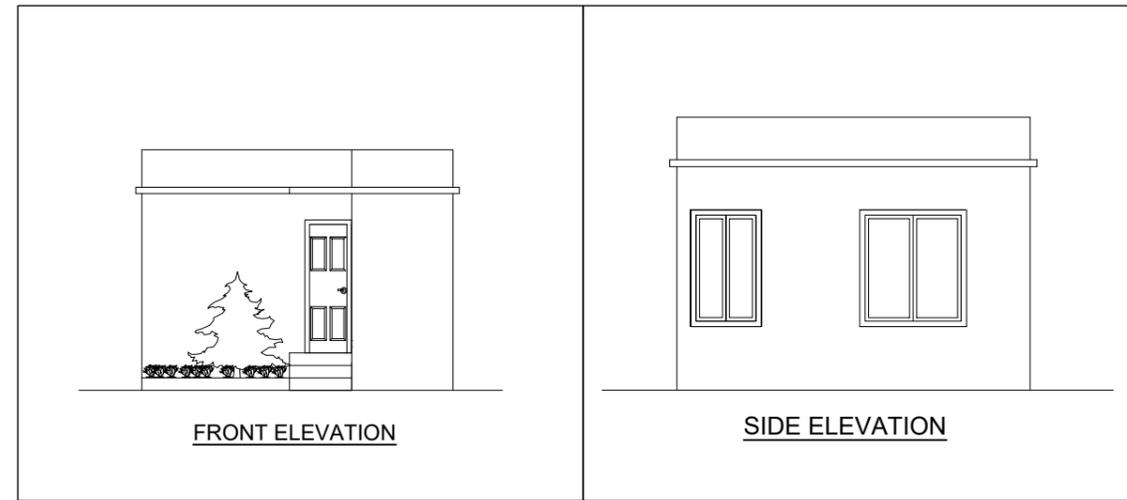
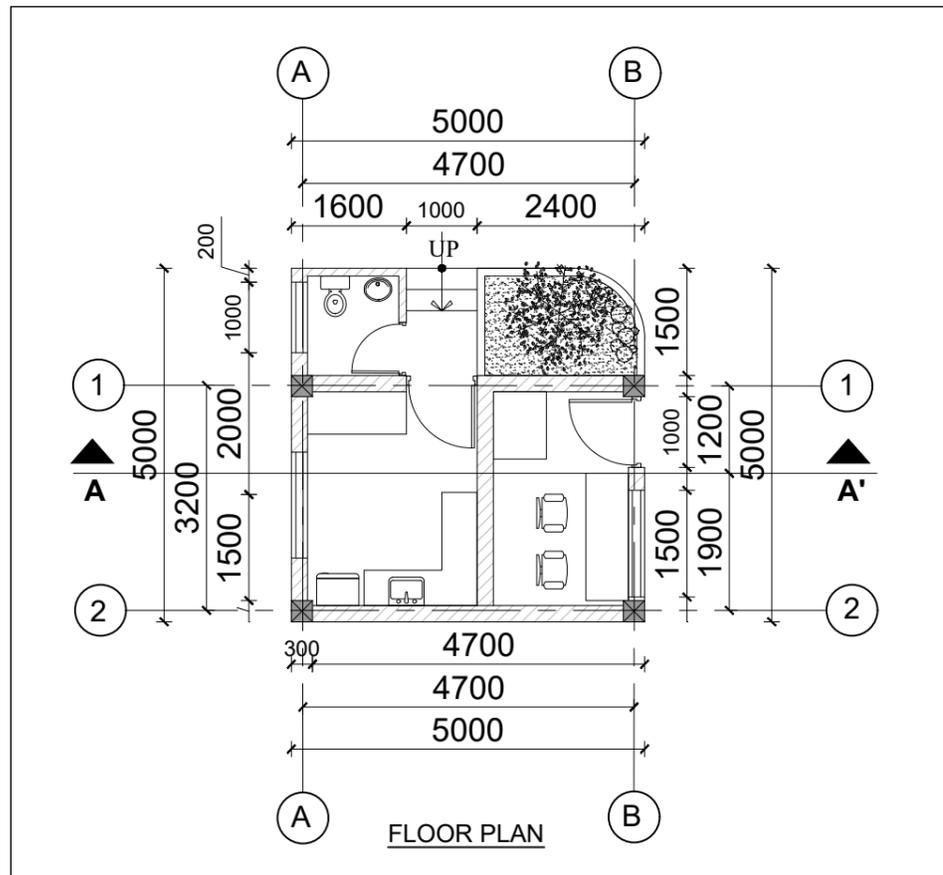
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| AgroVets Ground Floor Plan, Front and elevation view | BH4289_100-100 | - 205 | - 0001 | - 0 |

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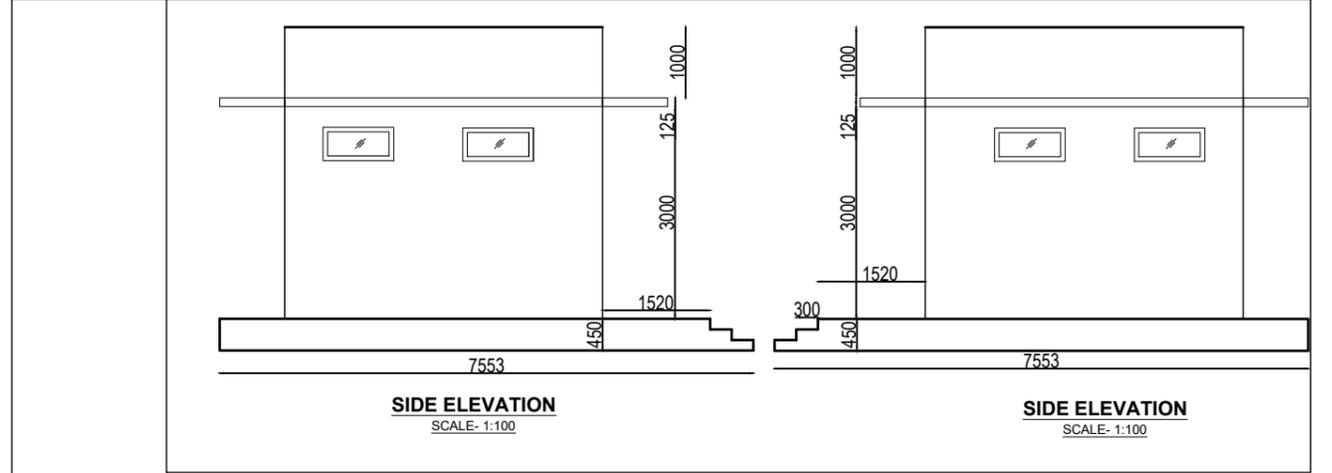
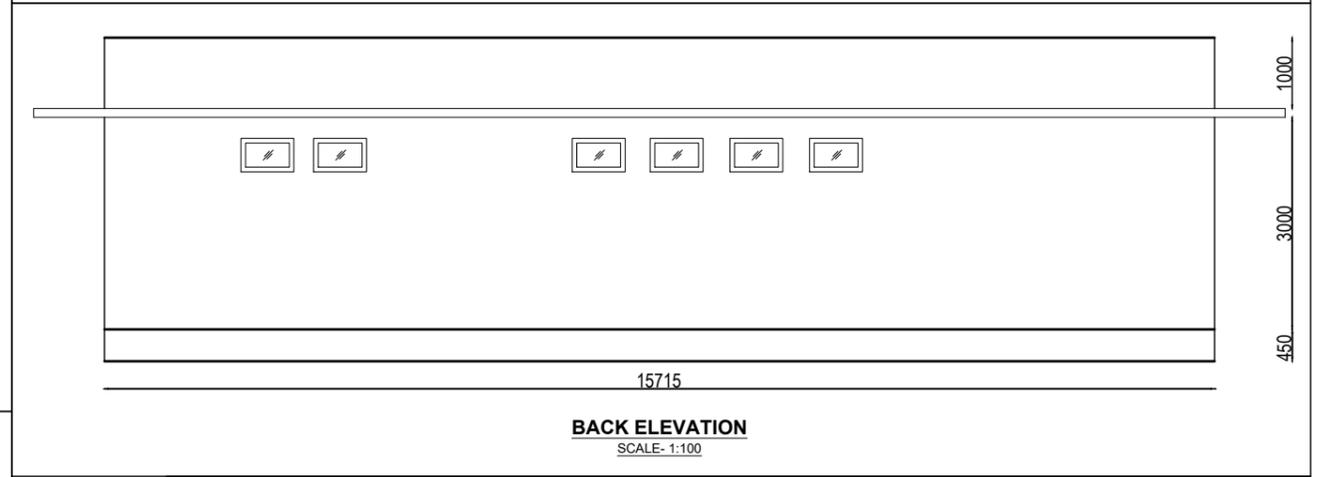
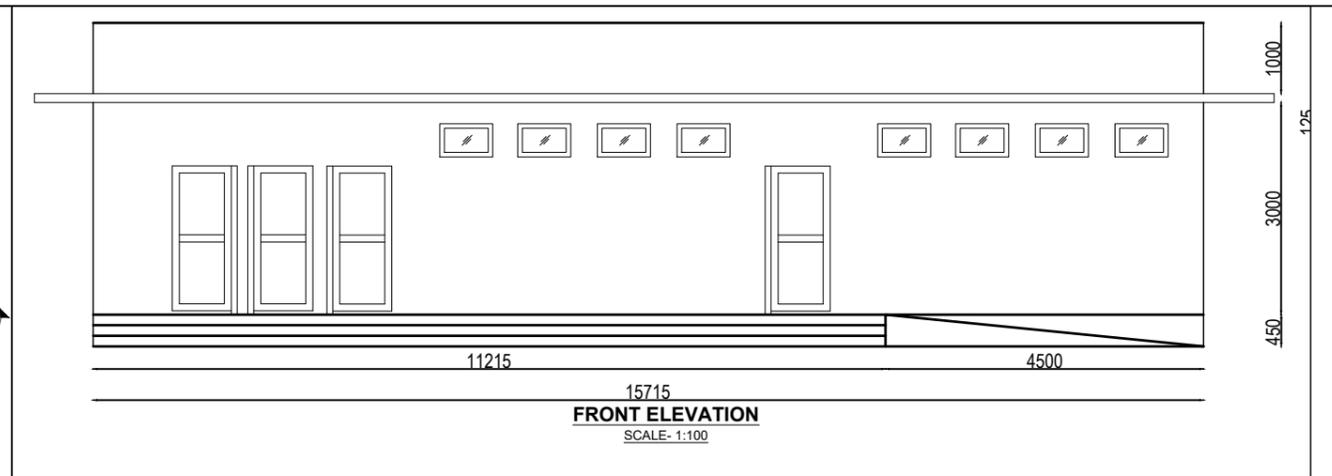
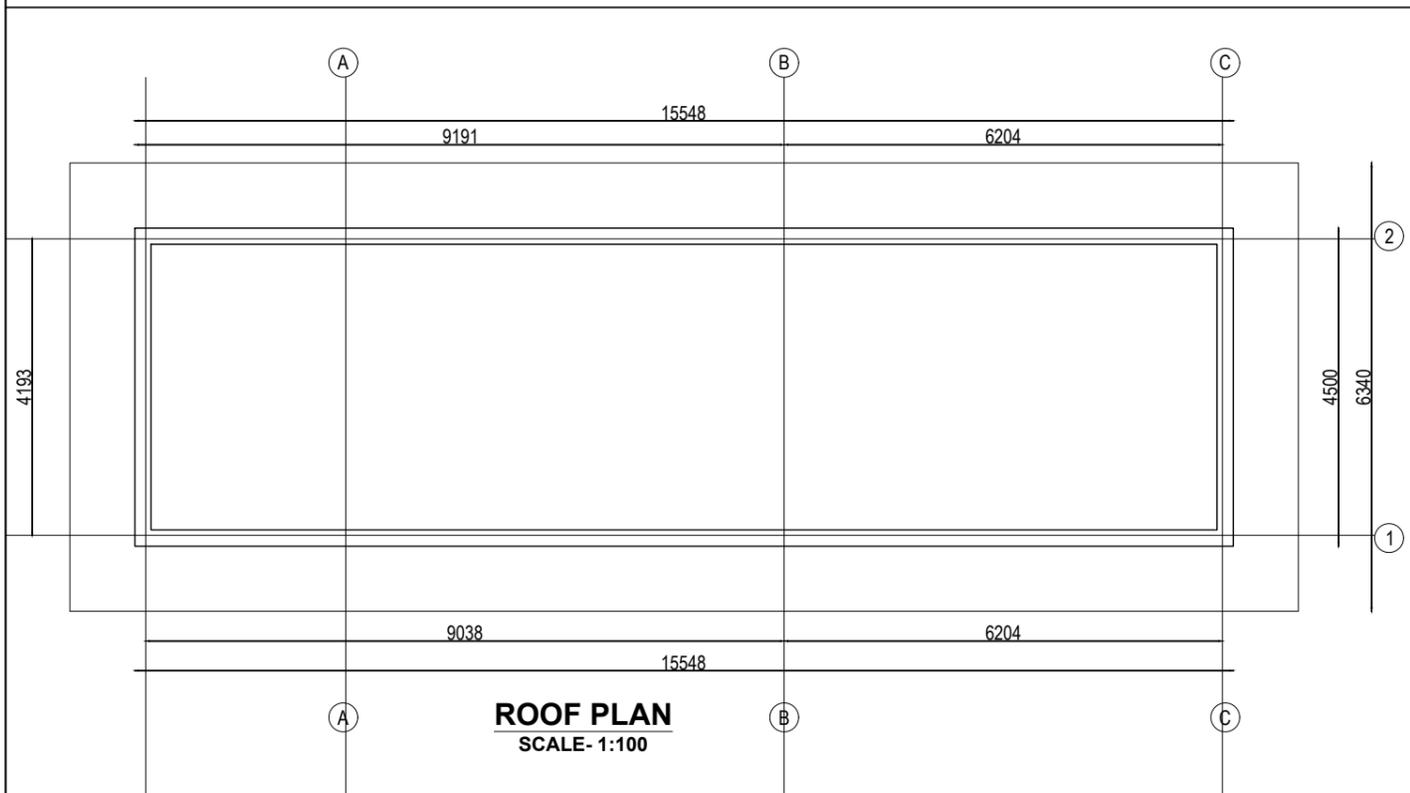
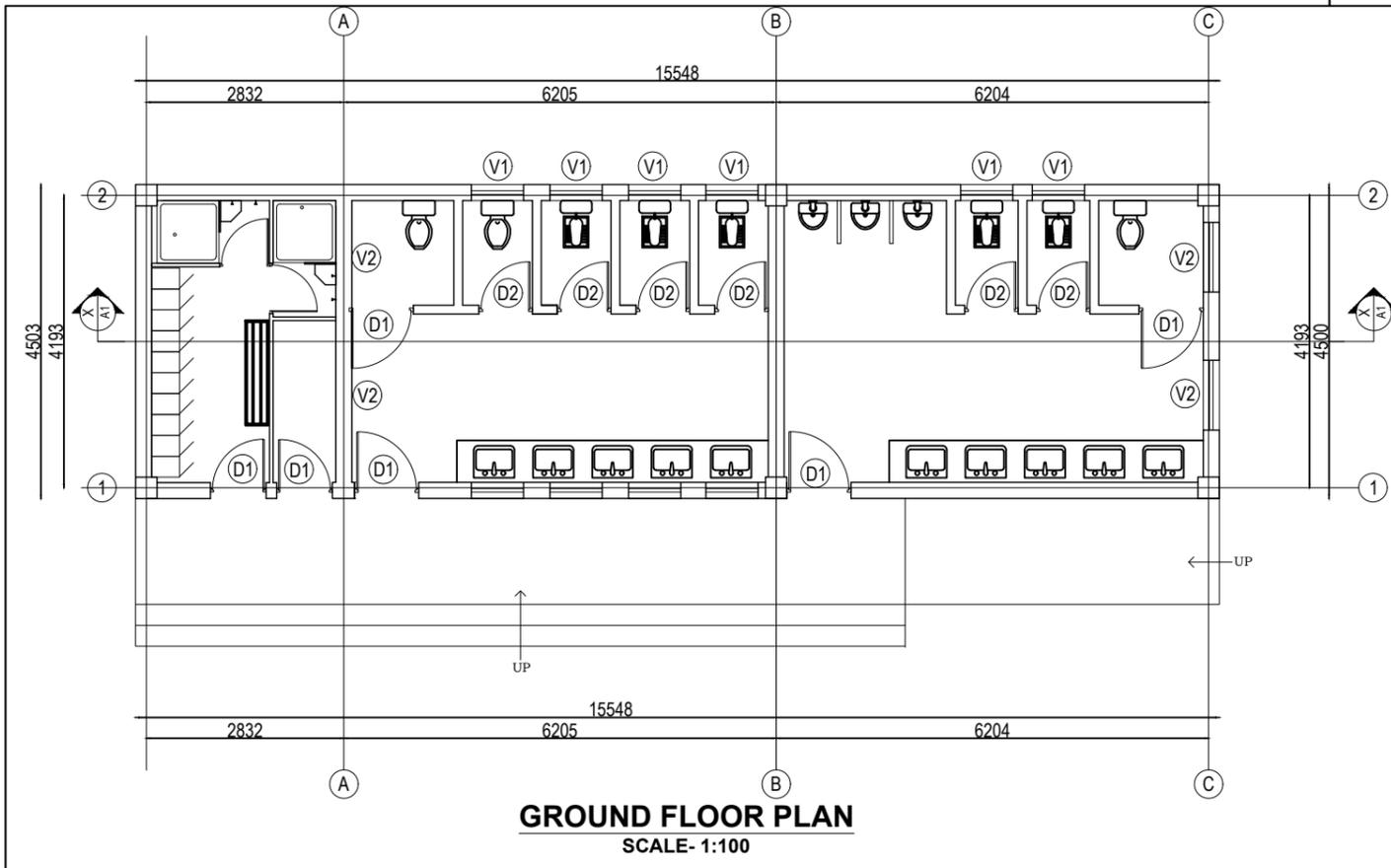
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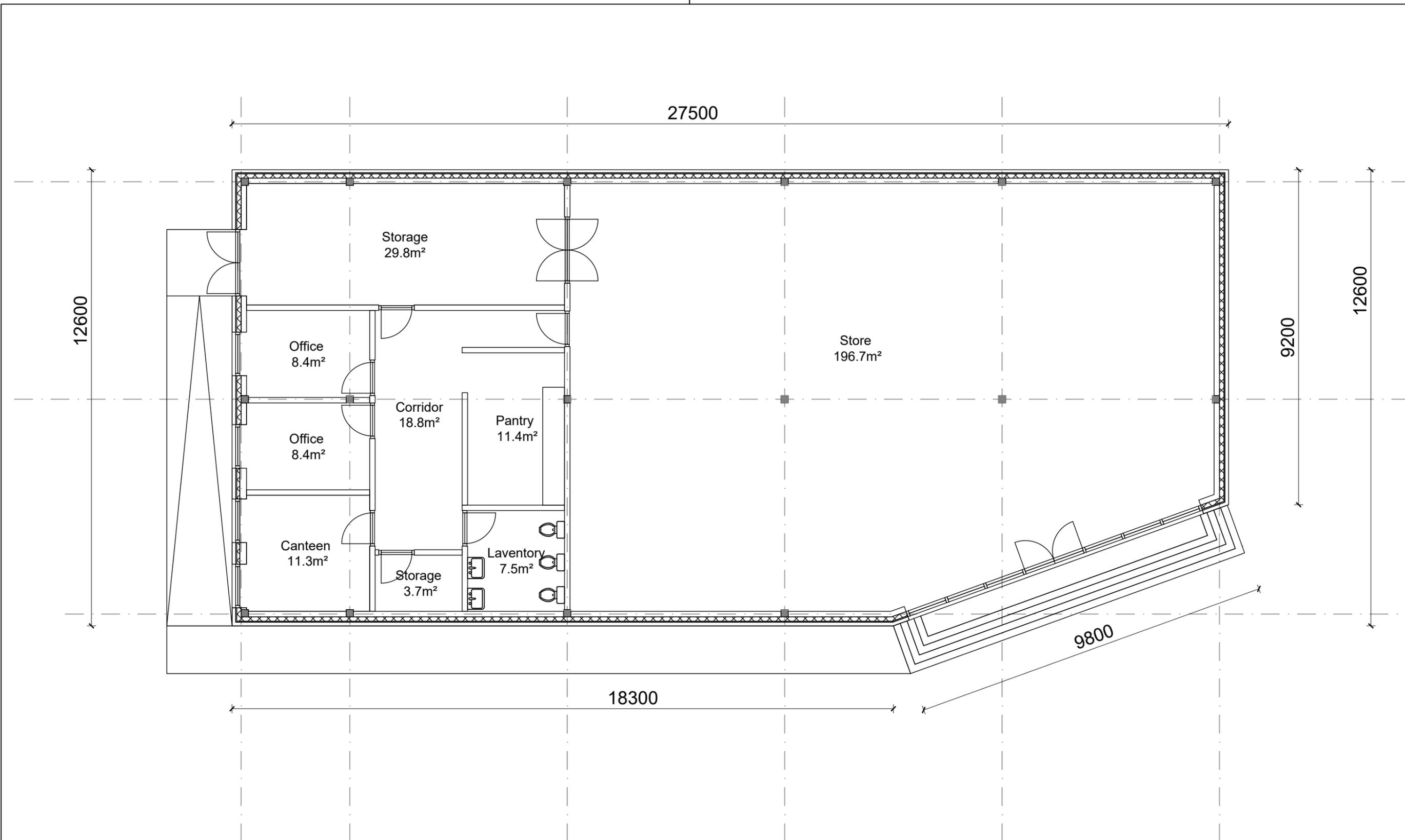
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| client Invest International | | project Export Orientated Agriculture Wholesale Market | | description Public Toilet Building Plan & Elevation | | <small>HASKONING NEDERLAND B.V. A COMPANY OF</small> <small>+31 88 348 90 00 Telephone info@rhdhv.com E-mail www.royalhaskoningdhv.com Internet</small> | | | | | | | | | | | | | | | | | | | |
| size A3 | scale 1:150 | phase Preliminary | A.G. BZ1051 | revision A | description Changes after remarks | drawn AGe | checked AGe | | | | | | | | | | | | | | | | | | |
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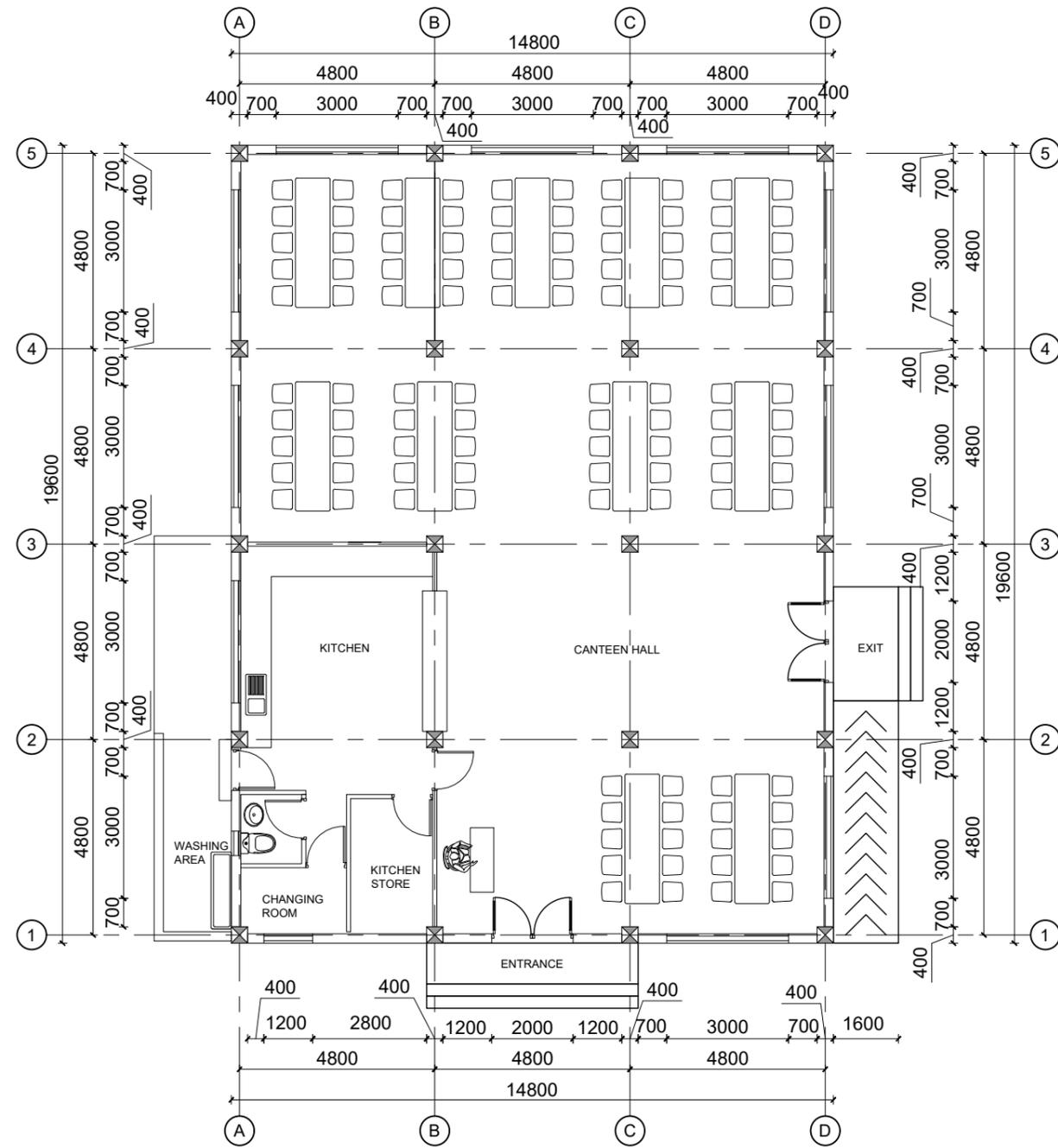
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| description | Supermarket Buidling Ground Floor Plan | | | |
| project | dwg | blad | rev | |
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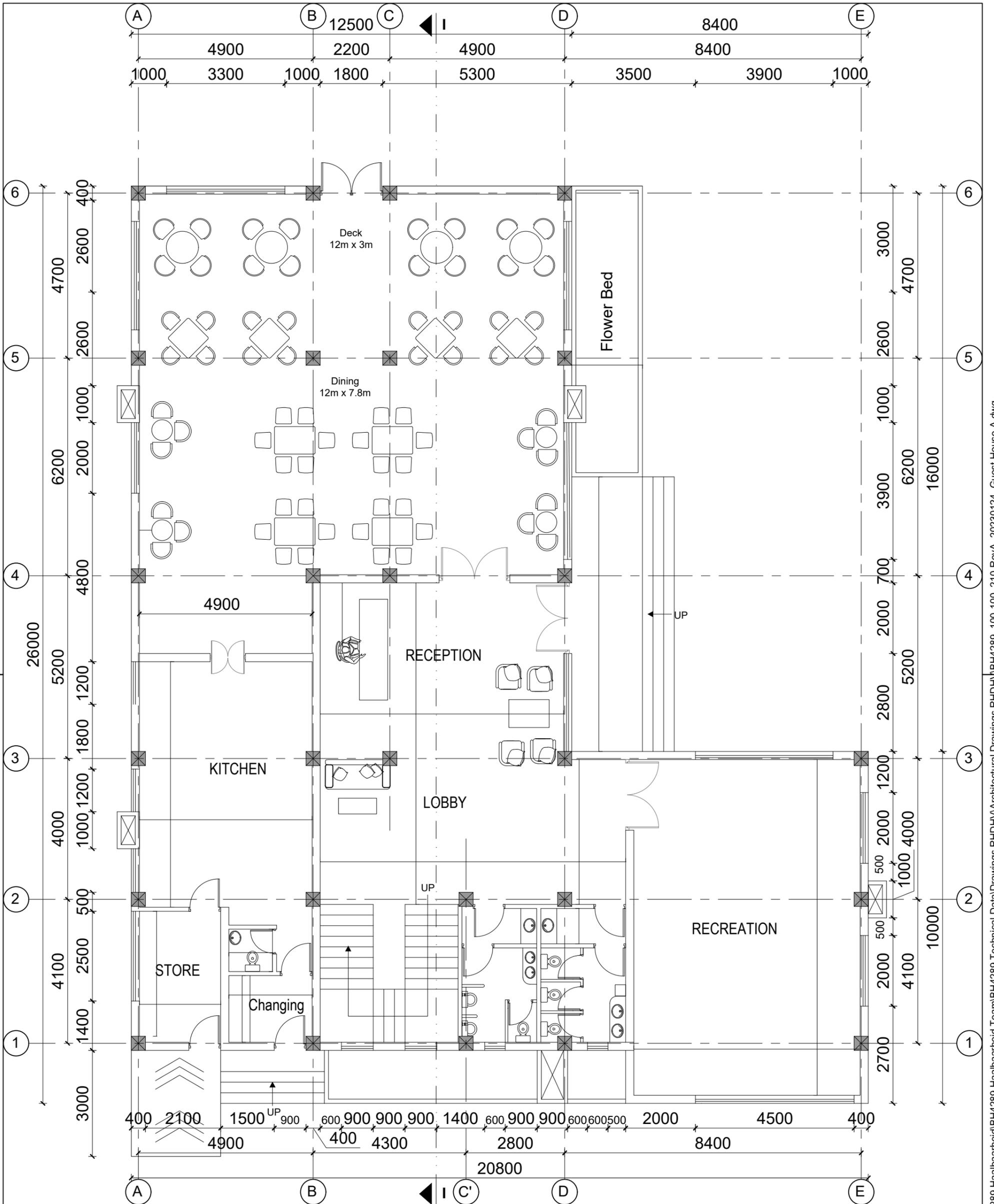
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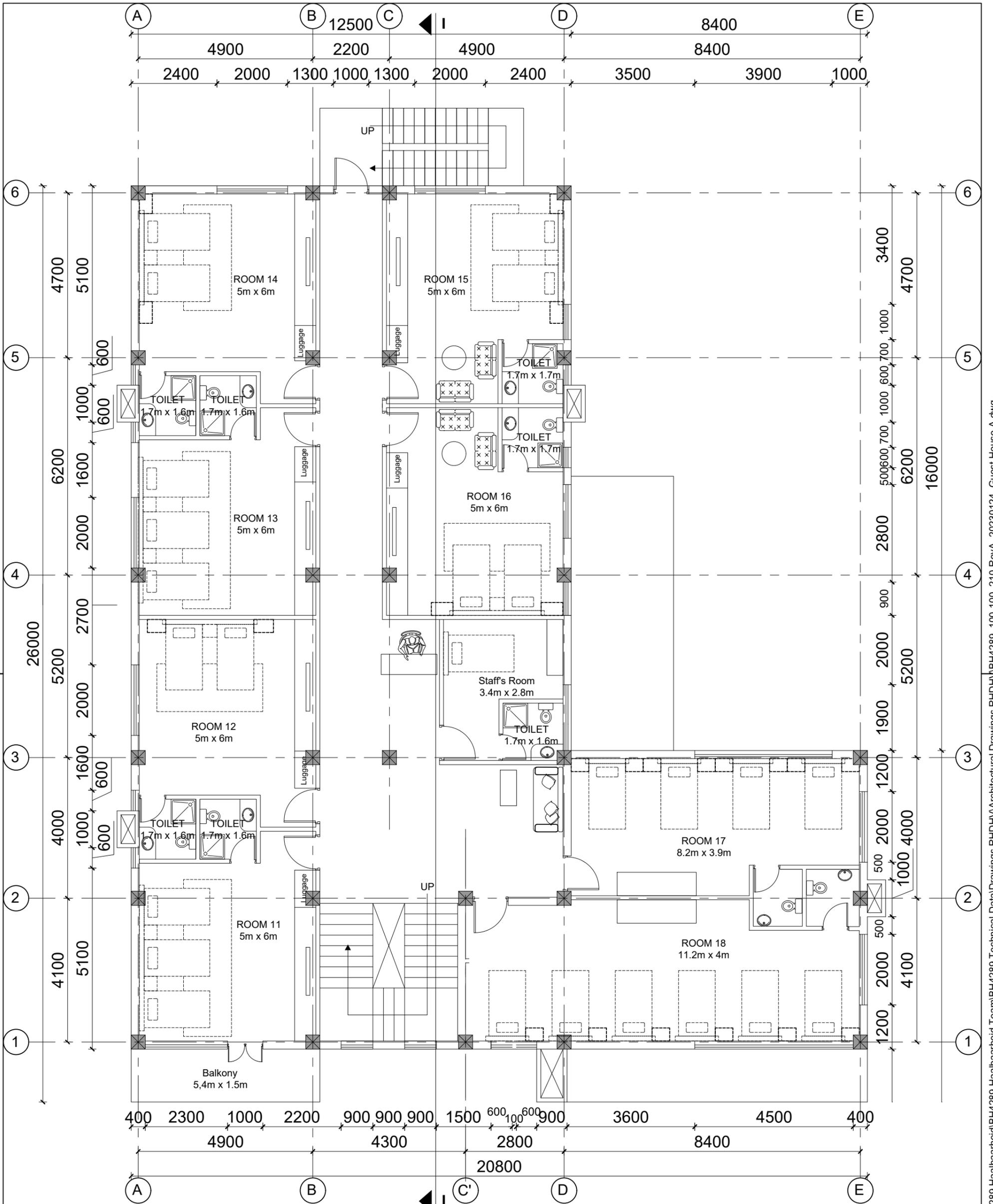
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GROUND FLOOR PLAN

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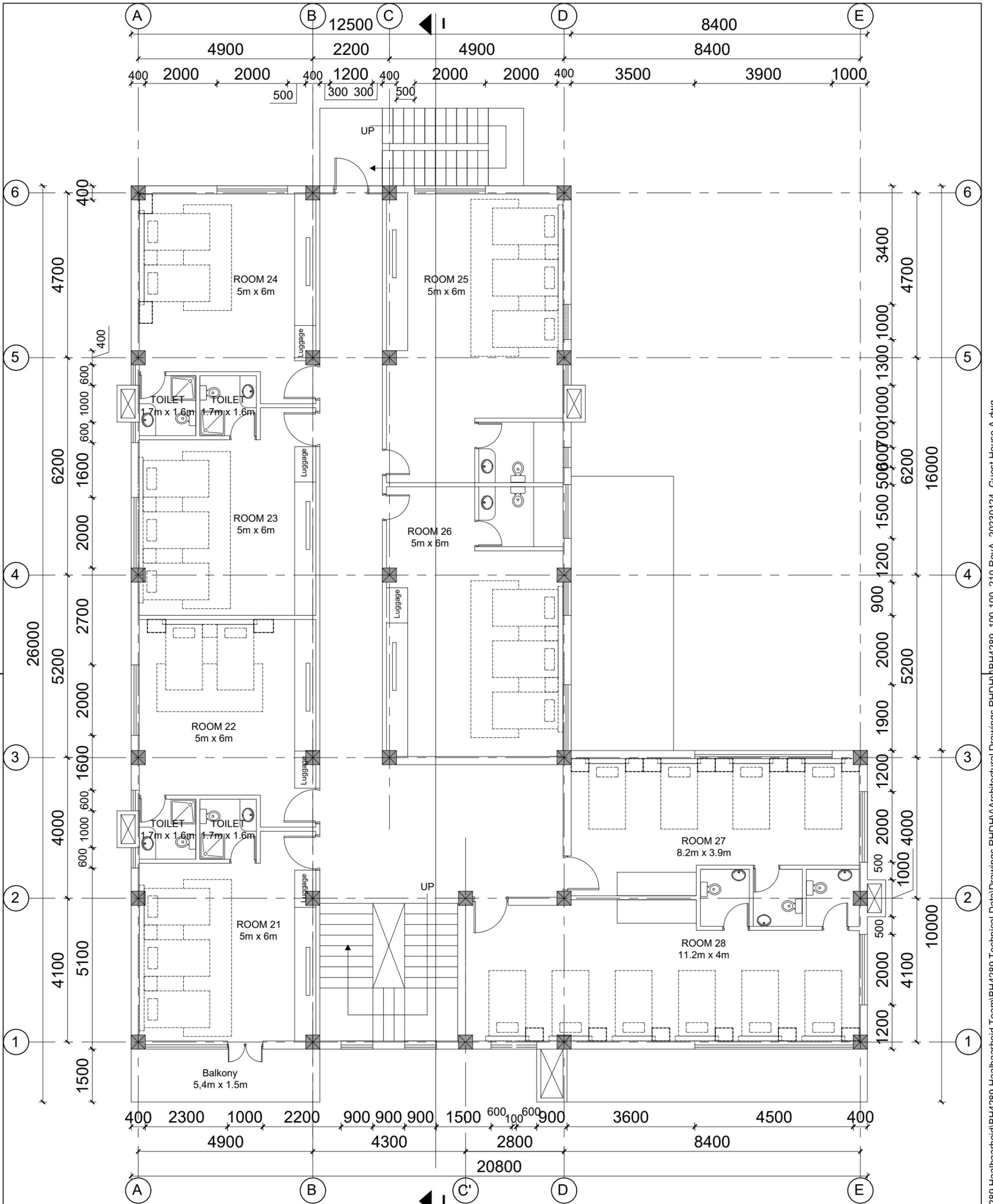
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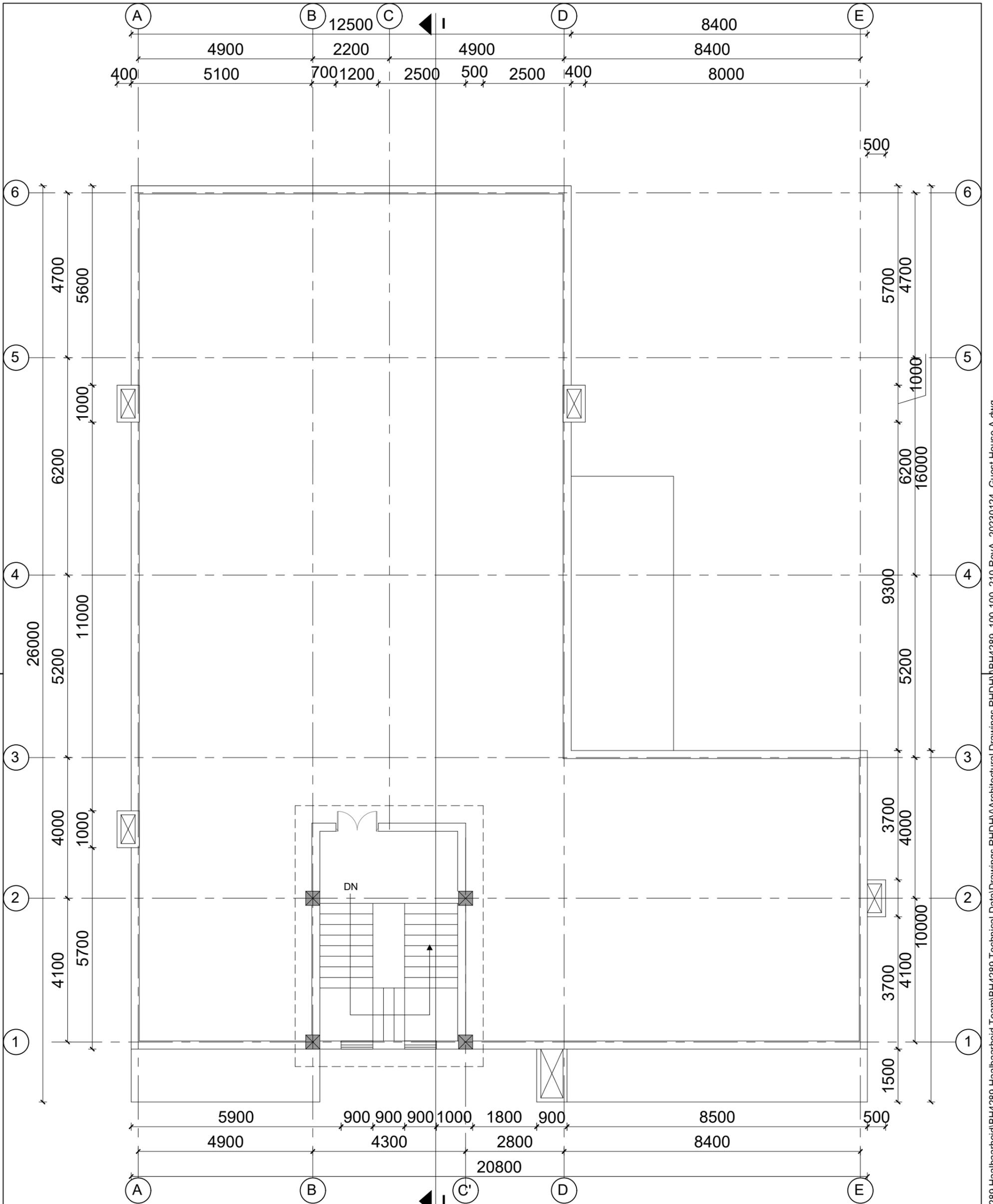
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SECOND FLOOR PLAN

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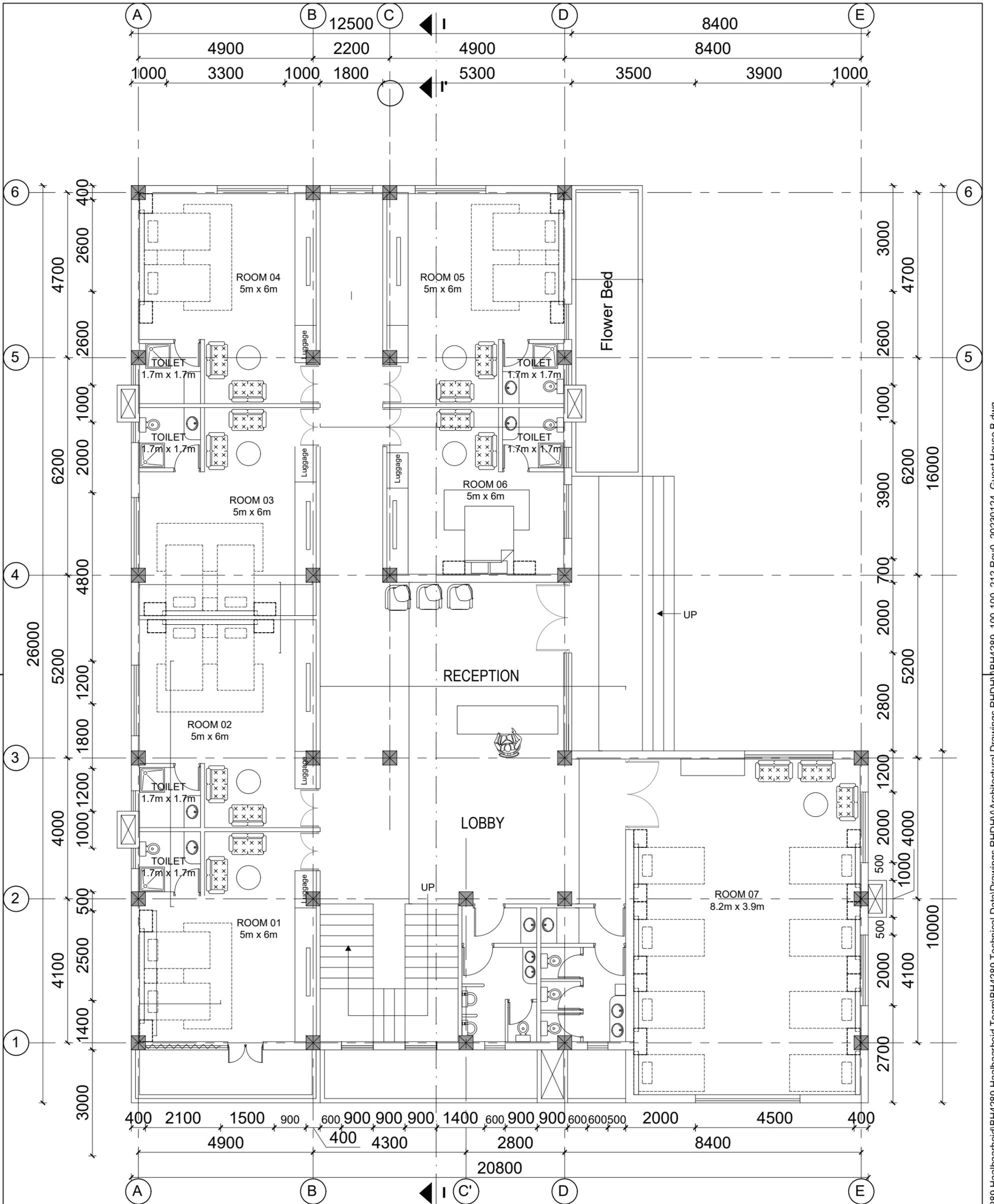
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TOP FLOOR PLAN

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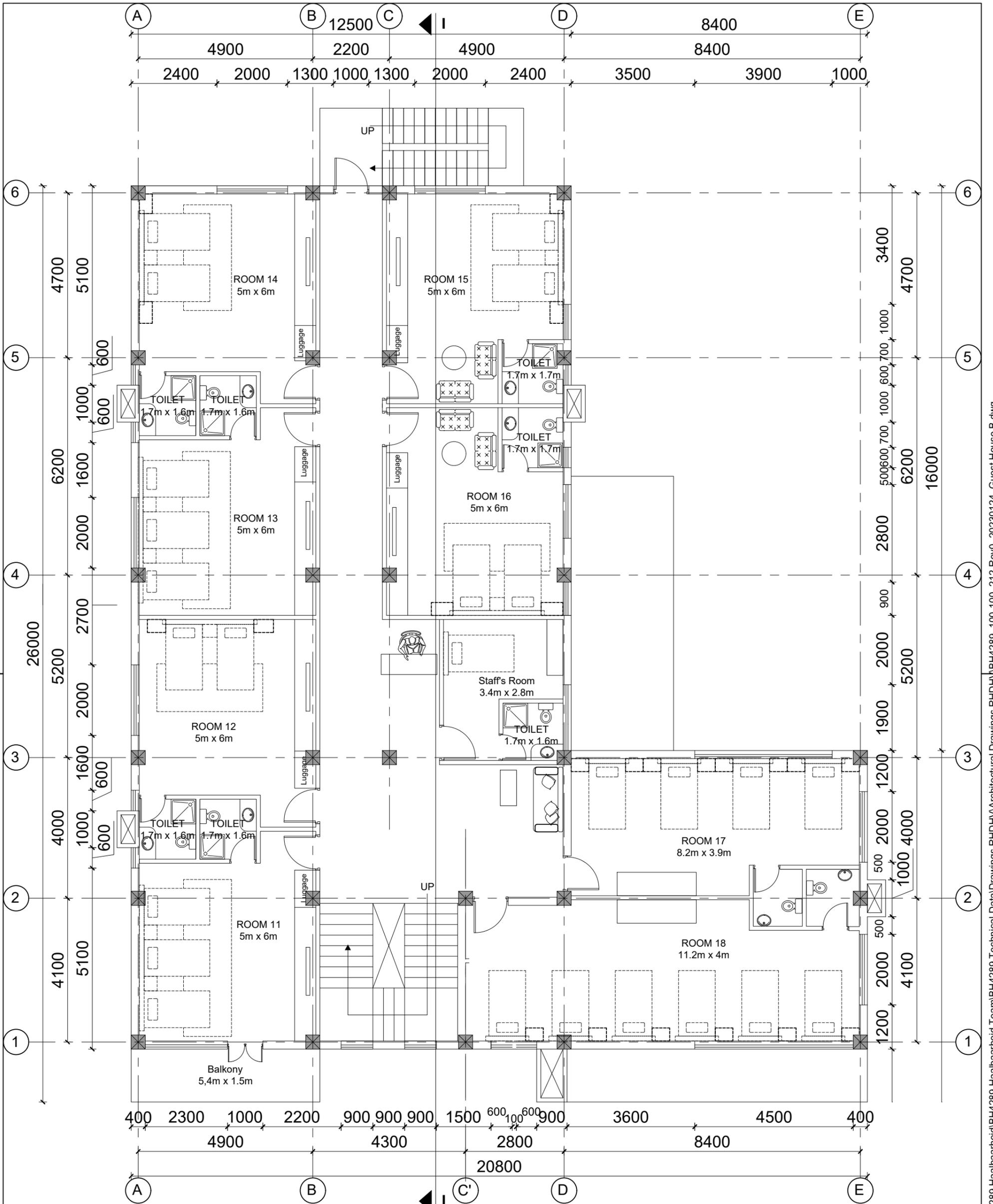
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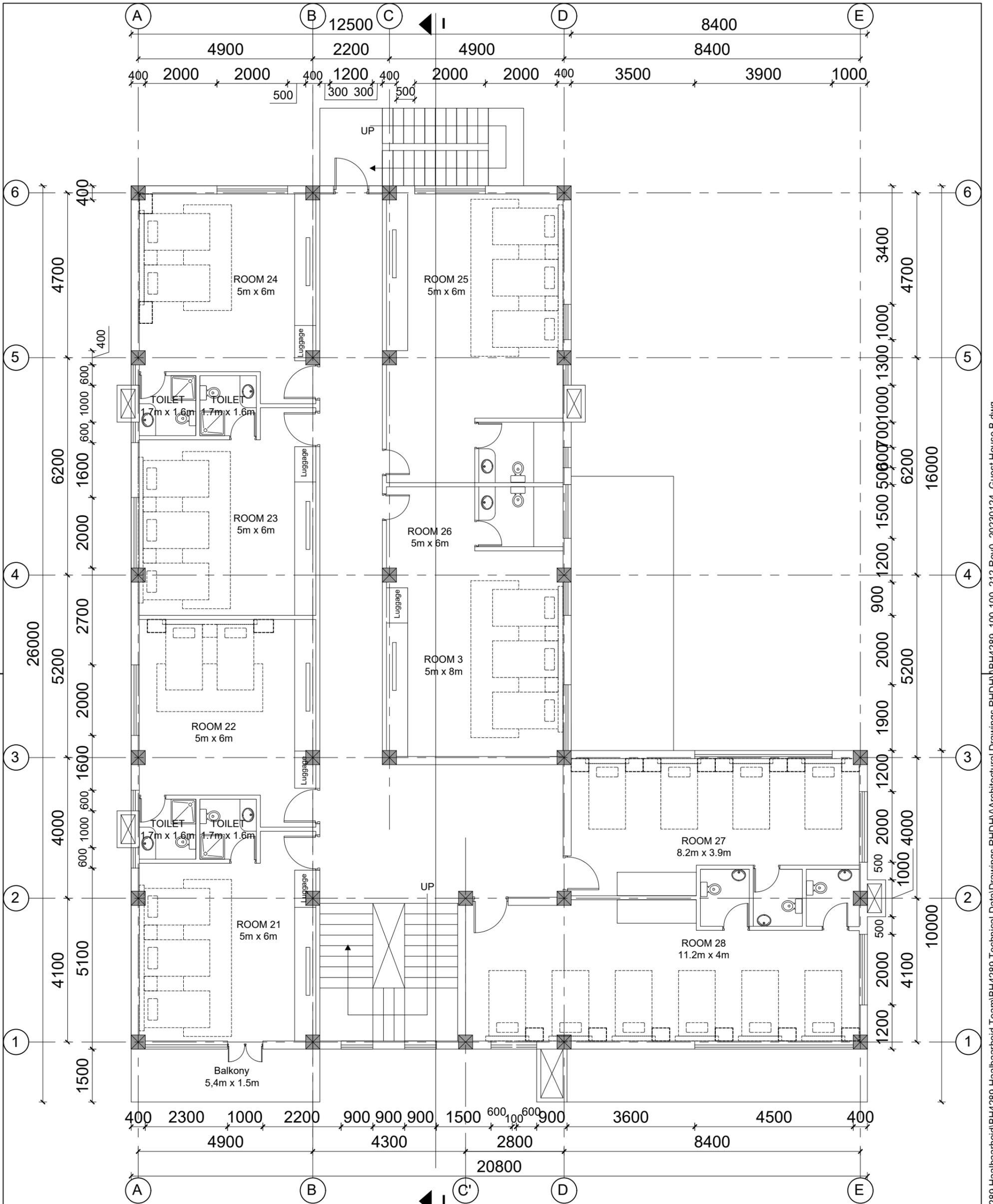
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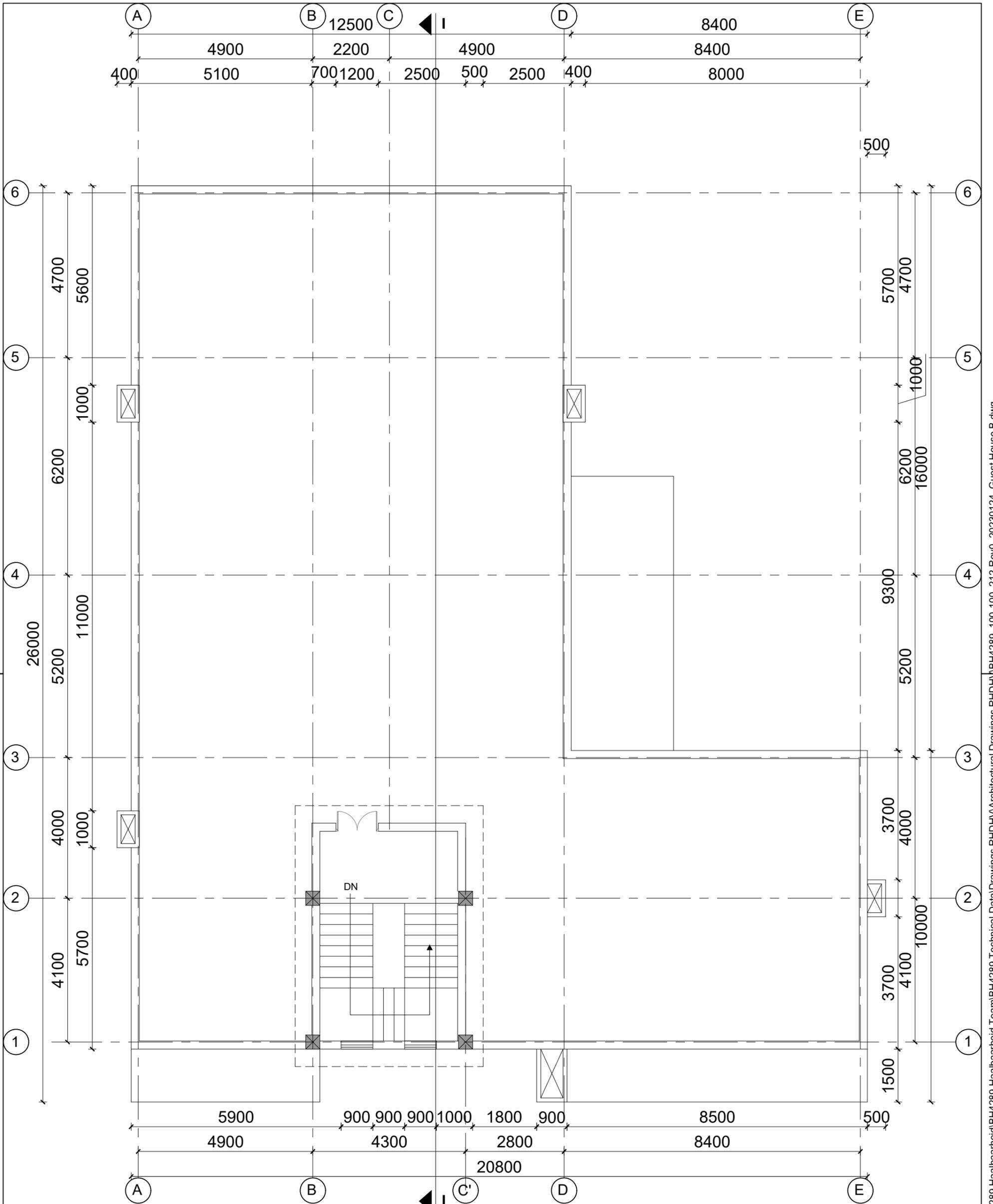
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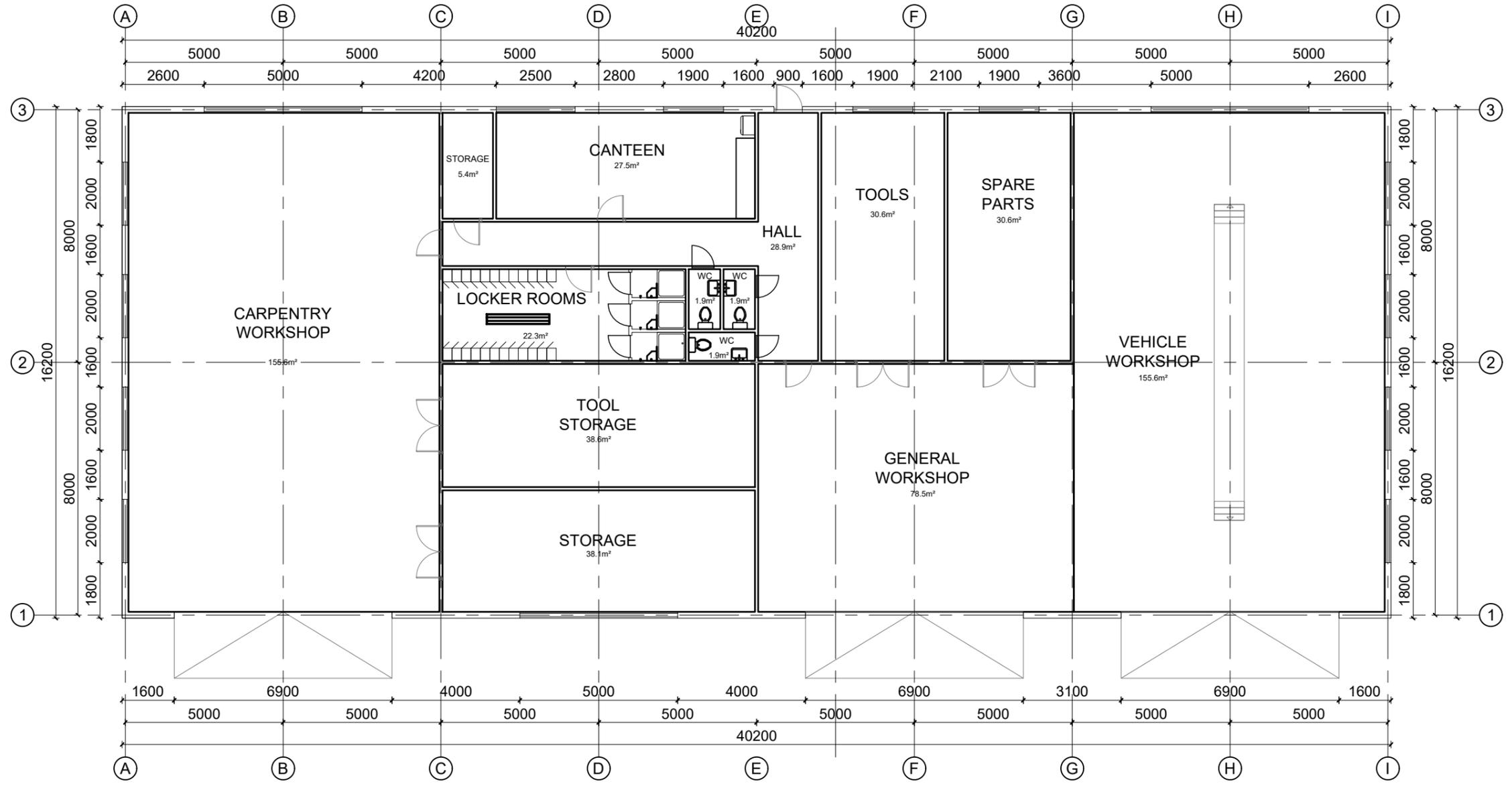
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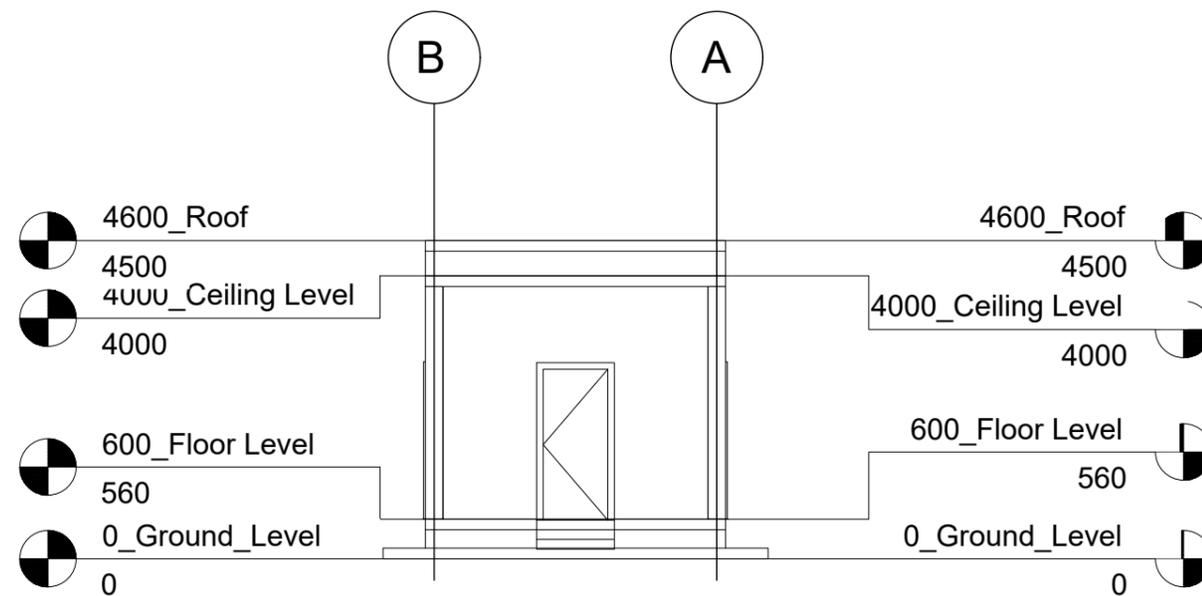
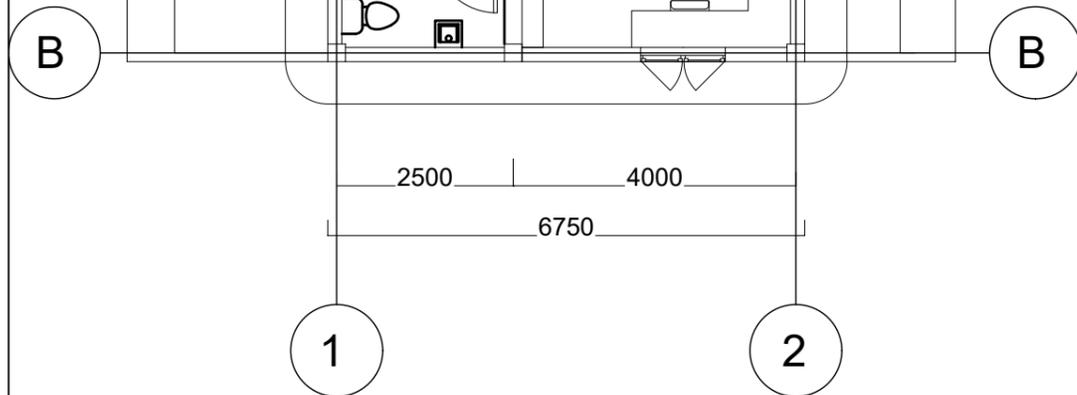
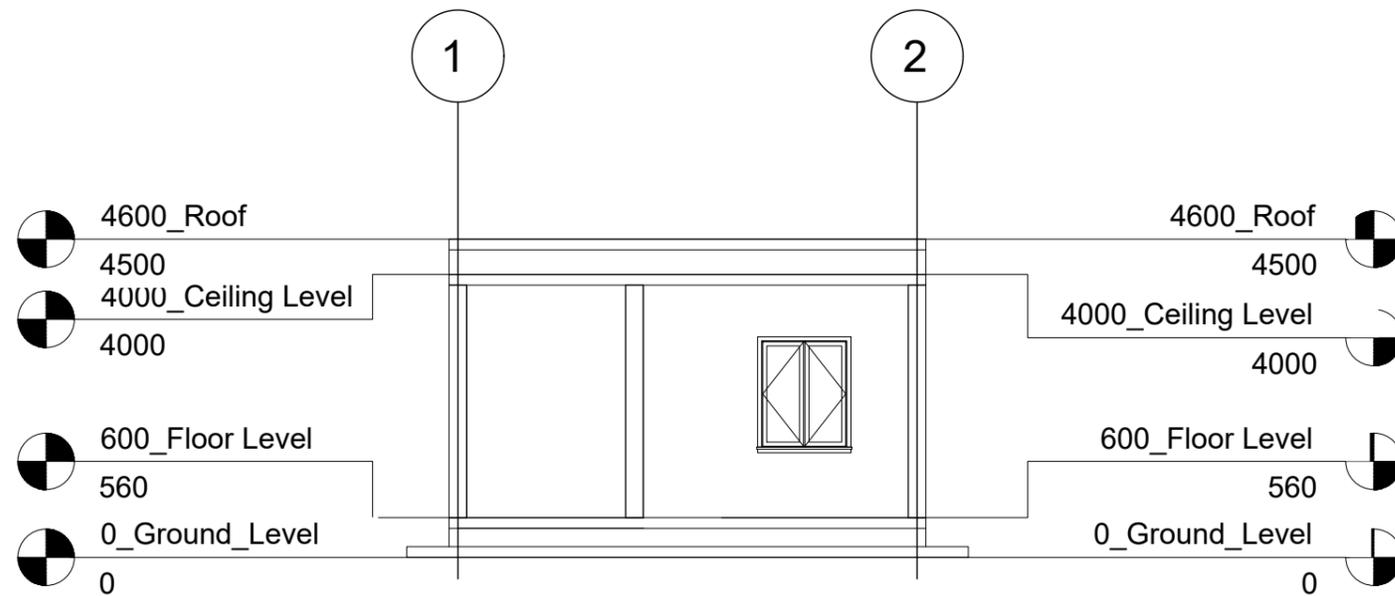
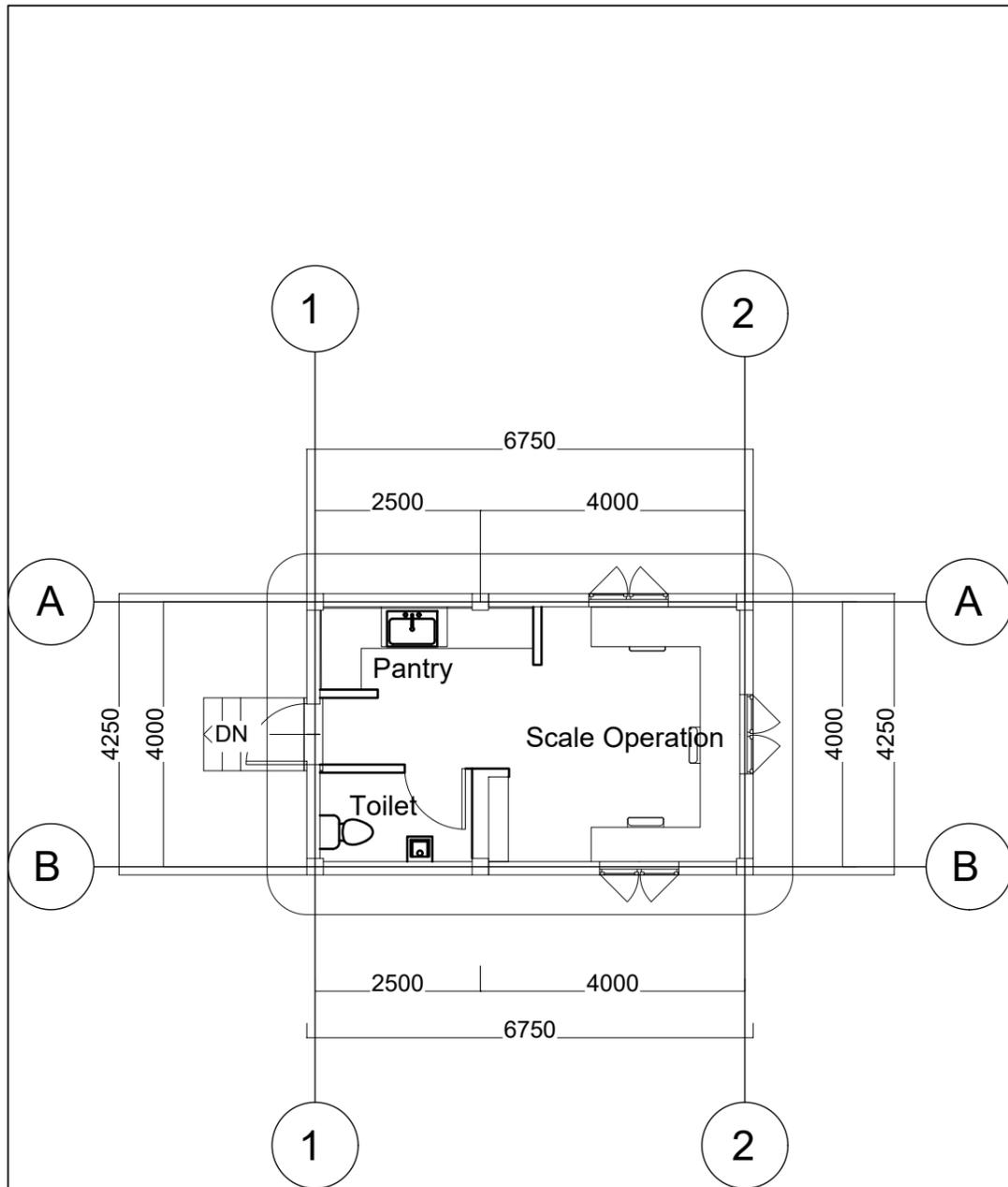
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|--------|----------------------|
| client | Invest International |
| size | A3 |
| scale | 1:150 |
| phase | Preliminary |

| | |
|---------|---|
| project | Export Orientated Agriculture Wholesale Market |
| A.G. | BZ1051 |

| | | | |
|-------------|--|-----|------------|
| description | Workshops (General and Carpentry Ground Floor Plan) | | |
| project | BH4289_100-100 | dwg | 213 - 0001 |
| blad | | rev | - A |

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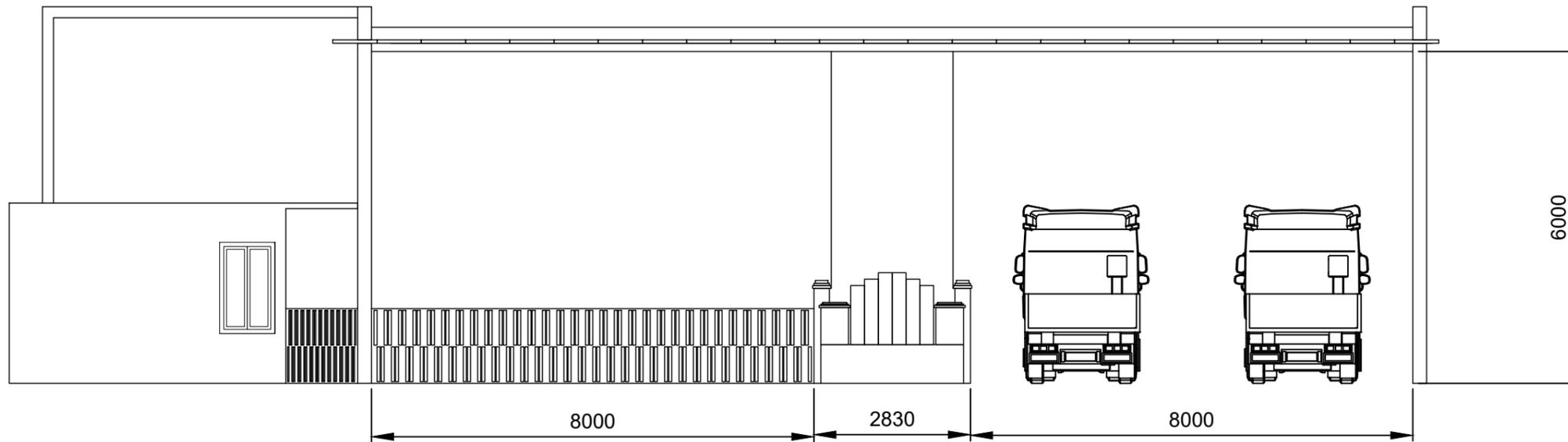
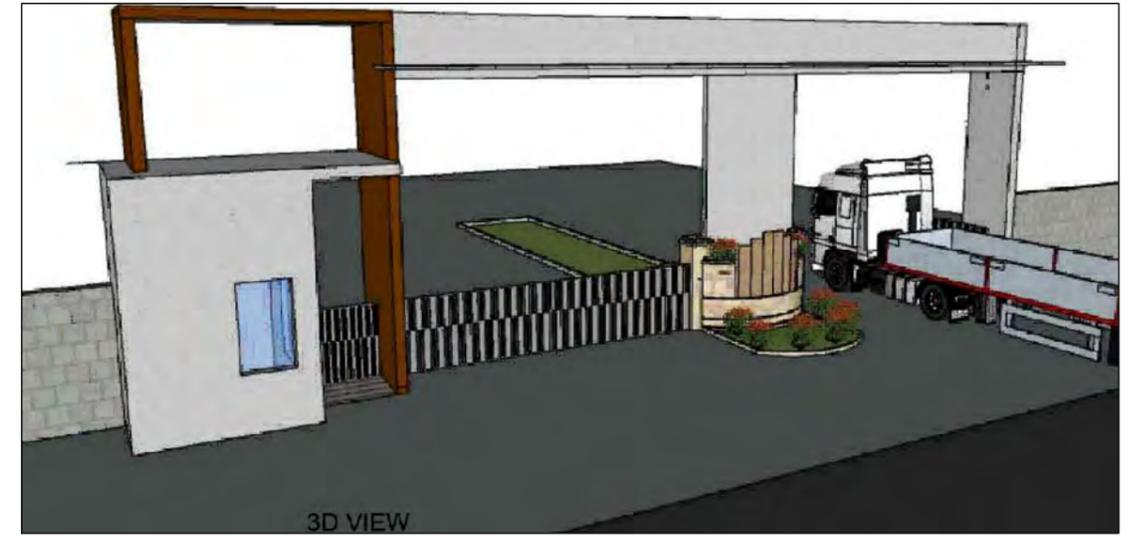
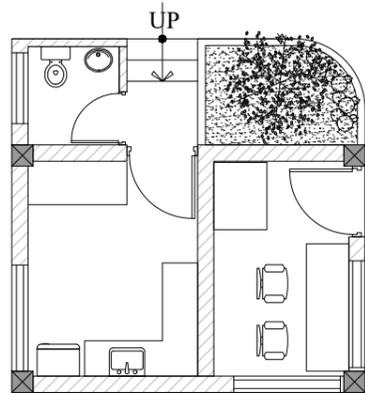
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| | First Edition | AGe | | 05 SEP 2022 | |
| revision | description | drawn | checked | approved | date |

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| client | Invest International |
| project | Export Orientated Agriculture Wholesale Market |
| size | A3 |
| scale | 1:150 |
| phase | Preliminary |

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| project | A.G. | BZ1051 |
| description | Weighing scale building Ground Floor Plan and Elevations | |
| project | dwg | blad |
| BH4289_100-100 | - 214 | - 0001 |
| | | rev |
| | | - A |

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| A | Changes after remarks | AGe | | 05 JAN 2023 | |
| | First Edition | AGe | | 05 SEP 2022 | |
| revision | description | drawn | checked | approved | date |

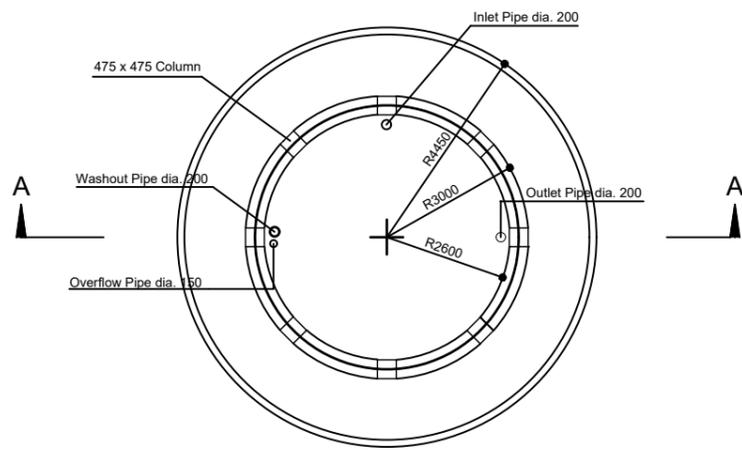
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| scale | 1:150 |
| phase | Preliminary |

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| A.G. | BZ1051 |

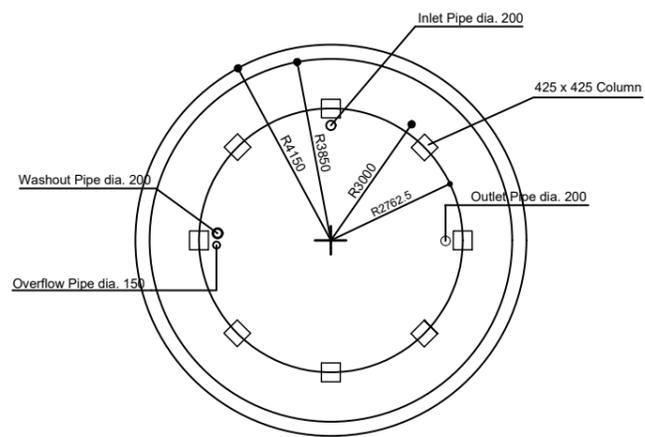
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| description | | | |
| Gate Design Floor Plan and Front View | | | |
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| BH4289_100-100 | - 215 | - 0001 | - A |

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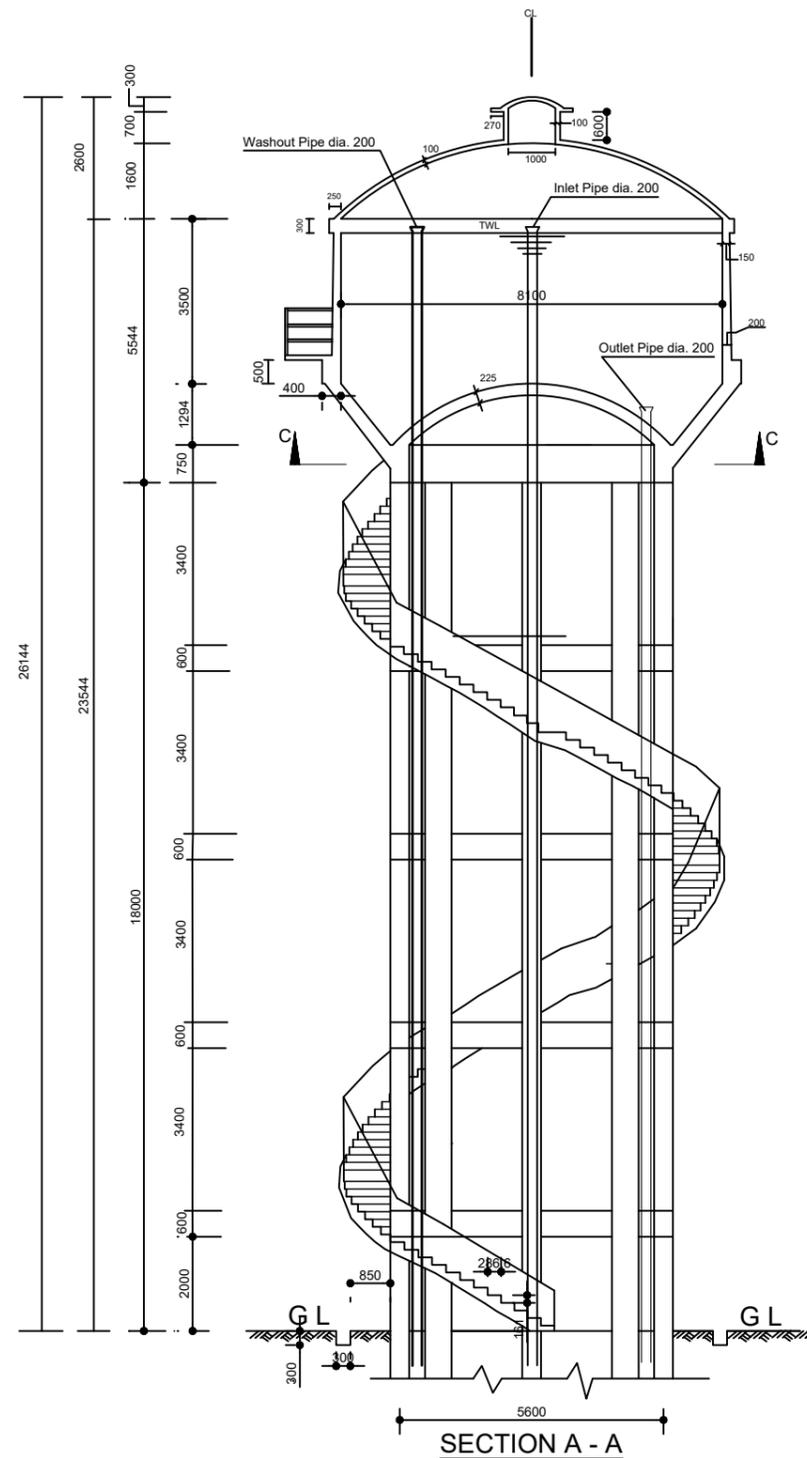
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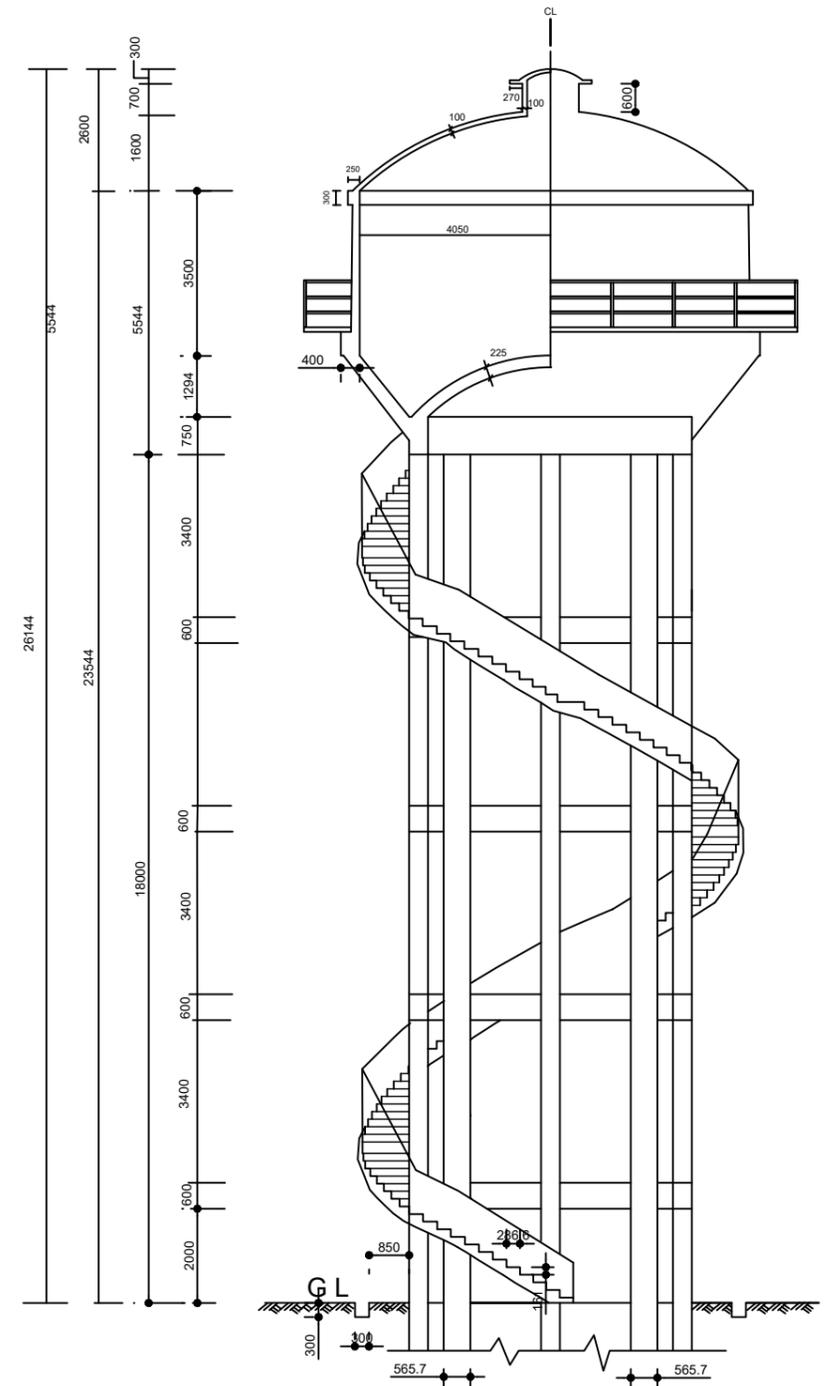
SECTION C - C



PLAN OF GROUND FLOOR LEVEL
(FOR LVL ± 0.00)



SECTION A - A



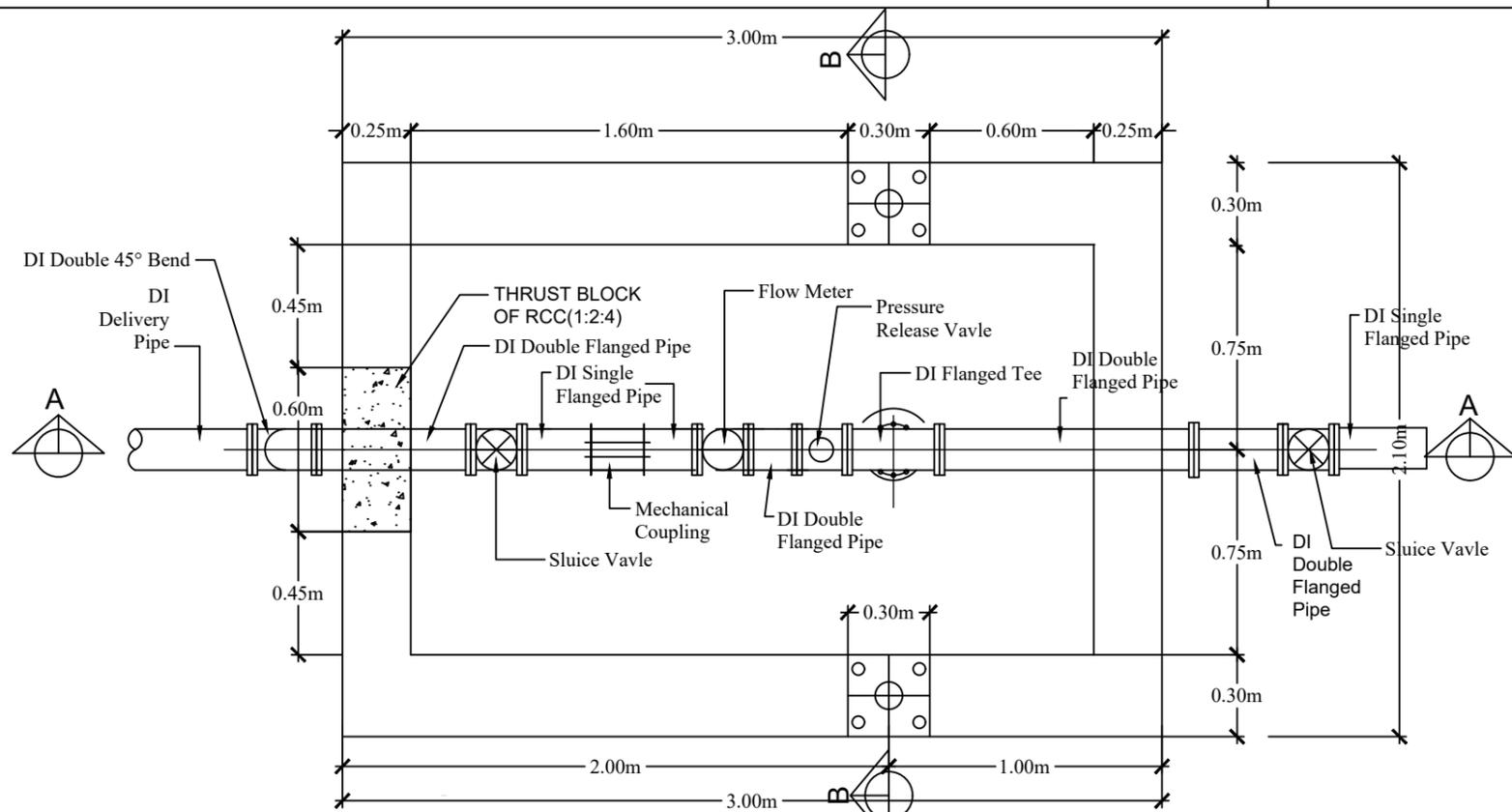
HALF SECTIONAL ELEVATION
Scale 1:150

| | | | | | | | | | |
|----------------------|--|---|--|---------------------------------------|--|-----------------------------|--|-------------|--|
| client | | project | | description | | revision | | date | |
| Invest International | | Export Orientated Agriculture Wholesale Market | | Water Supply Details Overhead Tank | | First Edition | | 05 SEP 2022 | |
| size | | scale | | phase | | dwg | | blad | |
| A3 | | 1:150 | | Preliminary | | BH4289_100-100 - 216 - 0001 | | - 0 | |
| A.G. | | BZ1051 | | project | | revision | | date | |
| | | | | BH4289_100-100 | | 216 - 0001 | | - 0 | |

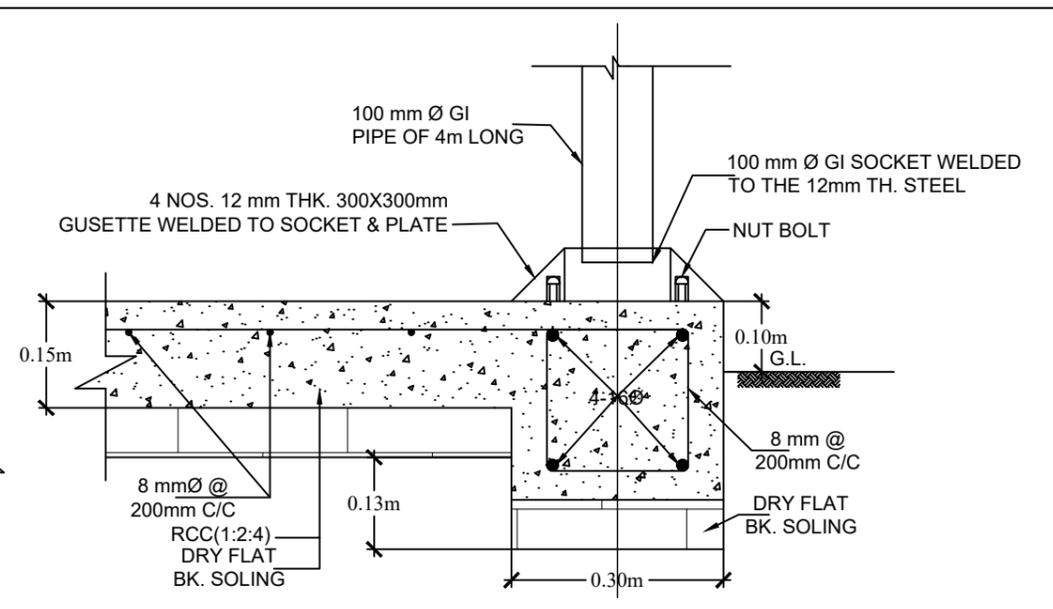
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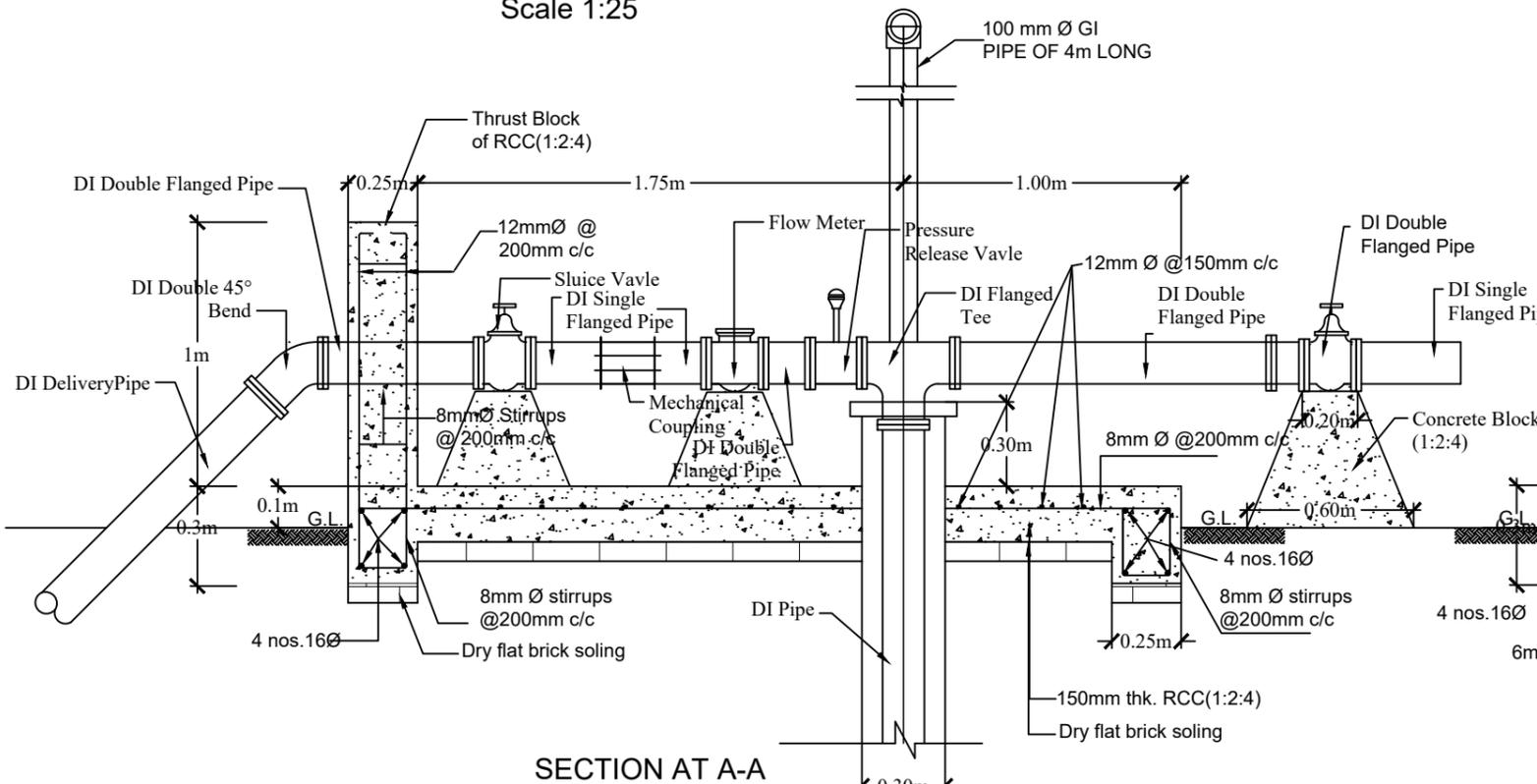
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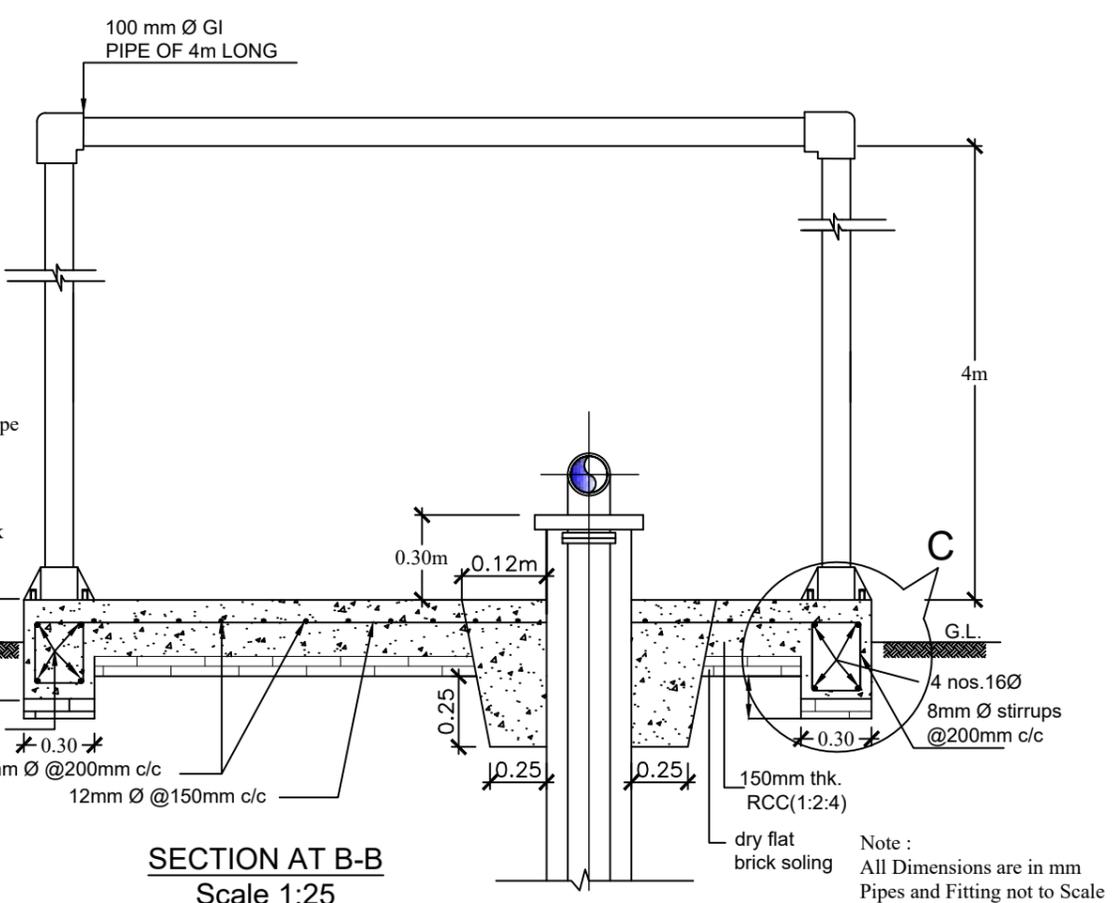
PLAN OF GANTRY
Scale 1:25



DETAILS AT C
Scale 1:10



SECTION AT A-A
Scale 1:25



SECTION AT B-B
Scale 1:25

Note :
All Dimensions are in mm
Pipes and Fitting not to Scale

| | | | | | | |
|----------|-------------|-----|-------|---------|----------|-------------|
| revision | description | AGE | drawn | checked | approved | date |
| | | | | | | 05 SEP 2022 |

| | |
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| project | Export Orientated Agriculture Wholesale Market |
| size | A3 |
| scale | 1:150 |
| phase | Preliminary |

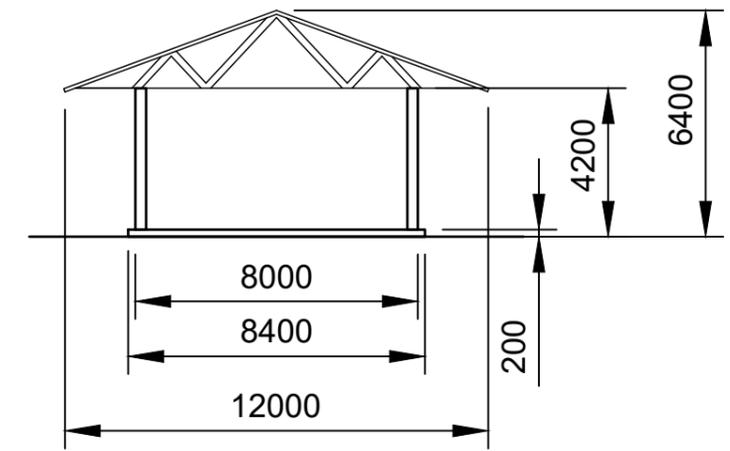
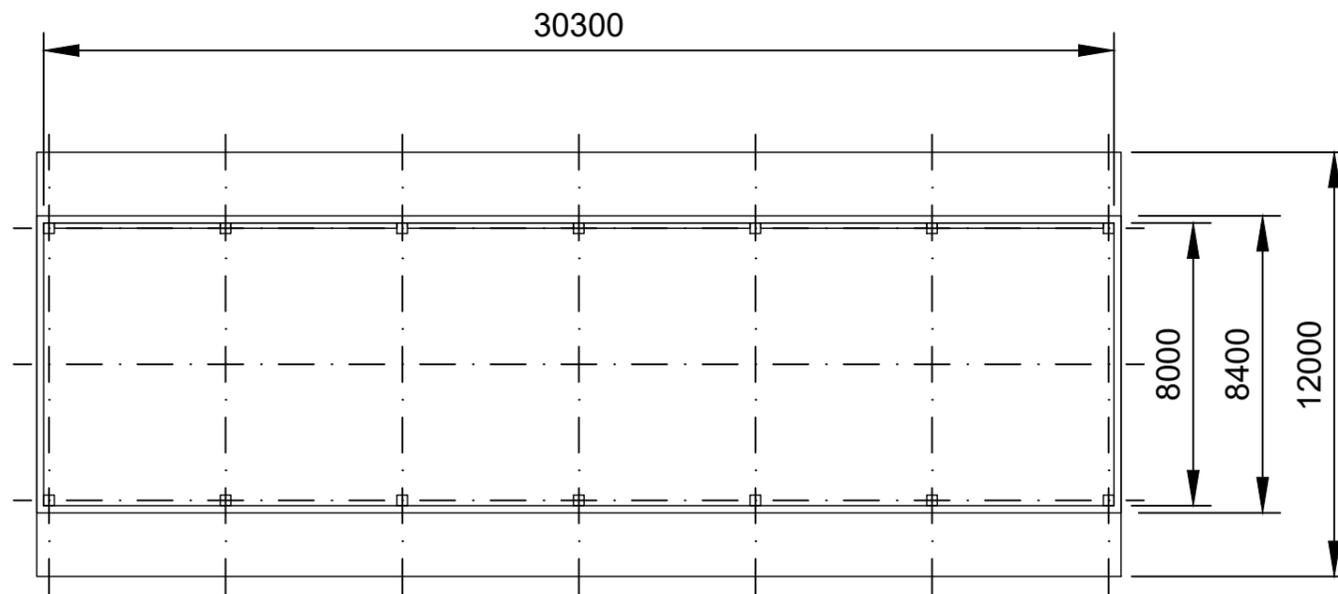
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|-------------|-------------------------------|
| project | BZ1051 |
| description | Water Supply Detail Tube Well |
| project | BH4289_100-100 |
| dwg | 217 |
| blad | 0001 |
| rev | - 0 |

| | |
|-------------|-------------------------------|
| description | Water Supply Detail Tube Well |
| project | BH4289_100-100 |
| dwg | 217 |
| blad | 0001 |
| rev | - 0 |

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| A | Changes after remarks | AGe | | 11 JAN 2023 | |
| | First Edition | AGe | | 05 SEP 2022 | |
| revision | description | drawn | checked | approved | date |

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| phase | Preliminary |

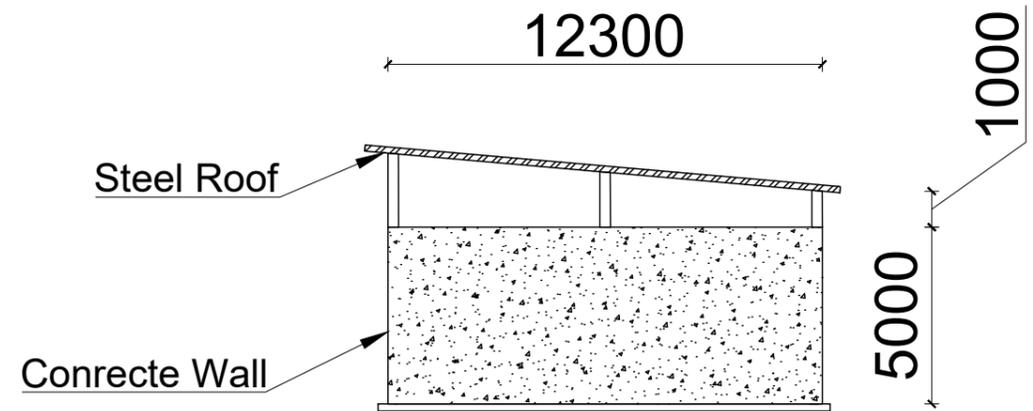
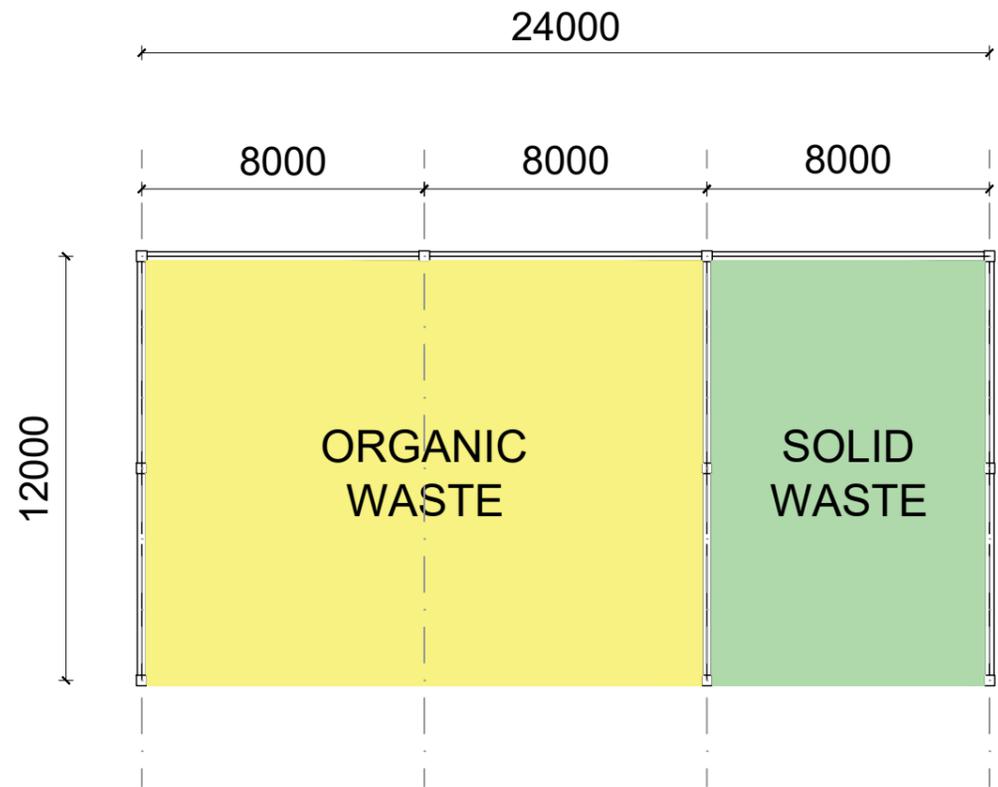
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| project | Export Orientated Agriculture Wholesale Market |
| A.G. | BZ1051 |

| | | | | |
|----------------|--|--------|-----|--|
| description | Krishak Chautari (market place) Ground Floor and elevation Plan | | | |
| project | dwg | blad | rev | |
| BH4289_100-100 | - 219 | - 0001 | - A | |

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| client | | project | | revision | | description | | date | |
| Invest International | | Export Orientated Agriculture Wholesale Market | | First Edition | | AGe | | 11 NOV 2022 | |
| size | | scale | | phase | | A.G. | | drawn | |
| A3 | | 1:150 | | Preliminary | | BZ1051 | | checked | |
| project | | dwg | | blad | | rev | | approved | |
| BH4289_100-100 | | - 220 | | - 0001 | | - A | | date | |
| description | | project | | dwg | | blad | | rev | |
| Central Waste Collection Area Ground Floor Plan, | | BH4289_100-100 | | - 220 | | - 0001 | | - A | |
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14500

6000

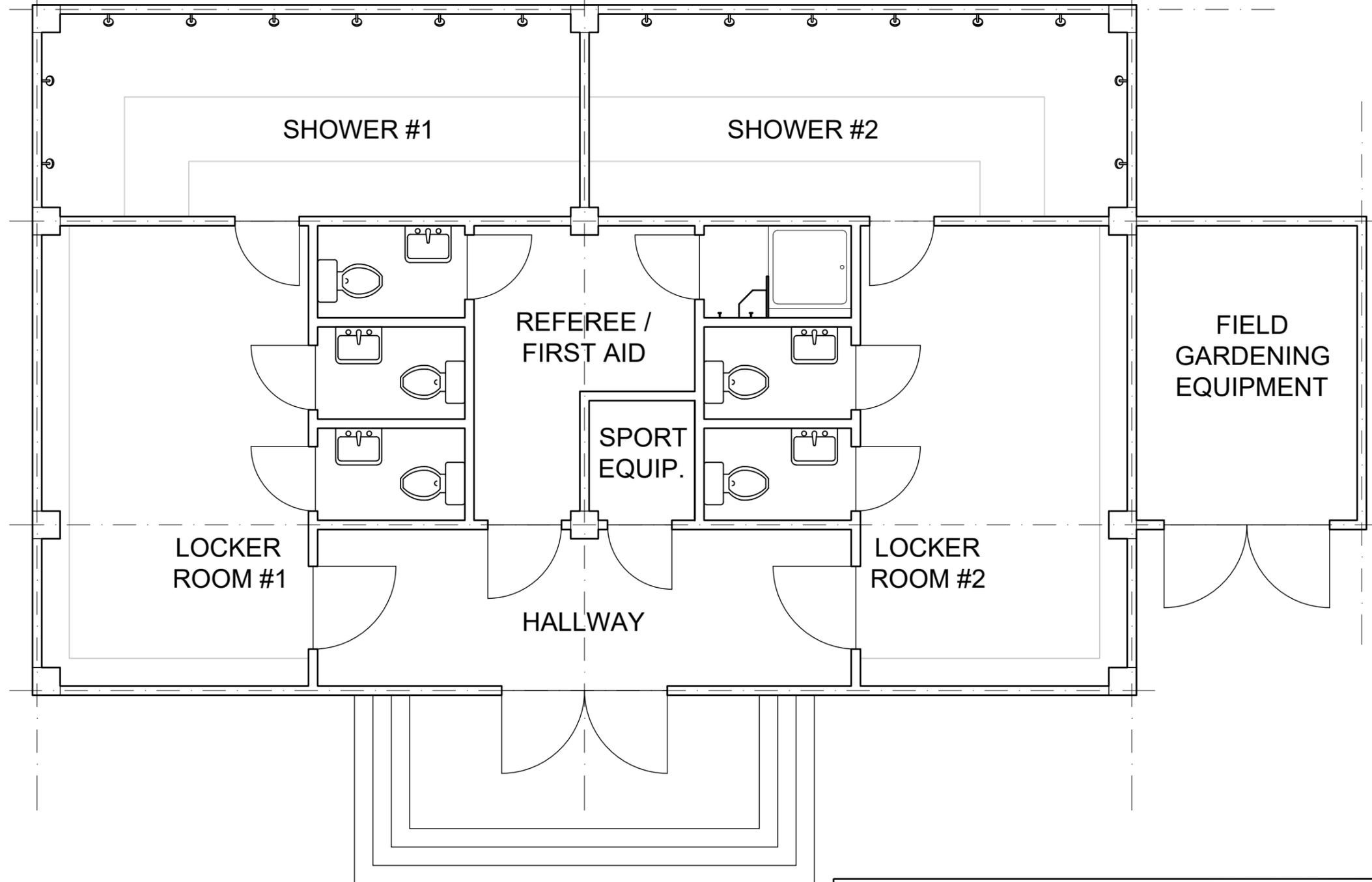
6000

2500

2300

3300

1800



| | | | | |
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| revision | description | drawn | checked | approved |

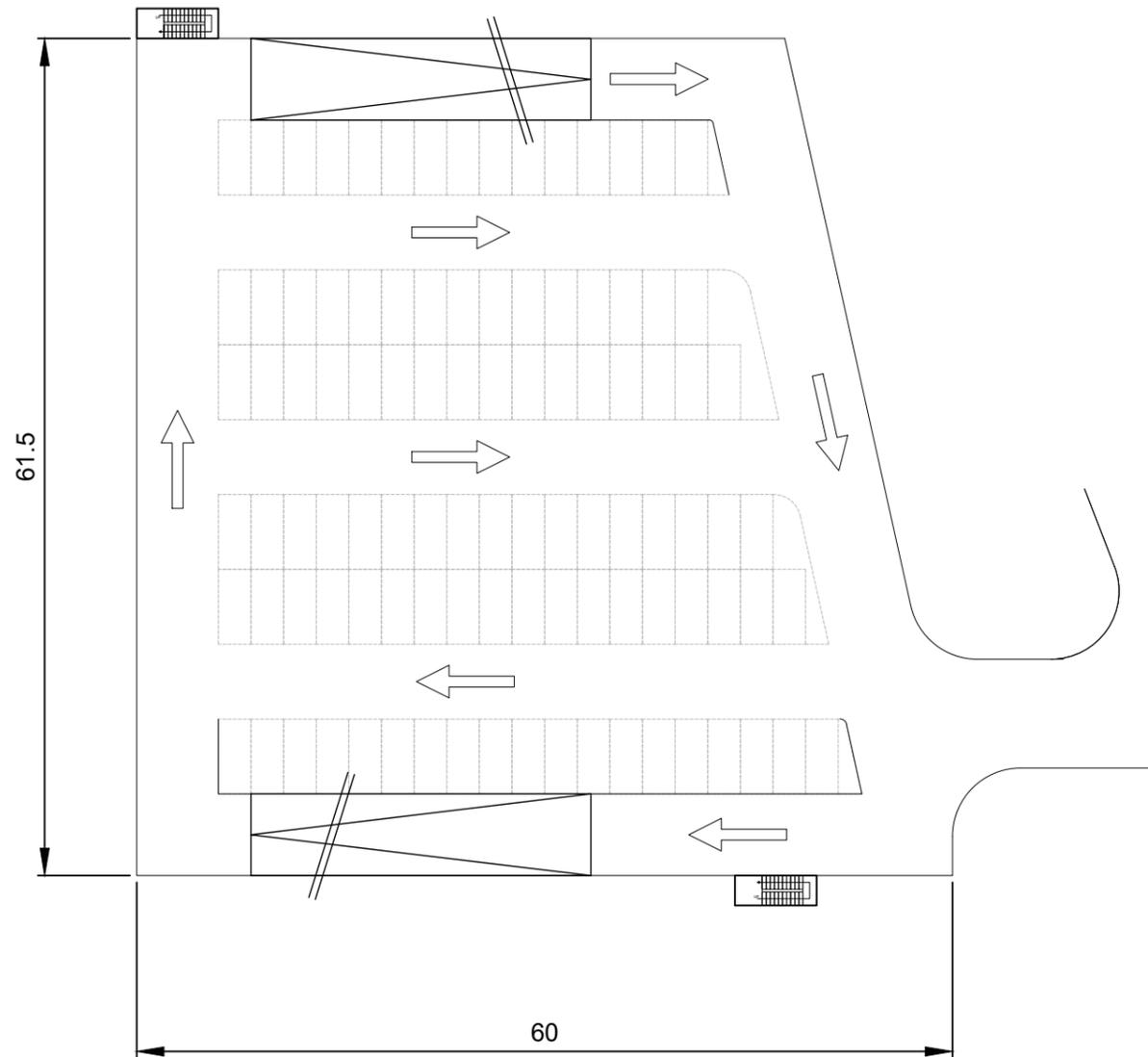
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| client | project |
| Invest International | Export Orientated Agriculture Wholesale Market |
| size | scale |
| A3 | 1:50 |
| phase | A.G. |
| Preliminary | BZ1051 |

| | | | |
|--|-------|--------|-----|
| description | | | |
| Dressing Room Soccer Field Floor Plan | | | |
| project | dwg | blad | rev |
| BH4289_100-100 | - 221 | - 0001 | - 0 |

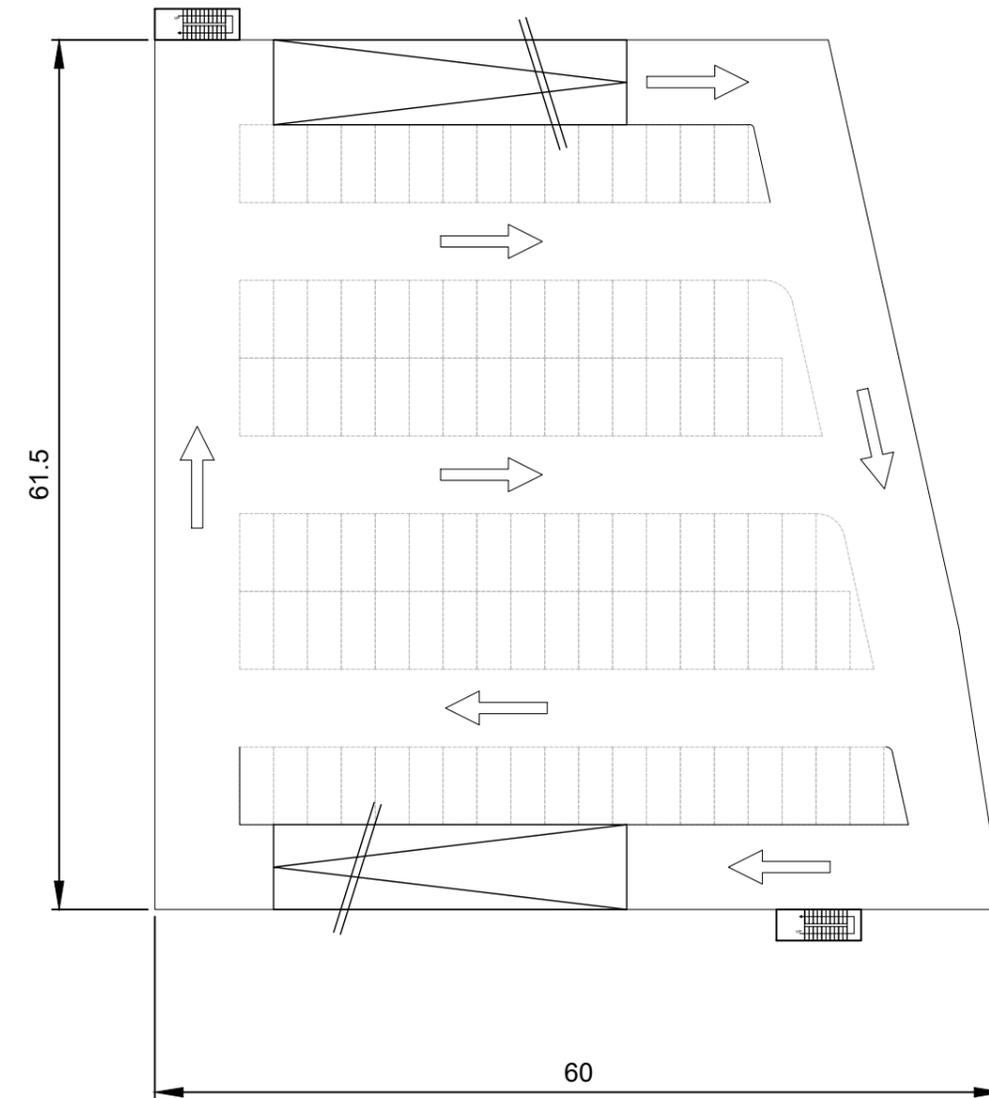
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CAR PARK GARAGE GROUND FLOOR



CAR PARK GARAGE FIRST ANF SECOND FLOOR



TOTAL PARKING LOTS ; 300

| | | | | | | | | | |
|----------------------|--|---|--|----------------|--|--|--|-------------|--|
| client | | project | | First Edition | | AGe | | 24 JAN 2023 | |
| Invest International | | Export Orientated Agriculture Wholesale Market | | description | | drawn | | checked | |
| size | | scale | | project | | dwg | | blad | |
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| phase | | A.G. | | rev | | - | | - | |
| phase | | BZ1051 | | - 0 | | | | | |
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Appendix

A7. Capex cost estimate

| | | |
|--|------------------------|------------|
| Client: Invest International | Rate: EURO/ NPR | 126 |
| Project: Development of Agricultural Value Chain Infrastructure Nepal | | |
| Subject: CAPEX cost estimate wholesale market Semlar/Butwal | | |
| Status: Final | | |
| Reference: BH4289 | | |
| Date: 30 January 2023 | | |

| TOTAL | | | |
|---|---|-------------|---------------------|
| nbr. | Description | Subtotal | Total |
| A | Direct construction costs | | € 26,865,400 |
| A.1 | New buildings, incl. building installations | € 8,511,000 | |
| A.2 | Infrastructure and utilities | € 7,400,000 | |
| A.3 | Additional interventions | € 8,656,000 | |
| A.4 | Furniture, computers, laboratory equipment, etc. | € 250,000 | |
| A.5 | Future expansion | € 2,048,400 | |
| B | Indirect construction costs | | € 5,410,000 |
| B.1 | Contractor's site establishment, supervision, hoisting facilities, etc. (12% of A1 and A2) | € 1,909,000 | |
| B.2 | Contractor's general overhead costs (7% of A1 and A2) | € 1,114,000 | |
| B.3 | EPC risk contingency (10% of A1 and A2) | € 1,591,000 | |
| B.4 | General profit and risk (5% of A1 and A2) | € 796,000 | |
| C | Design fees, project management, site supervision, etc. | | € 4,519,000 |
| C.1 | Design fee and environmental management plan (6% of A+B) | € 1,937,000 | |
| C.2 | Surveys and investigations, incl. flooding risk impact assessment and morphological study (1.5% of A+B) | € 484,000 | |
| C.3 | Project management, supervision and quality control (6% of A+B) | € 1,937,000 | |
| C.4 | CAR insurance (0,5% of A+B) | € 161,000 | |
| D | Contingencies | | € 3,679,000 |
| D.1 | Contingencies (10% of A+B+C) | € 3,679,000 | |
| TOTAL INVESTMENT COSTS EXCLUDING VAT (+/- 25%) | | | € 40,473,400 |

Client: Invest International
Project: Development of Agricultural Value Chain Infrastructure Nepal
Subject: CAPEX cost estimate wholesale market Semlar/Butwal
Status: Final
Reference: BH4289
Date: 30 January 2023

Rate: EURO/ NPR **126**

| A.1 New buildings, incl. building installations | | | | | | |
|---|---|----------------|----------|-----------|-------------|--------------------|
| Code | Description | unit | quantity | unit rate | sub total | total costs |
| 1 | General facilities | | | | | € 2,442,600 |
| 1 | Administrative block | m ² | 1,410 | € 650 | € 916,500 | |
| 2 | Canteen | m ² | 291 | € 600 | € 174,600 | |
| 3 | Weighbridges 100MT with weigh control system and ticket printer | sum | 2 | € 60,000 | € 120,000 | |
| 4 | Weighbridge house | m ² | 29 | € 500 | € 14,500 | |
| 5 | Truck wheel wash installation | sum | 1 | € 60,000 | € 60,000 | |
| 6 | Gate house | m ² | 20 | € 600 | € 12,000 | |
| 7 | Generator for administrative block and canteen | sum | 1 | € 60,000 | € 60,000 | |
| 8 | Toilet building 1 | m ² | 70 | € 500 | € 35,000 | |
| 9 | Car park building | m ² | 3,000 | € 350 | € 1,050,000 | |
| 2 | Wholesale area | | | | | € 2,763,900 |
| 1 | Block A/B | m ² | 1,884 | € 400 | € 753,600 | |
| 2 | Block C/D | m ² | 1,884 | € 400 | € 753,600 | |
| 3 | Block E/F | m ² | 1,884 | € 400 | € 753,600 | |
| 4 | Block G (future) | m ² | - | | € - | |
| 5 | Commercial bank | m ² | 230 | € 650 | € 149,500 | |
| 6 | Canteen | m ² | 291 | € 600 | € 174,600 | |
| 7 | Central waste collection building | m ² | 288 | € 500 | € 144,000 | |
| 8 | Toilet building 2 | m ² | 70 | € 500 | € 35,000 | |
| 3 | Collection centre | | | | | € 1,537,800 |
| 1 | Washing, grading, sorting and packaging building | m ² | 1,680 | € 500 | € 840,000 | |
| 2 | Agrovet | m ² | 572 | € 400 | € 228,800 | |
| 3 | Auction building | m ² | 143 | € 500 | € 71,500 | |
| 4 | Workshop building | m ² | 651 | € 500 | € 325,500 | |
| 5 | Weighbridges 100MT with weigh control system and ticket printer | sum | 1 | € 60,000 | € 60,000 | |
| 6 | Gate house | m ² | 20 | € 600 | € 12,000 | |
| 4 | Guest house area | | | | | € 1,352,400 |
| 1 | Guesthouse A | m ² | 1,127 | € 600 | € 676,200 | |
| 2 | Guesthouse B | m ² | 1,127 | € 600 | € 676,200 | |
| 5 | Public farmers market | | | | | € 413,850 |
| 1 | Grocery | m ² | 493 | € 450 | € 221,850 | |
| 2 | Public market stalls | m ² | 320 | € 200 | € 64,000 | |
| 3 | Retail market | m ² | 320 | € 400 | € 128,000 | |
| Total carried to summary | | | | | | € 8,510,550 |

| | | | |
|-------------------|--|------------------------|-----|
| Client: | Invest International | Rate: EURO/ NPR | 126 |
| Project: | Development of Agricultural Value Chain Infrastructure Nepal | | |
| Subject: | CAPEX cost estimate wholesale market Semlar/Butwal | | |
| Status: | Final | | |
| Reference: | BH4289 | | |
| Date: | 30 January 2023 | | |

| A.2 Infrastructure and utilities | | | | | | |
|----------------------------------|---|----------------|----------|-----------|-------------|--------------------|
| Code | Description | unit | quantity | unit rate | sub total | total costs |
| 1 | Site clearance and earthworks | | | | | € 450,000 |
| 1 | Site clearance and cutting of trees | m ² | 125,000 | 0.40 | € 50,000 | |
| 2 | Earthworks, levelling and backfilling | m ² | 125,000 | 3.00 | € 375,000 | |
| 3 | Compensation for forest | sum | 1 | 25,000.00 | € 25,000 | |
| 2 | Flood protection measures | | | | | € 312,500 |
| 1 | Fill measures to fill the main site depressions | m ³ | 20,833 | 15.00 | € 312,500 | |
| 3 | Pavement | | | | | € 2,464,000 |
| 1 | Asphalt pavement for main roads, including base and subbase | m ² | 39,900 | € 50 | € 1,995,000 | |
| 2 | Walkways | m ² | 15,300 | € 30 | € 459,000 | |
| 3 | Signs and road marking | sum | 1 | € 10,000 | € 10,000 | |
| 4 | Utilities | | | | | € 3,395,000 |
| 1 | Overhead water tank 200 cbm with water supply system | sum | 1 | € 120,000 | € 120,000 | |
| 2 | Water supply and distribution system | sum | 1 | € 80,000 | € 80,000 | |
| 3 | Fire water pump station | sum | 1 | € 120,000 | € 120,000 | |
| 4 | Emergency generator for water supply system | sum | 1 | € 40,000 | € 40,000 | |
| 5 | Power supply connection with transformer and distribution network | sum | 1 | € 100,000 | € 100,000 | |
| 6 | Power distribution network | sum | 1 | € 200,000 | € 200,000 | |
| 7 | Rainwater drainage system | sum | 1 | € 150,000 | € 150,000 | |
| 8 | Foul water drainage system | sum | 1 | € 80,000 | € 80,000 | |
| 9 | Settling tanks | sum | 3 | € 15,000 | € 45,000 | |
| 10 | Central waste water treatment facilities | sum | 1 | € 950,000 | € 950,000 | |
| 11 | Telephone and IT systems | sum | 1 | € 30,000 | € 30,000 | |
| 12 | Solar panels on onion/potato storage (optional) | m ² | 7,400 | € 200 | € 1,480,000 | |
| 5 | Miscellaneous | | | | | € 778,000 |
| 1 | Gate structure | pcs | 2 | € 40,000 | € 80,000 | |
| 2 | Boundary wall and fence | m ¹ | 1,700 | € 80 | € 136,000 | |
| 3 | Football field | m ² | 12,000 | € 5 | € 60,000 | |
| 4 | Grand stand and catch net football field | sum | 1 | € 20,000 | € 20,000 | |
| 5 | Dressing room football field | sum | 1 | € 25,000 | € 25,000 | |
| 6 | Tractor | nbr | 1 | € 30,000 | € 30,000 | |
| 7 | Trailer for waste transport | nbr | 1 | € 15,000 | € 15,000 | |
| 8 | Frontloader for waste collection | nbr | 1 | € 60,000 | € 60,000 | |
| 9 | Forklift truck (2.5 MT) incl. charging station | nbr | 1 | € 36,000 | € 36,000 | |
| 10 | Electronic display boards | nbr | 5 | € 10,000 | € 50,000 | |
| 11 | Fumigation container | nbr | 1 | € 12,000 | € 12,000 | |
| 12 | Manual cleaning, grading and packing facilities for ginger | nbr | 5 | € 10,000 | € 50,000 | |
| 13 | Security/ CCTV systems | sum | 1 | € 60,000 | € 60,000 | |
| 14 | Landscaping | m ² | 28,800 | € 5 | € 144,000 | |
| Total carried to summary | | | | | | € 7,399,500 |

| | | | | |
|-------------------|--|--------------|-----------|-----|
| Client: | Invest International | Rate: | EURO/ NPR | 126 |
| Project: | Development of Agricultural Value Chain Infrastructure Nepal | | | |
| Subject: | CAPEX cost estimate wholesale market Semlar/Butwal | | | |
| Status: | Final | | | |
| Reference: | BH4289 | | | |
| Date: | 30 January 2023 | | | |

| A.3 Additional interventions | | | | | | |
|---------------------------------|---|------|----------|-----------|-------------|--------------------|
| Code | Description | unit | quantity | unit rate | sub total | total costs |
| 1 | Buildings | | | | | € 3,251,250 |
| 1 | Storage potatoes (4.500 MT) | m² | 2,600 | € 255 | € 663,000 | |
| 2 | Storage onions (800 MT) | m² | 600 | € 255 | € 153,000 | |
| 3 | Storage onion optional (1.500 MT) | m² | 1,000 | € 255 | € 255,000 | |
| 4 | Storage cabbage (1.000 MT) | m² | 600 | € 255 | € 153,000 | |
| 5 | Storage banana (35 MT) | m² | 180 | € 480 | € 86,400 | |
| 6 | Handling area for onions, potato, cabbage | m² | 4,400 | € 360 | € 1,584,000 | |
| 7 | Offices/furniture) | pcs | 1 | € 80,000 | € 80,000 | |
| 8 | Building lighting | sum | 1 | € 187,600 | € 187,600 | |
| 9 | Generator house | m² | 50 | € 255 | € 12,750 | |
| 10 | Solid waste disposal | m² | 100 | € 255 | € 25,500 | |
| 11 | Water supply system | m² | 200 | € 255 | € 51,000 | |
| 2 | Utilities | | | | | € 2,457,200 |
| | Utilities processing and packing | | | | | |
| 1 | Electricity | pcs | 1 | € 600,000 | € 600,000 | |
| 2 | Water | pcs | 1 | € 80,000 | € 80,000 | |
| | Cooling, ventilation, ripening | | | | | |
| 3 | Cooling potato | ton | 4,500 | € 144 | € 648,000 | |
| 4 | Cooling onion | ton | 800 | € 144 | € 115,200 | |
| 5 | Cooling onion optional | ton | 1,500 | € 144 | € 216,000 | |
| 6 | Cooling cabbage | ton | 1,000 | € 120 | € 120,000 | |
| 7 | Cooling others | ton | 20 | € 240 | € 4,800 | |
| 8 | Cooling banana | ton | 35 | € 240 | € 8,400 | |
| 9 | Ventilation potato | ton | 4,500 | € 96 | € 432,000 | |
| 10 | Ventilation onion | ton | 800 | € 96 | € 76,800 | |
| 11 | Ventilation onion (optional) | ton | 1,500 | € 96 | € 144,000 | |
| 12 | Ripening room banana | ton | 10 | € 1,200 | € 12,000 | |
| 3 | Processing equipment | | | | | € 2,222,000 |
| | Vegetables | | | | | |
| 1 | Potato / onion intake line | pcs | 1 | € 300,000 | € 300,000 | |
| 3 | Potato / onion weighing and packing system | pcs | 1 | € 200,000 | € 200,000 | |
| 4 | Potato / onion dust aspiration system | pcs | 1 | € 100,000 | € 100,000 | |
| 5 | Cabbage intake line | pcs | 1 | € 50,000 | € 50,000 | |
| 6 | Cabbage cleaning, grading and packing line | pcs | 1 | € 50,000 | € 50,000 | |
| 7 | Banana ripening room | pcs | 1 | € 60,000 | € 60,000 | |
| 8 | Switchboard for production lines and electrical works | pcs | 1 | € 25,000 | € 25,000 | |
| 9 | Forklift trucks (2.5 MT) incl. charging stations | pcs | 2 | € 36,000 | € 72,000 | |
| 10 | Pallet lifter | pcs | 2 | € 6,000 | € 12,000 | |
| 11 | Tractors | pcs | 1 | € 30,000 | € 30,000 | |
| 12 | Trailers | pcs | 1 | € 6,000 | € 6,000 | |
| 13 | Soil containers | pcs | 6 | € 7,000 | € 42,000 | |
| 14 | Pallet boxes (excl. transport). Local manufacturing | pcs | 7,500 | € 150 | € 1,125,000 | |
| 15 | Crates (return system) | pcs | 10,000 | € 15 | € 150,000 | |
| 4 | Miscellaneous | | | | | € 726,000 |
| 1 | Laboratory equipment | pcs | 1 | € 12,000 | € 12,000 | |
| 2 | High pressure cleaning | pcs | 1 | € 12,000 | € 12,000 | |
| 3 | Air compressors | pcs | 1 | € 12,000 | € 12,000 | |
| 4 | Generator for cooling units | pcs | 2 | € 60,000 | € 120,000 | |
| 5 | Work shop tools / equipment | pcs | 1 | € 12,000 | € 12,000 | |
| 6 | Office equipment / furniture | pcs | 1 | € 18,000 | € 18,000 | |
| 7 | Training / know-how transfer | pcs | 1 | € 60,000 | € 60,000 | |
| 8 | Spare parts | pcs | 1 | € 30,000 | € 30,000 | |
| 9 | Factory ventilation / airco systems | pcs | 1 | € 60,000 | € 60,000 | |
| 10 | Firefighting / sprinkler systems | pcs | 1 | € 60,000 | € 60,000 | |
| 11 | Waste water cleaning | pcs | 1 | € 60,000 | € 60,000 | |
| 12 | International transport of technology | TEU | 15 | € 3,600 | € 54,000 | |
| 13 | ERP / IT soft- and hardware | pcs | 1 | € 60,000 | € 60,000 | |
| 14 | Certifications (HACCP / ISO) | pcs | 1 | € 60,000 | € 60,000 | |
| 15 | Factory drainage system | pcs | 1 | € 60,000 | € 60,000 | |
| 16 | Security / CCTV systems | pcs | 1 | € 36,000 | € 36,000 | |
| Total carried to summary | | | | | | € 8,656,450 |

| | | | |
|-------------------|--|------------------------|-----|
| Client: | Invest International | Rate: EURO/ NPR | 126 |
| Project: | Development of Agricultural Value Chain Infrastructure Nepal | | |
| Subject: | CAPEX cost estimate wholesale market Semlar/Butwal | | |
| Status: | Final | | |
| Reference: | BH4289 | | |
| Date: | 30 January 2023 | | |

| A.1 New buildings, incl. building installations | | | | | | |
|---|---|------|----------|-----------|-----------|--------------------|
| Code | Description | unit | quantity | unit rate | sub total | total costs |
| 1 | Future expansion | | | | | € 2,048,400 |
| 1 | Site clearance and cutting of trees | m² | 125,000 | 0.40 | € 50,000 | |
| 2 | Earthworks, levelling and backfilling | m² | 125,000 | 3.00 | € 375,000 | |
| 3 | Wholesale market block G | m² | 942 | € 400 | € 376,800 | |
| 4 | Banana storage and processing building | m² | 1,200 | € 500 | € 600,000 | |
| 5 | Cooling banana | ton | 35 | € 240 | € 8,400 | |
| 6 | Ripening room banana | ton | 10 | € 1,200 | € 12,000 | |
| 7 | General purpose godown #1 | m² | 560 | € 360 | € 201,600 | |
| 8 | General purpose godown #2 | m² | 560 | € 360 | € 201,600 | |
| 9 | Asphalt pavement for main roads, including base and subbase | m² | 2,500 | € 50 | € 125,000 | |
| 10 | Additional utilities | sum | 1 | € 50,000 | € 50,000 | |
| 11 | Forklift trucks (2.5 MT) incl. charging stations | pcs | 1 | € 36,000 | € 36,000 | |
| 12 | Pallet lifter | pcs | 2 | € 6,000 | € 12,000 | |
| Total carried to summary | | | | | € | 2,048,400 |

Appendix

A8. Tender specification storage and handling equipment



A.8.1 Technical requirements

This section describes the technical requirements, in a functional way.

All requirements are to be confirmed by the Contractor. It is the Contractors responsibility the verify and/or modify all processing equipment, including amounts of and type of, according to these Technical Requirements to allow for the proper design and functioning of the facilities.

All processing equipment, which is in direct contact to the raw or processed product, shall be constructed of materials suitable for the food industry and suitable to ensure long life under the prevailing loads and bearings.

Equipment shall be provided with complete electrics, electronics and automated process control system for integrated an uninterrupted operation of the lines.

System integration, engineering and coordination with different suppliers in order to ensure correct and optimal operation is part of the scope.

A.8.2 Potato/ onion line

The scope of the potato/ onion line is described below.

Intake line of 15-20 tph, including:

- Box tipper for tipping of pallet boxes of 2.4 m³ (1.2x1.24x1.6);
- Receiving hopper with an intake capacity of 15 tph and with a propelled roller grader to remove soil;
- 2 belts feeding into the receiving hopper for the emptying of potato and onion brought in crates and sacks;
- Visual inspection table(s) with propelled roller grades with under belt for the disposal of clods and rejected product. Sufficient space for 6 workers;
- Connecting belts with at the end 2 pallet box fillers able to feed 2 pallet boxes of 2.4 m³ each.

Cleaning, grading and intermediate storage line of 15 tph including:

- Receiving hopper with box tipper for the tipping of 2.4 m³ boxes. Receiving hopper to be equipped with propelled roller grader for the removal of soil and undersize product;
- Pallet box filler for the disposal of soil and undersize product;
- Visual inspection table with propelled roller grades with under belts for the disposal of clods and rejected product. Sufficient space for 4 workers in cabin with overpressure;
- Brush with dirt disposal belt to container;
- Visual inspection table with roller grades with under belts for the disposal of rejected product;
- Pallet box filler for the disposal of rejected product;
- Size grader for four sizes;
- 4 pallet box places in accordance with the size as indicated on the drawings;
- Complete set of stairs and platforms for easy and safe access for workers and machine maintenance.



Weighing and packing machines:

- One weighing and packing machines (total 10 tph) for packing into 1- 5 kg plastic and net bags;
- One weighing and packing machine for packing oversize product in 25 kg net bags;
- Belt and rotating table.

A.8.3 Cabbage line

The scope of the cabbage line is described below.

One (1) intake line of total 10 tph with each intake line comprising:

- 1 small receiving hopper with three unloading stations, connecting belt and for manual filling of the pallet boxes.

Cleaning, grading and packing line (1) with a total capacity of 10 tph including:

- Receiving hopper with box tipper for the tipping of 2.4 m³ boxes;
- Connecting product supply belt and compressed air jet cabbage cleaning stations;
- Connecting belt for waste handling with at the end a pallet box filler for filling pallet boxes with waste;
- Connecting belt for the transport of cleaned cabbage to the cabbage grader;
- Cabbage grading machines (weight or coil) with sufficient working places for 4-6 workers per machine for the packing of cabbage in carton boxes;
- Complete set of belts connecting the individual machines.

Weighing and packing tables:

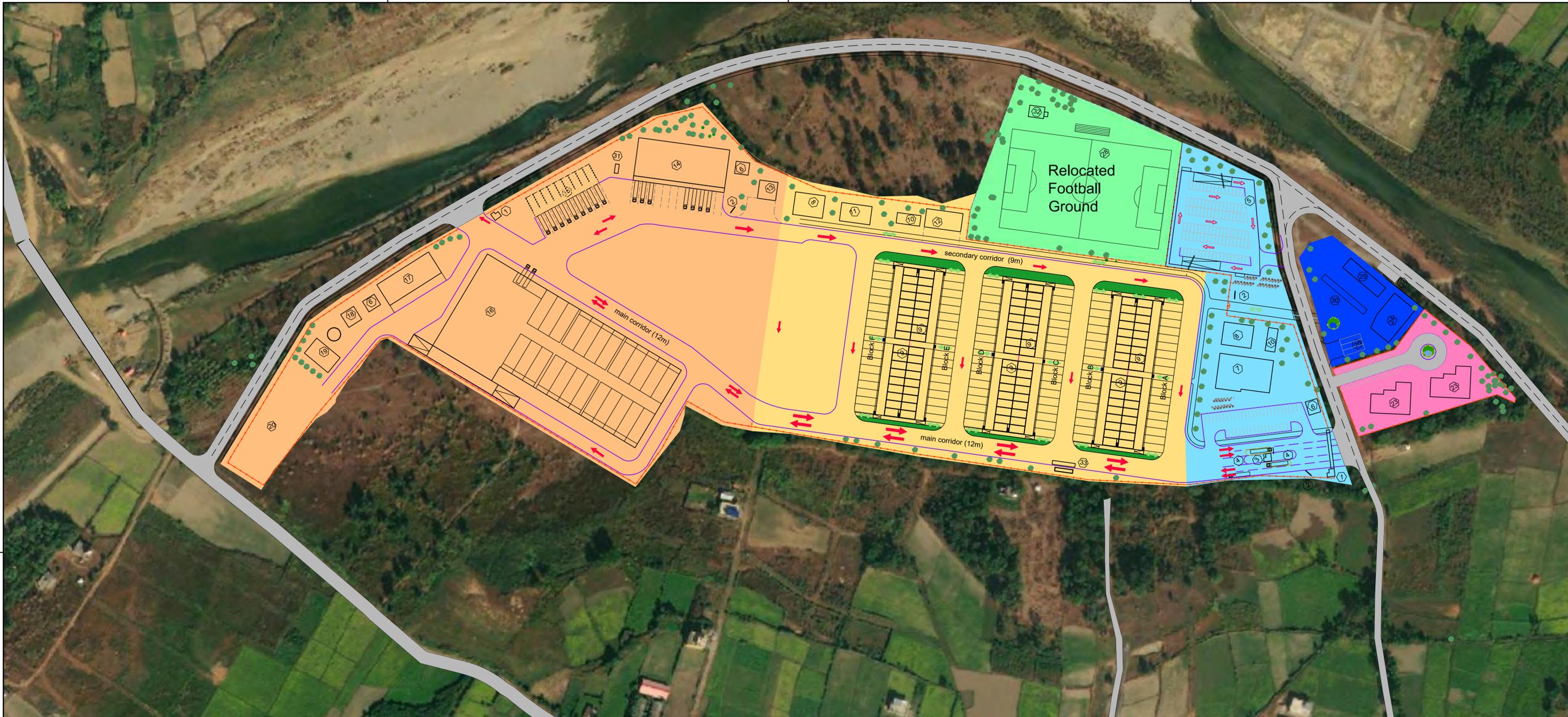
- One weighing and packing tables with connecting roller belts for each packing line for the packing of cabbage into carton boxes or in net bags.

A.8.4 Climate conditioning long-term storage

The scope of the climate conditioning is described below.

- 13 rooms x 345 ton (288 boxes) potato provided with an automated aspiration system for room size 8 x 25 mtr. Each room shall contain:
 - 150 m³ per ton potato;
 - drying/aspiration wall;
 - for storage in pallet boxes of 2.4 m³ approx. 1.2 ton potato (pallet box size: 160 x 120 x 125 h);
 - number of fans per cell: 4 of 4 kW minimum;
 - number of hatches per cell: 2 (2.80 x 1.20 mtr);
 - 13 rooms x 1,000 ton ethylene system;
 - 13 rooms x 1,000 ton humidification with pad humidifier;
 - 13 rooms heating system (gas burner, hot water, heat recovery from compressors).
- 3 rooms x 275 ton onion provided with an automated aspiration system for room sizes 8 x 25 mtr. Each room:
 - 270 m³ per ton onion

3. Project Layout Map: master plan drawing



LEGEND

| S.No. | DESCRIPTION | SIZE (mm) | Nos. |
|-------|---|----------------|--------|
| 1 | MAIN GATE | - | 2 |
| 2 | ELECTRONIC SIGNAGE BOARD | 2800 X 5800 | 3 |
| 3 | WEIGHBRIDGE HOUSE | 4250 X 6750 | 1 |
| 4 | WEIGHING SCALE (100 MT) | | 2 |
| 5 | PARKING GARAGE | | 1 |
| 6 | GENERATOR HOUSE | | 3 (+1) |
| 7 | ADMINISTRATIVE BLOCK | 36900 X 23000 | 1 |
| 8 | CANTEEN | 19600 X 14800 | 2 |
| 9 | WHOLESALE SHUTTER | 98000 X 32000 | 6 (+1) |
| 10 | TOILET BLOCK | 12750 X 6620 | 3 (+1) |
| 11 | BANK WITH ATM | 18700 X 12800 | 1 |
| 12 | CENTRAL WASTE COLLECTION CENTRE | 16000 X 24000 | 1 |
| 13 | AUCTION CENTER | 12000 X 12000 | 1 |
| 14 | WASHING, SORTING GRADING AND PACKAGING BUILDING | 60000 X 28000 | 1 |
| 15 | AGROVETS | 42000 X 16000 | 1 |
| 16 | ONION / POTATO / CABBAGE INTAKE STORAGE AND PROCESSING BUILDING | 147500 X 68500 | 1 |

* () ARE FOR FUTURE PLANS

| S.No. | DESCRIPTION | SIZE (mm) | Numbers |
|-------|--|---------------|---------|
| 17 | MAINTANANCE AND REPAIR WORKSHOP | 40250 X 16200 | 1 |
| 18 | POWER INTAKE STATION | 10000 X 10000 | 1 |
| 19 | WATER SUPPLY SYSTEM WITH OVERHEAD WATER TANK + FIRARE FIGHTING STATION | | 1 |
| 20 | WATER WASTE TREATMENT FACILITY | | 1 |
| 21 | MULTI PURPOSE GODOWN | | (2) |
| 22 | BANANA STORAGE AND PROCESSING | | (1) |
| 23 | GUEST HOUSE | 26000 X 20800 | 2 |
| 24 | GROCERY STORE | 18500 X 27500 | 1 |
| 25 | KRISHAK CHAUTARI (SMALL MARKET STALLS) | 40000 X 8000 | 1 |
| 26 | PARKING FOR DELIVERIES | - | 1 |
| 27 | BUS STOP | - | 1 |
| 28 | FOOTBALL GROUND | - | 1 |
| 29 | LANDSCAPING | - | 1 |
| 30 | RETAIL MARKET | 36000 X 8000 | 1 |
| 31 | FUMIGATION CONTAINER | - | 1 |
| 32 | DRESSING ROOM ON FOOTBALL GROUND | - | 1 |
| 33 | TRUCK WHEEL CLEANING STATION | - | 1 |

- Collection Centre
- Wholesale area
- General Facilities
- Guest house area
- Area reserved for small public farmers market and grocery
- Reserved for connection to Dano Road Corridor
- Relocated football field
- Truck Traffic
- Pedestrian Traffic



WARD 15

WARD 16

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| <p>client Invest International</p> | | <p>project Export Orientated Agriculture Wholesale Market Butwal</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>description Agriculture Market at Semlar Butwal (Rupandehi) North Plot Master Plan Layout Design Without Future Plans</p> | | <table border="1"> <thead> <tr> <th>format</th> <th>scale</th> <th>phase</th> <th>A.G.</th> <th>project</th> <th>dwg</th> <th>sheet</th> <th>rev</th> </tr> </thead> <tbody> <tr> <td>A1</td> <td>1:1250</td> <td>Preliminary</td> <td>BZ1051</td> <td>BH4289-100-100</td> <td>- 060</td> <td>- 001</td> <td>- E</td> </tr> </tbody> </table> | format | scale | phase | A.G. | project | dwg | sheet | rev | A1 | 1:1250 | Preliminary | BZ1051 | BH4289-100-100 | - 060 | - 001 | - E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| A1 | 1:1250 | Preliminary | BZ1051 | BH4289-100-100 | - 060 | - 001 | - E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



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| 3 | WEIGHBRIDGE HOUSE | 4250 X 6750 | 1 |
| 4 | WEIGHING SCALE (100 MT) | | 2 |
| 5 | PARKING GARAGE | | 1 |
| 6 | GENERATOR HOUSE | | 3 (+1) |
| 7 | ADMINISTRATIVE BLOCK | 36900 X 23000 | 1 |
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4. Wastewater treatment plant for the EOAWM in Butwal Nepal

REPORT

Wastewater treatment plant (WWTP) for a wholesale market in Nepal

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Table of Contents

| | | |
|----------|--|-----------|
| 1 | Introduction | 3 |
| 2 | Starting Points | 4 |
| 2.1 | Wastewater characteristics | 4 |
| 2.2 | Discharge requirements | 5 |
| 3 | Proposed treatment options | 6 |
| 3.1 | Scenario 1. WWTP without sludge thickening | 6 |
| 3.2 | Scenario 2. WWTP with sludge thickening | 7 |
| 4 | Technological calculations | 8 |
| 4.1 | Design principles | 8 |
| 4.2 | Design specifications | 9 |
| 4.3 | Basic assumptions for OPEX calculations | 10 |
| 5 | CAPEX and OPEX cost estimates | 11 |
| 5.1 | Starting points | 11 |
| 5.2 | Capital expenditures (CAPEX) | 12 |
| 5.3 | Operational expenditures (OPEX) | 13 |
| 5.4 | Summary | 13 |

1 Introduction

Invest International, on behalf of the Government of Nepal (GoN) has selected Royal HaskoningDHV (RHDHV) and its partners Agriplan Consultants, Nepal Agribusiness Innovation Centre (NABIC) and Total Management Services (TMS) to undertake a Feasibility Study (FS) for the development of the agricultural value chain infrastructure in Nepal (the Project). The FS is being financed as part of Invest International's Develop to Build Program (D2B) which aims to identify and develop suitable and sustainable public infrastructural measure(s) in Nepal throughout the value chain to improve domestic supply, to reduce import reliance and to increase export potential. The client for this project is the GoN, Invest International (II) is the financier, whereas the primary beneficiary is the Ministry of Agriculture and Livestock Development (MoALD).

IFAD and II are both interested to contribute to the construction of a wholesale market and some of the required additional interventions. The investment decision will be informed by a Feasibility Study. In addition, the Government of Nepal, IFAD and Invest International share the goal of strengthening the agricultural value chain in Nepal to improve domestic supply, to reduce import reliance and to increase export potential. With the combined expertise of the three goals, the financial decision will likely be embedded within the broader VITA programme.

In the framework of the Project a wastewater treatment plant (WWTP) for the treatment of the produced wastewater from the wholesale market must be designed. In this memo a preliminary design with given starting points and a techno-economical evaluation is described.

2 Starting Points

2.1 Wastewater characteristics

At the wholesale market different industries within the agri-food sector are present. The wastewater from the market will be a mixture of domestic- and lightly polluted industrial produced wastewater. In Table 1 the characteristics of the produced wastewater from the wholesale market is given.

Table 1– Wastewater characteristics of domestic- and light industrial wastewater.

| Parameter | Unit | Domestic | Low industrial | Total |
|-----------------------------------|-------------------|----------|----------------|-------|
| Flows¹ | | | | |
| average daily flow | m ³ /d | 462 | 76 | 538 |
| hourly peak flow | m ³ /h | 23 | 4 | 27 |
| Concentrations² | | | | |
| COD | mg/l | 900 | 750 | 879 |
| BOD | mg/l | 630 | 525 | 615 |
| Total Nitrogen (TN) | mg/l | 100 | 50 | 93 |
| Total Phosphorus (TP) | mg/l | 20 | 8 | 18 |
| Fat, oil and grease (FOG) | mg/l | 756 | 614 | 736 |
| Total suspended solids (TSS) | mg/l | 120 | 70 | 113 |
| Loads | | | | |
| COD | kg/d | 57 | 416 | 473 |
| BOD | kg/d | 40 | 291 | 331 |
| Total Nitrogen (TN) | kg/d | 4 | 46 | 50 |
| Total Phosphorus (TP) | kg/d | 1 | 9 | 10 |
| Fat, Oil and Grease (FOG) | kg/d | 47 | 350 | 396 |
| Total suspended solids (TSS) | kg/d | 5 | 55 | 61 |

¹ Data derived from received excel sheet: Nepal requirements.xlsx

² Concentrations on RHDHV expert judgement

2.2 Discharge requirements

The treated wastewater will be discharged into surface water and its quality should meet the IFC requirements. Based on the location of the wholesale market, it is most likely that the effluent is discharged into River Dano. The discharge requirements are presented in Table 2.

Only the discharge requirement on the Total Coliform parameter is derived from the Nepal requirements³ because it was more strict compared to the IFC requirement and therefore becomes leading.

Table 2–Discharge requirements for discharge into surface water.

| Parameter | Unit | Discharge requirement (maximum value) |
|------------------------------|------------|---------------------------------------|
| COD | mg/l | 125 |
| BOD | mg/l | 30 |
| Total nitrogen | mg/l | 10 |
| Total phosphate | mg/l | 2 |
| Oil and grease | mg/l | 10 |
| Total suspended solids (TSS) | mg/l | 50 |
| Total coliform* | MPN/100 ml | 400 |
| pH | - | 6 – 9 |

* The discharge requirement for the Total Coliform parameter is according to the Nepal requirements¹

³ Nepal Gazette, 2060/3/9 Bs (2003), Country Environmental Analysis for Nepal, ADB 2004.

3 Proposed treatment options

Domestic- and industrial wastewater from the wholesale market will be collected and transported to the WWTP. At the WWTP the wastewater will be pumped from the inlet works into the different treatment steps. First step in the treatment is screening to remove coarse material, like leaves, branches, tie-raps and all kinds of other rather large debris. The second step is a Fat Oil and Grease (FOG) removal unit, which also will remove grit. Both steps (preliminary treatment) are to protect the subsequent treatment from clogging, blockage, or other damage.

The third step is the aeration (secondary treatment). In the aeration tank a surface aerator will dissolve sufficient oxygen into the wastewater and sludge mixture for the conversion of the dissolved pollutants such as carbohydrates (COD, BOD) and nitrogen compounds by bacteria in the sludge.

For the chemical removal of phosphorus ferric chloride dosing equipment will be installed. The treated wastewater from the aeration tank will overflow to the final sedimentation tank, in which treated effluent and biological sludge will be separated.

Chlorination is the last step (tertiary treatment) to meet the effluent requirements regarding the total coliform parameter before it is discharged into the river.

Part of the biological sludge from the final sedimentation tank will be returned to the aeration tank to maintain a sufficiently high sludge concentration. The other part must be wasted because of bacterial growth. This will be pumped directly to the sludge drying beds (scenario 1) or to a sludge thickener for thickening before it is dried at sludge drying beds (scenario 2).

In a sludge thickener the waste sludge is thickened from around 1% DS (dry solids) to 3% DS. This will significantly reduce the volume of the waste sludge and so the necessary surface area required for the sludge drying beds. After a sufficiently long drying period on the sludge drying beds, the remaining sludge will have a concentration of around 30% DS and can be removed for further treatment, disposal, or agricultural purposes. This last option must be studied because there might be strict guidelines and requirements for the use of waste sludge as fertilizer. This is beyond the scope of this report.

In this report two different WWTP scenarios are studied. These two scenarios are:

1. WWTP configuration with preliminary, secondary, and tertiary treatment in which the produced sludge will be directly dried on sludge drying beds;
2. WWTP configuration as scenario 1 but with sludge thickening before the sludge is dried on sludge drying beds.

3.1 Scenario 1: WWTP without sludge thickening

The WWTP in scenario 1 has the following configuration:

- Preliminary treatment consisting of a screen and a Fat Oil and Grease (FOG) removal unit which will also remove grit;
- Secondary treatment consisting of a conventional activated sludge system (CASS);
- Tertiary treatment consisting of chlorination;
- Sludge treatment on sludge drying beds.

In Figure 1 a schematically representation of the WWTP in scenario 1 is given.

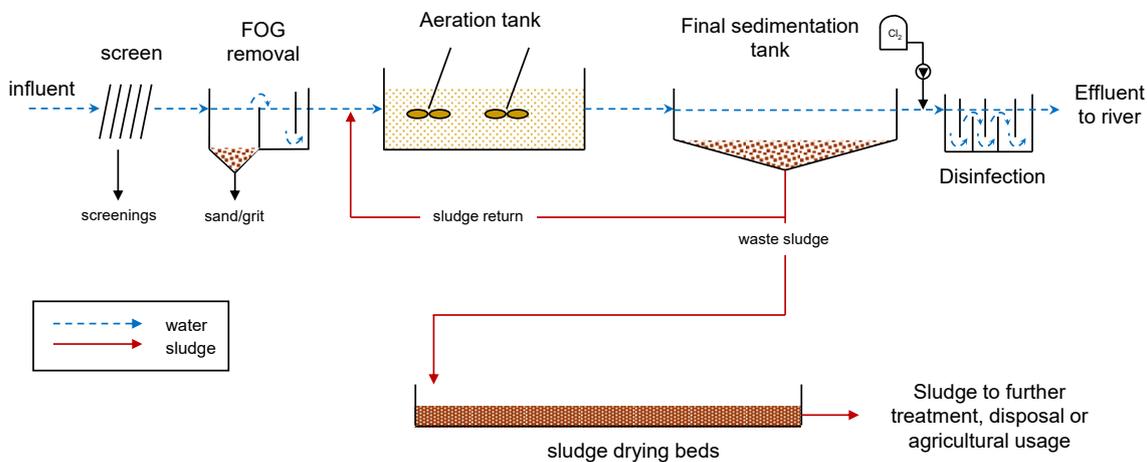


Figure 1: Schematical representation of the WWTP in scenario 1: Without sludge thickening

3.2 Scenario 2: WWTP with sludge thickening

In this configuration a sludge thickener will be constructed. Although this results in some more operational complexity of the plant, the surface area needed for the sludge drying beds will be significantly less. It is the question (answered in this report) if the application of a sludge thickener will have impact on the CAPEX and OPEX costs.

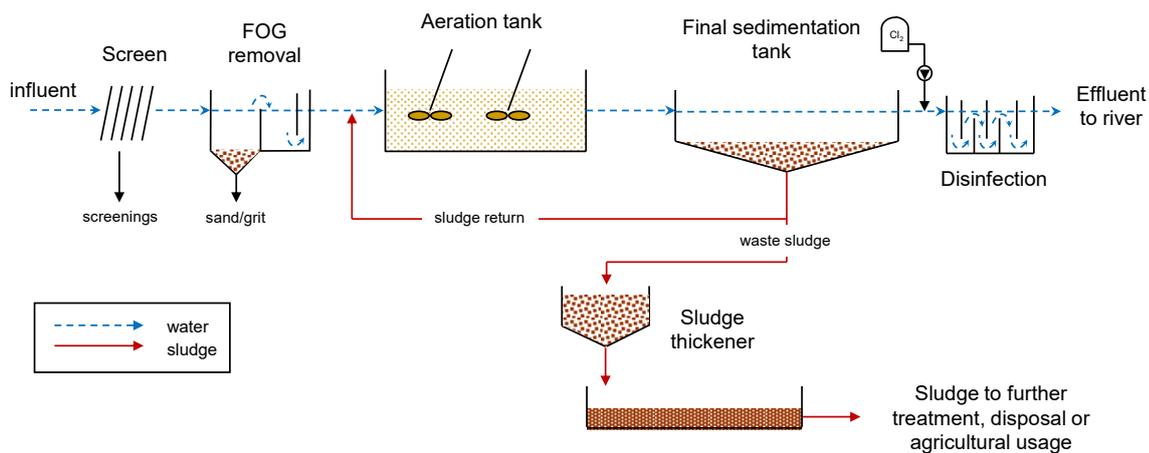


Figure 2: Scenario 2: Schematical representation of the WWTP of scenario 2: with sludge thickening.

4 Technological calculations

Based on various design principles, which are stated below, the necessary process components are preliminary designed and put on CAPEX and OPEX costs for comparison. Most adopted design principles are given in Table 4.1 and are commonly used for preliminary designs.

4.1 Design principles

Table 4.1 shows the general design principles for the preliminary design, used for both the studied scenarios.

Table 4.1 – Design principles for both wastewater treatment configurations.

| Element | Unit | Scenario 1 | Scenario 2 |
|-------------------------------|-------------------------|--------------------------|-----------------------|
| | | Without sludge thickener | With sludge thickener |
| Aerobic treatment | | | |
| - Sludge concentration | kg/m ³ | 4 | 4 |
| - Sludge retention time (SRT) | d | 12 | 12 |
| - Me/P ratio | - | 1.3 | 1.3 |
| - SVI | ml/g | 120 | 120 |
| - Surface aeration | kg O ₂ /kWh | 2 | 2 |
| Sedimentation | | | |
| - Surface loading rate | m/h | 0.5 | 0.5 |
| - DS percentage output | % DS | 1.0 | 1.0 |
| Sludge thickening | | | |
| - Energy demand | kWh/ton DS | n.a. | 80 |
| - Surface loading rate | kg/m ² .d | n.a. | 25 |
| - Dry solids (DS) output | % | n.a. | 4 |
| Sludge drying beds | | | |
| - Surface loading rate | kg DS/m ² .d | 1.2 | 1.2 |
| - Hydraulic loading rate | cm/d | 2,1 | 2,1 |

4.2 Design specifications

In Table 4.3 the main design specifications of the required process units are presented. A preliminary design of the WWTP scenarios is required to calculate tentative CAPEX and OPEX costs.

Table 4.3 – Design specifications of required process units

| Element | Unit | Scenario 1 | |
|---------------------------|-------------------|--------------------------|-----------------------|
| | | Without sludge thickener | With sludge thickener |
| Aerobic treatment | | | |
| - Flow | m ³ /d | 528 | 528 |
| - Total volume | m ³ | 1,070 | 1,070 |
| - Depth | m | 6 | 6 |
| - Type aeration | - | Surface aeration | Surface aeration |
| Sedimentation | | | |
| - Amount | pcs | 1 | 1 |
| - Surface area | m ² | 49 | 49 |
| - Return flow | m ³ /h | 25 | 25 |
| Chlorination | | | |
| - Amount | pcs | 1 | 1 |
| - Contact time | min | 10 | 10 |
| Sludge thickener | | | |
| - amount | pcs | n.a. | 1 |
| - Surface area | m ² | n.a. | 15 |
| - diameter | m | n.a. | 4.3 |
| Sludge drying beds | | | |
| - Surface area | m ² | 9 x 200 | 3 x 200 |

4.3 Basic assumptions for OPEX calculations

In Table 4.4 the main consumables per process unit are presented for both scenarios. These consumables are required for OPEX calculations.

Table 4.4 – Consumables per process unit for both scenarios

| Element | Unit | Scenario 1 | | Scenario 2 | |
|-----------------------------------|----------------------|--------------------------|---------------------|-----------------------|-----|
| | | Without sludge thickener | | With sludge thickener | |
| Aerobic treatment | | | | | |
| - Oxygen demand (nominal) | kg O ₂ /h | | 21 | | 21 |
| - FeCl ₃ dosing | kg Fe/d | | 5 | | 5 |
| - Sludge production | kg DS/d | | 356 | | 356 |
| - Sludge production (1,0% DS) | m ³ /d | | 36 | | 36 |
| - Energy demand | kWh/d (kW) | | 8 | | 8 |
| Chlorination | | | | | |
| - Dosing rate | mg/l | | 15 | | 15 |
| - Retention time | min | | 20 | | 20 |
| Sludge thickener | | | | | |
| - Volume loading (input) | m ³ /d | | No sludge thickener | | 36 |
| - DS loading (incl. chem sludge) | kg DS/d | | No sludge thickener | | 356 |
| Sludge drying beds | | | | | |
| - Volume loading (input) | m ³ /d | | 36 | | 9 |
| - DS loading (incl. chem. Sludge) | kg DS/d | | 356 | | 356 |

5 CAPEX and OPEX cost estimates

5.1 Starting points

For the techno-economical evaluation, both the investment and operational costs are roughly estimated for each process component. The calculations are based on West European prices but are corrected to arrive at more Nepalese circumstances for Civil, Mechanical and Electrical a correction factor of 0,6 is applied. The following starting points are given in the tables.

The OPEX costs are calculated based on unit prices as given in Table 5.1. All prices mentioned are expressed in euros, based on price level 2022, and excluding VAT and with an accuracy between - 40% and + 40%.

Table 5.1 – Starting points for OPEX calculations

| Element | Unit | Value |
|--------------------------------------|----------------------------|---------|
| Capital costs: | | |
| - Base | - | Annuity |
| - capital interest | % per year | 3.0 |
| - Depreciation Mechanical/Electrical | year | 10 |
| - Depreciation Civil | year | 80 |
| Maintenance | | |
| - Mechanical/electrical | % of CAPEX | 2.0 |
| - Civil | % of CAPEX | 1.0 |
| - Labour | €/FTE | 5,000 |
| Consumables | | |
| - Electricity | €/kWh | 0.10 |
| - Ferric chloride | €/ ton Fe | 600 |
| - Chlorine | €/ton Cl ₂ | 700 |
| Sludge disposal | | |
| - Sludge discharge costs | €/ m ³ (30% DS) | 10 |

5.2 Capital expenditures (CAPEX)

The tentative capital expenditures for both scenarios are presented in Table 5.2

Table 5.2 – Tentative capital expenditures (CAPEX) expressed in EURO (rounded to 1,000)

| Element | Scenario 1 | Scenario 2 |
|-------------------------------------|--------------------------|-----------------------|
| | Without sludge thickener | With sludge thickener |
| Direct Costs | | |
| - Civil | 490,000 | 437,000 |
| - Mechanical | 148,000 | 151,000 |
| - Electrical (including automation) | 122,000 | 127,000 |
| Not detailed | | |
| - Not detailed (25%) | 191,000 | 179,000 |
| - Contingencies (10%) | 76,000 | 72,000 |
| Indirect costs | | |
| - Indirect costs (60%) | 616,000 | 579,000 |
| Total CAPEX | 1,643,000 | 1,545,000 |

More details of the tentative CAPEX cost calculations are presented in Appendix A1.

5.3 Operational expenditures (OPEX)

De operational expenditures for the scenarios are presented in Table 5.3.

Table 5.3 – Operational Expenditures (OPEX) expressed in EURO per year (rounded to 500)

| Element | Scenario 1 | Scenario 2a |
|-----------------------------|--------------------------|-----------------------|
| | Without sludge thickener | With sludge thickener |
| Capital costs | 104,000 | 102,000 |
| Operational costs | | |
| - Maintenance | 22,200 | 21,400 |
| - Energy | 7,000 | 7,200 |
| - Chemicals | | |
| FeCl ₃ | 800 | 800 |
| Chlorine (Cl ₂) | 2,000 | 2,000 |
| - Labour | 10,000 | 10,000 |
| - Laboratory | 800 | 800 |
| - Sludge discharge | 4,400 | 4,200 |
| Subtotal operational costs | 47,200 | 46,400 |
| Total OPEX | 151,200 | 148,400 |

5.4 Summary

In the framework of the Project for a wholesale market in Nepal a wastewater treatment plant (WWTP) for the treatment of the produced wastewater is preliminary designed. In this memo the preliminary designs of two scenarios, with adopted starting points and a techno-economical evaluation, are described.

Based on the techno-economical evaluation it is concluded that the total CAPEX and OPEX of both scenarios are in the same range and none of the scenarios is distinctive.

Because scenario 1 does not have an additional sludge thickener the operation of the treatment plant will be slightly easier, and it can be the preferred scenario. This can only be the case if the available area for the WWTP allows the construction of rather large sludge drying beds. The conclusion is, when the available area is not a limiting factor in the Project, it is advised to construct the WWTP according to scenario 1: without a sludge thickener.

A1 Tentative CAPEX costs estimate

Table A1.1 – Tentative civil cost estimate expressed in EURO (rounded to 1,000)

| Civil elements | Scenario 1 | Scenario 2 |
|---------------------------|--------------------------|-----------------------|
| | Without sludge thickener | With sludge thickener |
| - Inlet pumping station | 22,000 | 22,000 |
| - Screening | 3,000 | 3,000 |
| - Sand and FOG trap | 5,000 | 5,000 |
| - CASS | 183,000 | 183,000 |
| - Surface aerators | - | - |
| - Final sedimentation | 54,000 | 54,000 |
| - Sludge return | 14,000 | 14,000 |
| - Dosage | 9,000 | 9,000 |
| - Chlorination | 2,000 | 2,000 |
| - Gravitational thickener | - | 30,000 |
| - Sludge drying beds | 115,000 | 39,000 |
| - Building | 22,000 | 22,000 |
| - Piping (15%) | 61,000 | 54,000 |
| Total Civil | 490,000 | 437,000 |

Table A1.2 – Tentative mechanical cost estimate expressed in EURO (rounded to 1,000)

| Mechanical elements | Scenario 1 | Scenario 2 |
|----------------------------|--------------------------|-----------------------|
| | Without sludge thickener | With sludge thickener |
| - Inlet pumping station | 10,000 | 10,000 |
| - Screening | 6,000 | 6,000 |
| - Sand and FOG trap | 19,000 | 19,000 |
| - CASS | 16,000 | 16,000 |
| - Surface aerators | 9,000 | 9,000 |
| - Final sedimentation | 10,000 | 10,000 |
| - Sludge return | - | - |
| - Dosage | 36,000 | 36,000 |
| - Chlorination | 7,000 | 7,000 |
| - Gravitational Thickening | - | 15,000 |
| - Sludge drying beds | 17,000 | 6,000 |
| - Building | 3,000 | 3,000 |
| - Piping of Civil (25%) | 15,000 | 14,000 |
| Total Mechanical | 148,000 | 151,000 |

Table A1.3 – Tentative electrical cost estimate expressed in EURO (rounded to 1,000)

| Electrical elements | Scenario 1 | Scenario 2 |
|----------------------------|--------------------------|-----------------------|
| | Without sludge thickener | With sludge thickener |
| - Inlet pumping station | 6,000 | 6,000 |
| - Screening | - | - |
| - Sand and FOG trap | 24,000 | 24,000 |
| - CASS | 47,000 | 47,000 |
| - Surface aerators | 5,000 | 5,000 |
| - Final sedimentation | 12,000 | 12,000 |
| - Sludge return | - | - |
| - Dosage | 15,000 | 15,000 |
| - Chlorination | 12,000 | 12,000 |
| - Gravitational Thickening | - | 5,000 |
| - Sludge drying beds | - | - |
| - Building | 1,000 | 1,000 |
| Total Electrical | 122,000 | 127,000 |

Table A1.4 – Summary of CAPEX cost estimate expressed in EURO (rounded to 1,000)

| | | |
|---|------------------|------------------|
| Summary Construction costs | | |
| Total Civil | 490,000 | 437,000 |
| Total Mechanical | 148,000 | 151,000 |
| Total Electrical | 122,000 | 127,000 |
| <i>Subtotal Construction costs</i> | <i>760,000</i> | <i>715,000</i> |
| Not detailed and Contingencies (35% CC) | 267,000 | 251,000 |
| Total Construction costs | 1,027,000 | 966,000 |
| Investment costs | | |
| Construction costs | 1,027,000 | 966,000 |
| Additional costs (60%) | 616,000 | 579,000 |
| Total CAPEX (excl. VAT) | 1,643,000 | 1,545,000 |

5. Methodology and forms used in EIA surveys (physical environment, biodiversity and socio-economic environment)

Checklist for Physical Environment

Topography

1. Study of Topographic maps/ other available maps and identify the ground topographic characteristics of land covered by the proposed road project
2. Verify the topographic characteristics of the land in the field
3. Soil Type
4. Geological Map/Google map

B. Climate and Hydro-Meteorology

1. Study of published data of regarding temperature, rainfall, humidity, wind speed and direction, solar radiation
2. If possible classify the climatic zone and its verification
3. Visit the meteorological office of the district and get latest information
4. Water resources/ water resource zone: Information about the water resource of the affected area and its watershed zone will be studied
5. Drainage pattern

C. Air Quality

1. Collect any data on air quality of the area from previous literature
2. Investigate on the air polluting activities of the area (traffic, biomass burning, industries, other anthropogenic activities)

D. Erosion and land Stability

1. Identification of erosion prone area along the road alignment
2. Investigate the erosion features and potentials of the local streams and gullies
3. Landslide: Features (Physical and cultural) along the road alignment with chainage , locality (name of place , ward of local level) sides, distance from the center line, existing status, details impacts from the project, tentative mitigation requirements
Religious structures
Services, utilities, facilities
Structures
Crossing; rivers/streams, foot trails, irrigations etc.
Maps, photographs, freehand drawings etc. needs to be added to make it more sites specific

E. Land Use

1. Investigate on the land use of the Project Blocks from the topo-maps, and other available land use maps
2. Investigate the land use affected by the project structures and subsidiary facilities
3. Investigate on the land use potentials of the proposed project area

Checklist for Biological Environment

1. Forest Classification by types (by association, Format- A1)
2. **Forest Area** (By Management Categorisation as per Forest Act and Forest regulation): The areas shall be delineated according to following classification:
 - a. Community Forest
 - b. Religious Forest
 - c. Private Forest
3. Management status and forest management groups (if any) and importance of these forests shall be discussed. In case of community forest **estimation of the boundary of the community forest** area from the field survey and available records, constituted member, purpose of usage of community forest on application, item of forest products, frequency of gathering forest products will also be discussed. The opinion of the key stakeholders of forest management will be gathered and presented.
4. **Wild Forest Vegetation Biodiversity observed:** List of tree, shrub, herb, pteridophytes, brtophytes, lichens and fungi found within the influence area of the project will be prepared.
5. Agro-vegetation Diversity Observed
6. **Ethnobotanical Use:** The above vegetation species will also be tabulated according to local ethno-botanical uses (such as timber, fodder, NTFP, ornamental, medicinal, food value etc.).
7. **Conservation significance:** The species found shall also be categorised according IUCN/ CITES APPENDIX. and Government of Nepal Protection category, as rare, endangered, endemic, vulnerable, etc.
8. **Biomass and wood Stock:** The vegetation lying within the directly affected area (areas required for construction and placement of spoils or other infrastructure facilities), particularly tree species shall be inventoried for trees above 10 cm DBH for biomass and wood stock as per Forest Regulation norms or any other international norms
9. **Status of vegetation:** In the affected areas, frequency of occurrence, importance value index, and density per ha shall be calculated. Besides vertical stratification of forest i.e. upper story, middle story, lower story along with status of trees, pole, saplings, seedlings, shrubs, herbs, pteridophytes, bryophytes, lichens and fungi shall be described.
10. Water resources/ water resource zone: Information about the water resource of the affected area and its watershed zone will be studied including the aquatic biota of the area.

Checklist for Socio-economic Survey

1. The questionnaire survey will identify the following status of the local peoples:
2. The family background of the respondents.
3. The education background of the respondents
4. Occupation status of the respondents
5. Environmental conditions of the project area
6. Community Forest and flora and fauna around the project area
7. Aquatic condition and species around the area
8. Potential disasters due to the Dano River
9. Past history of Danab River
10. Economic income of the households
11. What is the role of agriculture production for their livelihood
12. Detail about the agricultural production
13. If they are project affected family then what is their perception about the proposed project
14. Either they are aware or not about the project
15. What they wants from the project
16. How far the proposed project area from their locality
17. Could they increase the production if the market is in operation
18. How can they benefit from the Proposed Project
19. What type of energy source they are using?
20. How the community-based organisation supporting the agricultural production
21. Is there any comments and suggestions regarding the project?

6. Results of Physical Environment Surveys (air, noise and ground and surface water)

**Report on
Ground & Surface Water, Ambient Air and Noise Quality
Monitoring
Export Oriented Agricultural Wholesale Market Project**



Submitted to:

Consultant Environment & Energy, EIA (C/O Total Management Services)
Royal HaskoningDHV (RHDHV) and its Partners Agriplan Consultants, Nepal Agribusiness
Innovation Centre (NABIC) and Total Management Services (TMS)

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Abbreviations

| | | |
|--------------------|---|--|
| AAS | : | Atomic Absorption Spectrophotometer |
| CO | : | Carbon Monoxide |
| CO ₂ | : | Carbon dioxide |
| LPM | : | Liter Per Minute |
| m/s | : | Meter per Second |
| m ³ | : | Cubic Meter |
| mg | : | Miligram |
| mg/Nm ³ | : | Miligram per Normal Cubic Meter |
| MOSTE | : | Ministry of Science, Technology and Environment |
| ND | : | Not detected |
| NNQS - C | : | National Noised Quality Standard for Commercial Area |
| NNQS - R | : | National Noised Quality Standard for Urban Residential Area |
| NO _x | : | Oxides of Nitrogen |
| O ₂ | : | Oxygen |
| ACGIH | : | American Conference of Governmental Industrial Hygienist |
| OSHA TLV | : | Occupational Safety and Health Administration Thresh Hold Limit Value, USA |
| °C | : | Degree Celsius |
| PM | : | Particulate Matters |
| PM ₁₀ | : | Particulate Matters less than 10 microns in size |
| PM _{2.5} | : | Particulate Matters less than 2.5 microns in size |
| SO _x | : | Oxides of Sulphur |
| TSP | : | Total Suspended Particulate Matters |
| TCM | : | Tetra Chloro Mercurate |
| µg | : | Microgram |
| µg/Nm ³ | : | Microgram per Normal Cubic Meter |

Table of Content

| | |
|---|----|
| 1. Background..... | 5 |
| 2. Environmental Monitoring Components, Sampling Points & Monitoring Parameters: | 5 |
| 2.1 Ambient Air Quality Monitoring (Google Map Location is Present in Annex 1, Figure A1):... 5 | 5 |
| 2.2 Noise Quality Monitoring (Google Map Location is Present in Annex 1, Fig N1):..... 6 | 6 |
| 2.3 Ground and Surface Water Quality Monitoring Locations..... 6 | 6 |
| 2.3.1 Ground Water Sampling | 6 |
| 2.3.2 Surface Water Sampling (Google Map Location is Present in Annex 1): | 6 |
| 3. Objective:..... | 7 |
| 4. Methodology:..... | 7 |
| 4.1 General Approach | 7 |
| 4.2 Specific Approach | 7 |
| 4.2.1 Ambient Air Quality | 7 |
| 4.2.2 Noise Quality | 8 |
| 4.2.3 Ground and Surface Water Quality..... | 8 |
| 5. Results: | 8 |
| 5.1 Ambient Air Quality..... | 8 |
| 5.1.1 Near Temple - at Jungle, Butwal - 15 (2988 /AA 2/079-080): | 8 |
| 5.1.2 Near Temple & First Bridge - Butwal - 15 (2989 /AA 2/079-080): | 9 |
| 5.1.3 House of Middle Near Highway - Butwal - 15 (2990/ AA 3/079-080):..... | 9 |
| 5.1.4 First House from Route of Highway - Butwal - 15 (2991/ AA 4/079-080):..... | 9 |
| 5.1.5 House near Second Bridge - Butwal - 15 (2982/ AA 5/079-080):..... | 10 |
| 5.2 Noise Quality Monitoring Data (2993 - NM-1 - 5/079-080) | 10 |
| 5.3 Water Quality Monitoring | 11 |
| 5.3.1 Ground Water Quality Monitoring..... | 11 |
| 5.3.2 Surface Water Quality Monitoring..... | 13 |
| 6. Assessment of Quality Data, Conclusion and Recommendations | 15 |
| 6.1 Assessment of Quality Data | 15 |
| 6.1.1 Ambient Air Quality | 15 |
| 6.1.2 Noise Quality | 15 |
| 6.1.3 Ground and Surface Water Quality..... | 15 |
| 7. Conclusion and Recommendations | 15 |
| 7.1 For Improvement of Air Quality: | 16 |
| 7.2 For Improvement of Noise Quality: | 16 |
| 7.3 For Maintaining Ground and Surface Water Quality:..... | 16 |
| 8. National Standards for Stack Emission: | 16 |

| | | |
|-------|---|----|
| 8.1 | National Ambient Air Quality Standards, 2012 for Nepal | 16 |
| 8.2 | Noise Quality Standards and Guideline | 17 |
| 8.2.1 | National Noise Quality Standards of Nepal, 2069 | 17 |
| 8.2.2 | National Noise Standards Exposure Limit (PEL) for Workplace Environment | 17 |
| 8.2.3 | Noise Pressure Exposure Limit (PEL) of Noise for Workplace as per ACGIH / OSHA TLV (For Reference)..... | 18 |

1. Background

To address the increasing concern about environment pollution due to various developmental activities, this outcome results was conducted to identify the existing environmental status by conducting Ground and Surface Water, Ambient Air and Noise qualities monitoring at 5 different locations for Ambient Air & Noise, 2 locations for Surface on the Waters and 1 location for Ground Water in Export Oriented Agriculture Wholesale Market Project Construction Area. This activity was conducted by Water Engineering and training Centre (P) Ltd. in close consultation and witness with HaskoningDHV Nederland B.V., a Company of Royal HaskoningDHV Jonkerbosplein 52, 6534 AB Nijmegen; Postal address: P.O. Box 151 - 6500 AD Nijmegen - The Netherlands (C/O: Total Management Services, Kathmandu, Nepal).

In this connection, HaskoningDHV Nederland B.V., a Company of Royal HaskoningDHV Jonkerbosplein (C/O: Total Management Services, Kathmandu, Nepal) has intended to monitor the Air and noise related environmental activities by hiring the Water Engineering & Training Centre P. Ltd., (WETC) Ratopul, Kathmandu, Nepal as an environmental monitoring consultant. WETC is one of the renowned company with well-equipped NS accredited laboratory under Nepal Laboratory Scheme (NEPLAS) and Nepal Bureau of Standards and Metrology (NBSM) as per ISO / IEC 17025.

Ground and Surface Water, Air and Noise Environmental Monitoring Survey was carried out in the following points as information provided by HaskoningDHV Nederland B.V. / Total Management Services, Kathmandu, Nepal in close consultation with Butwal Ward No. 15 local dignitary representatives as well as written information shared about the Field Environmental Survey to proponent (MOALD - official dignitary official):

2. Environmental Monitoring Components, Sampling Points & Monitoring Parameters:

2.1 Ambient Air Quality Monitoring (Google Map Location is Present in Annex 1, Figure A1):

Sampling Points:

- Station 1 - BM 1, Near Temple Area (2988/AA - 1/079-080), GPS: Latitude - 27.677352, Longitude: 83.388835
Station 2 - BM 1, Temple Near Bridge Area (2989/AA - 2/079-080), GPS: Latitude - 27.679427, Longitude: 83.379913
- Station 3, House Middle Route (2990/AA - 3/079-080), GPS: Latitude - 27.682743, Longitude: 83.379812
- Station 4, First House on the Route of Highway (2991/AA - 4/079-080), GPS: Latitude - 27.683105, Longitude: 83.379720
- Station 5, House on the Route of Second Bridge (2992/AA - 5/079-080), GPS: Latitude - 27.676787, Longitude: 83.393852

Monitoring Parameters:

Particulate Matter Less than 10 Micron (PM₁₀), Particulate Matter Less than 2.5 Micron (PM_{2.5}), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x), CO, Benzene, Ozone, Lead

2.2 Noise Quality Monitoring (Google Map Location is Present in Annex 1, Fig N1):

Monitoring Locations:

- Station 1 - BM 1, Near Temple Area (2993/NM - 1/079-080), GPS: Latitude - 27.677352, Longitude: 83.388835
Station 2 - BM 1, Temple Near Bridge Area (2993/NM - 2/079-080), GPS: Latitude - 27.679427, Longitude: 83.379913
- Station 3, House Middle Route (2993/NM - 3/079-080), GPS: Latitude - 27.682743, Longitude: 83.379812
- Station 4, First House on the Route of Highway (2993/NM - 4/079-080), GPS: Latitude - 27.683105, Longitude: 83.379720
- Station 5, House on the Route of Second Bridge (2993/NM - 5/079-080), GPS: Latitude - 27.676787, Longitude: 83.393852

Monitoring Parameters

- L_{max}, L_{min}, L_{eq}, L₅, L₁₀, L₅₀, L₉₀, L₉₅

2.3 Ground and Surface Water Quality Monitoring Locations

2.3.1 Ground Water Sampling

Monitoring Locations (Google Map Location is Present in Annex 1, Fig GW1&2/SW1):

Upstream Zone of Project Area (Near Danab River, Near Temple Area - 2985/GW - 1/079-080), Jeet Dhakal, Latitude: 27.676048 Longitude: 83.390448

- Downstream of Project Area (Near Danab River - Near Temple Area - 2986/GW - 2/079-080), Bhim Lal Sapkota, Latitude: 27.677188 Longitude: 83.384775

Monitoring Parameters

- COD, BOD₅, Chloride, Iron, Manganese, pH, Silica, Ammonical Nitrogen, Nitrate, Nitrite, Sulphate, Total Phosphorus, Cyanide, Suspended Solids, Total Dissolved Solids, Electrical Conductivity, Total Hardness, Total Alkalinity, Arsenic, Sodium, Potassium, Mercury, Chromium, Zinc, Copper, Cadmium, Cobalt, Aluminium, Nickel, Lead, Lithium; Others: Total Coliforms, Faecal Coliforms

2.3.2 Surface Water Sampling (Google Map Location is Present in Annex 1):

Monitoring Locations:

- At Upstream Zone of Project Area (from Danab River, Nearby Second Bridge (2987/SW - 1/079-080), Latitude: 27.676395 Longitude: 83.393528

Monitoring Parameters

- pH, BOD₅, COD, Ammonical Nitrogen, Nitrate, Nitrite, Total Nitrogen, Total Phosphorus, Sulphate, Oil & Grease, Total Suspended Solids, Total Dissolved Solids, Total Coliforms, Faecal Coliforms, Arsenic, Sodium, Potassium, Mercury, Iron, Manganese, Chromium, Zinc, Copper, Cadmium, Cobalt, Aluminium, Nickel, Lead, Lithium, Dissolved Oxygen; Others: Chloride, Silica, Cyanide, Electrical Conductivity, Total Hardness, Total Alkalinity, Total Coliforms, Faecal Coliforms

3. Objective:

The major objectives of the study were to determine and to identify the concentrations of the specified parameters and assess the observed values with respect to the established prevailing National Standards and recommend the necessary control measures as applicable.

4. Methodology:

To accomplish the agreed job following general and specific approaches were applied:

4.1 General Approach

- I. **Field Monitoring:** Running of monitoring instruments for the proposed time frame as per manufacturer instructions. Data collection by making Interaction with the HaskoningDHV Nederland B.V. / Total Management Services, Kathmandu, Nepal and sample collection team.
- II. **Laboratory Analysis:** The trapped / absorbed parameters were carried to the WETC laboratory and analyzed for determination of the concentration.
- III. **Data Assessment:** The data obtained from the laboratory were assessed with established prevailing national standards and acceptable limits.
- IV. **Report Preparation:** A comprehensive report is prepared of all the activities conducted during the field monitoring, laboratory analysis and data assessment.

4.2 Specific Approach

4.2.1 Ambient Air Quality

For the determination of TSPM, PM₁₀, PM_{2.5} and Lead sampling were done with help of high volume sampler (HVS). Pre weighted fiber glass filter paper were used for the collection of PM₁₀, PM_{2.5} and pre weighted cup were used for larger particles than PM₁₀, PM_{2.5}. After sampling safely transported to laboratory and taken the weight of exposed filter paper and cup and finally determine the PM₁₀ and TSPM against the drawn volume of air.

For determination of lead exposed filter paper digested in Nitric Acid and determine the lead concentration in AAS (Atomic Absorption Spectrophotometer).

SO_x and NO_x were sampled simultaneously by the same instrument through the attached gas sampling gadget. Sodium Hydroxide and Tetra Chloro Mercurate (TCM) solutions absorbing reagents were used for NO_x and SO_x respectively. The collection tubes were kept chilled with ice water to prevent evaporation and to provide greater absorption. Samples were instantly stored in refrigerator and safely transported to the laboratory under cold condition with ice in an ice box and kept at low temperature till analysis to determine the values of the parameters.

For the sampling of Benzene Organic Vapor Sampling equipment and activated charcoal tubes were used. After sampling safely transported in the laboratory and determine the concentration in GC (Gas Chromatography).

For the monitoring of Carbon monoxide in premises were used a dragger pump with low concentration CO detector tube.

Field Information data on ambient air temperature in monitoring days, relative humidity, air flow direction and velocity were also taken.

4.2.2 Noise Quality

Noise level was recorded at site **Lutron SL – 4023 SD** Noise Level Meter and SD Card data logger software.

4.2.3 Ground and Surface Water Quality

Sampling of Ground & Surface Water Samples were conducted at site by Grab Sampling Technique and Laboratory Analysis of all water samples were executed in Water Engineering and training Centre Laboratory, Kathmandu, Nepal by preserving in Ice Box and transporting immediately after sampling as per the Standard Protocols as mentioned in Standard Methods for the Examination of Water and Wastewater, 23rd Edition.

Field parameters of water samples (such as pH, Temperature, Dissolved Oxygen) were taken in site.

5. Results:

5.1 Ambient Air Quality

5.1.1 Near Temple - at Jungle, Butwal - 15 (2988 /AA 2/079-080):

Date of Sampling: 16th February, 2023

Duration of sampling: 12 hrs.

Ambient Temperature: 16°C

Weather: Clear

Relative Humidity: 33.2 to 70.1%

Wind flow: 0.2 to 7.6 mph

The measured values of following parameters are as follows:

| S. No. | Location | PM ₁₀ | PM _{2.5} | TSPM | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|--------|------------------|-----------------------|-------------------|-------|--------|-----------------|-----------------|---------|-------|------|
| | | (µg/Nm ³) | | | | | | | | |
| 1. | Near Temple – at | 177.0 | 44.0 | 313.0 | <0.002 | <0.02 | 1.3 | <2.0 | 27.0 | ND* |

| S. No. | Location | PM ₁₀ | PM _{2.5} | TSPM | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|--------|---------------------|-----------------------|-------------------|------------|----------------|-----------------|-----------------|--------------|------------|----------------|
| | | (µg/Nm ³) | | | | | | | | |
| | Jungle, Butwal - 15 | | | | | | | | | |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |

* ND - Not Detected NAAQS - National Ambient Air Quality Standard A - Annual

Comments: Observed TSP, PM₁₀ and PM_{2.5} were found higher than the National Ambient Air Quality Standard (NAAQS) Tolerance Limit.

5.1.2 Near Temple & First Bridge - Butwal - 15 (2989 /AA 2/079-080):

Date of Sampling: 17th February, 2023

Duration of sampling: 12 hrs.

Ambient Temperature: 15.8°C

Weather: Clear

Relative Humidity: 34.2 to 76.9%

Wind flow: 0.1 to 6.0 mph

The measured values of following parameters are as follows:

| S. No. | Location | PM ₁₀ | PM _{2.5} | TSP M | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|--------|---|-----------------------|-------------------|------------|----------------|-----------------|-----------------|--------------|------------|----------------|
| | | (µg/Nm ³) | | | | | | | | |
| 2. | At Near Temple & First Bridge - Butwal - 15 | 183.0 | 93.0 | 564.0 | <0.002 | <0.02 | 0.70 | <2.0 | 31.0 | ND* |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |

* ND - Not Detected NAAQS - National Ambient Air Quality Standard A - Annual

Comments: Observed TSP, PM₁₀ and PM_{2.5} were found higher than the National Ambient Air Quality Standard (NAAQS) Tolerance Limit.

5.1.3 House of Middle Near Highway - Butwal - 15 (2990/ AA 3/079-080):

Date of Sampling: 17th February, 2023

Duration of sampling: 12 hrs.

Ambient Temperature: 14.5°C

Weather: Clear

Relative Humidity: 45.8 to 72.2%

Wind flow: 0.2 to 6.6 mph

The measured values of following parameters are as follows:

| S. No. | Location | PM ₁₀ | PM _{2.5} | TSPM | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|--------|--|-----------------------|-------------------|------------|----------------|-----------------|-----------------|--------------|------------|----------------|
| | | (µg/Nm ³) | | | | | | | | |
| 3. | House of Middle Near Highway - Butwal - 15 | 187 | 54 | 575 | <0.002 | <0.02 | 0.80 | <2.0 | 29.0 | ND* |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |

* ND - Not Detected NAAQS - National Ambient Air Quality Standard A - Annual

Comments: Observed TSP, PM₁₀ and PM_{2.5} were found higher than the National Ambient Air Quality Standard (NAAQS) Tolerance Limit.

5.1.4 First House from Route of Highway - Butwal - 15 (2991/ AA 4/079-080):

Date of Sampling: 18th February, 2023

Duration of sampling: 12 hrs.

Ambient Temperature: 14.8°C

Weather: Clear

Relative Humidity: 42.3 to 76.2%

Wind flow: 0.3 to 6.3 mph

The measured values of following parameters are as follows:

| S. No. | Location | PM ₁₀ | PM _{2.5} | TSPM | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|--------|------------------|-----------------------|-------------------|------|--------|-----------------|-----------------|---------|-------|------|
| | | (µg/Nm ³) | | | | | | | | |
| 4. | First House from | 187 | 46 | 625 | <0.002 | <0.02 | 0.50 | <2.0 | 33.0 | ND* |

| S. No. | Location | PM ₁₀ | PM _{2.5} | TSPM | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|--------|--------------------------------|-----------------------|-------------------|------------|----------------|-----------------|-----------------|--------------|------------|----------------|
| | | (µg/Nm ³) | | | | | | | | |
| | Route of Highway - Butwal - 15 | | | | | | | | | |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |

* ND - Not Detected NAAQS - National Ambient Air Quality Standard A - Annual

Comments: Observed TSP, PM₁₀ and PM_{2.5} were found higher than the National Ambient Air Quality Standard (NAAQS) Tolerance Limit.

5.1.5 House near Second Bridge - Butwal - 15 (2982/ AA 5/079-080):

Date of Sampling: 18th - 19th February, 2023

Duration of sampling: 12 hrs.

Ambient Temperature: 16°C

Weather: Clear

Relative Humidity: 42.8 to 82.8%

Wind flow: 0.1 to 5.9 mph

The measured values of following parameters are as follows:

| S. No. | Location | PM ₁₀ | PM _{2.5} | TSPM | Lead | SO ₂ | NO _x | Benzene | Ozone | CO % |
|--------|---|-----------------------|-------------------|------------|----------------|-----------------|-----------------|--------------|------------|----------------|
| | | (µg/Nm ³) | | | | | | | | |
| 5. | House Near from Second Bridge - Butwal - 15 | 161 | 49 | 336 | <0.002 | <0.02 | 0.50 | <2.0 | 26.0 | ND* |
| | NAAQS | 120 | 40 | 230 | 0.5 (A) | 70 | 40 | 5 (A) | 157 | <1.0 |

* ND - Not Detected NAAQS - National Ambient Air Quality Standard A - Annual

Comments: Observed TSP, PM₁₀ and PM_{2.5} were found higher than the National Ambient Air Quality Standard (NAAQS) Tolerance Limit.

5.2 Noise Quality Monitoring Data (2993 - NM-1 - 5/079-080)

Monitoring Date: 16th - 18th February, 2023

| S. N. | Location / Spots | Test Parameters | | | | | | | | Range | |
|-------|--|------------------|------------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-------|--------|
| | | L _{max} | L _{min} | L _{eq} | L ₅ | L ₁₀ | L ₅₀ | L ₉₀ | L ₉₅ | | |
| 1 | House Near from Second Bridge - Butwal - 15 (2993-1 - 17-18/02/2023) | L _d | 58 | 41.8 | 47.3 | 52.6 | 51.9 | 46.5 | 43.7 | 43.3 | Normal |
| | | L _n | 75.9 | 33.9 | 41.7 | 47.3 | 45.7 | 41.5 | 37.7 | 36.8 | Normal |
| 2 | At Near Temple & First Bridge - Butwal - 15 (2993-2 - 17-18/02/2023) | L _d | 102.5 | 36.6 | 50.6 | 68.3 | 62.7 | 48.4 | 42.9 | 40.4 | Normal |
| | | L _n | 79.9 | 40.1 | 46.03 | 51.5 | 49.1 | 45.7 | 42.9 | 43.1 | Normal |
| 3 | House of Middle Near Highway - Butwal - 15 (2993-3 - 17-18/02/2023) | L _d | 62.8 | 42.2 | 46.1 | 50.6 | 49.2 | 45.4 | 43.6 | 43.3 | Normal |
| | | L _n | 60.6 | 41.4 | 44.7 | 49.9 | 48.5 | 43.9 | 42.3 | 42.0 | Normal |
| 4 | First House from Route of Highway - Butwal - 15 (2993-4 - 17-18/02/2023) | L _d | 76.8 | 49.3 | 59.1 | 67.3 | 64.6 | 58.2 | 54 | 53.4 | Normal |
| | | L _n | 75.6 | 35.3 | 58.9 | 56.1 | 56.1 | 53.5 | 39.1 | 37.9 | High |
| 5 | House Near from | L _d | 73.8 | 37.8 | 57.3 | 54.3 | 52 | 43.7 | 39.2 | 38.8 | Normal |

| | | | | | | | | | | |
|--|----------------------|------|------|----|------|------|------|------|------|--------|
| Second Bridge - Butwal - 15 (2993-5 - 17-18/02/2023) | L_n | 68.3 | 37.8 | 52 | 51.2 | 46.9 | 41.5 | 39.7 | 39.4 | Normal |
| <i>NNQS - Day for Mixed Residential Area</i> | | | | 63 | | | | | | |
| <i>NNQS - Night for Mixed Residential Area</i> | | | | 55 | | | | | | |
| <i>NNQS - Day for Commercial Area</i> | | | | 65 | | | | | | |
| <i>NNQS - Night for Residential Area</i> | | | | 55 | | | | | | |

NNQS R - National Noise Quality Standards for Urban Residential Area Environment

NNQS C - National Noise Quality Standards for Commercial Area Environment

Comments:

1. *Observed equivalent noise levels for both day and night time sound level were found in normal range as per Nepal Government National Noise Quality Standard for both Commercial and Mixed Residential Area (at House Near from Second Bridge, At Near Temple & First Bridge, House of Middle Near Highway and House Near from Second Bridge).*
2. *Observed equivalent noise levels for night time sound level were found higher than the National Ambient Noise Quality Standard for Commercial area (At First House from Route of Highway).*
3. *Impulsively higher range maximum noise was recorded at First House from Route of Highway due to vehicular and animal activities.*

5.3 Water Quality Monitoring

5.3.1 Ground Water Quality Monitoring

5.3.1.1 Ground Water Quality Monitoring Data (2985 - GW-1/079-080)

| Name of Sender: Consultant Environment & Energy EIA, BL Industry & Buildings Sample No: 2985 /079/080 Date of Receipt: 19/02/2023 Date of Report: 02/03/2023 | | | | Source: Sample - 1 Ground Water - Near Second Bridge Analyzed date: 19/02/2023-02/03/2023 No. of Samples: 01 Location: Butwal - 15, Ratanpur Tole Sampled by: WETC | | |
|---|---------------------------|-----------|--------------|--|--|--|
| Parameters | Units | WHO GV | NDWQS | Result | Methods used | |
| PHYSICAL | | | | | | |
| Color | Hazen | 15 | 5 (15) (Max) | <5.0 | 2120 B., APHA, 23 rd EDITION | |
| Turbidity | NTU | 5 | 5 (10) (Max) | 2.0 | 2130 B., APHA, 23 rd EDITION | |
| Conductivity | µS/cm | - | 1500 (Max) | 518.0 | 2510 B., APHA, 23 rd EDITION | |
| pH | - | 6.5 - 8.5 | 6.5-8.5* | 7.1 | 4500-H ⁺ B, APHA, 23 rd EDITION | |
| Lab Temperature | ⁰ C | - | - | 20.5 | 2550 B, APHA, 23 rd EDITION | |
| Total Dissolved Solids | mg/l | 1000 | 1000 (Max) | 312.0 | 2540 C., APHA, 23 rd EDITION | |
| Total Suspended Solids | mg/l | - | - | <1.0 | 2540 D. APHA, 23 rd EDITION | |
| CHEMICAL | | | | | | |
| BOD | mg/l | - | - | 0.32 | 5210 B., APHA, 23 rd EDITION | |
| COD | mg/l | - | - | 1.19 | 5220 B., APHA, 23 rd EDITION | |
| Ammonical Nitrogen | mg/l | 1.5 | 1.5 (Max) | <0.02 | 4500-NH ₃ F., APHA, 23 rd EDITION | |
| Silica | mg/l | - | - | 8.54 | 4500-SiO ₂ D., APHA, 23 rd EDITION | |
| Total Hardness | mg/l as CaCO ₃ | 500 | 500 (Max) | 336.0 | 2340 C., APHA, 23 rd EDITION | |

| | | | | | |
|-------------------------|---------------------------|-------|---------------|------------------|---|
| Total Alkalinity | mg/l as CaCO ₃ | 500 | - | 342.0 | 2320 B., APHA, 23 rd EDITION |
| Chloride | mg/l | 250 | 250 (Max) | 4.95 | 4500-Cl ⁻ B, APHA, 23 rd EDITION |
| Iron | mg/l | 0.3 | 0.3 (3) (Max) | 1.8 | 3111 C., APHA, 23 rd EDITION |
| Manganese | mg/l | 0.5 | 0.2 (Max) | 0.07 | 3111 C., APHA, 23 rd EDITION |
| Lead | mg/l | 0.01 | 0.01 (Max) | <0.01 | 3111 B. APHA, 23 rd EDITION |
| Arsenic | mg/l | 0.01 | 0.05 (Max) | <0.005 | 3114 C., APHA, 23 rd EDITION |
| Mercury | mg/l | 0.001 | 0.001 (Max) | <0.001 | 3112 B., APHA, 21 ST EDITION |
| Zinc | mg/l | - | 3 (Max) | 0.02 | 3111 B., APHA, 23 rd EDITION |
| Cadmium | mg/l | 0.003 | 0.003 (Max) | <0.003 | 3111 B., APHA, 23 rd EDITION |
| Nickel | mg/l | 0.02 | - | 0.04 | 3111 C., APHA, 23 rd EDITION |
| Total Chromium | mg/l | 0.05 | 0.05 (Max) | <0.05 | 3111 B. APHA, 23 rd EDITION |
| Aluminium | mg/l | - | 0.2 (Max) | <0.01 | 3500-Al B. APHA, 23 rd EDITION |
| Copper | mg/l | 2 | 1 (Max) | 0.02 | 3111 B., APHA, 23 rd EDITION |
| Nitrate | mg/l as NO ₃ | 50 | 50 (Max) | 4.2 | 4500-NO ₃ - B., APHA, 23 rd EDITION |
| Nitrite | mg/l as NO ₂ | 3 | - | <0.02 | 4500-NO ₂ - B., APHA, 23 rd EDITION |
| Sulphate | mg/l | - | 250 (Max) | 21.15 | 4500-SO ₄ . APHA, 23 rd EDITION |
| Phosphate | mg/l | - | - | 0.03 | 4500-P E. APHA, 23 rd EDITION |
| Cyanide | mg/l | 0.07 | 0.07 (Max) | <0.05 | 3111 B. APHA, 23 rd EDITION |
| Sodium | mg/l | - | - | 5.83 | 3111 B., APHA, 23 rd EDITION |
| Potassium | mg/l | - | - | 4.65 | 3111 B., APHA, 23 rd EDITION |
| Cobalt | mg/l | - | - | <0.01 | 3111 C., APHA, 23 rd EDITION |
| Lithium | mg/l | - | - | <0.01 | 3111 C., APHA, 23 rd EDITION |
| BIOLOGICAL | | | | | |
| Total Coliform | CFU/100ml | Nil | Nil | Nil | 9222 B, APHA, 23 rd EDITION |
| Faecal Coliforms | CFU/100ml | Nil | Nil | Nil | 9222 C., APHA, 23 rd EDITION |

APHA: American Public Health Association, Standard Methods for the Examination of Water & Waste Water,

WHO GV: World Health Organization Guideline Value, 2006 Update, NDWQS: National Drinking Water Quality Standard, 2062 (Nepal),

* These values show lower and upper limits, () Values in the parenthesis refers the acceptable values only when alternative is not available.

**Not accredited Test Method N.O. – Not Objectionable -Ve: Not Detected

Comment: The sampled water consists slightly higher Iron content as per WHO Guideline Value for drinking purpose. Other physical, chemical parameters were found within the acceptable range for human consumption.

5.3.1.2 Ground Water Quality Monitoring Data - (2986 - GW-2/079-080)

| | | | | | |
|---|----------------|---------------|--|----------------|---|
| Name of Sender: Consultant Environment & Energy EIA, BL Industry & Buildings | | | Source: Sample - 2 Ground Water Near First Bridge Temple Side | | |
| Sample No: 2986 /079/080 | | | Analyzed date: 19/02/2023-02/03/2023 | | |
| Date of Receipt: 19/02/2023 | | | No. of Samples: 01 | | |
| Date of Report: 02/03/2023 | | | Location: Butwal – 15, Mukti Dham Tole | | |
| Sampled by: WETC | | | | | |
| Parameters | Units | WHO GV | NDWQS | Result | Methods used |
| PHYSICAL | | | | | |
| Color | Hazen | 15 | 5 (15) (Max) | <5.0 | 2120 B., APHA, 23 rd EDITION |
| Turbidity | NTU | 5 | 5 (10) (Max) | <1.0 | 2130 B., APHA, 23 rd EDITION |
| Conductivity | μS/cm | - | 1500 (Max) | 594.0 | 2510 B., APHA, 23 rd EDITION |
| pH | - | 6.5 - 8.5 | 6.5-8.5* | 7.1 | 4500-H ⁺ B, APHA, 23 rd EDITION |
| Lab Temperature | ⁰ C | - | - | 20.5 | 2550 B, APHA, 23 rd EDITION |
| Total Dissolved Solids | mg/l | 1000 | 1000 (Max) | 594.0 | 2540 C., APHA, 23 rd EDITION |
| Total Suspended Solids | mg/l | - | - | <1.0 | 2540 D. APHA, 23 rd EDITION |

| CHEMICAL | | | | | |
|--------------------|---------------------------|-------|---------------|--------|---|
| BOD | mg/l | - | - | 0.49 | 5210 B., APHA, 23 rd EDITION |
| COD | mg/l | - | - | 2.37 | 5220 B., APHA, 23 rd EDITION |
| Ammonical Nitrogen | mg/l | 1.5 | 1.5 (Max) | 0.08 | 4500-NH ₃ F., APHA, 23 rd EDITION |
| Dissolved Silica | mg/l | - | - | 9.31 | 4500-SiO ₂ D., APHA, 23 rd EDITION |
| Total Hardness | mg/l as CaCO ₃ | 500 | 500 (Max) | 384.0 | 2340 C., APHA, 23 rd EDITION |
| Total Alkalinity | mg/l as CaCO ₃ | 500 | - | 372.0 | 2320 B., APHA, 23 rd EDITION |
| Chloride | mg/l | 250 | 250 (Max) | 7.92 | 4500-Cl ⁻ B, APHA, 23 rd EDITION |
| Iron | mg/l | 0.3 | 0.3 (3) (Max) | 0.27 | 3111 C., APHA, 23 rd EDITION |
| Manganese | mg/l | 0.5 | 0.2 (Max) | 0.08 | 3111 C, APHA, 23 rd EDITION |
| Lead | mg/l | 0.01 | 0.01 (Max) | <0.01 | 3111 B. APHA, 23 rd EDITION |
| Arsenic | mg/l | 0.01 | 0.05 (Max) | <0.005 | 3114 C., APHA, 23 rd EDITION |
| Mercury | mg/l | 0.001 | 0.001 (Max) | <0.001 | 3112 B., APHA, 21 ST EDITION |
| Zinc | mg/l | - | 3 (Max) | 0.02 | 3111 B., APHA, 23 rd EDITION |
| Cadmium | mg/l | 0.003 | 0.003 (Max) | <0.003 | 3111 B., APHA, 23 rd EDITION |
| Nickel | mg/l | 0.02 | - | 0.05 | 3111 C, APHA, 23 rd EDITION |
| Total Chromium | mg/l | 0.05 | 0.05 (Max) | <0.05 | 3111 B. APHA, 23 rd EDITION |
| Aluminium | mg/l | - | 0.2 (Max) | <0.01 | 3500-Al B. APHA, 23 rd EDITION |
| Copper | mg/l | 2 | 1 (Max) | 0.02 | 3111 B., APHA, 23 rd EDITION |
| Nitrate | mg/l as NO ₃ | 50 | 50 (Max) | 9.6 | 4500-NO ₃ - B., APHA, 23 rd EDITION |
| Nitrite | mg/l as NO ₂ | 3 | - | <0.02 | 4500-NO ₂ - B., APHA, 23 rd EDITION |
| Sulphate | mg/l | - | 250 (Max) | 32.96 | 4500-SO ₄ . APHA, 23 rd EDITION |
| Total Phosphate | mg/l | - | - | 0.02 | 4500-P E. APHA, 23 rd EDITION |
| Cyanide | mg/l | 0.07 | 0.07 (Max) | <0.05 | 3111 B. APHA, 23 rd EDITION |
| Sodium | mg/l | - | - | 8.19 | 3111 B., APHA, 23 rd EDITION |
| Potassium | mg/l | - | - | 5.97 | 3111 B., APHA, 23 rd EDITION |
| Cobalt | mg/l | - | - | <0.01 | 3111 C, APHA, 23 rd EDITION |
| Lithium | mg/l | - | - | <0.01 | 3111 C, APHA, 23 rd EDITION |
| BIOLOGICAL | | | | | |
| Total Coliform | CFU/100ml | Nil | Nil | 55 | 9222 B, APHA, 23 rd EDITION |
| Faecal Coliforms | CFU/100ml | Nil | Nil | 3 | 9222 C., APHA, 23 rd EDITION |

APHA: American Public Health Association, Standard Methods for the Examination of Water & Waste Water,

WHO GV: World Health Organization Guideline Value, 2006 Update, NDWQS: National Drinking Water Quality Standard, 2062 (Nepal),

* These values show lower and upper limits, () Values in the parenthesis refers the acceptable values only when alternative is not available.

**Not accredited Test Method

N.O. – Not Objectionable

-Ve: Not Detected

Comment: Physical and chemical quality of the tested water sample was found within the WHO Guideline value for human consumption. The sampled water is contaminated with E.coli and Coliforms.

5.3.2 Surface Water Quality Monitoring

5.3.2.1 Surface Water Quality Monitoring Data (2987 - SW-1/079-080)

| Name of Sender: Consultant Environment & Energy EIA, BL Industry & Buildings Sample No: 2987 /079/080 Date of Receipt: 19/02/2023 Date of Report: 02/03/2023 | | | Source: Sample - 3 Surface Water, Danab Khola, Analyzed date: 19/02/2023-02/03/2023 No. of Samples: 01 Location: Butwal - 15, Downstream of Second Bridge Sampled by: WETC | | |
|---|-------|--------|--|--------|--------------|
| Parameters | Units | WHO GV | NDWQS | Result | Methods used |

| PHYSICAL | | | | | |
|------------------------|---------------------------|-----------|---------------|--------|---|
| Color | Hazen | 15 | 5 (15) (Max) | <5.0 | 2120 B., APHA, 23 rd EDITION |
| Turbidity | NTU | 5 | 5 (10) (Max) | 6.0 | 2130 B., APHA, 23 rd EDITION |
| Conductivity | μS/cm | - | 1500 (Max) | 449.0 | 2510 B., APHA, 23 rd EDITION |
| pH | - | 6.5 - 8.5 | 6.5-8.5* | 7.9 | 4500-H ⁺ B, APHA, 23 rd EDITION |
| Lab Temperature | ⁰ C | - | - | 19.8 | 2550 B, APHA, 23 rd EDITION |
| Total Dissolved Solids | mg/l | 1000 | 1000 (Max) | 270.0 | 2540 C., APHA, 23 rd EDITION |
| Total Suspended Solids | mg/l | - | - | 4.0 | 2540 D. APHA, 23 rd EDITION |
| CHEMICAL | | | | | |
| BOD | mg/l | - | - | 1.10 | 5210 B., APHA, 23 rd EDITION |
| COD | mg/l | - | - | 4.75 | 5220 B., APHA, 23 rd EDITION |
| Ammonical Nitrogen | mg/l | 1.5 | 1.5 (Max) | 0.05 | 4500-NH ₃ F., APHA, 23 rd EDITION |
| Total Nitrogen | mg/l | - | - | 1.99 | 4500-N _{org} B. , APHA, 23 rd EDITION |
| Total Hardness | mg/l as CaCO ₃ | 500 | 500 (Max) | 226.0 | 2340 C., APHA, 23 rd EDITION |
| Total Alkalinity | mg/l as CaCO ₃ | 500 | - | 198.0 | 2320 B., APHA, 23 rd EDITION |
| Chloride | mg/l | 250 | 250 (Max) | 10.89 | 4500-Cl ⁻ B, APHA, 23 rd EDITION |
| Iron | mg/l | 0.3 | 0.3 (3) (Max) | 0.60 | 3111 C., APHA, 23 rd EDITION |
| Manganese | mg/l | 0.5 | 0.2 (Max) | <0.06 | 3111 C, APHA, 23 rd EDITION |
| Lead | mg/l | 0.01 | 0.01 (Max) | <0.01 | 3111 B. APHA, 23 rd EDITION |
| Arsenic | mg/l | 0.01 | 0.05 (Max) | <0.005 | 3114 C., APHA, 23 rd EDITION |
| Mercury | mg/l | 0.001 | 0.001 (Max) | <0.001 | 3112 B., APHA, 21 ST EDITION |
| Zinc | mg/l | - | 3 (Max) | 0.01 | 3111 B., APHA, 23 rd EDITION |
| Cadmium | mg/l | 0.003 | 0.003 (Max) | <0.003 | 3111 B., APHA, 23 rd EDITION |
| Nickel | mg/l | 0.02 | - | 0.04 | 3111 C, APHA, 23 rd EDITION |
| Total Chromium | mg/l | 0.05 | 0.05 (Max) | <0.05 | 3111 B. APHA, 23 rd EDITION |
| Aluminium | mg/l | - | 0.2 (Max) | <0.01 | 3500-AI B. APHA, 23 rd EDITION |
| Copper | mg/l | 2 | 1 (Max) | 0.02 | 3111 B., APHA, 23 rd EDITION |
| Nitrate | mg/l as NO ₃ | 50 | 50 (Max) | 5.08 | 4500-NO ₃ - B., APHA, 23 rd EDITION |
| Nitrite | mg/l as NO ₂ | 3 | - | <0.02 | 4500-NO ₂ - B., APHA, 23 rd EDITION |
| Sulphate | mg/l | - | 250 (Max) | 5.76 | 4500-SO ₄ . APHA, 23 rd EDITION |
| Total Phosphate | mg/l | - | - | <0.1 | 4500-P E. APHA, 23 rd EDITION |
| Cyanide | mg/l | 0.07 | 0.07 (Max) | <0.05 | 3111 B. APHA, 23 rd EDITION |
| Sodium | mg/l | - | - | 5.45 | 3111 B., APHA, 23 rd EDITION |
| Potassium | mg/l | - | - | 3.57 | 3111 B., APHA, 23 rd EDITION |
| Cobalt | mg/l | - | - | <0.01 | 3111 C, APHA, 23 rd EDITION |
| Lithium | mg/l | - | - | <0.01 | 3111 C, APHA, 23 rd EDITION |
| BIOLOGICAL | | | | | |
| Total Coliform | CFU/100ml | Nil | Nil | > 300 | 9222 B, APHA, 23 rd EDITION |
| Faecal Coliforms | CFU/100ml | Nil | Nil | > 300 | 9222 C., APHA, 23 rd EDITION |

APHA: American Public Health Association, Standard Methods for the Examination of Water & Waste Water,

WHO GV: World Health Organization Guideline Value, 2006 Update, NDWQS: National Drinking Water Quality Standard, 2062 (Nepal),

* These values show lower and upper limits, () Values in the parenthesis refers the acceptable values only when alternative is not available.

**Not accredited Test Method

N.O. – Not Objectionable

-Ve: Not Detected

Comment: The tested water sample consists slightly higher turbidity range with presence of Iron content. Bacteriologically, The sampled water is contaminated with E. coli and Coliforms.

6. Assessment of Quality Data, Conclusion and Recommendations

6.1 Assessment of Quality Data

6.1.1 Ambient Air Quality

While comparing the observed particulate matters (TSP, PM₁₀ & PM_{2.5}) data of all monitoring locations, the attributed values were recorded beyond the National Ambient Air Quality Standard Tolerance Limit. But the gaseous parameters (SO_x, NO_x, Co, Ozone, Benzene) were found within the tolerance limit whereas the Lead contents were also found within durable status.

Other, gaseous and metal parameters were found within the tolerance range as per NAAQS.

6.1.2 Noise Quality

The observed day and night time equivalent noise pressure level, all the values were found within the National Ambient Noise Quality Standard (NAAQS) for Mixed Residential and Commercial Area purpose.

However, Observed equivalent noise levels for night time sound level were found higher than the National Ambient Noise Quality Standard for Commercial area (At First House from Route of Highway). Instead of this, the maximum noise was recorded impulsively at First House from Route of Highway due to vehicular and animal activities.

6.1.3 Ground and Surface Water Quality

6.1.3.1 Ground Water Quality

Most of the physical, chemical parameters of ground water sample were found within the suitable range for human existing condition except few chemical parameters (Iron in Sample - 1 Ground Water - Near Second Bridge, Butwal - 15, Ratanpur Tole of Jeet Dhakal, Latitude: 27.676048 Longitude: 83.390448), Upstream Zone of Project Area.

It was found inferior in Sample - 2 Ground Water, Bhim Lal Sapkota, Latitude: 27.677188 Longitude: 83.384775, Downstream Zone of Project Area. The microbiological quality of this ground water was found contaminated with both organisms, Coliform and Faecal Coliforms.

6.1.3.2 Surface Water Quality

In present situation, the physical, and chemical parameters of the Danab river were not found polluted significantly. Slight odor and turbidity were found recorded in the river water. But, microbiological quality was found contaminated with Faecal Coliforms and Coliform organisms in comparison with both Ground Water.

7. Conclusion and Recommendations

Following remedial actions shall be adopted for minimizing possible pollution indicators being aggravated in future during / and after project construction:

7.1 For Improvement of Air Quality:

- Timely blacktopping of road and covering of top surface (especially in the entrance road from highway to First Bridge)
- Periodical spraying of water during the construction period.
- Management and implementation of proper disposal practices of solid waste in the project construction zone.
- Provision of solid waste burning incinerator at the suitable zone of project area.
- Awareness training about the safe environmental management implementation / safeguarding to the authorized personnel / management committee authority.

7.2 For Improvement of Noise Quality:

- Lower speed during vehicle movement on road / service pathways.
- Prohibition excess and over range horn blowing practices.
- Construction of speed breaker at the entrance road zone.
- Implementation of rules for establishing peaceful environment with implementation of punishment for excess noise polluters.

7.3 For Maintaining Ground and Surface Water Quality:

- Proper disposal of solid and liquid waste shall be done during construction period and suitable plan shall be implemented for operation period of the Wholesale Market.
- Prohibition safe toilets and drainage shall be important to retain the ground as well as river water quality.
- Construction suitable type treatment plant for liquid and degraded waste management.

8. National Standards for Stack Emission:

8.1 National Ambient Air Quality Standards, 2012 for Nepal

| Parameters | Units | Averaging Time | Concentration, maximum | Test Methods |
|------------------------------------|--------------------------|----------------|------------------------|--|
| TSP (Total Suspended Particulates) | $\mu\text{g}/\text{m}^3$ | Annual | - | |
| | | 24-hours | 230 | High Volume Sampling and Gravimetric |
| PM ₁₀ | $\mu\text{g}/\text{m}^3$ | Annual | - | |
| | | 24-hours | 120 | High Volume Sampler and Gravimetric Analysis, TOEM, Beta Attenuation |
| Sulphur Dioxide | $\mu\text{g}/\text{m}^3$ | Annual | 50 | Ultraviolet Fluorescence, West and Gaeke Method |

| Parameters | Units | Averaging Time | Concentration, maximum | Test Methods |
|-------------------|--------------------------|----------------|------------------------|---|
| | | 24-hours | 70 | Same as annual |
| Nitrogen Dioxide | $\mu\text{g}/\text{m}^3$ | Annual | 40 | Diffusive sampling based on weekly averages |
| | | 24-hours | 80 | To be determined before 2005. |
| Carbon Monoxide | $\mu\text{g}/\text{m}^3$ | 8 hours | 10,000 | Non Dispersive Infra Red Spectrophotometer (NDIR) |
| Lead | $\mu\text{g}/\text{m}^3$ | Annual | 0.5 | High Volume Sampling Followed by Atomic Absorption Spectrometry |
| Benzene | $\mu\text{g}/\text{m}^3$ | Annual | 5 | Gas Chromatographic Technique |
| PM _{2.5} | $\mu\text{g}/\text{m}^3$ | 24 hours | 40 | PM _{2.5} sampling gravimetric analysis |
| Ozone | $\mu\text{g}/\text{m}^3$ | 8-hours | 157 | UV spectrophotometer |

8.2 Noise Quality Standards and Guideline

8.2.1 National Noise Quality Standards of Nepal, 2069

| Area | Maximum Sound Pressure Level in dBA (Decibels A-weighted) | |
|---|---|-------|
| | Day | Night |
| Industrial area | 75 | 70 |
| Commercial area | 65 | 55 |
| Rural residential area | 45 | 40 |
| Urban residential area | 55 | 50 |
| Mixed residential area | 63 | 55 |
| Peaceful Area | 50 | 40 |
| Maximum Sound Pressure Level from Domestic Equipment in dBA (Decibels A-weighted) | | |
| 1 | Water Pump | 65 |
| 2 | Diesel Generator | 90 |
| 3 | Entertainment Equipment | 70 |

Section 62, Number 30, Nepal Gazette, Chapter 5, 2069/07/13

8.2.2 National Noise Standards Exposure Limit (PEL) for Workplace Environment

| Permissible Total Time Exposure Limit of Continuous Sound Level in hour per Day (Maximum) | Maximum Sound Pressure Level in dBA (Decibels A-weighted) for Workplace |
|---|---|
| 8 | 90 |
| 4 | 95 |
| 2 | 100 |
| 1 | 105 |
| 1/2 | 110 |
| 1/4 | 115 |

Note: No exposure permitted above 115 dBA sound pressure level.

Source: Section 66, Number 63, Nepal Gazette, Chapter 5, 2073/12/14

8.2.3 Noise Pressure Exposure Limit (PEL) of Noise for Workplace as per ACGIH / OSHA TLV (For Reference)

| Total time of exposure (continuous or a number of short term Exposures) per day, in hours. | Sound Pressure Level in dBA (decibels A-weighted) |
|---|--|
| 8 | 85 |
| 4 | 95 |
| 2 | 100 |
| 1 | 105 |
| $\frac{1}{2}$ | 110 |
| $\frac{1}{4}$ | 115 |

Notes:

- (1) No exposure in excess of 115 dBA is to be permitted.
- (2) Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level in C weighting network.
- (3) Hearing protection shall be mandatory within 75 - 85dBA.

ANNEX I: Monitoring Location (Google Map)

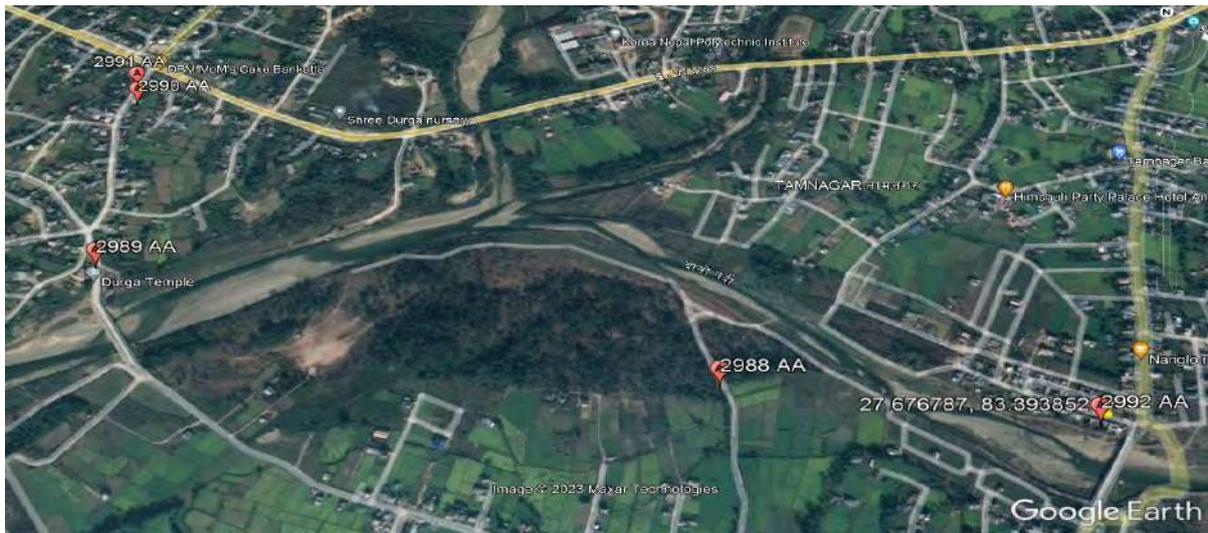


Figure A1to5: Google map Location of Ambient Air Quality Monitoring

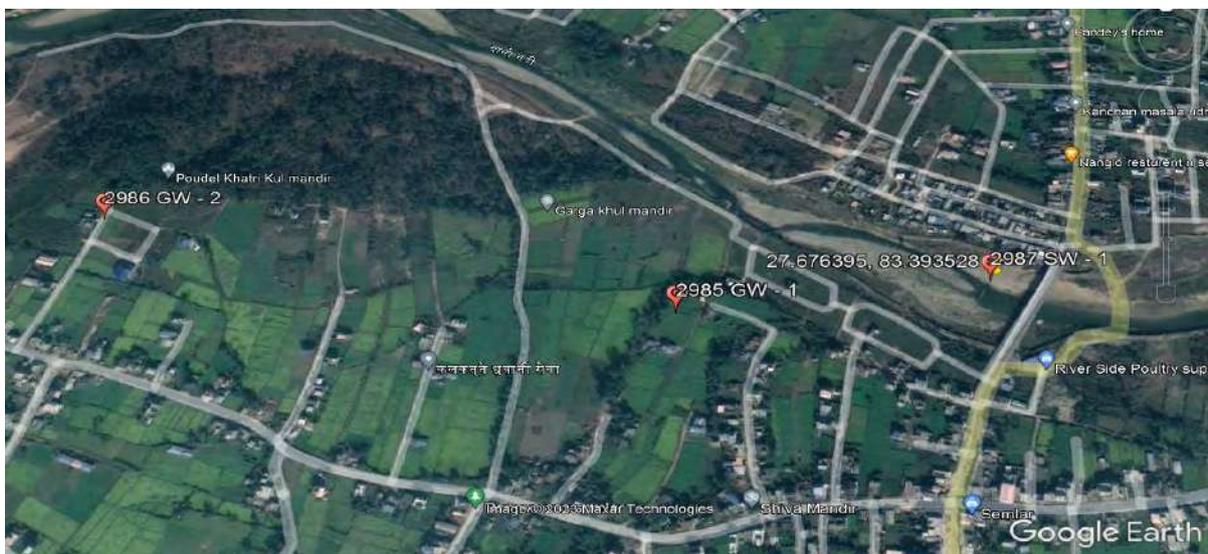


Figure GW1&2/SW2: Google map Location of Ground and Surface Water Quality Monitoring

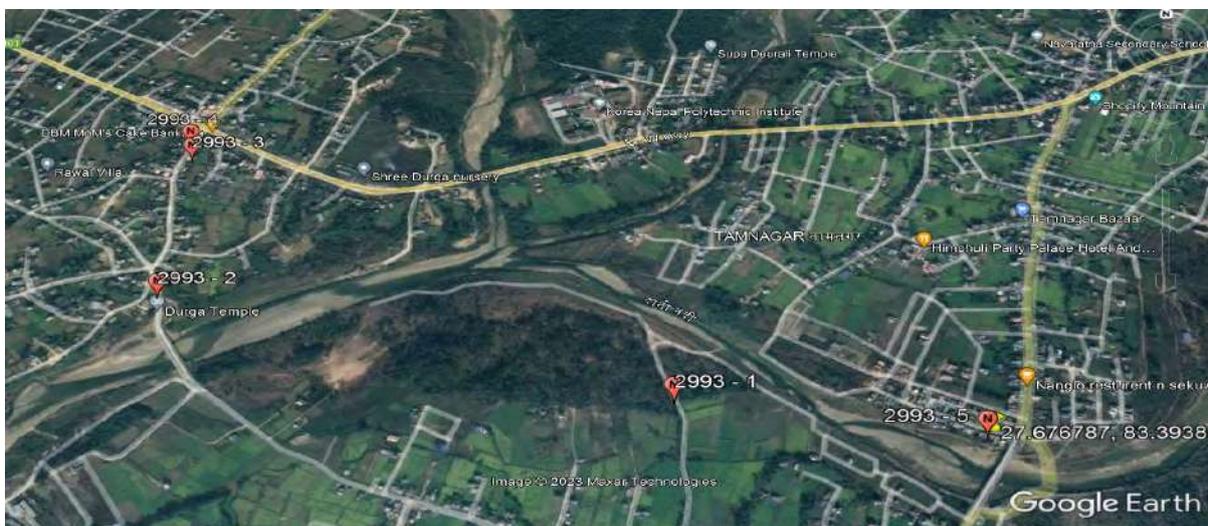


Figure N1to5: Google Map Location of Noise Quality Monitoring

ANNEX II: Some Photographs of Field Monitoring







7. Minutes of Public Hearing Consultation during the EIA Phase of the project, including 2 notice, letters of invitation to PH, GRM, 4 consent letters collected after the PH, photo evidence

Public Hearing

Public Hearing procedure

The EPR2020 stipulates undertaking of public hearing as one of the mandatory requirements of the EIA process. Thus, a public hearing was organised at the project site to disclose the EIA findings to meet this requirement. The public hearing also served to bring together the proponent and affected stakeholders in a forum to exchange their opinions and offer suggestions on a proposed undertaking to assist the decision-making process. Thus, the public hearing for the proposed project was organised to:

- inform local communities in the project area about the findings and outcomes of the EIA study of the proposed project;
- consult the potential project affected families and other stakeholders on the issues dealt by the EIA study; and
- provide an official forum for the affected families and other stakeholders to express their concerns, opinions and suggestions on the issues dealt by the EIA report, and/or on any other outstanding issues.

The public hearing was conducted at the Shiva Ganesh Mandir, Semlar, Butwal – 15 on the 24 March 2023.

Information disclosure

The following documents were disclosed for the public hearing:

1. The EIA report of the proposed Export Oriented Wholesale Agriculture Market in Semlar, Butwal;
2. Executive Summary (in Nepali) of the EIA report;
3. Project layout map projected on the Google Earth Imagery;
4. Power point Presentation on the project;
5. Power point Presentation of the Executive Summary.

The main purpose of the above disclosure materials was to adequately inform the stakeholders of the EIA findings. These documents covered the essence of the EIA report in simple language.

Preparation of Public Hearing

The announcements were made on the disclosure of the summary of the draft EIA Report in both English and Nepali as well as the dates of public hearings in the national daily “Nepal Samacharpatra” (see details in Appendix 7).

Prior to the public hearing, the team visited affected stakeholders to discuss and invite them to the public hearing. On the same occasion, the team had delivered the EIA summary in Nepali with a covering letter. The team had visited Chief District Office, Divisional Forest Office, Butwal Sub-Metropolitan Office and the office of Ward no 15, Ratanpur Community Forest User Group. The covering letter made a request to the stakeholders for providing their

comments and suggestions as well as to participate in the public hearings. The covering letter and its confirmation of receiving by stakeholders are given in Appendix 7.

Notification of Public Hearing

The affected families and concerned stakeholders were notified about the undertaking of public hearing program through (a) invitation letters to the concerned stakeholders, (b) pasting of public notice in the project affected ward offices, and (c) notice publication in the national daily newspaper.

a) Invitation for the public hearing: The concerned stakeholders were formally invited for the public hearing with the invitation letter. The invitation letter along with the Summary EIA report were hand delivered to the invitees.

b) Pasting of the public hearing notice: The notice of the public hearing was also pasted in the project affected area. The notice was pasted at the public places like – ward office, municipality office, community forest user group office.

c) Notice published in the national daily newspaper: as mentioned above a public notice (7 day) was also published in the national daily newspaper - “Nepal Samacharpatra” (see Appendix 7).

d) Notice published in the national daily calling for the feedback – a second notice (7 day) was published in the national daily newspaper - “Nepal Samacharpatra” (see Appendix 7) calling for the comments and suggestions after completion of the public hearing.

Location of Public Hearing

The public hearing was conducted at the project site – Shiva Ganesh Mandir, Semlar, Butwal – 15 on 24 March 2023.

Participant of the Public Hearing

The Public Hearing was attended by 70 participants from Ward 15, 16 and Butwal Sub-Metropolitan City. The attendance of participants is presented in Appendix 7. The participants included farmers, teachers, students, NGOs, CBOs, businessmen, servicemen, forest user groups, government organizations, indigenous community, women, youths, and representatives.

The details of Public Hearing

The public hearing was organised at the premises of the Shiva Ganesh Mandir, Semlar, Butwal -15 on 24 March 2023. The hearing was chaired by Mr Shiva Thapa, Chairperson of the ward -15, Butwal. Mr Khel Raj Pandey, Mayor of the Butwal Sub-Metropolitan City was the Chief Guest of the public hearing, and Mr. Tek Raj Panthi, Chief Administrative Officer, of BSMC. Mr Tikaram Sharma, Chief of the CAIDMP, MoALD and Mr Robbin Boustead representative of Invest International were presented at the program. The program was also attended by the representatives of district government line agencies, district representatives of the major political parties, and the local respected figures.



The program was formally started with Dr Maniratna Aryal, Senior Agricultural Economist, Under Secretary, Centre for Agri-Infrastructure and Agri Mechanization Promotion, Ministry of Agriculture and Livestock Development, Nepal Government by welcoming the participants to the public hearing and making a presentation on the project. The EIA team consisting of Ms Violeta Paginu, Mr Ajay B Mathema and Prof Dr Binod Pokharel presented the findings of the EIA report.

The second session was entirely dedicated for the discussion, in which participants were given sufficient time to express their comments and suggestion. In addition to it, written comments from the participants were also collected. The comments mainly consisted of the followings:

- (a) Timely commencement of the project;
- (b) Women and youth shall be prioritized for recruitment in the project (this is included as one of the project mitigation measure, see section 8.4) ;
- (c) Access gate in the south to the project site shall also be included in the design.
- (d) Waste management for the future market (the measures that will be embedded in the project design are explained in section 2.2.5. Project requirements, see details on waste management on site and provision of the wastewater treatment plan. Further mitigation measures on this aspect are included in chapter 8 of this report, see section Pollution of direct environment due to improper waste management)
- (e) Management of fruits and vegetables that have a high pesticides content and cannot be traded/ consumed and shall be disposed in a responsible, environmentally safe manner (see details in chapter 8, section Pollution of direct environment due to improper waste management during the operation phase of the project).

Mr Khel Raj Pandey thanked all the participants for their active involvement and assured that their concerns will be adequately addressed in the EIA final report as far as possible. Further he requested the MoALD to start the project on the timely basis. The Chairperson of the program, Mr Shiv Thapa concluded the public hearing.

For more details, please refer to the event minutes of meeting.

गिरी अर्थशास्त्रज्ञांको सुदूर उद्वेगपर्याप्तिका पार्ति न. १५ संख्याका प्रस्ताव अर्थको निर्णय अनुसार कृषि क्षेत्र बजारको बलाकरवीय प्रभाव न्यूनाइकाको सापेक्षिक सुनुवाई कार्यक्रमका अर्पित स्थानिय सरोपभसाहाइको नाम र टपतावर

| क्र.सं. | नाम | ठेगाना | संकेत नं. | हस्ताक्षर |
|---------|-----------------------------|-------------------|--------------|-----------|
| १. | सीता ठकाल | रतनपुर | ९८५७५०२९५२ | |
| २. | पुडासानी उमान | रतनपुर | ९८६७१९९६५० | |
| ३. | वासवता पौडेल | " | ९८५५७८८६२५ | |
| ४. | कुल प्रसाद लामाल | " | ९८५६२५१५०६ | |
| ५. | प्रेम प्रसाद पौडेल | " | ९८६९३१३९५९ | |
| ६. | मूल उपाध्याय | सुनगाडी | ९८४६०२६८०६ | |
| ७. | Rishm Boudhary | Investor INT'L | ९६१८७७८१६५ | |
| ८. | रश्मि क.सी | कुटवल १५ रतनपुर | ९८५७०२७२९२ | |
| ९. | अजय शक मण्डेला | कठमाडौं | ९८६०६७१७७३ | |
| १०. | बिलोद पौडेल | " | ९८५१०९५५१५ | |
| ११. | निसा खत्री | " | ९८५११३६७०६ | |
| १२. | कुशल बस्नेल | कुटवल १४ | ९८६५५०५५०१ | |
| १३. | Violeta Pagina | Netherlands | +31623041734 | |
| १४. | पुनिराज आचार्य | रतनपुर डेल | ९८२६०९३२०९ | |
| १५. | राम बहादुर थापा मगर | | ९८४६०२५२९५ | |
| १६. | गुरु प्रसाद पौडेल | कठमाडौं | ९८४६०२५२९५ | |
| १७. | कुम कथापुर मन्थाइ | कुटवल १६ | ९८०६९६०६९८ | |
| १८. | वासवता पौडेल | कुटवल १८ | ९८४६०२६६२३ | |
| १९. | सुलेख नि.सी. डी.वि.सी. युवा | | ९८६०६६९६६ | |
| २०. | विजय शर्मा | कुटवल-१४ | ९२५७०७००३९ | |
| २१. | मन्मथराज शर्मा | रुडा सानि १५ | ९८४६०२६३६६ | |
| २२. | उम्वरा देवी शर्मा | गुठका-१५ रतनपुर | ९८४६९२२९५४ | |
| २३. | कमला देवी शर्मा | रतनपुर ८ | ९८६७८८७८५१ | |
| २४. | चिरञ्जीव लामाल | गोर्खा | ९८५६३५५९३९ | |
| २५. | जयवन्ता शर्मा | रतनपुर | ९८६७३३५०६५ | |
| २६. | सीता शर्मा | रतनपुर | ९८५७६३७२१४ | |
| २७. | श्री धनलाल शर्मा | कुटवल, कृषि उपकरण | ९८५६०२६९७९ | |
| | यात्रा कृषि सञ्चालक (सहित) | | ९८६०२६९७९ | |

| क्र.सं. | नाम | पता | मो.नं. | व्यवहार |
|---------|-----------------------|--------------------|------------|---------|
| 28 | बाबु राम कुमाल | अध्यापक | 986032998 | वा |
| 29 | सुभा कुमारी केशरी | | 989866633 | |
| 30 | कमला कुमाल | रतनपुर | 9857082830 | अप |
| 31 | विष्णु शर्मा | " | 9811943834 | वि.सं. |
| 32 | इया फाफी | " | 9867144995 | अप |
| 33 | रिजन रकना | गुजरात | 9855164258 | अप |
| 34 | ZAHID SHAKEEL | IFAD | | अ |
| 35 | नारायण प्रसाद पांडे | महेंद्रगढ़ | 9847421822 | अप |
| 36 | जितेंद्र कुवैर | गुजरात | 9860348899 | अ |
| 37 | श्री सुख प्रसाद कुमाल | " | 9826022082 | अप |
| 38 | रजनीश सुवेदी | " | 9826026680 | अप |
| 39 | सौरभ विश्वकर्मा | परीपत्रना कार्यालय | 9826096379 | अप |
| 40 | तुलका डाहा | व्याप | 9899832260 | अप |
| 41 | इमिलाल मुन्शी | व्याप | 9826022434 | अप |
| 42 | मन्जु चर्च | | 9804413123 | अप |
| 43 | सरिता कुमाल | मुन्शी काम टोल | 9847312648 | अप |
| 44 | के.वि.नि. कुमाल | रतनपुर | 9826039639 | अप |
| 45 | आनंद शर्मा | अध्यापक | 9826039639 | अप |
| 46 | राजू प्रसाद मंडारी | अध्यापक | 9826039639 | अप |
| 47 | विश्व मिश्रा | अध्यापक | 9826039639 | अप |
| 48 | अध्यापक मंडारी | कृ.वि.नि. | 9826039639 | अप |
| 49 | पलका देवी | | 9808832089 | अप |
| 50 | तारक नाथ | " | 9806228908 | अप |
| 51 | लक्ष्मी पांडे | | 9826028187 | अप |
| 52 | शमेश साफ़ी | गुजरात | 9826028187 | अप |
| 53 | के.पी.ला केशरी | व्याप | 9826028187 | अप |
| 54 | पुष्प प्रसाद केशरी | (अध्यापक) | 9867256779 | अप |
| 55 | श्री मन्जु देवी | अप | 9813219198 | अप |
| 56 | सावित्री देवी शर्मा | अप | 9847249038 | अप |
| 57 | लक्ष्मी शर्मा | | 9864453196 | अप |
| 58 | मार्ग मन्जु केशरी | | 9847141965 | अप |
| 59 | Annam Kumar | | 9827553850 | अप |
| 60 | नारायण केशरी | | 9841773957 | अप |

| क्र.स. | नाम | पेजना | मो.न. | चक्रावर |
|--------|-------------------|-------------|------------|---------|
| ६१ | गणेश्वर पांडे | मदगा | 9749769418 | |
| ६२ | KALADHAR - PANTHI | " | 9847024167 | |
| ६३ | अमृत पौखरे | " | 9847532484 | |
| ६४ | शिव भुसाव | " | 926026222 | |
| ६५ | हेमराज पन्ना | बुधल इ.गणप. | | |
| ६६ | अमृत कासत | बुधल | | |
| ६७ | गोपाल पांडे | बुधल-१६ | 926026222 | |
| ६८ | बाल प्रसाद ठोस | बुधल-१६ | 926026222 | |

Public Hearing Minute

An Overview

The Ministry of Agriculture and Livestock Development's Centre for Agriculture Infrastructure Development and Mechanization Promotion (CAIDMP) in Nepal is proposing to construct an Export Oriented Agricultural Wholesale Market in Semlar, Karsaghat Area, Butwal Sub-Metropolitan City-15. This project aims to enhance the export of agricultural products and satisfy domestic demand. Financial support for this project will be provided by the Government of the Netherlands via Invest International's Develop to Build Program and the International Fund for Agricultural Development (IFAD). The project's location is approximately 10 km west of Butwal Bazar and 30 km away from Bhairahawa International Airport, with GPS coordinates of 27.678103, 83.386825. The proposed wholesale market is surrounded by Ward no 14 to the east, Sainamaina Ward no 1 to the west, Ward no 13 to the northwest, and Ward no 16 (Karshaghat) of BSMC to the south.

The proposed development was subject to the regulations set forth by the GoN EPA, 2077, and EPR 2078, as well as the IFC E&S Performance Standards and IFAD's Social, Environmental, and Climate Assessment Procedures. Accordingly, Scoping Documents and Terms of Reference (ToR) were prepared to align with these regulations and standards. On March 2, 2023, the Ministry of Forests and Environment approved the Scoping Documents and ToR.

Methods of Public hearing

In September-October 2022, an Environmental Impact Assessment (EIA) was conducted for the proposed Export Oriented Agricultural Wholesale Market in Butwal Sub-Metropolitan City-15, Semlar, Karsaghat Area. The draft report was prepared by national and internal experts. On March 24, 2023, a public hearing was conducted to share the key findings of the EIA.

On March 12, 2023, a public notice regarding the upcoming public hearing was published in the National Daily News Paper (Samachar Patra). In addition, the notice was posted on the notice board of several locations, including Butwal Sub-metropolitan City (BSMC), ward No 15 of BSMC, Office of the Ratanpur Community Forest, Semalar, and Division Forest Office, Bhairahawa.

The public hearing was conducted by a team of national and international experts, as well as the Chief and agriculture engineer from CAIDMP, IFAD, and Invest International.

Experts and client members in the public hearing were:

1. Dr. Ratnamani Aryal: Chief, CAIDMP
2. Mr. Tikaram Sharmma: Agriculture Economist, CAIDMP
3. Violeta Paginu, RHDHV
4. Mr. Robin Boustead, Invest International
5. Dr. Ajya Mathema, TMS
6. Dr. Binod Pokharel, TMS
7. Mr. Zahid Shakeel IFAD

8. Mr. Nirajan Khadka, IFAD

The program included the participation of all relevant stakeholders, such as representatives from Butwal Sub-metropolitan City, Sainamaina Municipality, adjoining wards, Agriculture knowledge centre, and the Sub-division forest office of Sainamaina (See List of Participants Table-1). A total participant of the program was 70. Of the total, 19 were women.

Participants' Views and Voices

Mr. Shiva Rana, Ward No. 15, chaired the public hearing program. Prior to the discussion of the EIA report, Ratnamani Aryal, Chief of CAIDMP, provided a detailed description of the project and its process. According to him, the Centre for Agriculture Infrastructure Development and Mechanization Promotion (CAIDMP), under the Ministry of Agriculture and Livestock Development, Government of Nepal, is proposing the development of an Export Oriented Agricultural Wholesale Market in Butwal Sub-Metropolitan City-15, Semlar, Karsaghat Area (the PROJECT).

The need for a new modernized wholesale market in Semlar Butwal includes appropriate storage and grading packing facilities. It will have ample area for further expansion, which has been reconfirmed during the project engagements at central, provincial and local level. These engagements were conducted in October 2021 and July 2022 by the EIA study team with the support of CAIDMP.

On behalf of the consultant team Mr. Ajaya Mathema (Environment expert) and Binod Pokharel (social expert) presented the possible environmental and social impact of the project, and mitigation measures.

Following the presentation, the audience had some inquiries, but all of them expressed the desire to commence the project implementation at the earliest opportunity. One attendee pointed out that they had been hearing about the project since 2019, and numerous individuals had come to study it, with the group gathering multiple times at the same venue. Despite this, the project has yet to commence.

1. The program should commence promptly: As a national priority project, we have no grievances regarding the project. While there are some environmental impacts that must be mitigated, the priority is to begin the project as soon as possible. One of the participants inquired why public hearings were being conducted instead of commencing the project immediately.
In response to the question, Maniratna acknowledged that the project had been delayed due to various reasons. Although the project feasibility had commenced in 2019, the onset of COVID-19 had occurred during that time. Moreover, they had to adhere to national and international legal requirements before initiating the project.

2. A female participant raised a question by saying, "We comprehended all the impacts that the project may induce, including air and pollution through the presentation. However, what benefits would the residents of the ward receive from the project?" She suggested that locals should be provided employment opportunities within the project.

In response to the question, a team member of the EIA study stated that the project would initiate trading activities, and locals would be given priority in both the construction and operation phases of the project. This would provide employment opportunities to the residents of the ward.

3. Maniratna Aryal commented on the presentation and raised a question about the process and installation of RISTRA LAB, which was not mentioned in the report. He asked how the lab would decompose, and inquired about the management of washed commodities from outside, commodities with pesticides, and non-edible commodities. In response to the question, Violeta Paginu, Team Leader of the EIA, assured that the modality of decomposing the commodity would be included in the report. This would ensure that the process and installation of RISTRA LAB, as well as the management of washed commodities from outside, commodities with pesticides, and non-edible commodities, would be adequately addressed.
4. Road construction: The present road is not sufficient for the entrance of the project It has been proposed to expand the existing road to 31 feet in width.
5. We have already accepted this project earlier. Now, it should be commenced soon.

Concluding the public hearing, the Mayor of Butwal Sub-metropolitan City asked the participants to clap their hands if they agreed with the project implementation. Following this, all the participants clapped their hands.

Table 1: List of the Participants

| S.N. | Name of the participants | Sex | Address |
|------|--------------------------|--------|----------|
| 1. | Sita Dhakal | Female | Ratanpur |
| 2. | Chudamani Dhakal | Male | Ratanpur |
| 3 | Saraswati Paudel | Female | Ratanpur |
| 4 | Kul Prasad Lamsal | Male | Ratanpur |

| | | | |
|----|-------------------------|--------|---|
| 5 | Prem Prasad Paudel | Male | Ratanpur |
| 6 | Krishna Upadhaya | Male | Semlar |
| 7 | Robin Baustead | Male | Invest International |
| 8 | Resham KC | Male | Chairman of Ratanpur Community Forest |
| 9 | Ajay Bhakta Mathema | Male | TMS, Kathmandu |
| 10 | Binod Pokharel | Male | TMS, Kathmandu |
| 11 | Nisha Basnet | Female | Kathmandu |
| 12 | Kushal Bashyal | Male | Butwal-14 |
| 13 | Violeta Paginu | Female | RHDHV, Netherlands |
| 14 | Phaniraj Acharya | Male | Ratanpur |
| 15 | Ram Bahadur Thapa Magar | Male | Ratanpur |
| 16 | Guru Prasad Paudel | Male | Baithali, ward No 16 |
| 17 | Kum Bahadur Marchaha | Male | Butwal, 16 |
| 18 | Narayan Paudel | Male | Butwal, 15 |
| 19 | Santosh GC | Male | BSMC |
| 20 | Shiva Rana | Male | Ward Chair, 15 |
| 21 | Megha Raj Kafle | Male | Ward Secretary, 15 |
| 22 | Dambaradevi Sharma | Female | Ratanpur |
| 23 | Kamala Devi Gautam | Female | Ratanpur |
| 24 | Chrinjibi Lamsal | Male | Gobariya, 15 |
| 25 | Kalpna Tamata | Female | Ratanpur |
| 26 | Rita Neupane | Female | Ratanpur |
| 27 | Ghanashyam Bhushal | Male | Vice-chair of executive committee, Butwal agricultural |

| | | | |
|----|-------------------------|--------|--|
| | | | commodities wholesale Market |
| 28 | Baburam Bhushal | Male | Chair of executive committee, Butwal agricultural commodities wholesale Market |
| 29 | Muna Kumari KC | Female | Ratanpur |
| 30 | Kamala Bhushal | Female | Ratanpur |
| 31 | Bishnu Regmi | Female | Ratanpur |
| 32 | Chhaya Pugami | Female | Ratanpur |
| 33 | Nirajan Khadka | Male | IFAD, Kathmandu |
| 34 | Zahid Shaker | Male | IFAD, Kathmandu |
| 35 | Narayan Prasad Paudel | Male | Bhadaiya, Chauraha, 15 |
| 36 | Jitendra Subedi | Male | Butwal, 15 |
| 37 | Budhhi Prasad Dhakal | Male | Butwal, 15 |
| 38 | Khaganath Subedi | Male | Butwal, 15 |
| 39 | Saurat Bishwakarma | Male | Project Implementation Unit, Rupandehi |
| 40 | Tula Bahadur Gaha Thapa | Male | Butwal, 15 |
| 41 | Chhabilal | Male | Muktidham,15 |
| 42 | Manju Darji | Female | Muktidham, 15 |
| 43 | Sarita Dhakal | Female | Muktidhamtol, 15 |
| 44 | Bednidhi Rijal | Male | Ratanpur |
| 45 | Anita Baniya | Female | Agriculture Knowledge Centre |
| 46 | Raju Prasad Bhandari | Male | Forest Office |
| 47 | Binod Acharya | Male | Secretary |
| 48 | Asha Bhandari | Female | Agriculture Extension officer |

| | | | |
|----|-----------------------------|--------|-------------------------------|
| 49 | Dal bahadur Thapa | Male | |
| 50 | Tarakanatha | Male | Agriculture Extension Officer |
| 51 | Laxman Paudel | Male | |
| 52 | Ramesh Sapkota | Male | Butwal, 15 |
| 53 | Kopila Kumari Thapa | Female | Butwal, 15 |
| 54 | Punya Prasad Kandel (Milan) | Male | Butwal, 15 |
| 55 | Makar Dhoj Malla | Male | |
| 56 | Sabitra Devi Sharma Dhakal | Female | |
| 57 | Laxmi Sharma | Female | Butwal, 15 |
| 58 | Mani Bhadra Kadel | Male | Butwal, 15 |
| 59 | Shyam Kandel | Male | Butwal, 15 |
| 60 | Narayan Banjade | Male | Butwal, 15 |
| 61 | Govinda Paudel | Male | Madaiya |
| 62 | Kaladhar Panthi | Male | Madaiya |
| 63 | Amrit Pokharel | Male | Madaiya |
| 64 | Shiva Bhushal | Male | Madaiya |
| 65 | Tekraj Panthi | Male | Butwal |
| 66 | Amrit Khadka | Male | Butwal |
| 67 | Gopal Paudel | Male | Butwal, 16 |
| 68 | Dhan Prasad Dhakal | Male | Butwal, 15 |
| 69 | Khel Raj Pandey | Male | Mayor, BSMC |
| 70 | Dilli Prasad Sharma | Male | Ward Chair, Butwal 12 |

8. Approval letter of the Scoping Report and EIA Terms of Reference



नेपाल सरकार

वन तथा वातावरण मन्त्रालय

EX: पो.ब.न ३५८७
सिंहदरबार, काठमाडौं

वातावरण तथा जैविक विविधता महाशाखा



पत्र संख्या - ०६९/२०

चलानी नं. ६८७

प्राप्त पत्र संख्या र गिति -

श्री कृषि तथा पशुपन्छी विकास मन्त्रालय,
सिंहदरबार, काठमाडौं।

मिति: २०७९।११।२५

विषय: Development of Export Oriented Agriculture Wholesale Market in Semlar, Butwal
आयोजनाको क्षेत्रनिर्धारण प्रतिवेदन (SD) तथा कार्यसूची (TOR) स्वीकृति सम्बन्धमा।

प्रस्तुत विषयमा तहाँ मन्त्रालयको च.न. ३७ मिति २०७९।०६।१० को पत्र मार्फत प्राप्त भएको श्री कृषि विभाग, कृषि पूर्वाधार विकास तथा कृषि यान्त्रिकरण प्रवर्द्धन केन्द्र प्रस्तावक रहेको लुम्बिनी प्रदेश रुपन्देही जिल्लाको बुटवल उपमहानगरपालिका वडा नं. १५ मा प्रस्तावित Development of Export Oriented Agriculture Wholesale Market in Semlar, Butwal आयोजनाको वातावरणीय प्रभाव मुल्यांकन (EIA) को क्षेत्र निर्धारण (SD) तथा कार्यसूची (TOR) प्रतिवेदन उपर कारवाही हुँदा प्रस्तावकबाट पेश भएको परिमार्जित SD/TOR प्रतिवेदनलाई प्रचलित कानूनको विपरित नहुने गरी साथै यस प्रतिवेदनमा पालना र कार्यान्वयन गर्ने भनी प्रतिबद्धता जनाइएका विषयहरूको पूर्ण पालना गर्ने गरी तपशिलका शर्तहरू सहित वातावरण संरक्षण ऐन २०७६ को दफा (५) को उपदफा (१) को प्रावधान तथा वातावरण संरक्षण नियमावली, २०७७ को नियम ४ को उपनियम (७) र नियम ५ को उपनियम (५) बमोजिम सम्माननीय प्रधानमन्त्री तथा वन तथा वातावरण मन्त्रीज्यूको मिति २०७९।११।१५ को निर्णयानुसार स्वीकृत गरिएको व्यहोरा अनुरोध गर्दछु।

शर्तहरू:

१. वातावरणीय प्रभाव अध्ययन (EIA) को क्रममा कुनै थप/नयाँ वातावरणीय सवाल तथा प्रभावहरूमा पहिचान हुन गएमा ती सवाललाई समेत EIA प्रतिवेदनमा समावेश गर्नु पर्नेछ।
२. EIA प्रतिवेदन तयारीका क्रममा कार्यसूचीले औल्याएका प्रभाव (Impact) र न्युनीकरण (Mitigation) का उपायहरू (Measures) लाई क्रमबद्ध रूपमा उल्लेख गर्नु पर्नेछ।
३. वातावरण व्यवस्थापन योजनामा सकारात्मक प्रभाव अभिवृद्धि र नकारात्मक प्रभाव निराकरणका उपायहरू के, कहाँ, कसले र कहिले गर्ने बारेमा स्पष्ट उल्लेख हुनुपर्नेछ।
४. सार्वजनिक सुनुवाईको क्रममा उठेका सवालहरू प्रतिवेदनमा कहाँ, कसरी समावेश गरिएको छ सो देखिने तालिका तथा माईन्युटिङमा सरोकारवाला र सहभागिको हस्ताक्षर EIA प्रतिवेदनमा समावेश गर्नु पर्नेछ।
५. स्थानीय निकायको सिफारिस संलग्न गर्दा सार्वजनिक सुनुवाईको मिति पश्चातको हुनु पर्नेछ।
६. प्रस्तावकले वातावरणीय प्रभाव अध्ययन प्रतिवेदन वातावरण संरक्षण ऐन, २०७६ र वातावरण संरक्षण नियमावली, २०७७ मा भएका व्यवस्था र प्रक्रियाहरूको पुर्णपालना गरी तयार पार्नु पर्नेछ।

(Signature)
२०७९/११/२५



नेपाल सरकार
वन तथा वातावरण मन्त्रालय

EX: पो.ब.न ३९८७
सिंहदरबार, काठमाण्डौ



पत्र संख्या -

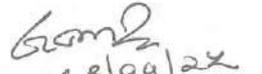
चलानी नं. ६८६

प्राप्त पत्र संख्या र मिति -

७. EIA प्रतिवेदनमा Solid/ Liquid Waste management plan, Disaster Reduction Preparedness Plan र Grievance Redress Mechanism को बारेमा छुटा छुटै शीर्षकमा विस्तृत रूपमा उल्लेख गर्नु पर्नेछ।
८. आयोजना क्षेत्रमा रहेको cremation site relocate अथवा उचित व्यवस्थापन कसरी गर्ने समेत EIA प्रतिवेदनमा उल्लेख गर्नु पर्नेछ।
९. प्रमुख कृषि उपज र volume कति, कहाँबाट संकलन गर्ने, सफाई, Packaging कसरी गर्ने आदि विषयहरू EIA प्रतिवेदनमा उल्लेख गर्नु पर्नेछ।
१०. वन नियमावली, २०७९ को नियम ८७ बमोजिम डिभिजन वन कार्यालयसंग समन्वय गरी अध्ययन कार्य गर्ने र सोको राय सुफाव समेत समावेश गर्नु पर्नेछ।

बोधार्थ:

श्री कृषि विभाग, कृषि पूर्वाधार विकास तथा कृषि यान्त्रिकरण प्रवर्द्धन केन्द्र, हरिहर भवन, ललितपुर।


2073/19/12

सिर्जना शाह
सहायक वैज्ञानिक अधिकृत

9. EIA Terms of Reference

Contents

| | | |
|--------|--|----|
| 1 | Background | 5 |
| 1.1 | Introduction of the proponent | 5 |
| 1.2 | Name and Address of the consultant preparing the report..... | 5 |
| 1.3 | Purpose of the Terms of Reference | 5 |
| 1.4 | Objectives of EIA Terms of Reference | 6 |
| 1.5 | Objectives of EIA | 6 |
| 1.6 | Rationality of the EIA | 6 |
| 2 | Introduction of the Proposal..... | 8 |
| 2.1 | Introduction | 8 |
| 2.2 | Project location and accessibility | 9 |
| 2.3 | Type of Proposal..... | 14 |
| 2.4 | Components of the Project..... | 15 |
| 2.5 | Master Plan Layout | 18 |
| 2.6 | Project components and key activities | 20 |
| 2.6.1 | Main Gate..... | 20 |
| 2.6.2 | Administration Building / Agriculture sub-service Centre | 20 |
| 2.6.3 | Rapid Bioassay of Pesticide Residue Lab | 20 |
| 2.6.4 | Bank | 20 |
| 2.6.5 | Wholesale Shutters | 21 |
| 2.6.6 | Market stalls for small farmers..... | 21 |
| 2.6.7 | Canteen..... | 21 |
| 2.6.8 | Guest Houses..... | 21 |
| 2.6.9 | Farmer’s market/Auction centre | 21 |
| 2.6.10 | Toilet Blocks | 22 |
| 2.6.11 | Washing, Sorting, Grading and Packing Building | 22 |
| 2.6.12 | Temple | 22 |
| 2.6.13 | Weighing Bridge | 22 |
| 2.6.14 | Bio-composting Unit | 22 |
| 2.6.15 | Overhead Water Tank | 22 |
| 2.7 | Project requirements and utilities | 23 |
| 2.7.1 | Access road(s) Construction | 23 |
| 2.7.2 | Power supply | 23 |
| 2.7.3 | Water Supply..... | 24 |

| | | |
|-------|--|----|
| 2.7.4 | Waste management infrastructure | 24 |
| 2.7.5 | Liquid Waste Management..... | 25 |
| 2.8 | Requirements of the Project..... | 25 |
| 2.8.1 | Human Resources..... | 25 |
| 2.8.2 | Construction materials and source | 25 |
| 2.9 | Land Area Requirement..... | 27 |
| 2.10 | Project schedule | 28 |
| 3 | Required Data for the Preparation of Report | 30 |
| 3.1 | Data requirement | 30 |
| 3.1.1 | Physical/chemical environmental issues | 30 |
| 3.1.2 | Biological environment | 30 |
| 3.1.3 | Socio-economic and cultural environment..... | 31 |
| 3.2 | Methodology of data collection..... | 31 |
| 3.2.1 | Literature review..... | 31 |
| 3.2.2 | Field Study | 31 |
| 4 | Review of plan, policies, laws, guidelines and conventions applicable to the project 38 | |
| 4.1 | The constitution..... | 38 |
| 4.2 | Plan and Policies | 39 |
| 4.3 | Acts and Regulations | 39 |
| 4.4 | Rules and Regulations..... | 39 |
| 4.5 | Review of Guidelines and Manuals..... | 39 |
| 4.6 | International Conventions and Treaties | 40 |
| 5 | Required time, budget and experts..... | 40 |
| 5.1 | Time..... | 40 |
| 5.2 | Estimated Budget..... | 42 |
| 5.3 | Study Team..... | 42 |
| 6 | Potential Environmental Issues | 43 |
| 6.1 | Issues identified by the study team | 43 |
| 6.1.1 | Beneficial environmental issues | 43 |
| 6.1.2 | Adverse Environmental Issues..... | 43 |
| 6.2 | Issues identified by the key stakeholders..... | 48 |
| 7 | Environmental issues prioritized for the EIA study..... | 50 |
| 7.1 | Alternative design and construction approach: | 56 |
| 7.2 | Alternative location..... | 56 |

| | | |
|-------|--|----|
| 7.3 | Alternative schedule and process | 57 |
| 7.4 | Alternative resources | 57 |
| 7.5 | No action option: | 57 |
| 8 | Environmental Mitigation Measures for Adverse Impacts and Enhancement Measures | 57 |
| 8.1 | Mitigation Measures | 57 |
| 8.1.1 | Mitigation Measures in case of Forest and Vegetation loss..... | 58 |
| 8.1.2 | Other Measures / Requirements | 58 |
| 8.2 | Enhancement Measures | 59 |
| 9 | Environment Management Plan (EMP) | 62 |
| 9.1 | Matters to be monitored while implementing the proposal | 63 |
| 9.2 | Other Necessary Matters | 64 |
| 9.3 | Environmental Audit | 64 |
| 10 | Format of the EIA report..... | 65 |
| | Impact Identification, Prediction and Assessment/Evaluation Method | 10 |

References

Appendices

1. Checklist for Physical and Chemical Environment, Flora and Fauna
2. Checklist for Social Survey
3. Methodology of EIA
4. Methodology for Vegetation Survey
5. Methodology for Flooding Risk Assessment

Table of Tables

| | |
|--|----|
| Table 2-1: Project Area of Influence..... | 13 |
| Table 2-2: The general features of the project | 15 |
| Table 2-3: The technical features of the project | 16 |
| Table 2-4: Manpower during construction and operation, based on similar developments | 25 |
| Table 2-5: Estimate List of Major Construction Materials | 26 |
| Table 2-6: Estimated Heavy Equipment Required for Preparation of the site, based on similar developments | 27 |
| Table 2-7: Land requirement for the project | 28 |
| Table 2-8: Tentative Time Schedule of the Project | 29 |
| Table 3-1: Details of measurement to be collected by sample plot | 33 |
| Table 5-1 Work schedule for conducting EIA study..... | 41 |
| Table 7-1: Impact qualifier..... | 50 |
| Table 7-2: Prioritization of the issues raised by stakeholders and study team | 50 |
| Table 8-1: Mitigation Measure Matrix | 60 |

Table 9-1: Environmental Management framework..... 62
Table 9-2: Monitoring framework..... 63

Table of Figures

Figure 2-1: Proposed location of the Export Oriented Agricultural Wholesale Market in Semlar, Butwal in the broader context 9
Figure 2-2: Proposed location of the Export Oriented Agricultural Wholesale Market in Semlar, Butwal and the direct surroundings..... 11
Figure 2-3: Location of Butwal Sub-Metropolitan City in Rupandehi District, Lumbini Province Nepal..... 12
Figure 2-4: Visualisation of direct and indirect impact area by the project 14
Figure 2-5: Proposed development Master Plan Layout 19
Figure 2-6: Map the Ratanpur Community Forest..... 28

1 Background

1.1 Introduction of the proponent

The proponent of this project is the **Ministry of Agriculture and Livestock Development (MoALD)**. The MoALD has the responsibility of the planning, design, construction and maintenance of agriculture related infrastructure. The name and address of the proponent is as follows:

Name and address of proponent

**Ministry of Agriculture and Livestock Development
Centre for Agriculture Infrastructure Development & Mechanization Promotion
(CAIDMP)**

Department of Agriculture

Hariharbhawan, Lalitpur, Nepal

Phone: 01-5524227/015524228

Mailing address: info@caidmp.gov.np

1.2 Name and Address of the consultant preparing the report

The Terms of References (TOR) for the “**Environmental Impact Assessment of Export-Oriented Agricultural Wholesale Market at Semlar, Butwal**” has been prepared for the Project Proponent by the following Consultancy:

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Kamalpokhari, Kathmandu, Nepal

Phone: 014439182/014439187

Mailing address: info@tms.com.np

1.3 Purpose of the Terms of Reference

The Terms of Reference (TOR) of the present Project stipulates the requirements of undertaking an Environment Impact Assessment (EIA) of the Project, as per the provisions of the Government of Nepal (GoN)'s applicable laws on environment protection and identify a package of mitigation measures to prevent and where not possible to reduce the adverse impact to acceptable levels.

The Consultant shall undertake a detailed environmental study of the Project to produce an EIA report suitable for receiving environmental clearance from the GoN's line Ministries and project financiers.

1.4 Objectives of EIA Terms of Reference

The main objectives of the Terms of Reference for the Environmental Impact Assessment (EIA) of the project are as follows:

- To identify major issues on physical, biological, socio-economic and cultural environment that may arise as results of proposed works;
- To systemize the working procedure of the EIA study;
- To Determine methodology, tools, and techniques for EIA Study To provide technical guidance to proponent/consultant;

The approved TOR document serves as the basic guideline for preparation of the EIA report.

1.5 Objectives of EIA

The objectives of the EIA study of the proposed project are presented below:

- Identify the major physical, biological and socio-economic and cultural baseline conditions/data of project area;
- Identify key project structures and components and their alternatives and the activities involved in the construction and operational phases that are potential to change the existing baseline conditions;
- Identify potential positive and adverse impacts for various proposal alternatives;
- Analyse the most critical adverse impacts for the selected alternative;
- Involve public opinion in the decision-making process related to the identification of potential impacts, mitigation measures and project alternatives;
- Recommend appropriate, practical, cost effective and site-specific mitigation measures for the identified adverse environmental impacts to avoid or minimize or compensate adverse impacts and enhancement measures for the capitalization of positive impacts;
- Outline the elements of environmental and social mitigation, management, monitoring and auditing and prepare an Environmental and Social Management Plan (ESMP).

1.6 Rationality of the EIA

This EIA study will be carried out to meet the environmental requirements of the Government of Nepal. The EIA requirements specified by the Environmental Protection Regulations 2077 are presented below:

Table 1-1: Environmental assessment requirements as per the EPR 2077

| SN | Environmental Regulations 2077 | Protection requirements | Project Assessment Details | Environmental Impact |
|----|---|-------------------------|--|----------------------|
| 1 | Rule XXXX If more than 5 ha of forest area will be used for another purpose, the project requires an EIA | | The project will require more than 5 ha of community forest that will be cleared for project development (total community forest to be cleared amounts 12.47 ha) | |
| 2 | Rule 3, Annex 3 (5) (5) If the floor area of the development is more than 10,000 sqm, the project requires an EIA | | This project will have a floor area of more than 33,000 sqm. | |
| 3 | Rule XXX If the project requires more than 10,000 liters of water per day, the project requires an EIA | | The project will consume in average 4,000 liters of water per day during the operation phase of the project | |

Rule 7 (7 and 8) of Environment Protection Rule (2077) informs about the language of the report. This report is prepared with the support from Invest International (Government of Netherlands). Since the project is funded by an International Agency, the study can be conducted in the English Language.

In line with Invest International requirements, the impact assessment process will be also aligned with the requirements of the International Finance Corporation Environmental and Social Performance Standards, 2012.

2 Introduction of the Proposal

2.1 Introduction

The project aims to construct and operate an Export Oriented Agricultural Wholesale Market at Butwal Sub-Metropolitan City-15, Semlar, Karsaghat. This proposed project will cover an estimated 12.47 ha of Butwal Sub metropolitan area. The main objective of the proposed project is to develop a good functioning and modern wholesale market with facilities for the farmers, businessman and customers. The wholesale market contain an administrative building, stalls for wholesale trade, storage and processing facilities. As part of additional intervention to draw the maximum benefits from the project, cleaning sorting, packaging and storage facilities of 4 commodities, i.e., Potato, Onion, Cabbage and Banana will also be provided. It is considered that the above interventions will strengthen the agricultural value chain, by reduction of food waste and post-harvest losses, this will make more product available for local consumption and reduce import from other countries. It also provides conditions to further increase local production by creating a market for the (smaller) producers. The wholesale market will be supported by proper utilities such as supply of water, electricity, waste management.

Nepal's current and future potential of agricultural commodities seems to be dependent on the food imports to meet the demand for the food (cereals, oilseeds, legumes, fruits, vegetables and spices) by its growing population. This is indicated by the import record of these commodities from different countries. Thus, the primary contribution of the proposed wholesale markets should be in substituting the imports.

Despite of the potentiality to grow majority of the commodities, these are still being imported in large quantities. Potato, onion, and major fruits like apple, banana, pomegranate, grape, orange, watermelon, lemon, papaya and fruit vegetables have been imported in a large amount, though these commodities can be easily grown in Nepal, in its different agro-ecological regions, which are prevailing in the district proposed for establishment of the wholesale market as well as in its neighbouring districts.

It is urgent that Nepal should be promoting production of these commodities with proper market planning, extension and market education. Agro-ecologically feasible crops with comparative advantage as mentioned above can drive farmers towards earning more along with successful operation of the wholesale markets. Second important aspect, which is in the scope of this FS, is development of well organised, suitable and sustainable wholesale markets that would enable the trade and storage of locally produced fruits and vegetables.

The proposed Export Oriented Agricultural Wholesale Market in Butwal, being in the Terai belt will have the opportunity of linking mountain and high hill products to the plains and plain products and imported agricultural goods to high hills and mountain districts. The wholesale market will provide for the required storage and processing facilities that are currently undeveloped in the area.

As a part of the scoping exercise, consultations were organised with the local communities at Ward 15, Ratanpur Community Forest User Group (CFUG), as well as Butwal Municipality and local authorities in Ward 15. These key stakeholders have explicitly expressed their support towards development of the **Export Oriented Agricultural Wholesale Market at Semlar, Butwal**. They have pointed out that a well-designed and functioning **wholesale market is needed** in the areas which can bring in **socio-economic benefits** to the local communities and wider area (see more details in **chapter 7** of this report).

2.2 Project location and accessibility

The site for the proposed Wholesale Market is located at the Butwal Sub-Metropolitan City-15, Semlar, Karsaghat. The site is locally known as Karshaghat, situated at the bank of the *Danab* River (channel bifurcated from Tinau River).

The location of the proposed site is about 10 km west of Butwal and about 1 km south from Bankatta Bazar located at the East-West Highway. The location is linked to Sunauli-Butwal-Pokhara-Kathmandu, Pokhara Lomanthang, and the East-West Highway. Currently, the proposed site is located inside Ratanpur Community Forest (CF).

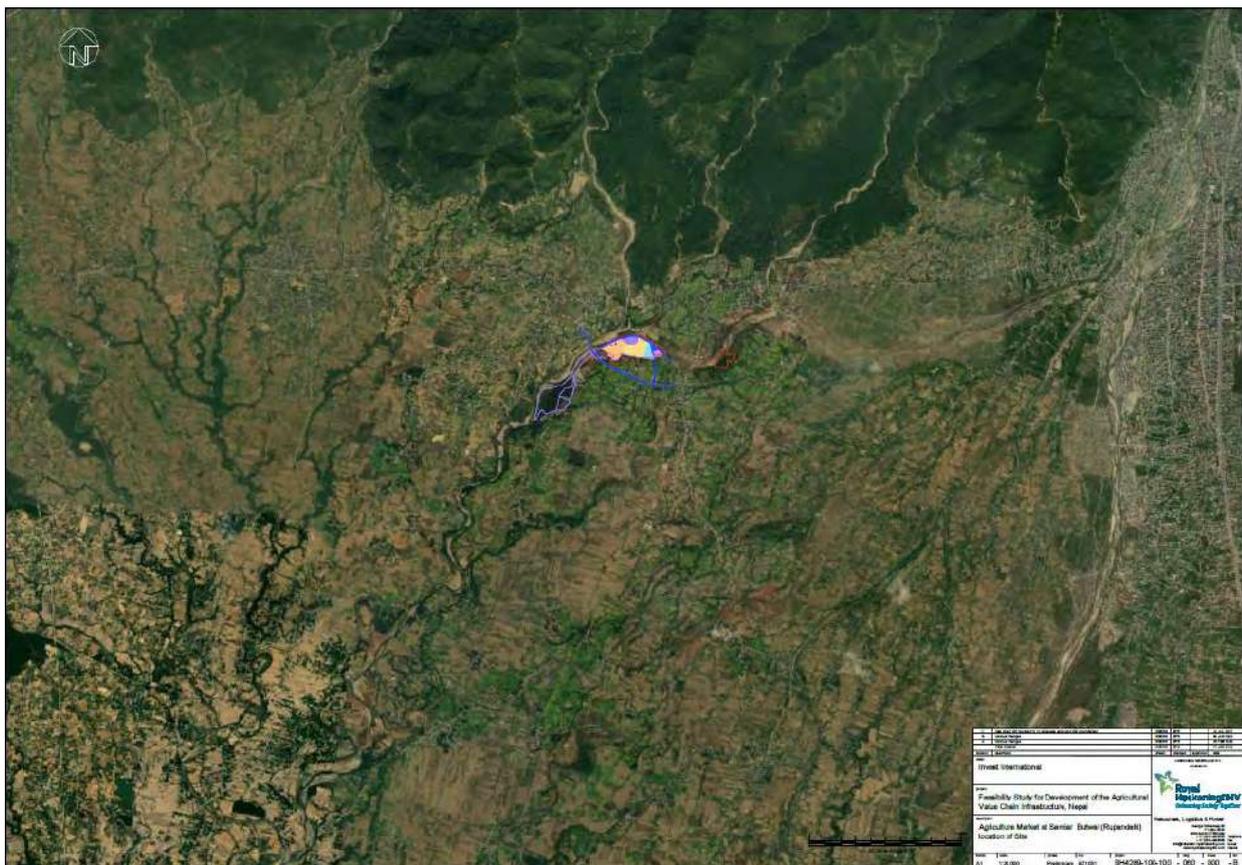


Figure 2-1: Proposed location of the Export Oriented Agricultural Wholesale Market in Semlar, Butwal in the broader context

Source: Map produced by the study team, **the map will be updated in the EIA phase of the project to show project location in relation to major infrastructure, roads network and other key elements in the area**

For the complete project, it is estimated to build 42,801 m² of roads (including all parking lots for trucks and cars and access road to the site its self). Only for the wholesale area, it is estimated to have 22,816 m² of roads (including Wholesale parking lot for loading/unloading trucks). The roads required by the project will be built as part of the project. The access road can be seen on the master plan included in section 2.5.

A new bridge has been recently constructed across the Danab River on the west from the project site location. A new road is being developed to be located between the river and the proposed site, this development is part of the Tinau Danab Corridor Road Project (outside of the scope of this project, the road is being constructed by the Tinau Danab Corridor Road Project. The new road, especially the section next to the proposed site is expected to be built in the coming years. These two infrastructure projects will facilitate the access to the site and the logistic operations connected to the wholesale market.

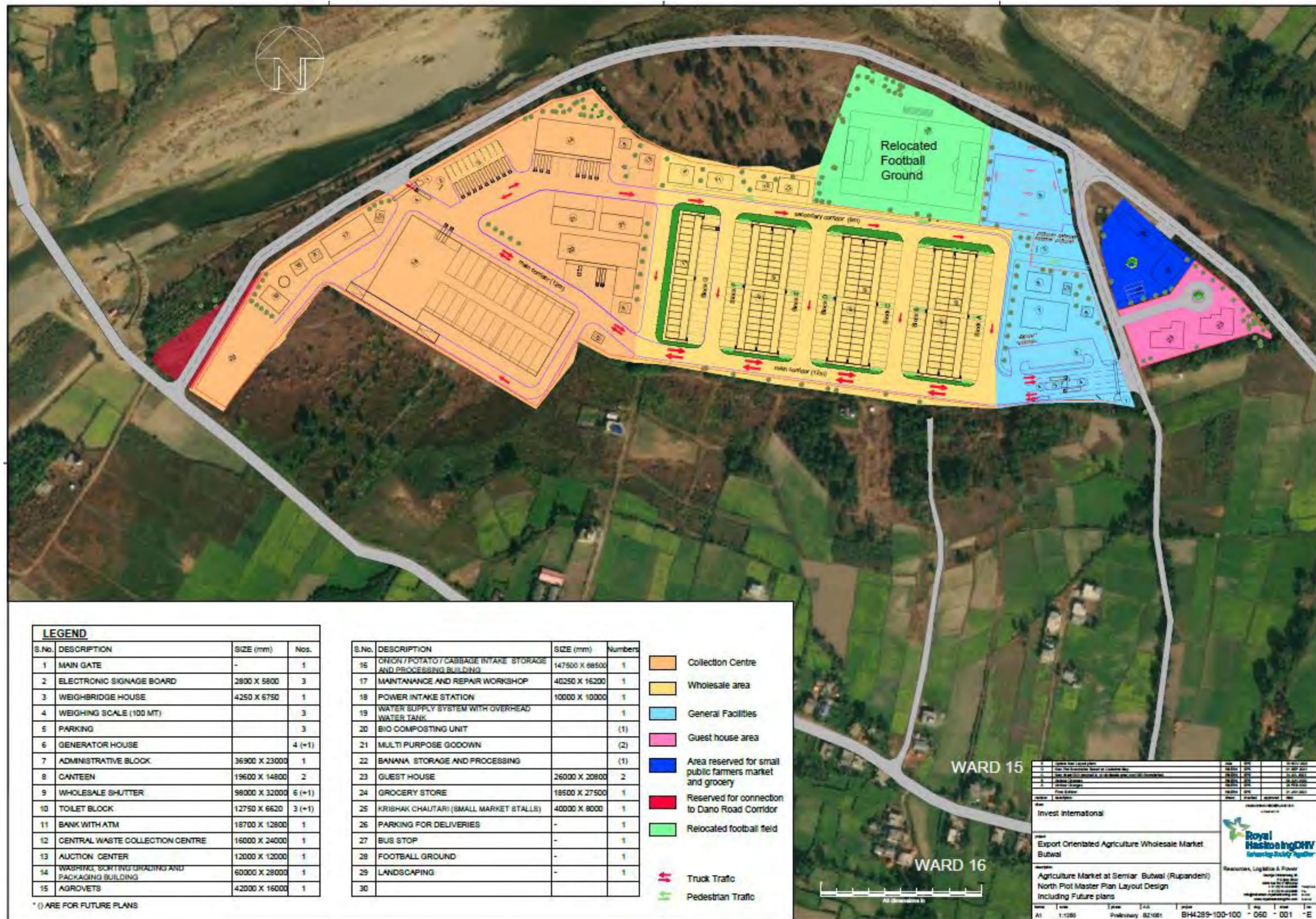


Figure 2-2: Proposed location of the Export Oriented Agricultural Wholesale Market in Semlar, Butwal and the direct surroundings

The climate in the project area is tropical monsoon type. Monthly temperature ranges from 17 to 31.4 °C with average of 25.9 °C. The annual precipitation is about 2,600 mm, more than 80% of it occurs in four summer months from June to September. Precipitation events with more than 100 mm within 24 hours are frequent. The altitude of Butwal ranges from 121 m in the southwest to 1,060 m in the north. The Tinau River is the main river originating from Mahabharat lekh and middle hills. The total population of the Rupandehi District is 880,196. The total number of households is 136,916. The population density is 647/km² with a growth rate of 2.17% (population census 2011). Majority of the population is dependent on agriculture for livelihood.

The project area is surrounded by Ward no 14 to the east, Sainamaina Ward no 1 to the west, Ward no 13 to the north-west, and Ward no 16 (Karshaghat) of BSMC to the south. There are altogether 14 settlements and clusters in Ward 15, BSMC. The project is located in Muktidham settlement, and the border of the community forest located on the proposed site connects to Ratanpur in the south. The community forest has been managed by the people of Ratanpur. The western and northern part of the project site is surrounded by DanabRiver. Across the Danabrivers Ward no 1 of Sainamaina municipality is located.

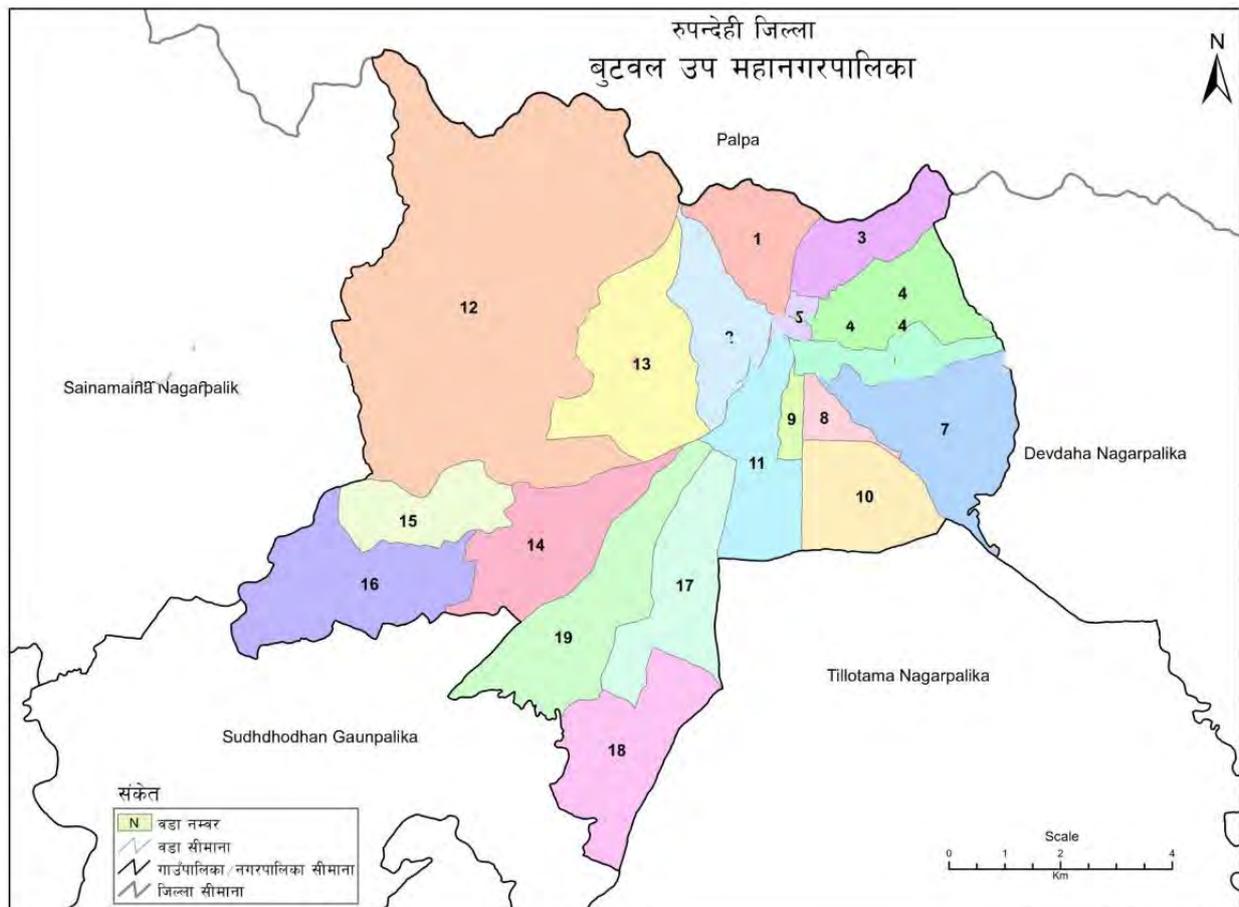


Figure 2-3: Location of Butwal Sub-Metropolitan City in Rupandehi District, Lumbini Province Nepal

Source: Secondary information, Map obtained from the Butwal Sub-Metropolitan City during the consultation of the Scoping Report, July 2022.

The site under consideration was identified and recommended by the Local Government from Butwal Sub-Municipality in consultation with local stakeholders. Wider consultations were made with future market beneficiaries, e.g., farmers, traders, representatives of political parties, etc. The Fruit & Vegetable Wholesale Market Management Committee in Butwal was among other consulted parties. The consultation process was commissioned by the Centre for Agriculture Infrastructure Development and Mechanization Promotion (CAIDMP) as part of the GoN effort to identify suitable locations for wholesale market development. The Department of Agriculture was also consulted as part of this process. The GoN budget plans for the Financial Year 2021/2022 have identified Karasaghat (specific location in Semlar) as the site for the planned wholesale market.

Part of the EIA process is to determine the potential environmental and social impacts for project location. In order to properly assess these environmental, and social impacts, a larger study area is defined, this is explained in the table below and the figure that follows.

Table 2-1: Project Area of Influence

| Project Area | Impact | | Description |
|--------------------------------|--------|-----|---|
| Direct Area | Impact | DIA | Potential environmental and social impacts occurring directly on site , e.g., impacts to soil, receptors on site. The site covers an area of 12.47ha . The DIA will also consider potential impacts from roads connecting to the site (200m on the both sides of the road). |
| Indirect Area | Impact | IIA | Potential environmental and social impacts occurring in the vicinity of the site, within a radius of 1000m from the proposed project location, e.g., impacts to groundwater, air, noise levels, potential impacts concerning social aspects |
| Area of Influence (Study Area) | of | Aol | For this purpose, wider area Butwal and Sainamana Municipality have been considered. |

The proposed DIA, IIA and Aol is based on expert judgment and experience drawn by Royal HaskoningDHV experts from similar EIA studies in the Agricultural Sector. The proposed DIA, IIA and Aol is visualised in the table below and shall be finalised in the EIA stage of the project.

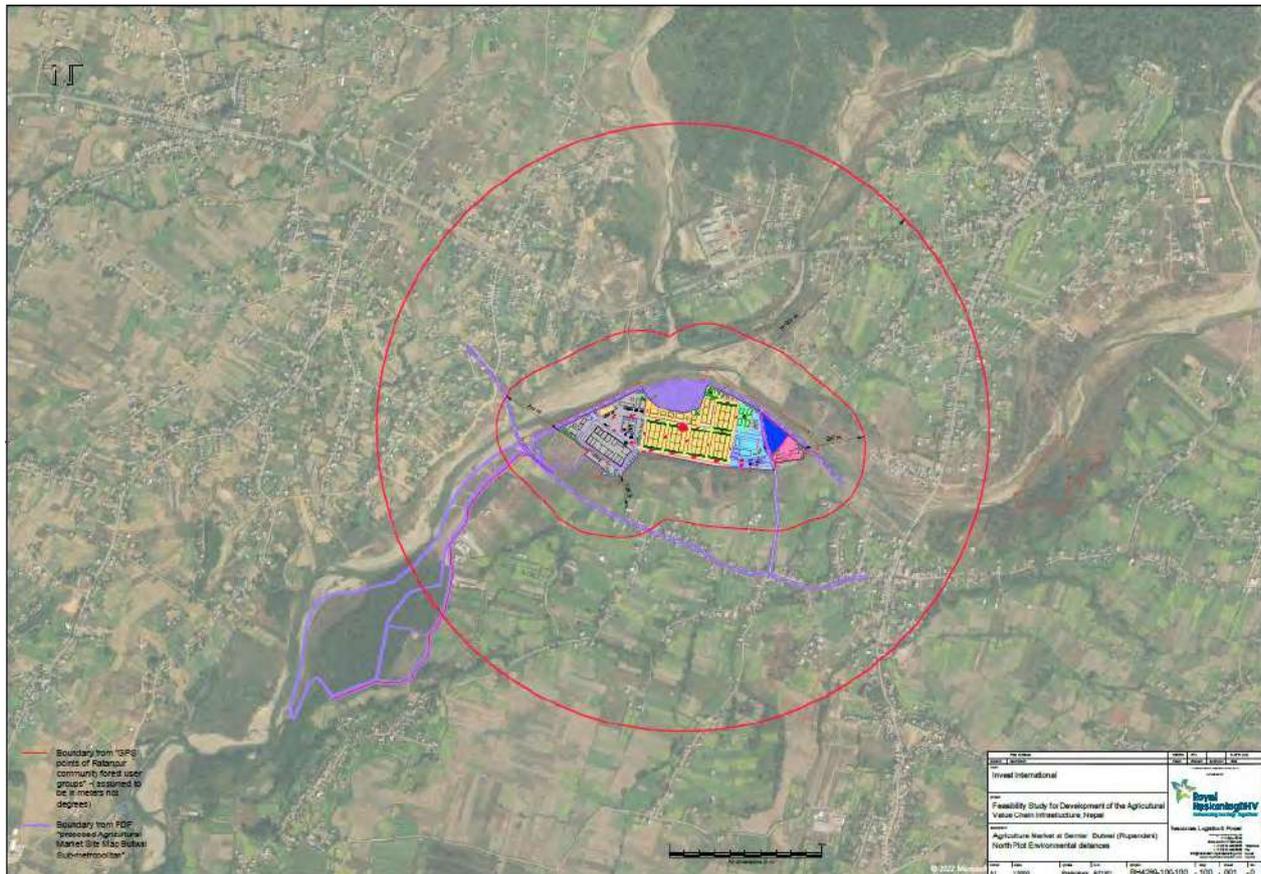


Figure 2-4: Visualisation of direct and indirect impact area by the project

Source: Map produced by the study team, to be updated during the EIA phase of the project

Land use near in the proposed site consists of land used in agriculture, livestock grazing, community forest and some sporadic households. Households in the direct proximity to the proposed wholesale market are located estimated > 200m.

2.3 Type of Proposal

The general and technical details of the wholesale market, the layout and the list of proposed activities are based on:

- Detailed Project Report (DPR) Preparation for the Infrastructure Development of Agriculture; Market, prepared by the Centre for Agriculture Infrastructure Development and Mechanization Promotion, at the request of MoALD;
- Analysis of the present market, situation of the trade in and out of the commodities in the existing market and present transaction volumes of the commodities and their future projections (as part of the Market Study conducted during the Pre-Feasibility Stage of the project);
- Discussion with stakeholders, e.g., various engagements moments during pre-feasibility and feasibility stage of the project;
- Site investigation during the Fact-Finding Mission led by the MoALD, financier and advisor team to be conducted in October 2021 and July 2022.

2.4 Components of the Project

The general features of the project are as listed in the table below. The number of the project general features corresponds with the numbering showed on the Wholesale Market Master Plan drawing.

Table 2-2: The general features of the project

| Nr. | Units | Nos | SIZE (mm) |
|-----|--|--------|-------------------|
| 1 | Gate house | 2 | |
| 2 | Electronic Display Board | 3 | 2800 X 5800 |
| 3 | Weighbridge house | 1 | 4250 X 6750 |
| 4 | Weighing Scale (100 MT) | 3 | |
| 5 | Parking | 3 | |
| 6 | Generator building (1 future) | 4 (+1) | |
| 7 | Office/Admin Building (2 storey) including pesticide residue lab, training hall, agriculture subservice center, childcare centre, primary health care centre, cooperatives office, CCTV surveillance room, office rooms. | 1 | 36900 X 23000 |
| 8 | Canteen | 2 | 19600 X 14800 |
| 9 | Wholesale Shutters (1 future) | 6 (+1) | 98000 X 32000 |
| 10 | Toilet Block with Septic Tank and Soak Pit (1 future) | 3 (+1) | 12750 X 6620 |
| 11 | Bank with ATM | 1 | 18700 X 12800 |
| 12 | Central waste collection centre | 1 | 16000 X 24000 |
| 13 | Farmer's Auction Centre | 1 | 12000 X 12000 |
| 14 | Washing, sorting, grading and packaging block | 1 | 60000 X 28000 |
| 15 | Agrovet building | 1 | 42000 X 16000 |
| 16 | Onion/Potato/Cabbage intake storage and processing building | 1 | 147500 X 68500 |
| 17 | Workshop building | 1 | 40250 X 16200 |

| | | | | |
|----|---|-----|----------------|---|
| 18 | Power intake station | 1 | 10000 10000 | X |
| 19 | Water Supply System with Overhead tank | 1 | | |
| 20 | Bio-composting Units (future) | (1) | | |
| 21 | Multipurpose go down | (2) | | |
| 22 | Banana storage and processing building (future) | (1) | | |
| 23 | Guest House | 2 | 26000 20800 | X |
| 24 | Grocery shop | 1 | 18500 27500 | X |
| 25 | Krishak Chautari (small market stalls area) | 1 | 40000 X 8000 | |
| 26 | Parking for deliveries | 1 | | |
| 27 | Bus stop | 1 | | |
| 28 | Football ground with covered grandstand and water tap | 1 | | |

Source: Export Oriented Agricultural Wholesale Market Master Plan, Feasibility Study Report produced by Royal HaskoningDHV as part of the Feasibility Study.

The technical features of the project are listed in the table below.

Table 2-3: The technical features of the project

| Nr. | Technical feature | Description |
|-----|-----------------------|---|
| 1 | Name of the project | Export Oriented Wholesale Market |
| 2 | Location | Butwal Sub-Metropolitan City-15, Semlar, Karsaghat. The site is locally known as Karshaghat |
| 2.1 | Geographical location | |
| | Province | Lumbini Province |
| | District | Rupandehi District |
| 2.2 | Geographical features | |
| | Climate | Tropical |
| | Geology | Terai |
| | Hydrology | |
| | Meteorology | Unevenly distributed precipitation controlled by Monsoon |
| 3 | Classification | |
| 3.1 | Classification | Wholesale Market |

| | | |
|-----|--------------------------------------|--|
| | | In line with IFC E&S categorisation: Category B: Business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures. |
| 3.2 | Land details | Governmental and Public Land |
| 3.2 | Capacity | The wholesale market which is designed for 500 to 1,000 MT of trade per day Potato: 4,500 MT, cleaning, sorting & packaging Onion: 800 MT, cleaning, sorting & packaging Onions: 1500 MT (Optional) Cabbage: 1000 MT, cleaning, sorting & packaging Banana: 35 MT, ripening chambers, sorting & packaging (optional) |
| 3.3 | Access | Access road is located on the east side of the plot and will be connected to Tinau Danab Corridor Road Project (road project) The access road will have 2 incoming lanes and 2 exist lanes, guard house and 2 weighting bridges 1 Exit Road consisting of 2 exist lanes, guard house and weight bridge |
| 3.4 | Total Area | Total proposed development is: 12.47 ha, composed of The wholesale market area is 43,148 m ² = 4.31 ha The collection centre area is 45,910 m ² = 4.59 ha, The general facilities are 15,235 m ² = 1.52 ha. The small market/retail area is 3,646 m ² = 0.36 ha , The purple guest house area is 4,887 m ² = 0.48 ha The hatched area around the football ground is 12,058 m ² = 1.21 ha |
| 3.5 | Wholesale Area | The wholesale market area is 43,148 m ² = 4.31 ha |
| 3.6 | Built Up Area | 25,547 m ² + (4,441 m ² Future Buildings) only ground floor |
| | Floor Area Ratio | The estimate ratio is 68% will be constructed (buildings, roads, sidewalks) and 32% will be free space (e.g., to be occupied by greenery) |
| 3.7 | Road Area, including the access road | For the complete project, it is estimated to have 42,801 m ² of roads (including all parking lots for trucks and cars) Only for the wholesale area, it is estimated to have 22,816 m ² of roads (including Wholesale parking lot for loading/unloading trucks) |
| 3.8 | Parking Area | The parking located on the north of the proposed |

| | | |
|-----|---|---|
| | | development is 3,002 m ² , the employee parking inside the General Facilities area is 1,210 m ² |
| 3.9 | Football ground | The hatched area around the football ground is 12,058 m ² = 1.21 ha |
| 4 | Total Estimated Cost (CAPEX), excluding VAT, (+/-25%) | 38,643,400 EUR Finding support from international finance organisations in combination with funding from Government of Nepal |
| 4.1 | Required Land Area | 12.47 ha |

Source: Export Oriented Agricultural Wholesale Market Master Plan, Feasibility Study Report produced by Royal HaskoningDHV as part of the Feasibility Study, (ref: BH4289IBRP004F02, dd 5 July 2022)

2.5 Master Plan Layout

The wholesale market is visualised in the figure below. The site layout, logistics and traffic flow are explained in the following sections.

For more details on the project master plan and its details, please revert to the Feasibility Study Report, ref: BH4289IBRP004F02, dd 5 July 2022.

Note: the proposed layout is still being finalized as part of the technical work stream. The final layout and exact site boundaries will be included in the next stage of the Feasibility Study and included in the EIA Study.

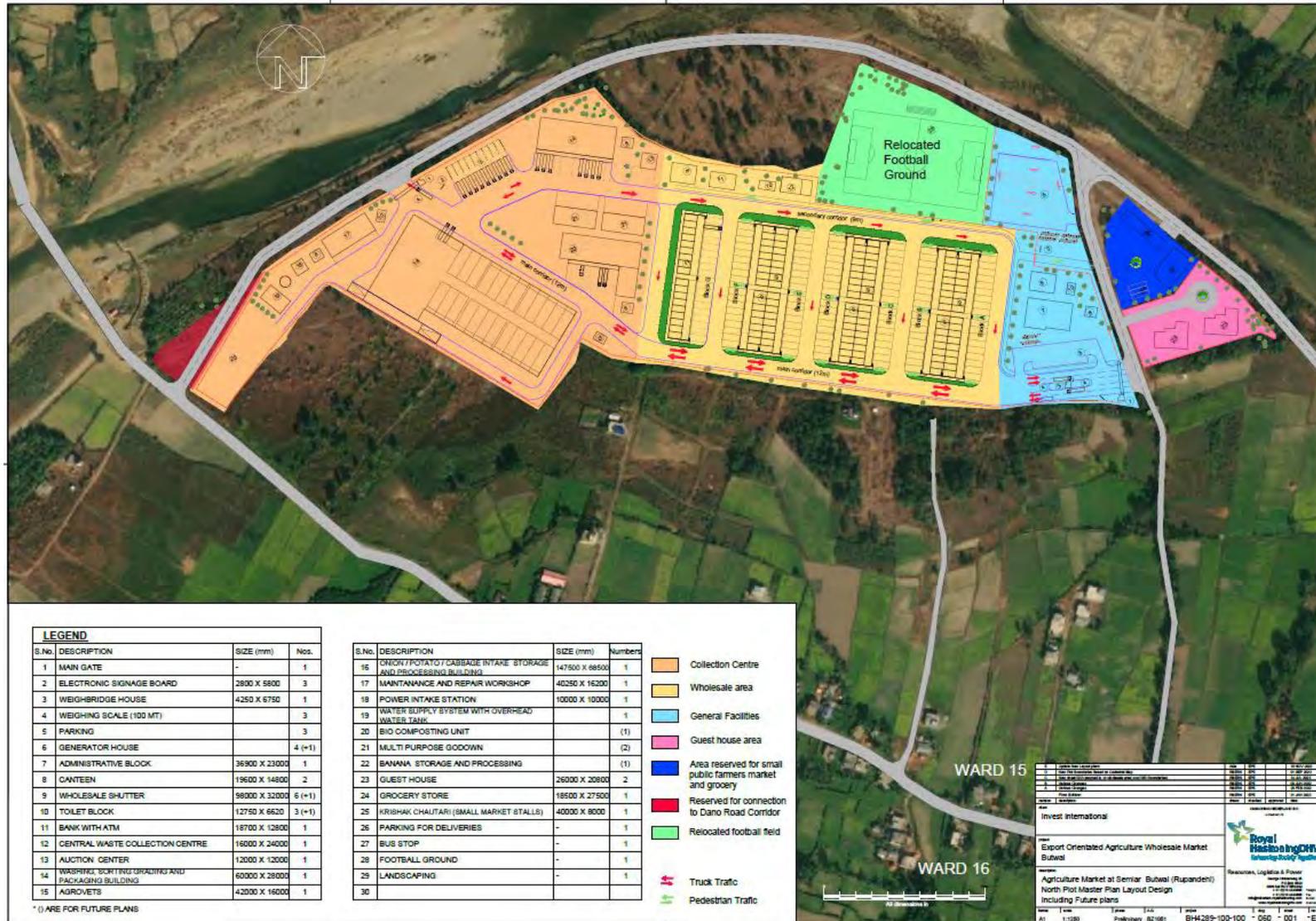


Figure 2-5: Proposed development Master Plan Layout

2.6 Project components and key activities

The total area of the proposed project is estimated at 12.47 ha and will be enclosed by brick masonry boundary wall all around.

2.6.1 Main Gate

One main gate with provision of the guard's room and weighbridges will be provided at appropriate location for entry and exit of the site. In addition, one (emergency) exit will be provided.

The complex includes infrastructures like administration block, wholesale block, open market shed for farmers, toilet block, electronic display board, parking, landscaping, canteen and guest house, guard house, boundary wall, generator block and water treatment plant. The descriptions of the major components designed for the proposed markets are provided below.

2.6.2 Administration Building / Agriculture sub-service Centre

The admin block is constructed in two floors with plinth area of 616 m². The ground floor is provided with reception area, cafeteria, childcare center with outdoor play area, primary health care center, pesticide laboratory, cooperative office, male and female toilets and meeting cum training hall with capacity for 200 persons.

Similarly, the first floor is designed to accommodate Manager's office with PA room, account and admin staff rooms, CCTV surveillance room, IT room, record room, meeting room, Traders organization's office room farmer's representative office room and toilets block. The admin block will be fully equipped with IT and telecommunication system. Electronic display board located at different places will be controlled from the IT room. A solar power back-up system will be provided for uninterrupted power supply. A separate generator will also serve for the admin block as a backup power, which will start up automatically in case of failure of electric supply. It has been envisaged that operation of the market will be controlled by the admin block through manager, administrative staff and management committee with roles and responsibilities assigned to them.

2.6.3 Rapid Bioassay of Pesticide Residue Lab

RBPR lab will be established for chemical analysis of the routine residue test of Carbamate and Organophosphate in Vegetables. The major objective of this lab is to evaluate the level of Carbamate and Organophosphate present in the vegetables collected from different production pockets. The laboratory will be located in the admin building (see above).

2.6.4 Bank

To facilitate trade and daily transactions, the construction of a Bank building is anticipated on the site of the wholesale market

2.6.5 Wholesale Shutters

The wholesale shutters are designed in blocks; 8 nos of 80 m by 16 m containing 15 shutters in each block. Total number of shutters proposed in the master plan with 4.86 m by 9.4 m inner dimensions are 120 nos. The wholesale shutters are provided in such a way that all the shutters face main road providing equal opportunities to traders in terms of accessibility to their shop by the potential customers. The shutters are designed as single storey masonry frame structures with flat RCC roofing. A 6 m wide canopy is provided in front of whole blocks, to facilitate loading and unloading of the commodities to and from the vehicles. The space can also be utilized for temporary storage of the commodities before taking them into the shutters in a managed way.

Optionally a few of the shutters can be designed as a cold storage room to improve storage life of the agricultural products.

2.6.6 Market stalls for small farmers

A small area on the wholesale market will be reserved for farmer Cooperatives and nearby small Farmers allowing them to sell their product directly. This area will be covered with a simple canopy.

2.6.7 Canteen

Two canteen units with kitchen are proposed in the market area. The canteen building is designed as single store building with plinth area of 375 m³.

2.6.8 Guest Houses

Two units are proposed as guest house opposite of the market area. The guest house building is designed in three floors with plinth area of 391 sq.m. The ground floor consists of recreation, reception, lobby, kitchen with store changing room and wash area, dining for about 70 people with deck for viewing outside scene and toilets for male female and disabled. Guest rooms are provided in first floor with 2 rooms general non-attached with 2 beds, 4 rooms provided with attached bathroom and sitting room as VIP room, 2 dormitories with 5 beds in each room and one staff room. Similarly, there are 5 double bedrooms with attached bathroom and 2 dormitories with 5 beds in each are provided in the second floor. All the rooms are provided with electric fan. AC's are also provided in 4 VIP rooms.

2.6.9 Farmer's market/Auction centre

The farmer's market block is designed as a 12mx12m square single storey RCC frame structure with CGI sheet roofing with plinth area of 144 m². The block is a semi open type of structure. Proper pavements are provided around the block for easy pedestrian movement and ramp has also been provided for wheelchair access. Projecting RCC slabs at lintel level are provided in the farmer's market block as well for aesthetic appearance as well as providing sun shading.

2.6.10 Toilet Blocks

Four nos. of toilet blocks with plinth area of 58 m². (12.75 x 4.5m) have been provided at appropriate places within the site. Each block is designed as a single storey RCC frame structure and it consists of 5 nos. of WC and 5 nos. of wash basin for female toilet and 3 nos. of WC, 6 nos. of urinal and 3 nos. of wash basin for male toilet. One unit in both male and toilets has been designed to incorporate differently able people with proper provision of ramp for wheelchair access. Out of the 5 nos. of WC in female toilet 3 nos of Indian style pan has been provided and 2 nos. of Indian style pan has been provided in male toilet considering the comfortable use of the users in the comparatively rural setting.

2.6.11 Washing, Sorting, Grading and Packing Building

The washing, sorting, grading and packing block is designed as a 30mx10m rectangular single storey RCC frame structure with CGI sheet roofing with plinth area of 300sq.m. The block is also a semi open type of structure with proper provision of water taps provided.

2.6.12 Temple

Currently an existing temple is located nearby the main entry gate within the site. The two-tiered temple is 3m x 3m in size and is a RCC frame construction. Wooden doors, windows and struts and tiled roof have been used in the temple to resemble with the pagoda style in which it is built.

2.6.13 Weighing Bridge

Two nos. of weighing scale of size 16mx3.6m and capacity of 100MT are located near the main gates for weighing heavy vehicles. The weighting scales are operated from a single storey 3mx4m control room located at close proximity.

2.6.14 Bio-composting Unit

The bio-composting unit consists of an area of about 300 sq.m enclosed with an internal boundary wall where the bio-degradable waste collected from the agricultural market is composted. It consists of a semi open 7m x 2m structure for initial collection of the waste and a 3m x 3m compost pit which is a single store RCC frame structure. Additionally, a bio-composting machine that converts 1.000 kg of degradable waste per day to compost manure has been proposed as a part of bio-composting unit.

2.6.15 Overhead Water Tank

The overhead water tank (OHT) is a 24.6m high RCC frame structure with 200 m³ capacity. The enclosed tank has an internal diameter of 7m and is 4.65m high. The OHT is fed by deep tube well with submersible pump installed in the well. Water is pumped from the well and passed through the closed mechanical filtration unit before filling the OHT. The water is then distributed with the piped distribution system laid all around the market area. The water is supplied 24 hours so there is no need to installed separate water tank for the different units. The water will be chemically treated with chlorination

unit before feeding to the distribution system. Two deep borings will be installed in the system so that another one can be used in case of breakdown or repair and maintenance of the well and pump. A diesel generator for power backup has been proposed in case of power failure.

For more details on the project components and main activities, please revert to the Feasibility Study Report, ref: BH4289IBRP004F02, dd 5 July 2022.

2.7 Project requirements and utilities

This section describes the necessary infrastructure for the project implementation. It comprises the access road(s) which is from the entry point as prescribed in the master plan, power and water supply and waste management infrastructure.

2.7.1 Access road(s) Construction

The access to the proposed site and other project facilities will require improvements to existing roads and/or construction of new roads.

The access road will be located on the east side of the plot and will be connected to the Danab River Corridor Road¹. The access road will consist of 2 entrance lanes and 2 exit lanes, guard house and 2 weighting bridges. There will be one exist road, consisting of 2 exist lanes, guard house and weighting bridge.

The access road will be designed with a suitable width to accommodate heavy and wide vehicles passage.

Typical road construction design specifications are listed below:

- Level and compacted 5-meter-wide road surface with 0.75-1.0 m wide shoulders;
- Road surface will consist of 20 cm of compacted fine gravel;
- Base and sub-base will consist of 40-50 cm of gravel;
- Ancillary structures may be necessary such as load bearing and retaining walls, bridges, and erosion control structures among others;
- Adequate drainage ditches and culverts will be installed to manage runoff.
- Existing access roads will also be upgraded as required.

2.7.2 Power supply

During construction period, power on the site will be provided by diesel generators of adequate capacity. During wholesale market operation, the site will be connected to the existing power supply infrastructure to provide power for the wholesale market and additional interventions.

¹This part of the road will be tendered at the end of this year by the Road Division and expected to be completed in 2027

Alternative option that will be investigated during the EIA Study is installation of solar PV panels on the rooftops of the market storage facilities to provide for the power for the main storage process buildings and the market in combination with connection to the grid.

2.7.3 Water Supply

Construction of wholesale market will require minimal amount of water, namely domestic water for construction camps and construction works. Operation of the wholesale market will require water to supply to guesthouse, canteen and toilets as well as water for certain processes, e.g., washing of banana, washing of other agriculture products *etc.* cleaning of facility and equipment, etc. For this purpose, the wholesale market will have a ground water extraction well and its own water purification plant. The project will consume in average 984,000 liters of water per day during the operation phase of the project. During the construction, the consumption will be much less (construction activities, spray against dust, etc) and the exact volume will be determined during the EIA phase of the project.

2.7.4 Waste management infrastructure

The site will be equipped with necessary infrastructure for the integrated waste management. All waste generated by project activities shall be sorted and classified prior to storage and disposal. Solid Waste will be segregated as practical (recyclable, biodegradable, non-hazardous common waste, hazardous waste). Solid waste bins classified according to waste type will be provided in all work areas.

It is foreseen that organic waste will be used as animal feed and/or be composted. For this purpose, a compositing facility will be developed on site. Alternative option that will be investigated during the EIA Study is installation of a digester to process organic waste and produce bio-gas. The resulting products, i.e., bio-gas that can be used by the wholesale market itself, for cooking in the canteen and a residual stream that is similar to compost that can be provided to farmers to be used as fertilizers.

Recyclable materials shall be segregated from the other stream and recycled with the aim to recover the materials. For this purpose, existing waste recycling facilities in project area shall be investigated and engaged as potential service providers. This shall be as well the strategy for recyclable hazardous waste (e.g., packaging from oil and lubricants, plastic containers), although the expected quantities are very small. Inert waste will be removed from site and disposed at the existing waste disposal facilities in the project area, e.g., at Ward level or Butwal municipal level.

Detailed information on waste management, expected list of waste and respective quantities, will be provided in the full EIA report.

2.7.5 Liquid Waste Management

Liquid waste management will be generated during all phases of the project. For the construction phase of the project, the liquid waste will be collected in septic tanks that will be serviced by a third party.

During the operation of the wholesale market process wastewater will be collected separately from other waters and treated in a dedicated effluent water treatment plant (as a minimum requirement water needs to pass a settlement tank for sludge separation). Quantities are expected to be low, since water will only be used for banana washing. Grey and black water will be collected separately in a septic tanks structure that will be serviced by third party.

Detailed information on wastewater management, expected type of effluent and respective quantises will be provided in the full EIA report.

2.8 Requirements of the Project

2.8.1 Human Resources

The following section presents estimated manpower needs during construction and operation phase of the project.

Table 2-4: Manpower during construction and operation, based on similar developments

| Nr | Manpower | Value | Unit |
|----|--------------------------|---------|---|
| 1 | Manpower Construction | | |
| | Managerial / Admin Staff | 5 | Staff |
| | Skilled Workers | 20 | Workers |
| | Unskilled Workers | 150-200 | Workers for whole Project construction period |
| | Manpower Operation | | |
| | Managerial / Admin Staff | 10 | Staff |
| | Skilled Workers | 15 | Workers |
| | Unskilled Workers | 5 | |

Source: Estimate made by the study team based on comparable projects

The exact list of manpower needed for the construction of the wholesale market will be estimated to a high level during the EIA Study and refined by the EPC Contractor during the detailed design stage of the project.

2.8.2 Construction materials and source

A wide range of construction material will be required for the development of the wholesale market infrastructure in Semlar. The construction materials that are required

are: filling material to level the ground, aggregates for concrete work and bricks and block stones for the construction of different types of walls, steel for the roofs, etc. **These construction materials are envisaged to be procured from the provincial markets in Lumbini Province and its direct surroundings area.**

Materials shall meet the construction standards and specifications and be tested prior to application as construction materials. This is to ensure that raw materials (filling, material, stone, sand, aggregates, and bricks) are sourced from quarries/suppliers from those who have government approvals and as per the rule of Government of Nepal's clearance procedure.

The Detail requirements of construction material will be identified during the EIA Stage. But primarily the following table shows the requirement of the construction materials.

Table 2-5: Estimate List of Major Construction Materials

| Nr | Construction Materials | Value | Unit |
|----|--------------------------------------|-------|----------------|
| 1 | Cement | 3200 | MT |
| 2 | Reinforced bars | 150 | MT |
| 3 | Steel material | 125 | MT |
| 4 | Aggregate | 11200 | m ³ |
| 5 | Sand | 4000 | m ³ |
| 6 | Scaffolding and supporting materials | 150 | MT |
| 7 | Concrete pipes | 100 | m |
| 8 | Bitumen | 125 | MT |

Source: estimation of the construction materials.

The proposed estimates are based on a similar development, e.g., Inland Clearance Depot (station to cater larger container type vehicles), including main site area, administrative area, quarter and utility area, total site: 11.77 Ha. (232.6 Ropani) and expert judgement. The exact list and volumes of construction materials needed for the construction of the wholesale market will be determined by the EPC Contractor (based on detail design).

Heavy equipment (e.g., bulldozers, graders, rollers, and heavy goods vehicles) will be used to prepare the site. Excavated material will be reused for levelling the site and/or reused or disposed outside of the site. Material that cannot be used (e.g., rocky substrate) will be disposed of at a suitable waste disposal facility. The table below provides indicative types and numbers of heavy equipment that would be on-site for the site preparation of the site.

Table 2-6: Estimated Heavy Equipment Required for Preparation of the site, based on similar developments

| Nr | Construction Machinery | Specifications |
|----|------------------------|--------------------------------|
| 1 | Excavator (Back Hoe) | 0.45, 0.8m ³ bucket |
| 3 | Bull Dozer | 21 ton |
| 4 | Dump Truck | 4 ton, 10 ton |
| 6 | Motor grader | W=3.1 ton |
| 7 | Tire Roller | 8-20 ton |
| 8 | Vibration Roller | 10 ton |
| 9 | Concrete Pump | 90-110m ³ /hr |
| 10 | Crawler Crane | 50 ton |
| 11 | Generator | 10-100KVA |

Source: Secondary data, reference from Environmental Impact Assessment (EIA) Report of Kathmandu Inland Clearance Depot (ICD) at Chovar, Kathmandu, Nepal (Exact will be incorporated at EIA Stage)

The proposed estimates are based on a similar development, e.g., Inland Clearance Depot (station to cater larger container type vehicles), including main site area, administrative area, quarter and utility area, total site: 11.77 Ha. (232.6 Ropani) and study team expert judgement. The exact list of heavy equipment needed for the construction of the wholesale market will be determined by the EPC Contractor (based on detail design).

Storage tanks containing fuels, or other potentially dangerous substances, will be set on matting (complete with drip trays, manifolds, and proper hose connections) to ensure no substance is spilled on the ground. Any operations involving transfer of substances shall take place in an area enclosed within a lined secondary containment berm.

The required energy during the construction and operation of the proposed project will be supplied from the NEA local grid. The Nepal Electricity Authority has already given the verbal consent for the supply of necessary electricity for the construction phase of the project. The Power Distribution Line are located near to the proposed site.

2.9 Land Area Requirement

Land required for the project development is 12.47 ha². The proposed site for project development is governmental land, next to the river. Households and agriculture land is not present on the proposed site.

The following land requirement will be in the proposed project:

² Originally, land availability was 14.18 ha whereas the new official map indicates land size as only 12.47 ha.

Table 2-7: Land requirement for the project

| SN | Type of Land | Ownership | Amount |
|----|------------------|--------------------------------------|----------|
| 1 | Community Forest | Ratanpur Community Forest User Group | 12.47 ha |

Currently, the land to be allocated to the wholesale market contains a community forest - Ratanpur Community Forest (see map below) It is important to note that Butwal Municipality has started the initial process for land title transfer through federal cabinet decisions.

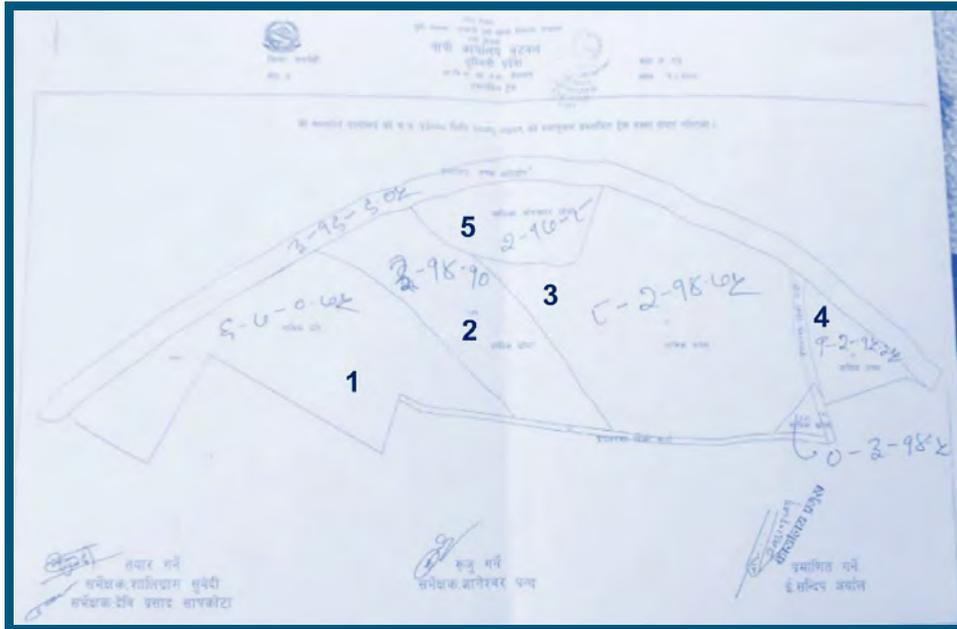


Figure 2-6: Map the Ratanpur Community Forest

Source: Primary data, map produced by the BSMC and survey department for the purpose of site demarcation, the survey was conducted in June 2022 specifically for this FS and EIA process.

Legend: As per the land area map shown in Figure 5-4 , public land of parcel number 188, depicted as 1, is around 6 Bighaa 7 Ropani and 0.75 Aana, likewise the Parcel number 146, depicted as 2, of 3 Bighaa, 14 Ropani and 10 Aana was previously under River area. The Forest area of 8 Bighaa 2 Ropani and 14.75 Aana (depicted as 3) and previously forest area of 1 Bighaa 2 Ropani and 15.25 Aana (depicted as 4). All these are collectively registered as Ratanpur Community Forest with the area of 13.54a The land parcel depicted as 5, is a private land and is outside the project boundary.

2.10 Project schedule

The project timeline carries considerable uncertainty. Once the project feasibility phase is completed in Q4, 2022 the project will enter into the tendering and procurement phase. This phase may take another few months to issue the tender documents and received quotations from potential contractors. A dedicated selection processes will be followed to select the most suitable and competitive contractor who will undertake the detailed design and construction of the wholesale market.

The construction of the wholesale market may take start from 2024 and take 2 years to complete. In the table below we show a timeline which is applied by the sector. However, the timeline shall be discussed with the selected contractor and updated accordingly.

Table 2-8: Tentative Time Schedule of the Project

| Nr. | Project Activity | Q2 2023 | Q3 | Q4 | Q1 2024 | Q2 | Q3 | Q4 | Q1 2025 | Q2 | Q3 | Q4 | Q1&2 2026 |
|-----|--|---------|--------|--------|---------|--------|--------|--------|---------|--------|--------|--------|-----------|
| 1 | Issue of the Tender Documents | Active | | | | | | | | | | | |
| 2 | Tender announcement | Active | Active | | | | | | | | | | |
| 3 | Tender evaluation and award | | Active | Active | | | | | | | | | |
| 4 | Detailed Design of the wholesale market, verification of the EIA results | | | | Active | | | | | | | | |
| 5 | Contractor mobilisation | | | | | Active | | | | | | | |
| 6 | Ground works | | | | | Active | Active | Active | | | | | |
| 7 | Foundations and sub-structures and infrastructure | | | | | Active | Active | Active | Active | | | | |
| 8 | Erection of the buildings (super structures) | | | | | | Active | Active | Active | Active | Active | | |
| 9 | Infrastructure and Utilities | | | | | | | | Active | Active | Active | Active | Active |
| 10 | Installation of equipment | | | | | | | | | | Active | Active | Active |
| 11 | Testing and Commissioning | | | | | | | | | | | | Active |
| 12 | Training | | | | | | | | | | | | Active |
| 13 | Start Operations | | | | | | | | | | | | Active |

3 Required Data for the Preparation of Report

3.1 Data requirement

For a comprehensive environmental impact assessment of the proposed project, baseline database on the following environmental resources of the project's scope area shall be collected.

3.1.1 Physical/chemical environmental issues

- Physiography (secondary data)
- Geology and soil (combination of secondary and primary data, e.g., collected as part of the topographical survey)
- Climate (secondary data)
- Drainage and Hydrology (existing valid, accurate and recent secondary data)
- Land Use (primary data collection, site boundaries based on Land Survey conducted by Butwal municipality for the scope of this FS)
- Land to be acquire by the project either temporarily or permanently (primary data collection, site boundaries based on Land Survey conducted by Butwal municipality for the scope of this FS)
- Mineral occurrences in project area, underground excavations, surface excavation both along the river and outside
- Possible water logging area (secondary data)
- Seismic hazards (secondary data)
- Spoil disposal (secondary data)
- Erosion, Sedimentation and Land instability (secondary data)
- Condition of slope stability, soil erosion in project area (secondary data)
- Water Quality (primary data) Air Quality (primary data)
- Noise Level (primary data)
- Climate Vulnerability Related data (secondary data)
- Hydrology of Danab River (secondary data)

3.1.2 Biological environment

- Forest type and vegetation and floral biodiversity
- Identification of species and its composition in the project site
- Non-Timer Forest Products (NTFPs) that includes medicinal,
- Endangered/Threatened/Protected floral species and their ecology
- Wildlife status and habitats
- Collection of Wildlife Habitat Data
- Endangered/Threatened/Protected faunal species and their ecology
- Threat and conservation status of flora and fauna based on Government of Nepal List; National Park and Wildlife Conservation Act; IUCN's Red Data Book and CITIES list.
- Aquatic biodiversity habitat and ecological status of the adjoining river to the project site.

3.1.3 Socio-economic and cultural environment

- Demographic features of Project affected Municipality and District
- Demographic features of Project affected Households
- Available infrastructures facilities and other supporting facilities
- Existing market price of land and property
- Habitat of indigenous, tribal and vulnerable people
- Status of community's dependency on local resources
- Data of land/property ownerships
- Family dependent on Forest resources and NTFPs
- Loss of local resources and infrastructures
- Identification of PAF and SPAF and other people to provide necessary training and skill for betterment of their life
- Above mentioned information will be taken in to account during the EIA study. Different sets of checklist and questionnaires will be made to collect the baseline information.

3.2 Methodology of data collection

To collect the above-mentioned data on physical, biological and socio economical environments, following methodological tools shall be applied.

3.2.1 Literature review

Secondary literatures such as reports, map, topographic, maps, land use maps, land capability maps, land system maps, aerial photographs, cadastral survey map etc. shall be collected and reviewed from different sources. Similarly, published and unpublished reports pertaining to environmental standards, Acts, Regulation etc. shall be collected and reviewed. However, the focus of the literature survey shall concentrate on proposal specific issues and related baseline information.

3.2.2 Field Study

Field studies of the proposal shall be carried out vigorously. The study shall be focused generating the information to fulfill the data gap identified during the literature review. The following methodological tools shall be applied to generate database on the physical, biological and socio-economic and cultural environment.

3.2.2.1 Physical environment survey

Physical environmental survey shall be conducted on the area where the project might have direct as well as indirect impact during the construction and operation phases. During the field survey, site specific information on topography, geomorphology, geology, soil and land stability including seismicity shall be collected to identify the physically critical area such as flood zone, water logged area, erosion prone areas that shall be shown in the site map.

The existing maps such as topographic map, land use map, including open source satellite imageries will be applied to generate data on the existing land use, land cover, topography, river networks, terrains *etc.* in the project affected areas.

The field investigation will further focus on the sensitive areas identified during the spatial analysis of the existing data such as water logged area, flood zone, soil erosion, landslides. Local community experiences on the season activities of the geomorphic agents such as rain, water and air influencing the water logging, flooding, soil erosion and land degradation shall be taken into consideration to interpret the status of air, water and noise level of the project direct and indirect impact areas.

3.2.2.2 Biological survey

Forest and vegetation survey will be carried out consisting of the following activities:

- Identification of forest types: The Forest Resources Assessment (FRA) system of forest category was applied in this study.
- Forest samplings (selective sampling) will be carried out to collect quantitative baseline data on the forest structure, composition, density, dominance and canopy cover (see details Forest inventory below).

Forest Inventory: Number of trees requiring to be removed will be enumerated in the project site. In addition, information regarding vegetation status, forest area, non-timber forest product (NTFP), grasses and climbers will be acquired, in accordance with the requirement and practices.

Estimation of wood/stem volume, biomass and carbon content: Following a standard volume model (Sharma and Pokula 1996, FSRO 1967) standing volume of tree will be predicted based on the directives of MoFSC (2017), number of trees will be enumerated. Standing Tree Volume will be predicted using following formula:

$$\ln(v) = a + b \times \ln(d) + c \times \ln(h) \quad (i)$$

Where a, b and c are volume constants, d: diameter at breast height and h: height of the tree.

Biomass content of a tree/shrub will be estimated using biomass models or “Biomass and Volume tables” developed by Tamrakar (2000). A total carbon that may be lost due to execution of the project will be predicted based on total biomass (Negi et al., 2003), which is total above ground biomass (Chaturvedi and Khanna, 1982) and root biomass (RB, FAO, 2000).

$$\text{Above Ground Biomass (AGB)} = \text{SB} + \text{BB} + \text{LB} \quad (ii)$$

Where, SB is Stem Biomass and is calculated as Stem Volume multiplied by Wood Density, BB is Branch Biomass and LB is Leaves Biomass. Carbon off-take will be predicted based on the total biomass of a tree.

Total number of sample plots to be laid will be determined during the scoping exercise. Each sampling plots with a mosaic have four different sizes of plots within it.

The outer sub-plot is 500 sq. m (25 m X 20 m) for enumerating tree species (DHB > 30 cm). The other sub-plot is 100 sq. m area (10m X10m) for pole crops (10-29.9cm). A 25 sq. m area (5 m X 5 m) plot is designated for sapling (4-9.9 cm) measurement. The last 4 sq. m area (2 m X 2 m) plot is for seedlings and regeneration (less than 4cm). The number of trees and volume of timber to be cleared will be estimated using quarter girth formula.

Table 3-1: Details of measurement to be collected by sample plot

| Stages of forests | Regeneration | Saplings | Poles | Trees |
|--|---------------------|--------------------|----------------------|----------------------|
| Plot size | 2x2 m ² | 5x5 m ² | 10x10 m ² | 20x25 m ² |
| Data collected | Counting | Dbh and height | Dbh and height | Dbh and height |
| Identification of stages (Diameter at Breast Height (DBH)) | less than 4cm | Between 4-9.9 cm | Between 10-29.9 cm | 30 cm and above |

The tentative cost of forest clearance at the project location, including cost required for compensatory re-plantation in the ratio of 1:25 and its protection for 5 years (according to Working Policy on Construction and Operation of Physical Infrastructures within Conservation Areas, 2008), will also be estimated and presented in the EIA final report. The area required for the compensatory re-plantation will be estimated and identified by consulting with respective FUGs and district forest offices during EIA stage. Interaction with DFO office staff and Forest User Groups (CFUGs), photographs, interviews, reference to secondary data etc. method will be adopted in this regard.

Documentation of vegetation status, endangered plants, medicinal and non-timber forest products (NTFPs) will be recorded and likely impact upon and its user group will be identified and will be presented in the final EIA report. Site visit protocols, minutes of interaction with National Park and Community Forest User Groups (CFUGs) and Photography will be taken for the documentation and records of conducted activities.

The following vegetative parameters will be measured during forest sampling:

- Circumference at Breast Height (CBH) is measured at 1.3 m from the ground level and later converted to diameter at breast height (DBH) for volume and basal area estimation or directly by diameter tape.
- Ground conditions such as gregariousness of the herbaceous vegetation, rock outcrops, richness of the ground flora, *etc.* will also be noted.
- Height of the trees will be measured by using a clinometer compass.

- Ecological parameters such as crown coverage, aspect, slope inclination, *etc.* will also be recorded for ecological analysis and further study.
- Crown coverage will be evaluated using ocular estimation.
- Ground flora will be identified on the field as far as possible, while trees and other species that cannot be identified in the field will be later identified in the National Herbarium and with the help of standard literature.

In case of doubtful samples of the plants for identification, resource use patterns of the plants within the forest environment (general plant diversity) and village settlements (mostly agro diversity) will be recorded by consulting with local residents. Ethno-botanical information will also be gathered to explore the specific use of plants found in and around the project area.

The flora of conservation significance (as per the GoN Protection List, IUCN Red Data Book and CITES Appendices) in the project impact area will be studied and listed along with their distribution and frequency of occurrence. Efforts of floral diversity conservation in the project impact areas will be gathered through consultation with the locals. In summary, the following forest data and information will be used to evaluate baseline conditions of the project:

- Forest Type Distribution and habitat conditions
- Forest Management Practices and Present Status
- Plants of Ethnobotanical Significance and Agro-biodiversity
- Forest Diversity and Distribution along the Project Alignment
- Invasive and Alien species

The aforementioned data shall be used to provide, among others, the following information regarding the biological environment of the project and its vicinity area.

- Potential of Non-Timber Forest Products (NTFPs); plant having medicinal, agro-forestry, and ethno-botanical values; identification of species and their composition in the core project area (where project structures are allocated) as well as in the surrounding area; identification of forest type (as identified by the Forest Act) having those potential.
- Site Description (Water body / holes, Vegetation cover, Ground and soil/rock features);
- Important Habitat Type/ Features – Tree/Herb/Shrub/Epiphyte/Others;
- Habitat Use – a) Active / Temporary / Migratory Corridor; b) breeding / feeding or hunting / resting/ and others;
- State the habitat in terms of - Degradation / Fragmentation / Human encroachments;
- Threat and Conservation status of flora and fauna based on Government of Nepal list, National Park and Wildlife Conservation Act (1973); IUCN's Red Data Book and CITES list.

Data and information related to the following aspects of the biological environment of the project area will be collected:

- Common flora of the site, surrounding locality and of the region;
- Forest data in the core project area (direct impact area) as per Forest Act;
- Tree density and basal area of tree species of the project construction site;
- Estimated number of trees, wood volume and biomass;
- Current use of vegetation, ethno-botany, medicinal plants and other related uses;
- Information on the non-timber forest products found in the project area;
- Ecological value of goods and services lost due to project implementation;
- Information on forest coverage and regeneration status;
- Cumulative impacts on loss of vegetation/ forest resources/habitat of protected and other species.

The collected data will be analyzed by experts using appropriate quantitative tools, formula and software. The study team will interact closely to discuss its findings and analyze the results. The impact will be identified by the experts based on the baseline condition of the area and project activities. A matrix will be used for identification of the significance of impacts.

Wildlife

Information related to herpato-fauna and mammals of the core and adjacent areas (e.g., forest, agriculture land, wetlands etc.) of the project area will be collected as follows:

Use of Secondary Sources of Information: Available literature on the herpetofauna and mammals of the areas will be thoroughly reviewed. These include published and unpublished articles, reports and books. Systematic arrangement for herpetofauna and mammals will be followed as given by Shah and Tiwari (2004), Prater (1971), Corbett and Hill (1992) and Baral and Shah (2008). National Red list status of the mammal will be assessed as provided by Jnawali et al. (2011).

The wildlife habitats of the areas will be identified by direct field observation. The existing habitat (forests) will be visited mostly on foot. Direct observation methods will be used to assess habitat diversity, quality and major threats. Interactions with local stakeholders will also be conducted to assess these parameters.

Interviews, Group meetings/Interactions: The local people of different social status including members of Community Forest User Groups (CFUGs), livestock grazers, grass collectors, farmers, Community Forest guards, , Divisional Forest Office officials, metropolitan city etc. will be interviewed and their group meeting will be conducted to assess occurrence and diversity of the herpetofauna and mammals, their distribution, movement pattern, human-wildlife conflict (crop and livestock depredation, illegal hunting etc.), religious and cultural importance

(ethnozoology) of these wildlife. In addition to this colour photographs of potential amphibians, reptiles and mammals of the area will be shown to the locals to ascertain their occurrence. Systematic arrangement for amphibians, reptiles and mammals will be followed as given by Shah and Tiwari (2004) and Baral and Shah (2008).

3.2.2.3 Review of Relevant Policies, Laws, Guidelines and Manuals

Relevant information and documents for the study will be collected and extensive review of Acts and bye laws, past/previous EIA study reports the project area or nearby will be done. Desk study of Related Policies, National legislations, Environment related Technical forest inventory guidelines and manuals will be reviewed. Available Municipality, Sub Metropolitan city Profiles, relevant maps, relevant websites and reports of MoALD, MoFE, and DNPWC will be reviewed.

Interaction Meetings, focus group discussions and key informant interview

Several meetings will be conducted during the study. Various, possibly all the stakeholders will be invited and participation acquired in these meetings. The stakeholders will be informed of the project and requested to provide comments and suggestions, foreseen impact on the forests resources and other biodiversity and their own lifestyles and issues due to execution of the project. Focused Groups and Key Informant will be specifically approached and discussion and interviews will be carried as appropriate.

Field Investigation

In the process to learn biological details distributed and abundances in the project area as well as existing situation and possible impacts on wild flora and fauna, study on key features of the wildlife and birds and their habitats such as water bodies, nesting trees and bushes preferred by important birds will be studied. Information regarding terrestrial and aquatic flora and fauna of the existing forest area will be established as baseline data and impact of project execution on the flora and fauna identified and predicted.

Field surveys will be carried out for assessing biological features of the project area: vegetation, wildlife, avian fauna, aquatic wildlife, reptiles and amphibians. The literature sources will be reviewed, first, in order to understand the nature and diversity of flora and fauna of the Ratanpur area. Documentation will be gathered for assessment of (i) Forest and vegetation, including flora and fauna in the project area and forest cover quality, (ii) Wildlife in the Project Area, including mammals, birds, aquatic fauna, reptiles and amphibians and possible impacts on them with the construction of embankment, (iii) description of wildlife habitat area within or in proximity to the project influence area (Direct or Indirect) and possible impact to habitat, which may further threaten or endanger wildlife species and their movements through landscape,. Areas of natural habitat for flagship species and critical natural habitats will be identified.

Information regarding terrestrial and aquatic flora and fauna of the existing forest area will be collected and established for baseline information; the impacts of project construction on the flora and fauna will be identified and predicted in order to propose appropriate mitigation or enhancement measures, including any national protection requirements within the project area. Participation of concerned government officials will be facilitated in all possible locations, when needed.

3.2.2.4 Socio-economic and Cultural Environment Survey

Socio-economic data includes people of all class, caste and economic categories such as demographic features of the households, census for near about houses, migration pattern, employment, landholding size, agricultural production, food sufficiency, other productive resources, livestock raising, access to different social infrastructures such as drinking water, education, health-posts, general health, hygiene and sanitation conditions etc.

Information on Infrastructures such as schools, health posts, drinking water facilities, sanitation facilities etc. shall be collected from the offices of rural municipalities and municipalities to update with current situation of these facilities. Information shall also be collected on the conditions of these facilities, their adequacy and beneficiary population.

All sites of religious, cultural and historical importance at project site will be visited and likely impact will be considered. The social, cultural and religious values and significance of these sites shall be noted. Possibilities of protecting, conserving or relocating such sites would also be examined thoroughly in consultation with local people, and village elite.

3.2.2.5 Stakeholders Consultation and Public Hearing

Public participation is part is an important component of the EIA process that ensures voices of concerned stakeholders and affected population in the study. Thus, the EIA study will organize consultations at various stages of EIA study. The issues raised by the stakeholders, comments and opinion during the consultation will be solicited to be considered in the EIA. Mainly, Focus Group Discussion (FGDs) and Key Informant Interviews (KII) approaches will be adopted in the consultations.

According to the EPR 2020, undertaking of public hearing at the project site is mandatory to share the findings of the EIA study, and solicit concerns of concerned stakeholders. The public hearing thus has been proposed to be carried out once the draft EIA report becomes available.

4 Review of plan, policies, laws, guidelines and conventions applicable to the project

Limiting within the scope of works, following policies, legislation (with amendments), guidelines, and appropriate information will be incorporated into the final EIA report. They are as presented hereunder:

4.1 The constitution

The Constitution of Nepal was promulgated by the Constitutional Assembly in September 2015, when the Federal Democratic Republic in Nepal was established. This constitution has 35 parts, 308 articles and 9 schedules. Some of the important aspects included in it are:

- It has restructured Nepal into a federal republic consisting of seven provinces.
- Its article 4 defined Nepal as an "independent, indivisible, sovereign, secular, inclusive, democratic, socialism-oriented, federal democratic republican state."
- A bicameral parliamentary system was created with two Federal houses and unicameral parliamentary systems in each province.
- A mixed electoral system was adopted for the elections of the lower Federal house with both first-past-the-post and proportional electoral aspects used to elect members.
- The rights of gender and sexual minorities are protected by the new constitution with provisions of special laws to protect, empower and develop minority groups as well as allowing them to get citizenship in their chosen gender.
- The rights of women were explicitly recognized, the constitution stating that "women shall have equal ancestral right without any gender-based discrimination."
- Nepal was declared as a secular nation and neutral toward all religions.
- Nepal also has continued not to use the death penalty.

Article 16 (1) human rights relates to environment and health; Article 27 relates to right to information; Article 35 (5) relates to priority to the prevention of adverse impacts in the environment from physical development activities, protection of the environment and special safeguard of the rare wildlife, protection and sustainable use flora/ fauna and biological diversity;

Section 13, Part 3 relates to equal treatment of citizens and provisions by law for the protection, empowerment or advancement of women, Dalits, indigenous people (Janajati); Article 19 relates to Rights to Property, compensation to acquired property; Article 33 relates to socio-economic security to the economically and socially backward classes including the landless, bonded labor, tillers and Harawa/Charawa; Article 22 (1-5) relates to rights of children.

4.2 Plan and Policies

15th Plan 2076/77-2080/81
National Forest Policy, 2075 B.S;
National Environmental Policy, 2076 B.S;
National Forest Policy, 2075
Agriculture Policy (2004),
Forest Policy, 2071 BS
Land Acquisition, Rehabilitation and Resettlement Policy, 2071 B.S;
Working Policy on Procurement of Forest Land for Other Provision, 2076 B.S;
Nepal Biodiversity Strategy and Action Plan 2014- 2020 A.D;
Nepal Environmental Policy and Action Plan, 2051 B.S.
National Agro Forestry Policy, 2076

4.3 Acts and Regulations

Environment Protection Act, 2076 B.S
Aquatic Life Protection Act, 2017 B.S;
National Parks and Wildlife Conservation Act, 2029
Water Resources Act, 2049 B.S;
Local Governance Operationalization Act, 2074 B.S;
Land Use Act, 2076 B.S;
Forest Act, 2076 B.S;
Pesticides Act;2048 BS
Plant Protection Act, 2079 BS
Soil and Watershed Conservation Act, 2039 B.S;
Labor Act, 2074 B.S;
Child Labor (Prohibition and Regulation) Act, 2056 B.S;
Intergovernmental Fiscal Arrangement Act, 2074 B.S;
Contribution Based Social Security Act, 2074 B.S;
National Civil (Code) Act, 2074 B.S;
Solid Waste Management Act, 2068 B.S.

4.4 Rules and Regulations

Environment Protection Rules (BS 2077)
Forest Regulation 2079 B.S;
Labor Rule, 2075 B.S;
Solid Waste Management Regulation 2070 B.S;
Soil and Watershed Conservation Act, 2039(1982)
Child Labor Prohibition Regulation , 2056 BS
Plant Protection Rules, 2050 BS
Solid Waste Management Rule, 2070 BS
Aquatics (Contract) Rules, 2019

4.5 Review of Guidelines and Manuals

National EIA Guidelines, 2050 B.S;

Land Acquisition Guidelines, 1989 A.D;
National Standard for Sound Quality, 2069 B.S;
National Ambient Air Quality Standard, 2069 B.S;
Inventory Guidelines of community forest, 2067;
Wildlife Friendly Infrastructure Construction Guidelines, 2076 BS
Procedure with Standard for the Use of National Forests for National Priority Project, 2076 B.S;
Social Security Schemes Operation Directives, 2075 B.S.

4.6 International Conventions and Treaties

Convention on Biological Diversity (CBD), 1992;
Convention on Rights of the Child, 1989 A.D;
United Nations Framework Convention on Climate Change, 1992 A.D;
United Nations Convention to Combat Desertification, 1994 A.D;
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), (1973 amended 1979 A.D).
Sendai Framework for Disaster risk reduction (2015-2030)

5 Required time, budget and experts

5.1 Time

The tentative schedule for the EIA study and over-duration required for its approval is presented in the Table below.

5.2 Estimated Budget

EIA study is a part of Feasibility and EIA study contract. The total estimated budget for the EIA is a part of the feasibility Study of the project, the estimated costs of the FS is 559580 EUR.

5.3 Study Team

A multi-disciplinary team of subject matter specialists with good orientation on environmental aspects will be involved in the Study. The composition will be as under:

Team Leader/ Environmental Management Specialist;
 Environment Specialist;
 Agriculture expert
 Engineering Geologist;
 Biodiversity / Ecology Expert;
 Hydrologist;
 Climate Expert;
 Social Development and Resettlement Specialist.

| SN | Name | Academic Qualification | Expertise | Experiences of Environment Assessment |
|----|----------------------|-----------------------------|--|--|
| 1 | Navaraj Pokharel | M.Sc in Environment Science | Team Leader (National) | 15 years of professional experience and contributed to more than 50 EA |
| 2 | Prof. Binod Pokharel | Ph D Anthropology | Social Development Expert | 30 years of professional experience and contributed to more than 50 EA |
| 3 | Eric Pereira | M.E. Engineering | Industry and Building Expert/ Agriculture Engineer | 30 years of international relevant experience and contributed to more than 5 EA |
| 4 | Jeroen Tepper | M.Sc In Environment | Environment and Social Expert | 5 years of international relevant experience and contributed to more than 10 EA |
| 5 | Johan Van Der Riet | M.Sc Agriculture | Agriculture Expert | 30 years of international relevant experience and contributed to more than 5 EA |
| 6 | Dr Lars De Ruigs | Ph D Engineering Geology | Engineering Geology /Disaster Risk Expert | 5 years of international relevant experience and contributed to more than 5 EA |
| 7 | Violeta Paginu | M.Sc Environment Management | Forest and Environment, Project Emissions and Discharges | 15 years of international relevant experience and contributed to more than 10 EA |
| 8 | Dr Ritu Paliwal | M.A Sociology | Environmental and Social Expert | 15 years of international relevant experience and contributed to more than 25 EA |
| 9 | Bhushan Shah | MBA | Agriculture Expert | 30 years of international relevant experience and contributed to more than 5 EA |
| 10 | Laura Bergsma | Master in Climate Science | Climate change specialist | 5 years of international relevant experience and contributed to more than 5 EA |

Field level assistants and other support staffs will be engaged to collect field level data, verify secondary information, and conduct data analysis.

6 Potential Environmental Issues

6.1 Issues identified by the study team

The following beneficial aspects and environmental issues have been identified by the study team (the experts):

6.1.1 Beneficial environmental issues

The likely beneficial aspects, envisaged during construction and operation stages, are:

Construction Stage

- Generation of employment;
- Improvement of access roads in the project area, construction of flood protection infrastructure connected to the project site and direct surrounding areas;
- Poverty Reduction through employment and socio-economic development of the study area.

Operation Stage

- Opening of wholesale market for the local entrepreneurs to trade their products, provision of adequate storage facilities avoiding/reducing the fruits and vegetable spoilage;
- Opening of local markets to generate income for livelihood at local level (small framers and traders);
- Enhancement of local economy;
- Beneficial aspects due to implementation of the proposal during construction and operation phases of the project will be assessed and further enhancement measures will be suggested in the EIA study.

6.1.2 Adverse Environmental Issues

6.1.2.1 Physical Environmental Issues

Construction Stage

Considering the proposed project activities, the following potential impacts might occur related to soil:

- Potential contamination of soil - soil quality can be degraded by accidental spills of petroleum products, chemicals, waste materials, storage tanks, leaks, and by runoff from aggregate and topsoil stockpiles. Potential of soil contamination risks exists throughout the project lifecycle. The risks are spatially limited to the footprint of the site and access roads;
- Potential disturbance and degradation of soil is expected due to excavation and earthworks and including removal of top soil/vegetation and soil compaction;
- During the project construction, some portion of topsoil will be removed; as a part of site preparation; which might consequently cause soil loss;

- Disturbance to the soil might increase the amount of storm water runoff from the project sites, which, in turn, might increase suspended sediment load of the receiving water body (this may be applicable only when the Tinau- Danab Corridor Road Project is developed later than the Wholesale Market).

Potential impacts to groundwater could result due to:

- Potential impacts to ground water, due to ground water extraction for construction needs;
- Potential spills of hazardous substances during construction and operation that reach a groundwater aquifer (shallow ground water has been confirmed as part of the Exploratory Topographical Survey conducted by APEX for the purpose of this FS).

The project site is located next to the Danab River, thus, its implementation might affect this river, which are presented below (however, these issues may be applicable only when the Tinau Danab Corridor Road Project is developed later than the Wholesale Market, thus these issues will be refined during the EIA study):

- The surface run-off from the project sites might increase sediment load of the Danab river;
- In addition to the sediments, the run-off might also pick up spilled hazardous and non-hazardous solid and liquids from the project site contaminating the Danab river;
- Modification of riverbanks, watercourse and hydrology might also raise sedimentation load of the Danab river.

Potential impacts to the air quality include:

- Emissions from diesel generators, (heavy) vehicles and traffic may adversely affect local ambient air quality;
- The level of dust in the project adjoining areas might also increase due to increased vehicular traffic and construction activities.

Climate risk and hazards

- Increase frequency/intensity of flooding might flood the wholesale market;
- The flood protection structures to be installed by the project might change the flood direction causing flooding of other adjoining areas.

Nuisance due to noise and lighting may negatively affect local communities and fauna.

- The sites will be heavily lighted at night resulting disturbance to the adjoining area;
- Increased traffic, construction activities and operation of heavy machinery might also raise noise level in the adjoining areas.

Operation Stage

- Potential contamination of soil, especially in open areas next to utilities, due to improper wastes and effluent management practices.

- Extraction of ground water for operation of the wholesale market might lower the ground water table, lowering the water level in the wells and tube wells used by the locals.
- Emissions from emergency diesel generators, (heavy) vehicles and traffic may adversely affect local air quality;
- The level of dust in the local ambient air might be increased due to increased vehicular traffic for operation activities of the market;
- Improper management leading to decay of agricultural waste might generate foul odor.
- Increase frequency/intensity of flooding might flood the wholesale market;
- The flood protection structures to be installed by the project might change the flood direction causing flooding of other adjoining areas.
- Nuisance due to noise and lighting may negatively affect local communities and fauna.
- The sites will be heavily lighted at night resulting disturbance to the adjoining area.
Increased traffic, construction activities and operation of heavy machinery might also raise noise level in the adjoining areas.

6.1.2.2 Biological issues

Construction Stage

- Loss of community forest land in process of handing it over to the project;
- Loss of trees and vegetation during the site clearance for the project sites;
- Loss and fragmentation of habitat due to land clearance and site preparation;
- The terrestrial wildlife species including avia-fauna might displace from the project area due to habitat modifications and interferences;
- Loss of flora and growth of potential invasive non-native species mostly during the site clearance and site preparation period;
- Disturbance to fauna from noise and lighting from construction activities;
- Alteration of aquatic habitat due to removal/suspension of riverbed sediments or covering of the riverbed (this may be applicable only when the Tinau Danab Corridor Road Project is developed later than the Export Oriented Agricultural Wholesale Market in Semlar, Butwal” Market, to be refined during the EIA study);

Operation Stage

Potential impacts on habitats, regarding flora and fauna, include:

- Terrestrial wildlife and avia-fauna might be displace due to habitat modification and interferences in the project area.
- Scavenging wildlife might congregate in the waste disposal site, and these might be exposed to plastic causing their health issue.

6.1.2.3 Socio-economic Issues

Construction Stage

- Community forest user group will lose the land under their jurisdiction to the project;

- Issue of Forest Products Management
- Locals using the land as football ground will have to be moved.

Community and occupational health and safety

- Communicable diseases associated with the influx of temporary construction workers;
- Sudden mixing of locals and large number of migrant workers might result in conflicts which might potentially lead to crime, harassment, discrimination, alcohol and drugs abuse and (gender based) violence;
- Sudden influx of large number of workers might exacerbate insecurity amongst the local communities;
- Influx of large number of workers will put additional pressure on local public facilities and services, such as health care service/facilities, market and other commodities;
- Air, noise, light pollutions from the construction activities, vehicular movement, and heavy machinery might affect wellbeing of local communities;
- Increased traffic on public roads could increase the number of accidents;
- Transport of personnel and materials may result in unsafe conditions and road accidents on local roads, causing impacts on worker health and safety;
- Potential worker's health and safety risks due to construction physical, chemical and confined space, exposure to noise and dust;
- Construction activities leading to operational health and safety issues.
- Improper disposal of the garbage produced in the camps and work sites might lead to unsanitary conditions for locals as well as workers.

Land ownership issues

- The project is proposed to be located at the government owned land and public land, thus complexities related to land ownership might be not applicable for this project.
- However, these public land might be used by locals, such as community forest, football ground, which need to be addressed prior to commencement of the project construction;

Compromise in use of local resources

- In case the ground water table lowers as a result of project consumption, it might lower the water tables in the wells and tube wells in the surrounding areas. This situation can compromise locals' ability to consume water for domestic as well as agricultural purposes;
- Pollution of water and soil by the project activities can affect local communities, particularly, those who have been using the land for farming and/or water for irrigation/livestock feeding. This could affect their livelihoods, e.g., reductions in agricultural yields or animal husbandry;
- Local population has been using the proposed project site for gathering forest products like firewood and fodder. Removing community forest leads to reduction in availability of fuel for animal feed preparation.

- Influx of project staff and workers might raise tariff for accommodations and rental.

Infrastructure and services

- Increased road traffic during construction causing deterioration of local roads, impacting travel times and health and safety of road users;
- Increased road traffic during project construction might cause increase traffic increasing travel times for locals e.g. difficulty to commute to the work or public facilities;
- Construction operations creating pressure on local energy net. This could impact the availability of energy for local communities.
- Local communities are using adjoining piece of land as a football ground, which will be lost to the project.

Religious, archaeological and cultural heritage sites

- The construction work might disturb the religious practices of the *Shiva* temple located in close proximity to the project site.

Operation Stage

Community health and safety

- Operational activities and increased transportation for the project may affect wellbeing of local communities through nuisances due to lights, noise, pollution and dust. Dust will occur especially during the dry season, while in the wet season the roads can become muddy due to the heavy traffic;
- Increased traffic on public roads could cause health and safety risks for local road users and residents nearby;
- Waste related issues

Worker health and safety

- Transport of personnel and materials may result in unsafe conditions and road accidents on local roads, causing impacts on worker health and safety;

Land use and livelihoods

- The project will be located on government owned land and public land, so complexities over land title and ownership are not applicable for this project;
- Consumption of groundwater – If groundwater quantity is reduced, this could affect local communities who use water for irrigation or livestock feeding. This could affect economy/livelihoods due to reductions in agricultural yields or animal husbandry;
- Potential pollution of water or soil - If water or soil quality is reduced, this could affect local communities who use land for farming and/or water for irrigation/livestock feeding. This could affect economy/livelihoods, e.g., due to reductions in agricultural yields or animal husbandry;

Infrastructure and services

- Increased road traffic during operation causing deterioration of local roads, impacting travel times and health and safety of road users;
- Increased road traffic during operation causing traffic jams and increased travel times for local communities who are e.g. commuting to work or public facilities, impacting health and safety of local road users;
- Operation of Market creating pressure on local energy net. This could impact the availability of energy for local communities.

6.1.2.4 Cultural Issues

Construction Stage

Access to culturally important area for cremation, religious sites might be restricted.

Operation Stage

Access to culturally important area for cremation, religious sites might be restricted.

6.2 Issues identified by the key stakeholders

The environmental (social, health and safety) issues identified by the local communities are presented below:

Construction Phase

Physical Environmental Issues

- Soil: Potential contamination of soil by accidental spills of petroleum, chemicals, waste materials, storage tanks, effluent and runoff from aggregate and topsoil stockpiles.
- Emissions from diesel generators, (heavy) vehicles and traffic may adversely affect local air quality;
- Air might get polluted by dust in adjoining area to the project due to increased vehicle traffic and construction activities;
- Climate risks and hazards may affect the project area, e.g., increased frequency/intensity of flooding which might flood the wholesale market.
- The construction site will be lighted at night resulting in light pollution in the immediate area;
- Increased traffic (day and night) might also raise noise level in the project adjacent areas;

Biological Environmental Issues

- Loss of trees and vegetation from the project sites during site clearance;
- Potential introduction of invasive non-native species mostly during the site clearance and site preparation period;
- Removal of the trees for the project site might result in loss and/or fragmentation of wildlife habitat;

- The terrestrial wildlife including avia-fauna might relocate from the project area due to project activities.

Socioeconomic Environmental Issues

- The Community Forest Users Groups will lose forest resources to the project;
- Generation of employment for the direct communities located next to the site;
- The influx of large number of migrant workers to the project area can create social and cultural tensions with the local communities;
- Issues related to final design and construction of, e.g., the access road for entry and exit from the wholesale market
- Issues related to potential inappropriate disposal of Construction and Demolition Waste and availability of such landfills in the vicinity of the project site/project area
- An adjoining area to the project site belonging to the government is currently used by locals as a football ground, which has to be acquired for the project.

Operation phase

Physical Environmental Issues

- Potential contamination of soil, especially in open areas next to utilities, due to improper wastes and effluent management practices
- Emissions from emergency diesel generators, (heavy) vehicles and traffic may adversely affect local air quality;
- Increase in dust pollution in the adjoining area due to increased vehicular traffic for operation of the market;
- Increase frequency/intensity of flooding might flood the wholesale market;
- The site will be lighted at night resulting in light pollution in the immediate area;
- Increased vehicular traffic of the wholesale market might raise noise level in the adjoining areas.

Biological Environmental Issues

- The terrestrial wildlife and avia-fauna might move away from the project area due to habitat modification and disturbance.

Socioeconomic Environmental Issues

- The CFUGs will lose the forest resources to the project, restricting their dependency to the forest products;
- Local people, particularly, project affected population shall be prioritize for recruitment for operation of the market;
- Deterioration of the health and sanitary condition of the area due to disposal of whole market wastes.

7 Environmental issues prioritized for the EIA study

Among the issues identified by the study team and the one raised by the key stakeholders, and local communities as well as identified by the study team during scoping exercise have been prioritized for the EIA study. The details of these issues are arranged in the impact matrix and their significance will be clearly determined in the EIA report. The impacts are scored based on accordance with the National EIA Guideline 1993. This exercise will be revised during the EIA stage.

Table 7-1: Impact qualifier

| Magnitude | Extent | Duration |
|-------------------|-----------------------|---------------------|
| High/major (H) 60 | Regional @60 | Long-term (Lt) 20 |
| Moderate (M) 20 | Local (L) 20 | Medium-term (Mt) 10 |
| Minor (L) 10 | Site Specific (SP) 10 | Short-term (St) 05 |

Source: National EIA Guidelines, 1993.

The issues identified by the stakeholders and study team have been consolidated and prioritized in the following table:

Table 7-2: Prioritization of the issues raised by stakeholders and study team

| Physical Environment | Construction phase | Magnitude | Extent | Duration | Significance |
|--------------------------|--|-----------|--------|----------|--------------|
| Beneficial issues | Improvement of access roads in the project area, construction of flood protection infrastructure connected to the project site and direct surrounding areas. | 60 | 20 | 20 | 100 |
| Adverse issues | Potential contamination of soil by accidental spills and leaks from chemicals handling and storage | 10 | 10 | 5 | 25 |
| | Potential disturbance and degradation of soil is expected due to excavation and earthworks and including removal of top soil/vegetation and soil compaction; | 20 | 10 | 5 | 35 |
| | Loss of the top-soil from the project sites during site clearance and excavation. Loss of soil function; | 60 | 10 | 5 | 75 |
| | Potential impacts to ground water, due to ground water extraction for construction needs, impacts on ground water levels; | 10 | 20 | 5 | 35 |
| | Potential contamination of ground | 20 | 20 | 5 | 45 |

| | | | | | |
|--------------------------|---|----|----|----|-----|
| | water due to spills, leaks of hazardous substances stored on site (the contamination could reach the aquifer); | | | | |
| | The surface run-off from the project sites might increase sediment load of the Danab river (in the situation when the Danab Road is not constructed/not in place yet) | 20 | 20 | 5 | 45 |
| | The run-off might also pick up spilled hazardous and non-hazardous solid and liquids waste from the project site contaminating the Danab river (in the situation when the Danab Road is not constructed/not in place yet) | 20 | 20 | 5 | 45 |
| | Modification of riverbanks, watercourse and hydrology profile might raise sedimentation load of the Danab river (in the situation when the Danab Road is not constructed/not in place yet) | 20 | 20 | 5 | 45 |
| | Emissions from diesel generators, (heavy) vehicles and traffic may adversely affect local ambient air quality; | 20 | 20 | 5 | 45 |
| | The level of dust on site as well as in the project adjoining areas might also increase due to increased vehicular traffic and construction activities. | 20 | 20 | 5 | 45 |
| | Climate change may lead to increase of frequency/intensity of flooding events, affect the site allocated for the wholesale market (scenario without flood protection measures in place); | 20 | 20 | 5 | 45 |
| | The flood protection structures to be installed by the project might change the flood direction causing flooding of other adjoining areas. | 20 | 20 | 5 | 45 |
| | Increased traffic, construction activities and operation of heavy machinery might raise the noise level in the adjoining areas. | 20 | 20 | 5 | 45 |
| | Operation phase | | | | |
| Beneficial issues | Opening of wholesale market for the local entrepreneurs to trade their products, provision of adequate storage facilities avoiding/reducing the fruits and vegetable spoilage (prevent or reduce GHG emissions from .degrading organic waste) | 60 | 60 | 20 | 140 |

| | | | | | |
|--------------------------|---|----|----|----|-----|
| Adverse issues | Potential contamination of soil, especially in open areas next to utilities, due to improper wastes and effluent management practices; | 20 | 10 | 20 | 50 |
| | Extraction of ground water for operation of the wholesale market might lower the ground water table, lowering the water level in the wells and tube wells used by the locals; | 20 | 20 | 20 | 60 |
| | Emissions from vehicles and traffic may adversely affect local air quality; | 60 | 20 | 20 | 100 |
| | The level of dust in the local ambient air might be increased due to increased vehicular traffic for operation activities of the market; | 20 | 20 | 20 | 60 |
| | Improper management of organic waste generated by the market leading to decay of agricultural waste and generation of foul odour; | 10 | 10 | 20 | 40 |
| | The flood protection structures installed by the project might change the flood direction causing flooding of other adjoining areas; | 20 | 20 | 20 | 60 |
| | Increase in ambient noise levels affecting the local noise levels and disturbance to the adjoining area.; | 20 | 20 | 20 | 60 |
| | The sites will be heavily lighted at night resulting disturbance to the adjoining area.; | 10 | 20 | 20 | 50 |
| Biological issues | Construction phase | | | | |
| Beneficial issues | | | | | |
| Adverse issues | Loss of community forest land in process of handing it over to the project; | 20 | 10 | 20 | 50 |
| | Loss of trees and vegetation during the site clearance for the project sites; | 20 | 10 | 20 | 50 |
| | Loss and fragmentation of habitat due to land clearance and site preparation; | 20 | 10 | 20 | 50 |
| | The terrestrial wildlife species including avia-fauna might displace from the project area due to habitat modifications and interferences; | 20 | 10 | 20 | 50 |
| | Growth of potential invasive non-native species mostly during the site clearance and site preparation period; | 10 | 10 | 5 | 25 |
| | Disturbance to fauna from noise and lighting from construction activities; | 10 | 20 | 5 | 35 |
| | Alteration of aquatic habitat due to removal/suspension of riverbed | 10 | 20 | 5 | 35 |

| | | | | | |
|------------------------------|---|----|----|----|----|
| | sediments or covering of the riverbed (in the situation when the Danab Road is not constructed/not in place yet) | | | | |
| | Issue of invasive plant species in open space | 10 | 20 | 10 | 40 |
| | Compensation of trees land and tree plantation | 20 | 20 | 20 | 60 |
| | Operation Stage | | | | |
| Adverse Issues | Terrestrial wildlife and avia-fauna might be displaced due to habitat modification and interferences in the project area. | 10 | 20 | 5 | 35 |
| | Scavenging wildlife might congregate in the waste disposal site, and these might be exposed to plastic causing their health issue. | 10 | 10 | 20 | 40 |
| Socio-economic issues | Construction phase | | | | |
| Beneficial issues | Generation of employment; | 20 | 20 | 5 | 45 |
| | Poverty reduction through employment and socio-economic development of the project area; | 20 | 20 | 5 | 45 |
| | Opening of local markets to generate income for livelihood at local level (small framers and traders); | 20 | 20 | 5 | 45 |
| | Enhancement of local economy. | 20 | 20 | 5 | 45 |
| Adverse issues | Community forest user group will lose the land under their jurisdiction to the project, access to community forest resources; | 20 | 10 | 20 | 50 |
| | Supply of forest products - firewood and fodder – will be compromised; | 20 | 10 | 20 | 50 |
| | Communicable diseases associated with the influx of temporary construction workers; | 10 | 20 | 5 | 35 |
| | Sudden mixing of locals and large number of migrant workers might result in conflicts which might potentially lead to crime, harassment, discrimination, alcohol and drugs abuse and (gender based) violence; | 10 | 20 | 5 | 35 |
| | Sudden influx of large number of workers might exacerbate insecurity amongst the local communities; | 10 | 20 | 5 | 35 |
| | Influx of large number of workers will put additional pressure on local public facilities and services, such as health care service/facilities, market and other commodities; | 10 | 20 | 5 | 35 |

| | | | | |
|---|----|----|---|----|
| Air, noise, light pollutions from the construction activities, vehicular movement, and heavy machinery might affect wellbeing of local communities; | 20 | 20 | 5 | 45 |
| Increased traffic on public roads could increase the number of accidents; | 20 | 20 | 5 | 45 |
| Potential worker's health and safety risks due to construction physical, chemical and confined space, exposure to noise and dust; | 20 | 10 | 5 | 35 |
| Improper disposal of the garbage produced in the camps and work sites might lead to unsanitary conditions for locals as well as workers. | 20 | 20 | 5 | 45 |
| The project is proposed to be located at the government owned land and public land, thus complexities related to land ownership might be not applicable for this project. However, these public land might being used by locals, such as community forest, football ground, which need to be addressed prior to commencement of the project construction; | 10 | 10 | 5 | 25 |
| Consumption of ground water by the project might lower water table, which might result in lowering of the water tables in the wells and tube wells in the surrounding areas compromising locals' ability to consume water for domestic as well as agricultural purposes; | 10 | 10 | 5 | 25 |
| Pollution of water and soil by the project activities can affect local communities, particularly, those who have been using the land for farming and/or water for irrigation/livestock feeding. This could affect their livelihoods, e.g., reductions in agricultural yields or animal husbandry; | 10 | 10 | 5 | 25 |
| Loss of community forest area might lead to reduction in availability of fuel for animal feed preparation. | 10 | 10 | 5 | 25 |
| Influx of project staff and workers might raise tariff for accommodations and rental. | 10 | 10 | 5 | 25 |
| Increased road traffic during construction causing deterioration of local roads, impacting travel times and | 10 | 10 | 5 | 25 |

| | | | | | |
|--------------------------|--|----|----|----|-----|
| | health and safety of road users; | | | | |
| | The construction work might disturb the religious practices of the <i>Shiva</i> temple located in close proximity to the project site. | 10 | 10 | 5 | 25 |
| | Access to culturally important area for cremation, religious sites might be restricted. | 10 | 10 | 5 | 25 |
| | Operation phase | | | | |
| Beneficial issues | Opening of wholesale market for the local entrepreneurs to trade their products, provision of adequate storage facilities avoiding/reducing the fruits and vegetable spoilage; | 60 | 60 | 20 | 140 |
| | Opening of local markets to generate income for livelihood at local level (small framers and traders); | 60 | 60 | 20 | 140 |
| | Enhancement of local economy; | 60 | 60 | 20 | 140 |
| | Local people, particularly, project affected population shall be prioritize for recruitment for operation of the market. | 20 | 20 | 20 | 60 |
| Adverse issues | Operational activities and increased transportation for the project may affect wellbeing of local communities through nuisances due to lights, noise, pollution and dust. Dust will occur especially during the dry season, while in the wet season the roads can become muddy due to the heavy traffic; | 20 | 20 | 20 | 60 |
| | Transport of personnel and materials may result in unsafe conditions and road accidents on local roads, causing impacts on worker health and safety; | 20 | 20 | 20 | 60 |
| | Consumption of groundwater – If groundwater quantity is reduced, this could affect local communities who use water for irrigation or livestock feeding. This could affect economy/livelihoods due to reductions in agricultural yields or animal husbandry; | 20 | 20 | 20 | 60 |
| | Potential pollution of water or soil - If water or soil quality is reduced, this could affect local communities who use land for farming and/or water for irrigation/livestock feeding. This could affect economy/livelihoods, e.g., due to reductions in agricultural yields or | 20 | 20 | 20 | 60 |

| | | | | | |
|--|---|----|----|----|----|
| | animal husbandry; | | | | |
| | Increased road traffic during operation causing deterioration of local roads, impacting travel times and health and safety of road users; | 20 | 20 | 20 | 60 |
| | Operation of Market creating pressure on local energy net. This could impact the availability of energy for local communities. | 20 | 20 | 20 | 60 |
| | Access to culturally important area for cremation, religious sites might be restricted. | 10 | 10 | 20 | 40 |
| | The CFUGs will lose the forest resources to the project, restricting their dependency to the forest products; | 10 | 10 | 20 | 40 |
| | Deterioration of the health and sanitary condition of the area due to improper disposal of whole market wastes. | 20 | 20 | 20 | 60 |
| | Issues of access to forest resources by CFUGs of Project area | 20 | 20 | 20 | 60 |
| | Issue of Raw materials for market center (fruits and vegetables) | 20 | 20 | 20 | 60 |

Alternatives of the Proposals

Alternative analysis is considered as an integral part of an EIA study, which involves an examination of alternative ways of achieving the objectives of a proposed project. The alternative analysis for a Market Project constitutes the development of an alternative market for the upliftment of the economic status of the country. Increase marketing system and overall support for the business of the country. . The alternatives, in this regard, could be alternative location and alternative design. The study team will conduct alternative analysis considering the following issues keeping these as an option:

7.1 Alternative design and construction approach:

Several technical processes like design, design parameter and construction approach will be analyzed during the EIA study period. The best design technique and design schedule will be proposed with full care of environmental and social consideration.

7.2 Alternative location

Any further alternative site location will be investigated in the EIA study and described in the report.

7.3 Alternative schedule and process

During the EIA study period, the alternative time schedule of construction, design and all the activities will be analyzed. The best alternative of the construction schedule will be proposed in EIA.

7.4 Alternative resources

The construction materials, human resources and other resources will also be analyzed to find the best suitable resources during the EIA study period.

7.5 No action option:

The No-project alternative will be assessed and described in the EIA report project.

8 Environmental Mitigation Measures for Adverse Impacts and Enhancement Measures

After the assessment of the prioritized issues, the Proponent shall identify ways to manage the environmental issues in the form of mitigation measures for pre-construction, construction, and operational stages.

In order to avoid or minimize adverse environmental impacts, cost effective and locally suitable mitigation measures with focus on preventive, corrective and compensatory measures as applicable shall be proposed.

The mitigation measures of the issues shall be presented in the form of a log frame matrix named "Impact Mitigation Matrix".

In the EIA report, there should be clear linkage between the existing baseline condition, issues due to project implementation, impacts due to the project implementation, proposed mitigation measures and the monitoring aspects.

8.1 Mitigation Measures

Mitigation measures shall be presented considering the following points:

- To overcome any adverse **Issues** by the project, the proposed measures shall be categorized as :
 - i) Avoidance, ii) Preventive, iii) Mitigative, and iv) Compensatory Measures (Since all the **Issues** may not need all four measures, measures shall be proposed based on the nature of environmental **Issues** and components of environment that is affected)
 - For Avoidance and Preventive measures, how their implementation or compliance will be ensured shall be proposed during project construction and operation.
- Steps for necessary co-ordination that is required in implementing Preventive, Avoidance, and Mitigative Measures with – local, district and central level institutions – as well as contractor's proponent, and consultant shall be proposed.

- Implementation of proposed Preventive, Avoidance, and Mitigative Measures, which fall under the responsibility of the contractor, are ensured during construction, shall be mentioned.

8.1.1 Mitigation Measures in case of Forest and Vegetation loss

- Guidelines on Use of Forest Area for Other Purposes, 2063 (2006) shall be followed while proposing mitigation measures regarding impacts on forest and vegetation.
- In the work schedule, there is a requirement, in addition to the plantation for the lost trees/ poles in the ratio of 1:25, by the developer, on the area equivalent to the one that is occupied by the project's physical infrastructure and facilities on the land designated by the concerned district forest office; managed for five years and handed over to the concerned district forest office.
- Cost for such plantation and management for five years shall be worked out.
- In addition, the cost shall also be worked out for – tagging, cutting and pruning, and collecting, transporting and stacking.

8.1.2 Other Measures / Requirements

8.1.2.1 Awareness and Training Programs

- Awareness and training programs that shall be described in the report and shall have sufficient detail to cover the target group, frequency, and program conductor.
- Allocated cost for such program shall justify the proposed activities.

8.1.2.2 Responsibilities of Agencies

The study shall also review the responsibilities of the local, district and central level institutions and those affected by the project construction and propose steps to ensure necessary coordination during the project implementation.

8.1.2.3 Contractual Obligation

Those mitigation measures that can be or are part of contractual obligation for project construction shall be clearly identified. Mechanisms of ensuring implementation of those mitigation measures, from the proponent' part, as a compliance of contractors shall be categorically proposed.

8.1.2.4 Implementation of Mitigation Measures

Organization chart/ organogram for implementation of mitigation measures, with clear provision of mitigation shall be proposed.

8.1.2.5 Procedures of Lodging Complaints and Grievance Redress Mechanism

The report shall propose:

- Procedures of lodging complaints of project affected people/ families/ institutions, and
- Grievance redresses mechanism.

8.2 Enhancement Measures

- Enhancement measures shall be presented with measures/ activities that will help heightening benefits accrued from the project implementation as identified under beneficial impact.
- Enhancement measures shall not be limited in stating possibilities and opportunities; instead they must be backed up with programs and activities from the proponent's side.
- Possibilities and opportunities created by the project, whose enhancement is beyond the scope of proponent's intervention, can be given with separate heading.
- Required fund shall be allotted to realize the intended enhancement.
- Corporate Social Responsibility (CSR) - Any activities/ measures proposed for the enhancement of living standard/ quality of life/ functioning or performance of local institutions- can be separately discussed under Corporate Social Responsibility (CSR).

Table 8-1: Mitigation Measure Matrix

| | | Beneficial / Adverse Impact | Mitigation/ Enhancement Measures | Location of implementation | Timing of Action | Mitigation Cost | Institutional Responsibility | |
|-----------------------------------|--|-----------------------------|----------------------------------|----------------------------|------------------|-----------------|------------------------------|------------|
| | | | | | | | Implementation | Monitoring |
| Construction Phase | | | | | | | | |
| Physical Environment | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| Biological Environment | | | | | | | | |
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| Socio-Economic Environment | | | | | | | | |
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|-----------------------------------|--|--|--|--|--|--|--|--|
| | | | | | | | | |
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| Operation Phase | | | | | | | | |
| Physical Environment | | | | | | | | |
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| | | | | | | | | |
| Biological Environment | | | | | | | | |
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| Socio-Economic Environment | | | | | | | | |
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9 Environment Management Plan (EMP)

After detail analysis and assessment of likely impacts of the project activities on the local environment, a mechanism shall be included in the EIA report to augment the beneficial Issues and minimize the adverse Issues. The Environmental Management Plan (EMP) shall account for mitigation measures for each Issues identified, monitoring of Issues and environmental auditing components, including environmental management responsibilities should be included. In addition, the EIA study should take into account project execution issues, as appropriate, strict management of contractor's works and use of appropriate technologies for construction.

The contents of the EMP shall be:

- Target-what is aimed to achieved through management plan
- Impact Mitigation Actions
 - Elements of actions that construction contractor/ or other assigned to follow
 - Examples of specific actions to be included
- Monitoring & reporting:
 - List of Activities that require measurement and reporting
 - Identification of – parameters, indicators, methods, location, frequency
 - Identification of reporting authority to whom contractor shall report; reporting interval
- Corrective Actions and reporting
 - Identification of incidences non-compliance
 - In case of non-compliance, identification of responsible person of the contractor to take necessary corrective actions
 - Reporting in case of non-compliance
 - Cause of non-compliance
 - Actions taken for re-compliance
 - Mechanism and necessary actions to ensure compliance
- Relevant Legislation and Standard to observe and follow
- Associated Costs & its provision

The EMP of shall contain the following information, for benefit enhancement measures and adverse impact mitigation measures respectively:

Table 9-1: Environmental Management framework

| | | | | | | | |
|--|--------|---|---------------------------|---|--|---|--|
| Activity Environm ental Risks Issues | Issues | Beneficial Issues Enhancement Measures | Monitorin g Methods | Monitoring Schedule and Location | Responsibl e Implementi ng Agency | Responsibl e Monitoring Agency | Associate d Costs & its provision |
|--|--------|---|---------------------------|---|--|---|--|

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|--|--|--|--|--|--|--|--|
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| Activity / Environmental Risks / Issues | | Adverse Issues Mitigation Measures | Monitoring Methods | Monitoring Schedule and Location | Responsible Implementing Agency | Responsible Monitoring Agency | Associated Costs & its provision |
|---|--|------------------------------------|--------------------|----------------------------------|---------------------------------|-------------------------------|----------------------------------|
| | | | | | | | |
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9.1 Matters to be monitored while implementing the proposal

An environmental monitoring plan will be developed for the baseline, compliance and impact monitoring of the project during construction and operation periods. Baseline, compliance and impact monitoring plan will include monitoring parameters/indicators, monitoring location, frequency, monitoring method and monitoring schedule along with the estimated item wise budget required for the monitoring.

Table 9-2: Monitoring framework

| Parameter Impact | Verifiable Indicators | Verification method | Implementing agency | Monitoring agency | Cost |
|---|-----------------------|---------------------|---------------------|-------------------|------|
| Baseline/pre-construction phase (all domain) | | | | | |
| | | | | | |
| | | | | | |
| Compliance/construction phase (all domain) | | | | | |
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| | | | | | |
| Impact/Operation and maintenance phase (all domain) | | | | | |
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9.2 Other Necessary Matters

The other necessary matters to be included in the IEE report shall be the relevant information, reference list, annexes, maps, photographs, tables and charts, and questionnaires to be mentioned at the time of carrying out baseline survey. The details of public hearing, record of public consultation and minutes of meeting, public notice, public deed (Muchulka) of pasting public notice, and recommendation letters from concerned municipality will also to be include in the report. In addition, the inputs and suggestions received from the Public Notice/Consultation with locals and concerned Rural Municipalities will be integrated in the final report.

The report format for IEE Study shall follow Schedule 11 of EPR, 2077. As a minimum, all requirements indicated in Schedule 11 of the EPR, 2077 will be included and addressed in the IEE report. The conclusions and the recommendations of the Study shall be drawn and presented at the end of the report.

9.3 Environmental Audit

The EIA study shall suggest the parameters to be audited, the auditing activities and estimate of the cost to be measured for carrying out the auditing.

10 Format of the EIA report

Table of Content

Executive Summary in Nepali

Executive Summary in English

Acronyms and Abbreviations

1. Name and Address of the Proponent and Institution/s Preparing the Report

1.1 Name and Address of Proponent

1.2 Name and Address of Institution preparing EIA Report

2. Introduction

2.1 The Project Background

2.2 Context of the Proposed Project

2.3 Relevancy of the project

2.4 EIA Study Team

2.5 Objectives of EIA

2.6 Rationale for Conducting EIA

3 Description of the Proposed Project

3.1 Type of Proposal

3.2 Objectives and Anticipated Benefits from the Proposed Project

3.3 Salient Features of the Project: (*With Location map and relevant drawings*)

3.4 Project Setting

3.4.1 Delineation of the Project Area

3.5 Technical Characteristics of the Project

3.6 Technical Standard of Export -oriented Agricultural Wholesale Market in Semlar, Butwal Market structures

3.7 Project Implementation Approach and Modality

3.8 Requirement of the project (Human resource, Energy, Materials, Investment and Land)

3.9 Existing Road Network that will get impacted

3.10 Details of the proposed site including access roads

3.11 Project Components and Construction Schedules

4. EIA Approach and Methods

4.1 Desk Study/Literature Review and Reconnaissance Visit

4.2 EIA Screening, Scoping, and Preparation of Terms of Reference

4.3 Field Survey and Investigations for EIA

4.3.1 Physical Environment

4.3.2 Biological Environment

4.3.3 Socio-economic and Cultural Environment

4.4 Database Preparation, Analysis, Prediction and Assessment of Impact

4.5 Data Analysis and Interpretation

4.6 Impact Identification, Prediction and Assessment/Evaluation Method

4.7 Prescription based on Mitigation Hierarchy (Avoid, Minimize and Mitigate) including Enhancement Measures

4.8 Preparation of Environmental and Social Management Plan

4.9 Public Notice, Public Hearing and Stakeholders Consultations

4.10 Public Disclosure (as per GoN Requirements)

4.11 Data gaps and limitations

5. Existing Environmental Condition

5.1 Physical Environment

5.1.1 Topography and Geomorphology

5.1.2 Climate and Hydrology

5.1.3 Regional Geology

5.1.4 Engineering Geological Condition

5.1.4 Hazards and Hazards Mapping

5.1.5 Construction Materials

5.1.6 Soil/Rock Types and Their Distribution

5.1.7 Seismicity

5.1.8 Landslide and Slope Stability

5.1.9 Air Quality

5.1.10 Noise Level

5.1.11 Water Quality

5.1.12 Land Use Pattern

5.1.13 Solid Waste Management

5.2 Biological Environment

5.2.1 General

5.2.2 Types of Forest by Vegetation

5.2.3 Types of Forest by Ownerships

5.2.4 Distribution of Tree Species on site

5.2.5 Trees to be felled on site

5.2.6 Ecological Resources Use

5.2.7 Ethno-Botanical Knowledge and Practice

5.2.8 Fauna in the Project Area

5.2.9 Aquatic Biology and Fisheries

5.2.10 Protected, Rare or Endangered Flora and Fauna Species

5.2.11 Protected Areas

5.3 Socio-economic and Cultural Environment (Caste, Ethnic & Gender disaggregated information shall be required)

5.3.1 Demography of the Project Area

5.3.2 Caste, Ethnicity, Religion and Language

5.3.3 Settlement Pattern and Housing Structures

5.3.4 Profile of Project Affected Families

5.3.5 Gender Situation

5.3.6 Profiles of Service Providing Institutions

5.3.7 Access to GoN Service facilities

5.3.8 Access to Private Service facilities

5.3.9 Occupational Status

5.3.10 Work Force and Employment

5.3.11 In and Out Migration Pattern

5.3.11 Land Holding Pattern

5.3.12 Land Use Pattern

5.3.13 Land Value

5.3.14 Agriculture Practices

5.3.15 Food Sufficiency Level

5.3.16 Off-farm Activities

5.3.17 Household Income and Expenditure

5.3.18 Mode of Transportation

5.3.19 Sources of Energy

- 5.3.20 Historical, Cultural, Religious and Aesthetic Sites and Values
- 5.3.21 Local NGOs and Community Based Organizations
- 5.3.22 Identification of Vulnerable Groups
- 5.3.23 Vulnerability of Project Affected Families

6. Consultations and Public Hearing

- 6.1 Consultations with local communities and stakeholders
- 6.2 Public Notice and Public Hearing
- 6.3 Public Consultation and Disclosure Plan

7. Alternatives of the proposal

- 7.1 Matter concerning the design of the project, project site, technology, operation procedure, time –schedule and raw materials to be used, E&S analysis of alternatives, selection of final options
- 7.2 No Action Alternative/Do Nothing Scenario

8. Specific Impacts of the implementation of the proposal on the environment

- 8.1 Beneficial Impact
- 8.2 Adverse Impact
 - 8.2.1 Physical environment
 - 8.2.1.1 Construction phase
 - 8.2.1.2 Operation phase
 - 8.2.1.3 Decommissioning phase
 - 8.2.2 Biological environment
 - 8.2.2.1 Construction phase
 - 8.2.2.2 Operation phase
 - 8.2.2.3 Decommissioning phase
 - 8.2.3 Socio-economic and cultural environment (*Restriction on access to natural and community/public resources, Loss of Common Property Resources (CPR), etc.*)
 - 8.2.3.1 Construction phase
 - 8.2.3.2 Operation phase
 - 8.2.3.3 Decommissioning phase

9. Impact Analysis and Evaluation

- 9.1 Impact analysis and evaluation
- 9.2 Significance of the Impacts (Scoring Tables)

10. Measures to reduce or control the impact of the implementation of the proposal on environment

- 10.1 Institutional Arrangement for ESMP implementation
- 10.2 Summary of Benefit Augmentation and Mitigation Cost (EMP Cost)

11. Environmental Monitoring and Audit

- 11.1 Environment Monitoring Plan
- 11.2 Institutions Role in Project
- 11.3 Environmental Monitoring Organization Structure
- 11.4 Environmental Audit

12. Conclusions

References Annexes

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1. Appendix: Checklist for Physical and Chemical Environment, Flora and Fauna

Checklist for Physical and Chemical Environment

A. Topography

1. Study of Topographic maps/ other available maps and identify the ground topographic characteristics of land covered by the proposed project
2. Verify the topographic characteristics of the land in the field
3. Soil Type
4. Geological Map/Google map

B. Climate and Hydro-Meteorology

1. Study of published data of regarding temperature, rainfall, humidity, wind speed and direction, solar radiation
2. If possible classify the climatic zone and its verification
3. Visit the meteorological office of the district and get latest information
4. Water resources/ water resource zone: Information about the water resource of the affected area and its watershed zone will be studied
5. Drainage pattern

C. Air Quality

1. Collect any data on air quality of the area from previous literature
2. Investigate on the air polluting activities of the area (traffic, biomass burning, industries, other anthropogenic activities)

D. Erosion and land Stability

1. Identification of flood prone area along the project area

Maps, photographs, freehand drawings etc. needs to be added to make it more sites specific

E. Land Use

1. Investigate on the land use of the Project Blocks from the topo-maps, and other available land use maps
2. Investigate the land use affected by the project structures and subsidiary facilities
3. Investigate on the land use potentials of the proposed project area

Forest and Vegetation

1. Forest Classification by types (by association, Format- A1)
2. **Forest Area** (By Management Categorisation as per Forest Act and Forest regulation): The areas shall be delineated according to following classification:
 - a. Community Forest
3. Management status and forest management groups (if any) and importance of these forests shall be discussed. In case of community forest **estimation of the boundary of the community forest** area from the field survey and available records, constituted member, purpose of usage of community forest on application, item of forest products, frequency of gathering forest products will also be discussed.

The opinion of the key stakeholders of forest management will be gathered and presented.

4. **Wild Forest Vegetation Biodiversity observed:** List of tree, shrub, herb, pteridophytes, bryophytes, lichens and fungi found within the influence area of the project will be prepared.
5. Agro-vegetation Diversity Observed
6. **Ethnobotanical Use:** The above vegetation species will also be tabulated according to local ethno-botanical uses (such as timber, fodder, NTFP, ornamental, medicinal, food value etc.).
7. **Conservation significance:** The species found shall also be categorized according to IUCN/ CITES APPENDIX and Government of Nepal Protection category, as rare, endangered, endemic, vulnerable, etc.
8. **Biomass and wood Stock:** The vegetation lying within the directly affected area (areas required for construction and placement of spoils or other infrastructure facilities), particularly tree species shall be inventoried for trees above 10 cm DBH for biomass and wood stock as per Forest Regulation norms or any other international norms
9. **Status of vegetation:** In the affected areas, frequency of occurrence, importance value index, and density per ha shall be calculated. Besides vertical stratification of forest i.e. upper story, middle story, lower story along with status of trees, pole, saplings, seedlings, shrubs, herbs, pteridophytes, bryophytes, lichens and fungi shall be described.
10. **Water resources/ water resource zone:** Information about the water resource of the affected area and its watershed zone will be studied including the aquatic biota of the area.

2. Appendix: Checklist for Social Survey

Checklist for Social Survey

1. The socio-economic background of the respondents
2. The education background of the respondents
3. Occupation status of the respondents
4. Environmental conditions of the project area
5. Use of the Community Forest located on site, purpose
6. Flora and fauna around the project area
7. Aquatic condition and species around the area
8. Potential disasters due to the Dano River, past events, experience and impact
9. Economic income of the households
10. The role of agriculture production for their livelihood
11. Detail about the agricultural production
12. If they are classified as PAP, distance to the project site, their perception about the proposed project, expectations, concerns, comments, suggestions, etc
13. Potential willingness to increase the agro production due Export -oriented Agricultural Wholesale Market in Semlar, Butwal” market development
14. Potential benefits from the Proposed Project
15. Energy, fuel source in the project area, water source, other resources source
16. Interaction and support from NGOs, other projects in the project area focus on agriculture

These are the some of the questions that need to discuss while the filed observation. These questionnaires give that the socioeconomic and general impression of the local communities' livelihood, perception of the project. The question list to be used in:

- Focus group discussions
- Women group focus group discussions
- Households that live in the next vicinity of the project
- Consultation in ward 15, 16, ward 1 (sainamaina) – 13, 14 (neighbouring)

3. Appendix: Methodology of EIA

Impact Identification, Prediction and Assessment/Evaluation Method

The environmental impact assessment methodology is presented through the following steps:

1. **Step 1 identify sensitive areas and receptors** that may be impacted by the project;
2. **Step 2 describe potential impacts** on receptors/ areas associated with project development;
3. **Step 3 undertake the impact assessment by scoring the impacts**

The steps listed above are explained in the text that follows.

10.1.1.1.1 Step 1 identify sensitive receptors and/or areas

The impact assessment starts with the identification of the sensitive receptors/ areas that may be impacted by the project development, e.g., physical, biological and social receptors .

10.1.1.1.2 Step 2 describe potential impacts on receptors/areas

Once the receptors/areas are identified, the next step is to describe the potential impacts. This is done considering the technical details of the project, expected emissions and discharges and applying the baseline conditions of the project site, project area.

10.1.1.1.3 Step 3 undertake the impact assessment by scoring the impacts

Finally the impact assessment is done. Each identified potential impact will be analysed and scored based on five criteria. These criteria and the defined scaling system is presented in Table. The scaling system and scores are further elaborated in the text below. The lower the score, the smaller are the impacts.

Table: Definition of the scaling system used to evaluate each impact of the Impact Assessment

| Criteria and the Scale used for the Impact Evaluation | | | | | | |
|--|--------------------------------------|------------|---|-------------|--|--|
| Probability of Occurrence | | | | | | |
| Remote (0) | Very Low (1) | Low (2) | Medium (3) | High (4) | Certain (5) | |
| Area of Influence (Extent in space) | | | | | | |
| No Impact (0) | Within project area footprint (1) | | Within or the vicinity of the project area (2-3) | | Within, vicinity or/and extended area (4-5) | |
| Duration | | | | | | |
| Hour | Days | Wee | Mont | Years | Perman | |

| | | | | | |
|--------------------------------------|--------------------------------------|------------------------|--|-----------------------------|---------------|
| Hours to Days (0) | Days to Weeks (1) | Weeks to Months (2) | Months to Years (3) | Years to Decades (4) | Permanent (5) |
| Magnitude | | | | | |
| None (0) | Very Low (1) | Low (2) | Medium (3) | High (4) | Very High (5) |
| Mitigation Potential | | | | | |
| Total Mitigation (0-1) | Total Mitigation with Difficulty (2) | Partial Mitigation (3) | Partial Mitigation with Difficulty (4) | Mitigation Not Possible (5) | |
| Total Qualification of Impact | | | | | |
| None (0) | Very Low (1) | Low (2) | Medium (3) | High (4) | Very High (5) |

Probability of Occurrence – Expresses the likelihood that an impact will occur as a result of project activities. This variable is defined as: remote (0), very low (1), low (2), medium (3), high (4), and certain (5).

Area of Influence (AOI) – Represents the extent in space of the impact. The ranking varies between 0 and 5, related to the size of the area of influence: Potentially impacted areas are ranked as no impact (0), within the boundaries of the project area (1), impacts to receptors in the general area (comprising the project area footprint and the vicinity to the project area (2-3), impacts to receptors further afield of the project likewise aquifer, or catchment of water body (4-5).

Duration – Measures the length of time an impact persists. Duration categories are as follows: hours to days (0), days to weeks (1), weeks to months (2), months to years (3), and years to decades (4). If the impact lasts continuously and indefinitely, it is considered permanent (5).

Magnitude – Evaluates the severity of the impact, with the following categories: none (0), very low (1), low (2), medium (3), high (4) and very high (5). The presence of existing impacts is considered when evaluating the magnitude of the potential impact to existing local conditions.

Mitigation Potential – Indicates the ease (in terms of time, effort, and cost) with which the following levels of mitigation can be achieved through preventive and/or reactive measures: total mitigation (0-1), total mitigation, but with difficulty (2), partial mitigation (3), partial mitigation with difficulty (4), and mitigation not possible (5).

Total Qualification/Evaluation of Impact – The overall severity of the impact is assessed as the weighted average of the above listed parameters. The total qualification is calculated by taking the average score of all characteristics and applying the following weight factors:

Table: Applied weight factors

| Category | Attributed weight factor |
|---------------------------|--------------------------|
| Probability of Occurrence | 25 % |
| Area of Influence | 10 % |
| Duration | 10 % |
| Magnitude | 45 % |
| Mitigation potential | 10 % |

Weight factors are proposed, in order to better differentiate between the severity of the different criteria. The reason for this was that the criteria “area of influence” “duration” and “mitigation potential” are not very distinctive, meaning the scoring is similar for all criteria. The Probability of Occurrence has been given a higher weight factor, because for certain impacts it is highly unlikely if they will occur. Such impacts should receive a lower total impact score. The Magnitude has been given the highest weight factor, because this is the key impact to determine the severity of the impact. If an impact scores high on the other criteria, but has a very low score on Magnitude, it should still be considered a minor impact.

The weighted averages result in the following total qualification of the impacts: none (0), very low (1), low (2), medium (3), high (4), and very high (5). Impacts which weighted average score 3 or higher are considered significant and additional mitigation measures are considered for these impacts.

Direct impacts – Potential impacts that result from a direct interaction between the project (construction and operation) and a resource/receptor (e.g. between development of a plot of land and the habitats which are affected).

Indirect impacts – Potential impacts that follow on from direct interactions between the project and its environment, such as a result of interactions between different aspects of the environment (e.g. viability of a species population resulting from habitat loss as a result of the Project developing a plot of land).

4. Appendix: Methodology for Vegetation Survey

Methodology for Vegetation Survey

Site visits, transect survey and forest inventory using plot method will be carried out.

Forest inventory will be carried out to identify number of trees that will be cleared up for implementation of the Project using sample plot method.

Vegetation status, forest area, medicinal plants and non-timber forest product (NTFP) will be documented in accordance with the established and prevailing norms and practices.

Forest survey will allow characterizing forest resources and their quality within the entire DIZ and IIZ. Habitat quality of forest areas will be noted for any natural and critical natural habitats.

Sample plots will be laid exactly following a systematic sampling technique, where identification of first point is randomly laid and rest of the sample plots are laid systematically on the predetermined vegetated area along the proposed project area. **Total number of sample plots to be laid will be determined during the scoping exercise.**

Each sampling plots with a mosaic have three (tbd) different sizes of plots within it. The outer plot will be 400 sq. m area (20 m X 25 m) for enumeration of tree species, second sub-plot of 100 sq. m. (10 m X 10 m) for measuring pole trees, 25 sq. m area (5 m X 5 m) within the outer plot for the enumeration of saplings and shrub species and finally, fourth number of 1 sq. m (1 m X 1 m) plots in the corner of outer plot for regeneration and herb species will be laid.

The number of trees and volume of timber to be cleared will be estimated using quarter girth formula. The procedure followed is in accordance with the Government of Nepal proposed procedure.

Data analysis

In case of tree species, basal area and relative dominance will be calculated by using the following formulae:

$$\text{Basal Area (BA)} \\ \text{(Area occupied at breast height)} = (\text{Circumference})^2 / 4\pi$$

The Standing Tree Volume will be calculated on the basis of following formula:

$$\text{Ln}(v) = a + b \times \text{Ln}(d) + c \times \text{Ln}(h)$$

[Where a , b and c are volume constants, d : diameter at breast height and h : height of the tree]

The tentative cost of forest clearance at project site, including cost required for compensatory re-plantation in the ratio of 1:25 and its protection and rearing for 5 years (according to Working Policy on Construction and Operation of Physical Infrastructures, as required by the MoFE. Details of which, including the costs, silvicultural techniques of maintenance and rearing, training and extension required to not to further deteriorate the floral and faunal environment will be estimated and presented in detail in the EIA final report.

The area required for the compensatory re-plantation will be estimated and identified by consulting with respective FUGs and district forest offices during EIA study. For the baseline state of the project area, in addition to above tools, interaction with DFO office staff and Forest User Groups (FUGs), capturing the state of forests and other environmental conditions through photographs, interviews, reference to secondary data etc. will be adopted in this regard.

Documentation of vegetation status, endangered plants, medicinal and non-timber forest products (NTFPs) will be recorded and likely impact upon and its user group will be identified and will be presented in the final EIA report.

5. Appendix: Methodology for Flooding Risk Assessment

Methodology for Flooding Risk Assessment

Flood risk assessment in 5 steps

Global Flood Risk Tool conducts a thorough flood risk assessment through a 5-steps approach and delivers a set of customized flood risk reduction strategies (see figure below). All steps are interlinked which means that when any



parameter is changed the whole assessment is updated. The tool is complemented cost databased based on reference projects and broad international experience..

GFRT 5 steps approach

Step 1: Flood Hazard



The GFRT will calculate and visualise the flood hazard, providing flood maps for multiple return periods and scenarios based on existing water levels³ and high-resolution topographic data.

Step 2: Flood Damage



Next, the geospatial distributed economic damage is calculated and visualised, providing economic damage maps per return period and damage graphs based on land uses in a given area for each scenario specified in the first step.

Step 3: Flood Risk



Through risk maps and risk graphs we'll calculate and visualise your flood risk, including calculated damage and

³Total Management Services Pvt. Ltd. (2019) Preparation of Hazard Map and Fixing Warning and Danger Level at Flood Forecasting Station of East Rapti and Tinau River.

annual expected and avoided damage for the different scenarios.

Step 4: Flood Measures



To help you transform the information gained in steps 1, 2 and 3 into next steps we'll draw conceptual flood measures based on a multi-level safety approach and include information on investment costs for the various protection levels.

Step 5: Business Case



The business case is provided, including an overview of the optimum investment level with subsequent protection levels for the specified scenarios. Furthermore, benefit cost ratios and net present values of derived measures will be calculated.

**10. Minutes of consultations during the Scoping Phase of the EIA,
including the notice and other associated documents**

मिति: २०७९।३।२२ गते
बुधबार २:०० बजे

नेपाल सरकारसँगको साभेदारी र नेदरल्याण्ड्स सरकारको सहयोगमा १७ डिसेम्बर २०१९ देखि संचालित Develop2 Build (D2B) D2B18NP01: Development of Agriculture Value Chain Infrastructure in Nepal परियोजनाको दोश्रो चरण (Phase 2) अन्तर्गत बुटवल उपमहानगरपालिकाको वडा नं १५ सेमलारमा अत्याधुनिक निर्यातमुलक कृषि बजार निर्माणका लागि विस्तृत सम्भाव्यता अध्ययन (Detail Feasibility Study) कार्य भईरहेको छ । यसै सन्दर्भमा विकास साभेदारीको तर्फबाट २०७९ असार २०-२६ गते सम्म आउने मिसन टोलिबाट तय भए बमोजिम बुटवल उपमहानगरपालिका र परियोजनासँग सम्बद्ध निकायहरूसँग आवश्यक छलफल र भेटघाट कार्यक्रम बुटवल उपमहानगरपालिकाका प्रमुख श्री खेलराज पाण्डेयज्यूको अध्यक्षता र देवदत्त बमोजिमको उपस्थितिमा सम्पन्न गरीयो ।

उपस्थिति:

- खेलराज श्री खेलराज पाण्डेय : प्रमुख-बुटवल उपमहानगरपालिका, रुपन्देही
- श्री फणेन्द्र प्रसाद शर्मा : प्रमुख-सैनामैना नगरपालिका, रुपन्देही
- श्री सावित्रादेवि अर्याल : उप प्रमुख- बुटवल उपमहानगरपालिका ,रुपन्देही
- श्री बिना राना : उप प्रमुख- सैनामैना नगरपालिका, रुपन्देही
- श्री गोविन्द प्रसाद शर्मा : सचिव- कृषि तथा पशुपन्छी विकास मन्त्रालय, काठमाण्डौ
- श्री याम नारायण देवकोटा : सचिव कृषि ,खाद्य प्रविधि तथा भूमि व्यवस्था मन्त्रालय, लु. प्रदेश
- वीरेन्द्र श्री वीरेन्द्रदेव भारती : प्रमुख प्रशासकीय अधिकृत- बुटवल उपमानगरपालिका, रुपन्देही
- शिव श्री शिव राना : वडा अध्यक्ष -वडा नं १५ बुटवल उपमहानगरपालिका ,रुपन्देही
- कृष्ण श्री कृष्ण प्रसाद पौडेल : वडा अध्यक्ष- वडा नं १६ बुटवल उपमहानगरपालिका ,रुपन्देही
- भुवा श्री भुवा प्रसाद लुईटेल : आर्थिक विकास महाशाखा प्रमुख- बुटवल उपमहानगरपालिका
- सुमन श्री सुमन श्रेष्ठ : सहरी पूर्वाधार विकास महाशाखा प्रमुख- बु.उ.म.न.पा.
- श्री बोधराज सुवेदी : डिभिजनल वन अधिकृत - डिभिजन वन कार्यालय , रुपन्देही
- श्री देवि बहादुर भण्डारी : मालपोत अधिकृत -मालपोत कार्यालय बुटवल रुपन्देही
- श्री सन्दिप अर्याल : नापी अधिकृत -नापी कार्यालय बुटवल ,रुपन्देही
- श्री सन्तोष जि.सि : कृषि विकास शाखा प्रमुख- बुटवल उपमहानगरपालिका
- श्री राम प्रसाद पन्थी : भू उपयोग तथा भूमि व्यवस्थापन शाखा- बुटवल उपमहानगरपालिका

श्री जे.एन. पाण्डेय : प्रमुख, कृषि प्रविधि विभाग तथा कृषि आनीकान् उपसुतकेन्द्र

श्री ए.ए. पाण्डेय : उपमल ३१२, IFAD

ERIC PEREIRA, ROYAL HASKONING DHV.

ROBERT BOUSTEAD, INVEST INTERNATIONAL.

Violeta Pagini, Royal Haskoning DHV

श्री श्री विनाय सिक्दरेल TMS

Dil Maya Dhakal TMS Dinayal

DATE:

शुभराज परिवार ल

FMS

[Signature]

मेजा प्रसाद पाठक

परिचय नमः सा. ७.११.१९६४
सु. वि. वि. अ. प्रवेश

[Signature]

शुभराज पाठक

नेपाल एग्रीकल्चरल इन्वेलपमेन्ट बोर्ड (NABIC) M

शुभराज राज पौडेल, वलिक - धरि अर्च विज, कृषि प्रो. वि. वि. अ. प्रवेश
अमरराज शमिधिमिरे, व. कृ. वि. अ. प्रवेश कृ. मन्त्रालय

त्रिदेव वडामोचि - न. उ. वि. अ. प्रवेश

मदन पौडेल - न. उ. वि. अ. प्रवेश

लक्ष्मी अर्चान - न. उ. वि. अ. प्रवेश

शोभा आचार्य - न. उ. वि. अ. प्रवेश

सोमन प्रसाद कुमारी - कृषि विद्यालय - ७२९७

रवि प्रसाद पाठक - कृषि विद्यालय - ७२९७

कृषि बजार परियोजना

सेमलार, बुटवल उपनगर महापालिका

कार्यक्षेत्र निर्धारण अध्ययन (Scoping Study)

छलफल कार्यकममा उपस्थित सहभागीहरुको नाम

मिति: २०७९/०३/२३.

स्थान: साठराभारे

वार्ड नं. १५

शानुदाजिङ वन

छलफलमा सहभागीहरुको समूहको नाम:

| क्र.सं. | नाम | तिङ्गा | उमेर | जातजाति | पेशा | दस्तखत |
|---------|---------------------|---------|------|-----------|----------|---|
| १ | रुमा डालाङ थापाकोशी | का. कु. | ५९ | काठमाण्डौ | बैँघर |  |
| २ | कुमिलालाङ कुँडेल | का. कु. | ७३ | काठमाण्डौ | कुँडा |  |
| ३ | सुजापती खामु | कु. | ५१ | काभ्रेपट | कृषि |  |
| ४ | देवी ड. राप्ता | कु. | ६३ | बाजुरा | ब्यापार |  |
| ५ | सिकर खोला खोला | कु. | ६२ | बाँके | क्याबल |  |
| ६ | शमशेर थापा | कु. | ९६ | काठमाण्डौ | शिल्पकार |  |
| ७ | सुभाषा कुँडेल | कु. | ७० | काठमाण्डौ | कृषि |  |
| ८ | सुभाषा कुँडेल | कु. | ६९ | " | क्याबल |  |
| ९ | शमशेर ड. थापा | का. कु. | ४५ | बाँके | कृषक |  |

कृषि बजार परियोजना

सेमलार, बुटवल उपनगर महापालिका

कार्यक्षेत्र निर्धारण अध्ययन (Scoping Study)

छलफल कार्यक्रममा उपस्थित सहभाषिहरूको नाम

स्थान: डोल्डा अन्डिङ

वार्ड नं. १५

सांख्यिकीयक बल

मिति: २०७९/०३/२३

छलफलमा सहभाषिहरूको समूहको नाम:

| क्र.सं. | नाम | लिंग | उमेर | जातजाति | पेशा | दस्तावेज |
|---------|----------------------|-------|------|-----------|-------|----------|
| १० | धन प्रसाद पौडेल | पुरुष | ४६ | काष्ठमजुर | उपचार | |
| ११ | कमला शिर | " | ४८ | " | जानी | |
| १२ | नूल बहादुर गौडा थापा | " | ४२ | मजुर | कृषि | |
| १३ | दरि प्रसाद कोइल | " | ६६ | काष्ठमजुर | कृषि | |
| १४ | कमल बहादुर खड्का | " | ६० | सुनी | कृषि | |
| १५ | अमन शर्मा खड्का | " | ३३ | बासना | कृषि | |
| १६ | पुष्प प्रसाद कोइल | " | ४२ | " | उपचार | |
| १७ | गणेश प्रसाद पौडेल | " | ४५ | " | " | |
| १८ | शारदा शिर | " | २६ | बासना | " | |

कृषि बजार परियोजना

सेमलार, बुटवल उपनगर महापालिका

कार्यक्षेत्र निर्धारण अध्ययन (Scoping Study)

छलफल कार्यकममा उपस्थित सहभागीहरुको नाम

मिति: २०७९/०३/२३

वार्ड नं. ०१४

स्थान: जणेश्वर अस्ट्रिय
शासक/साथिपक बज

छलफलमा सहभागीहरुको समूहको नाम:

| क्र.सं. | नाम | लिंग | उमेर | जातजाति | पेशा | दस्तावेज |
|---------|------------------------|------|------|----------|----------|--------------|
| ११५ | दिनेश्वर दास उपाध्यक्ष | पु | ४१ | ब्राह्मण | आयत्तिय | दिनेश्वर |
| ११०. | बाबुराम डामाल | " | ४८ | " | कृषि | बाबुराम |
| १११ | रमेश सापकाटे | प | २६ | " | कृषि | रमेश |
| ११२ | गोरायण पाँडे | प | ४५ | " | आयत्तिय | गोरायण |
| ११३ | गोर्खा डामाल | पु | ४८ | " | आयत्तिय | गोर्खा |
| ११४ | हरिकृष्ण उपाध्यक्ष | पु | ६३ | " | कृषि | हरिकृष्ण |
| ११५ | उमान कुशी | पु | ४२ | कुशी | कृषि | उमान |
| ११६ | उदररानी डामाल | पु | ५१ | ब्राह्मण | कृषि | उदररानी |
| ११६ | ERIC PEREIRA | M | ५० | | ENGINEER | ERIC PEREIRA |

कृषि बजार परियोजना

सेमलार, बुटवल उपनगर महापालिका

कार्यक्षेत्र निर्धारण अध्ययन (Scoping Study)

छलफल कार्यक्रममा उपस्थित सहभागीहरुको नाम

मिति: २०७९/०३/२३

स्थान: शौचा अभिे र
सामुदायिक कल

वार्ड नं. १२

छलफलमा सहभागीहरुको समुहको नाम:

| क. सं. | नाम | लिंग | उमेर | जातजाति | पेशा | दस्तखत |
|--------|------------------|-------|------|---------|---------------|--------|
| १८ | Robin Boustean | M | ५३ | - | व्यसन | RO |
| १९ | Beda Saidu Riyal | M | ५७ | Brahman | Agriculture | Shree |
| २० | श्री कृष्ण शर्मा | पुरुष | २६ | शर्मा | कृषि | Shree |
| २१ | Nidha Paganu | F | ४१ | Chhetri | MS Advisor | Shree |
| २२ | Shiva Rana | M | २९ | Magar | Ward Chairman | Shree |
| २३ | Bhushen Sheh | M | ५७ | Chhetri | Consultant | Shree |
| २४ | Dharmraj Sharma | M | ५७ | " | " | " |
| २५ | Bimal Paudyal | M | ५९ | Brahmin | " | " |
| २६ | गणेश शर्मा | M | ५० | " | " | " |

कृषि ब

सेमलार, बुटवार

कार्यक्षेत्र निर्धारण अ

छलफल कार्यक्रममा र

स्थान: क्षेत्राला, बाजिआथेल वार्ड नं. १५

छलफलमा सहभागीहरुको समुहको नाम:

| क्र. सं. | नाम | लिङ्ग |
|----------|-------------------|-------|
| १. | गणेश्वर १९. (सि.) | पु. |
| २. | गणेश्वर २०. (सि.) | पु. |
| ३. | गणेश्वर २१. (सि.) | पु. |
| ४. | गणेश्वर २२. (सि.) | पु. |
| ५. | गणेश्वर २३. (सि.) | पु. |
| ६. | गणेश्वर २४. (सि.) | पु. |
| ७. | गणेश्वर २५. (सि.) | पु. |
| ८. | गणेश्वर २६. (सि.) | पु. |
| ९. | गणेश्वर २७. (सि.) | पु. |

कृषि

सेमलार, बुटार

कार्यक्षेत्र निर्धारण :

छलफल कार्यक्रममा

स्थान: सेमलार वीजाला टीला

वार्ड नं. ०५

छलफलमा सहभागिहरुको समुहको नाम:

| क्र. सं. | नाम | लिङ्ग |
|----------|--------------------|-------|
| १० | चिरुङ्कीवी लामसाल | पु. |
| ११ | पुप आचार्य | " |
| १२ | उत्तम प्रसाद खड्का | " |
| १३ | केस राज आचार्य | पु. |
| १४ | फोला राज आचार्य | पु. |
| १५ | बसु नाम उपर्याय | पु. |
| १६ | प्रकाश को | पु. |
| १७ | श्याम कु.ली | पु. |
| १८ | विष्णु काडुवा | पु. |

कृषि बजा:

सेमलार, बुटवल :

कार्यक्षेत्र निर्धारण अध्याय

छलफल कार्यक्रममा उर्पा

स्थान:

वार्ड नं.

छलफलमा सहभागिहरुको समुहको नाम:

| क. सं. | नाम | लिंग | उ |
|--------|----------------------|-------|----|
| १९ | शक्ति प्रसाद ठकाल | पुरुष | २५ |
| २० | कण प्रसाद श्रेष्ठ | ॥ | ६० |
| २१ | शक्ति प्रसाद श्रेष्ठ | ॥ | ६० |
| २२ | शतलाल मगर | ॥ | ५५ |
| २३ | ERIC PEREIRA | | ५९ |
| २४ | ERSON BOUTERAN | M | ५० |
| २५ | Violata Pagan | F | ५५ |
| २६ | Mahendra N. Poudel | M | ५७ |
| २७ | Bahy Debm Bhysal | m | ५३ |

कृषि बज

सेमलार, बुटवल

कार्यक्षेत्र निर्धारण अष्ट

छलफल कार्यकममा जा

स्थान: सेमलार, रोजाना टोल वार्ड नं. १५

छलफलमा सहभागिहरुको समुहको नाम:

| क्र. सं. | नाम | लिङ्ग | |
|----------|-------------------|-------|----|
| २८ | सुब्य प्रगाथ कृषक | पु. | ४ |
| २९ | अनन्त टुगा | अ. | ५ |
| ३० | मधुसूदन थापा | पु. | ४५ |
| ३१ | बेदुसिंह रिजाल | पु. | ५६ |
| ३२ | अनन्त थापा | पु. | ५७ |
| ३३ | अनन्त थापा | पु. | ५८ |
| ३४ | अनन्त थापा | पु. | ५९ |
| ३५ | अनन्त थापा | पु. | ६० |
| ३६ | अनन्त थापा | पु. | ६१ |

कृषि बर
 सेमलार, बुटवल
 कार्यक्षेत्र निर्धारण अर्ह
 छलफल कार्यक्रममा उ

स्थान: सेमलार, वीजिला क्षेत्र वार्ड नं. १२

छलफलमा सहभागिहरुको समुहको नाम:

| क्र. सं. | नाम | लिंग |
|----------|---------------|------|
| १ | जोहार सुवाल | पु |
| २ | गणेश प्रसाद | " |
| ३ | मधुसूदन शर्मा | प |
| ४ | बसन्त शर्मा | प |
| ५ | शारदा शर्मा | म |
| ६ | बसन्त शर्मा | प |
| ७ | शारदा शर्मा | म |
| ८ | बसन्त शर्मा | प |
| ९ | शारदा शर्मा | म |

कृषि बर

सेमलार, बुटवल

कार्यक्षेत्र निर्धारण अठ

छलफल कार्यक्रममा उ

स्थान: रौतजला (कञ्चनपुर जिला) वार्ड नं. १५

छलफलमा सहभागीहरुको समुहको नाम:

| क्र. सं. | नाम | लिंग | |
|----------|--------------|-------|--|
| ४५ | इमा कुँवर | महिला | |
| ४६ | सुजिता कुँवर | म | |
| ४७ | सुजिता कुँवर | म | |
| ४८ | सुजिता कुँवर | म | |
| ४९ | सुजिता कुँवर | म | |
| ५० | सुजिता कुँवर | म | |
| ५१ | सुजिता कुँवर | म | |
| ५२ | सुजिता कुँवर | म | |
| ५३ | सुजिता कुँवर | म | |
| ५४ | सुजिता कुँवर | म | |
| ५५ | सुजिता कुँवर | म | |

कृषि

सेमलार, बुट

कार्यक्षेत्र निर्धारण

छलफल कार्यक्रम

स्थान: स्तम्भार, अठ्ठिमखोला वार्ड नं. ०५

छलफलमा सहभागिहरुको समुहको नाम:

| क्र. सं. | नाम | लिङ्ग |
|----------|----------------------------|-------|
| ४३ | शम्भुसार्क - चापागाई | पु |
| ४४ | श्रीधर लामा/श्रीधर अग्रवाल | पु |
| ४५ | अमल श्रेष्ठ | पु |
| ४६ | सुनील रवि शर्मा | पु |
| ४७ | राम लाल शर्मा | पु |
| ४८ | शम्भुसार्क - पत्नी | म |
| ४९ | सुनील शर्मा | पु |
| ५० | सुनील शर्मा | पु |
| ५१ | सुनील शर्मा | पु |
| ५२ | सुनील शर्मा | पु |

जसमें कुछ खाद्या तथा कृषि यांत्रिक रण प्रौद्योगिकी
 लालिहा वल प्रस्तावित कुशल उप-ग्रहनागपालिका वडा
 वडा क्षेत्रमा निर्माण हुने बाकि तरकारी बजार निर्माण
 तथा सन्पालन सम्बन्धी वातावरणीय प्रभाव मूल्याङ्कन प्रतिवेदन
 तयारीको क्रममा क्षेत्र निर्धारण क्रममा निर्मा २०७ डीडा
 क्षेत्रले कुशल तरकारी बजार समूहमा कक्षा मा ७ छत पुग्न
 क्रममा निर्माण अनुसूची उपलब्धी रहेको।

नाम पद हस्ताक्षर
 १. महेश्वरनाथ पौडेल प्रमुख वडा खाद्या तथा कृषि
 मालापालिका उपमुख्य वडा

२. निर्माता पक्षी पुं. डा. उपजु लाम निर्माता
३. वल्लभ सुवाल वडा अध्यक्ष वडा अध्यक्ष
४. विनाय पौडेल वडा अध्यक्ष " " "
५. मोहन पौडेल वडा अध्यक्ष " " "
६. डा. विनाय पौडेल TMS
७. सुन्दर ज्ञे. वि. शा. कुशल वडा अध्यक्ष
८. कवि शर्मा " " "
९. विनाय पौडेल वडा अध्यक्ष
१०. मो. पा. कुशल वडा अध्यक्ष
११. धनराज सुवाल वडा अध्यक्ष
१२. राम बहादुर राई वडा अध्यक्ष
१३. अरुण गौरी, IFAD
१४. ERIC PEREIRA - Royal Hollowing Univ
१५. Violeta Paganu, Royal Hollowing Univ
१६. R. Bro Boujard, INVEST INTERNATIONAL
१७. Bhushan Shah NABIZ
१८. सुन्दर सुवाल वडा अध्यक्ष
१९. अरुण गौरी वडा अध्यक्ष
२०. कृष्ण सुवाल वडा अध्यक्ष
२१. सुन्दर सुवाल वडा अध्यक्ष
२२. कवि शर्मा वडा अध्यक्ष
२३. विलास सुवाल वडा अध्यक्ष

प्रश्नपत्र प्रकरणमा प्राध्यापक नै दोषी



सौर्य समाचार

काठमाडौं । त्रिभुवन विश्वविद्यालयको हबहु प्रश्नपत्र प्रकरणमा प्राध्यापक नै दोषी रहेको पाइएको छ । शिक्षा तथा स्वास्थ्य समितिको विहीवारको बैठकमा त्रिविका उपकुलपति धर्मकान्त बाँस्कोटाले प्रश्नपत्र बनाउने प्राध्यापकको लापरवाहीले प्रश्नपत्र हबहु भएको जानकारी दिए ।

'प्रश्नपत्र बनाउने जिम्मा पाएका प्राध्यापकले अल्छी गरेर पहिले बनाएको प्रश्नपत्र नै दिने र अर्को बनाएको प्रश्नपत्र सार्नेजस्ता समस्या देखिए' उनले भने, 'प्राध्यापकको अल्छीका कारणले प्रश्नपत्र दोहोरिएको हो ।'

उनले त्रिविको परीक्षामा प्रश्नपत्र हबहु सम्बन्धमा सम्बन्धित प्राध्यापकलाई कारवाही गरिएको बताए । त्रिविले प्रश्नपत्र हबहुका सम्बन्धमा प्राध्यापक घनश्याम भट्टराईको संयोजकत्वमा तीन सदस्यीय छानविन समिति गठन गरेको थियो । सोही छानविन समितिको सिफारिसमा तीन जना प्राध्यापकलाई कारवाही गरिएको उनले बताए ।

त्रिविमा मानविकी संकायले गत जेठ १८ गते स्नातकोत्तर तह तेश्रो सेमेष्टरको अर्थशास्त्र विषयअन्तर्गत 'पब्लिक इकोनोमिक्स' र जेठ २२ गते स्नातकोत्तर तहको राजनीतिशास्त्रको

बाँकी पृष्ठ २

भुसाल र भट्टराईबीच प्रतिस्पर्धा

संसद्को आयु सकिन लाग्दा उपसभामुखको खोजी



सौर्य समाचार

काठमाडौं । रिक्त भएको करिब दुई वर्षपछि प्रतिनिधिसभाको उपसभामुख पदको निर्वाचन शुक्रवार हुने भएको छ । लामो समयसम्म कसैले चासो नदेखाएको उपसभामुख पदको निर्वाचन प्रतिनिधिसभाको आयु सकिनै लाग्दा हुन लागेको हो ।

संसद्को कार्यकाल सकिन करिब चार महिना मात्र बाँकी रहँदा किन उपसभामुख निर्वाचनको आवश्यकता महसुस भयो भन्ने विषयमा यतिवेला विभिन्न अडकल सुरु भएको छ । उपसभामुख पदका लागि नेपाली सरकारको नेतृत्व गरिरहेको दल कांग्रेसबाट पुष्पा भुसाल र प्रमुख प्रतिपक्षी दल नेकपा एमालेबाट विद्या भट्टराईको उम्मेदवारी परेको



छ । सत्ता गठबन्धनको तर्फबाट भुसालले मनोनयन दर्ता गराएकी हुन् । भुसालको प्रस्तावकमा माओवादी केन्द्रका प्रमुख सचेतक देवप्रसाद गुरुङ र समर्थकमा सांसद लक्ष्मीकुमारी चौधरी रहेका छन् । यसअघि पनि कांग्रेसले भुसाललाई उपसभामुखको उम्मेदवार बनाएको थियो ।

उनी तत्कालीन नेकपा एमालेकी शिवमाया तुम्बाहाङ्गफेसँग पराजित भएकी थिइन् । ०७४ साल चैतमा भएको उपसभामुखको निर्वाचनमा तुम्बाहाङ्गफे २ सय १ मतसहित विजयी हुँदा भुसालले ५८ मत प्राप्त गरेकी थिइन् । यसपटक भने सत्ता गठबन्धनको उम्मेदवारले जित्ने पक्कापक्कीजस्तै छ ।

२ सय ७५ सदस्यीय प्रतिनिधिसभामा चार सांसद रिक्त छन् । बाँकी २ सय ७१

जनामा पनि चार जना निलम्बनमा रहेकाले २ सय ६६ जनाले मतदान गर्न पाउँछन् । उपसभामुखमा विजयी हुन केवल १ सय २४ मत आवश्यक पर्छ ।

सत्ता गठबन्धनसँग हाल कांग्रेसका ६१, माओवादीका ४९, नेकपा एकीकृत समाजवादीका २४ जना सांसद छन् । जसपाका केही सांसद बाबुरामतिर छन् भने केही तटस्थ रहेका छन् । गठबन्धनमा आबद्ध राष्ट्रिय जनमोर्चाका एक सांसद छन् भने नेपाल मजदुर किसान पार्टी र राप्रपाका एक/एक जना सांसद रहेका छन् ।

कांग्रेस, माओवादी र एकीकृत समाजवादीको मत नै सत्ता गठबन्धनलाई जित्न पर्याप्त देखिन्छ । त्यसमध्ये सरकारमा सहभागी मधेसवादी दलको मतसमेत जोड्दा पुष्पा भुसालले सजिलै जित्ने अनुमान गर्न

सकिन्छ । संसद्मा रहेको सबैभन्दा ठूलो दल एमालेले आफ्नो मतको प्रयोगका लागि सांसद विद्या भट्टराईलाई उम्मेदवार बनाएको छ । उनी पूर्वमन्त्री स्व. रविन्द्र अधिकारीकी धर्मपत्नी हुन् । संसद्मा यस्तो प्रस्तावमा मतदान हुँदा पक्ष वा विपक्षमा मत प्रकट गर्नुपर्ने हुन्छ । त्यसैले एमालेले मत जाहेर गर्न मात्रै विद्यालाई अगाडि सारेको देखिन्छ ।

उपसभामुखको निर्वाचन अहिले किन ? सरकारले संसद्को बैठक जारी गरेको बेला अध्यादेश जारी गर्न मिल्दैन । पछिल्लो समय सरकारले चाहेअनुसारको विधेयक पारित हुन विवाद भएको खण्डमा त्यसलाई संसद् बन्द गरेर अध्यादेशमार्फत ल्याउने परम्पराजस्तै बनेको छ । संवैधानिक निकायमा ओली नेतृत्वको सरकारको

बाँकी पृष्ठ २

सवारी दुर्घटनाबाट बच्न र बचाउन ।

- मादक पदार्थ सेवन गरी सवारीसाधन नचलाउनु,
- आफूले यात्रा गरिरहेको सवारीसाधनको चालकले मादक पदार्थ सेवन गरेमा वा गरेको शंका लागेमा तत्काल प्रहरीलाई खबर गर्नु,
- क्षमताभन्दा बढी यात्रु र सामान नराख्नु,
- अनियन्त्रित र तीव्र गतिमा सवारीसाधन नचलाउनु,
- समय-समयमा सवारीसाधनको मर्मत-संभार गर्नु ।



'दुई' सदनमा विभेद नगरियोस्'

सौर्य समाचार

काठमाडौं । राष्ट्रियसभाका सांसद डा. वेदुराम भुसालले संविधानले कल्पना गरेको दुई सदनमा एक संसदीय व्यवस्थाका दुई सदनलाई विभेद नगर्न अनुरोध गरेका छन् । सञ्चारमाध्यमले समाचार प्रकाशन प्रशारण गर्नेदेखि निर्णय र निर्देशन कार्यान्वयनमासमेत उपेक्षा गरिएको गुनासो गर्दै भुसालले प्रतिनिधिसभाले गरेका कमजोरी सच्याउने राष्ट्रियसभा भएकाले संविधानले दिएको अधिकार प्रयोग गर्नबाट रोक्ने सभालाई उपेक्षा गर्ने कुरा स्वीकार गर्न नसकिने स्पष्ट पारे ।

दुई सदनको बैठक भएका बेला सञ्चारमाध्यमले पनि प्रतिनिधिसभाको मात्रै समाचार बजाउने गरेको आरोप लगाए । राष्ट्रियसभाको विशेष समयमा बोल्दै भुसालले राष्ट्रियसभाको उपाध्यक्षको पद किन पूर्ण नभएको भनी प्रश्न गरे ।

उनले भने, 'प्रतिनिधिसभामा उपसभामुखको निर्वाचन हुन लागेको छ तर यता ध्यान दिइएन, समितिका सभापति पद खाली छ त्यसमा पनि ध्यान गएको छैन, दलका नेता र सचेतकमा

बाँकी पृष्ठ २

प्रहरीकै मिलेमतोको आशंका

सौर्य समाचार

काठमाडौं । कस्तुरीको बिना बरामद घटनामा प्रहरीकै मिलेमतो रहेको आशंका गरिएको छ । यस सम्बन्धमा छानविन गर्न काठमाडौं उपत्यका प्रहरी कार्यालयले प्रहरी उपरीक्षक (एसपी) को संयोजकत्वमा छानविन समिति गठन गरेको छ ।

असार २४ गते साँझ प्रहरी वृत्त गौशालाले कस्तुरीको बिनासहित एक जनालाई पक्राउ गरेको थियो । चाबहिलस्थित सडकबाट कस्तुरीको बिनासहित पाँचथर तुमविया गाउँपालिका-५ घर भई हाल



कस्तुरीको बिना बरामद प्रकरण

काठमाडौं कपन बस्ने ४२ वर्षीय शिव लिम्बू पक्राउ परेका थिए । लिम्बूको बा ८२ प ५७९ नम्बरको मोटरसाइकलमा कस्तुरीको बिना लुकाई राखेको सूचना पाएपछि बिनासहित प्रहरीले लिम्बूलाई

नियन्त्रणमा लिएको थियो ।

लिम्बूका आफन्तले गृह मन्त्रालयदेखि प्रहरी प्रधान कार्यालयमा प्रहरीवाटै फसाइएको गुनासो गरेपछि मुख्यालयले छानविन समिति गठन गरेर सत्यतथ्यवाहिर ल्याउन रानीपोखरी प्रहरीलाई निर्देशन दिएको हो । काठमाडौं उपत्यका प्रहरी कार्यालय रानीपोखरीका एसपी दिलीप घिमिरेको संयोजकत्वमा समिति गठन गरेको हो । समितिमा काठमाडौं उपत्यका अपराध अनुसन्धान कार्यालयका डिएसपी

बाँकी पृष्ठ २

'प्रहरीलाई हतियार किनँदैन'

सौर्य समाचार

काठमाडौं । प्रधानमन्त्री शेरबहादुर देउवाले अहिले प्रहरीलाई कुनै पनि हालतमा हतियार नकिन्ने बताएका छन् । नेपाली कांग्रेसका सभापतिसमेत रहेका देउवाले यस विषयमा गृह मन्त्रीलाई निर्देशन दिने पनि बताए ।

नेताहरू गोपालमान श्रेष्ठ र अर्जुननरसिंह केसीले केन्द्रीय समितिको जारी बैठकमा प्रहरीलाई किन्न लागेको हतियारको विषयमा प्रश्न उठाएका थिए । त्यसको जवाफ दिँदै प्रधानमन्त्री देउवाले अहिले कुनै पनि हालतमा प्रहरीलाई

बाँकी पृष्ठ २

गभर्नरको राजीनामा माग

को हुन एम. अधिकारी ?



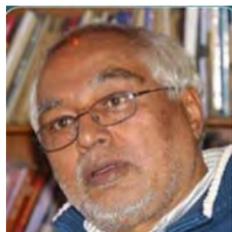
सुवास गोतामे

काठमाडौं । नेकपा एमालेले केन्द्रीय पार्टी विभाग गठन गर्दा अर्थ तथा योजना विभागको सदस्यमा परेको नाम एम. अधिकारीको हुनु भनेर यतिवेला राजनीतिक वृत्तमा चर्को बहस सुरु भएको छ । सत्तापक्षका केही नेताले एम. अधिकारी राष्ट्र बैंकका गभर्नर महाप्रसाद अधिकारी नै हुन् भन्ने दावी गर्दै आएका छन् । त्यसैले गभर्नर

अधिकारीमाथि छानविनदेखि राजीनामासम्मको दबाव बढ्दै गएको छ । प्रमुख प्रतिपक्षी एमालेले भने गभर्नर अधिकारी र एम. अधिकारी फरकफरक व्यक्ति भएको दावी गर्दै आएको छ । असार २९ गते गभर्नर अधिकारीले आफू एमाले वा अन्य कुनै दलको सदस्य नरहेको र नियम कानूनले पनि दलको समितिमा बस्न नमिल्ने भएकाले

बाँकी पृष्ठ २

एमाले नैतिक रूपमा चुक्यो



प्रा. राजेश गौतम

राजनीतिक दल त्यसमा पनि कम्युनिस्ट पार्टीमा छुट्टा नाम राख्ने परिपाटी पुरानै हो । अहिले बहसमा राष्ट्र बैंकका गभर्नर महाप्रसाद अधिकारी

बाँकी पृष्ठ २

अर्थ मन्त्रालयको बदमासी रोकन निहुँ खोजियो

नेकपा एमालेले केन्द्रीय पार्टी विभाग गठन गर्दा अर्थ तथा योजना विभागको सदस्यमा परेको नाम एम. अधिकारीको हुनु भनेर राजनीतिक वृत्तमा चर्को बहस सुरु भएको छ । यो विषयले यतिवेला सडक र सदन दुवै तताएको छ । एमालेको अर्थ तथा योजना विभागमा रहेका एम. अधिकारी र राष्ट्र बैंकका गभर्नर महाप्रसाद एकै व्यक्ति हुनु भन्ने आरोपले बल पाउँदै गएको छ । यस विषयमा केन्द्रीय रहेर नेकपा एमालेका प्रवक्ता प्रदीप ज्ञवालीसँग गरिएको साक्षिप्त कुराकानी :

बाँकी पृष्ठ २

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प्रहरीलाई...

प्रहरीलाई हतियार नकिन्ने दाबी गरेका हुन् । 'प्रहरीलाई हतियार किनदिन । त्यो अहिले आवश्यक पनि छैन र निर्णय पनि होइन । त्यो हतियार अहिले किनैनै' सभापति देउवाले बैठकमा भनेका छन् । प्रहरीलाई हतियार किन्न भन्दै यसअघि बजेट रकमान्तर गरिएको थियो ।

दुई...

समेत कुनै ध्यान गएन ।' नेपालको संविधानको धारा ८३ ले दुई सदनात्मक संघीय संसद हुने भनेर उल्लेख गरे पनि व्यवहारमा प्रतिनिधिसभा विशेष हो र राष्ट्रियसभा गौण हो भन्ने व्यवहार पाउने गरिएको उनले बताए । प्रतिनिधिसभामा २०७६ सालमा दर्ता भएको विधेयक यसै थन्क्याएर राखिएको र अहिले राष्ट्रियसभामा छिड्दै अघि बढाउन दबाव आइरहेको सन्दर्भ जोड्दै उनले यस्ता व्यवहार स्वीकार गर्न नसकिने बताए । नयाँ विधेयक छलफल नै नगरी लैजान नहुने उनको तर्क थियो ।

उनले महालेखाको प्रतिवेदनमा आर्थिक परिस्वरुचक हेर्दा चिन्ता लाग्दो अवस्था रहेको र यो वर्ष मात्रै १५ दशमलव ४६ प्रतिशत वेरुजु बढेकाले मुलुकको सुशासन कता जाँदैछ भनेर संकेत गरिरहेको बताए । उनले वेरुजु बढ्दै गएकोले मुलुक सुशासनभन्दा आर्थिक अराजकतातर्फ गइरहेको संकेत दिएकाले यस्ता विषयमा गम्भीर छलफल गर्नुपर्ने आवश्यकता औँल्याए । सांसद डा. विमला राई पौडेलले राष्ट्रियसभाले पारित गरेर पठाएका १२ वटा विधेयक प्रतिनिधिसभामा अड्किएर बसेको गुनासो गरिन् । उनले भनिन्, 'प्रतिनिधिसभाले पठाएको विधेयक दुई महिनाभित्रमा केही नगरे अघि बढाउन पाउने तर राष्ट्रियसभाले पठाएको विधेयक वर्षौंसम्म थन्क्याएर राख्दा पनि केही नगर्ने, यो सभामुखको काम होइन ।' उनले विधेयकमा राज्यको ठूलो रकम खर्च भइसकेकाले चुनावअघि सबै विधेयक पारित गर्नुपर्ने भनेर प्रश्न गरिन् । उनले कानून बनाउने ठाउँमा राष्ट्रियसभा कमजोर रहेको बताइन् ।

प्रहरीकै...

कृष्ण चन्द्र र प्रहरी निरीक्षक गणेशचन्द्र कोइराला छन् । लिम्बुलाई विनासहित पक्राउ गरिएको घटनामा उनकै आफन्तले सिंसिटिभी फुटेज हेरेर प्रहरीकै माथिल्लो तहमा उजुरी गरेका थिए ।

लिम्बु चाबहिल सडक खण्डमा मोटरसाइकल रोखेर एक रेस्टुरेन्टमा छिरेका थिए । त्यसको केही समयपछि अर्को एक जना व्यक्ति आएर लिम्बुको मोटरसाइकलमा केही वस्तु राखेजस्तो दृश्य सिंसिटिभी फुटेजमा देखिन्छ । मोटरसाइकलको सिटमुनि केही वस्तु राखेका ती व्यक्ति त्यसपछि सडक पारितर्फको सैलुनमा जान्छन् । त्यसको केही समयमा नै सादा पोसाकका प्रहरी आएर लिम्बु वसेको होटलमा छिरेर उनलाई पक्राउ गरेको दृश्य सिंसिटिभी फुटेजमा देखिन्छ । फुटेजमा लिम्बुको मोटरसाइकलमा बिना रहेको भन्दै उनलाई हतकडीसमेत लगाएपछि बर्दिसहितको प्रहरी टोली आएर घटनास्थल मुचुल्का गरेको दृश्य देखिन्छ । प्रहरी केन्द्रीय प्रवक्ता टेकप्रसाद राईका अनुसार घटना शंकास्पद रहेको दाबी लिम्बुका आफन्तले गरेपछि सत्यतथ्य पत्ता लगाउन छानविन समिति गठन गरिएको हो ।

समितिको प्रतिवेदनका आधारमा लिम्बु वा प्रहरी को दोषी हो पहिचान भएपछि कारवाही हुने जानकारी राईले दिए । यसअघि पनि रौतहटमा यस्तै प्रकृतिको घटना भएको थियो । प्रहरीकै मिलेमतोमा एक पत्रकारको मोटरसाइकलमा लागुऔषध रोखेर फसाउन खोजिएको थियो । पछि उक्त क्षेत्रको सिंसिटिभी फुटेज हेर्दा योजनाबद्ध तरिकाले फसाउन खोजेको पुष्टि भएपछि प्रहरीलाई फौजदारी मुद्दा चलाइएको थियो । उक्त घटनामा प्रहरी नै पुष्पक्षका लागि कारागार चलान भएका थिए ।

प्रश्नपत्र...

पहिलो सेमेस्टरको 'इन्टरनेशनल पोलिटिक्स' विषयको प्रश्नपत्र अघिल्लो वर्षको प्रश्नपत्रसँग हुबहु मिलेको थियो ।

यसैगरी व्यवस्थापन संकायको स्नातक तह विबीए छैटौँ सेमेस्टरको असार २२ गते र असार २५ गतेको प्रश्नपत्र पनि हुबहु पाइएको छ । मोर्डन नेपाल कलेजको तीन महिनाअघि सोधिएको प्रश्नपत्र असार २२ गतेको परीक्षामा र शंकरदेव क्याम्पसले लिएको पिबोर्ड परीक्षामा सोधिएको प्रश्नपत्र असार २५ गते विबीएलाई सोधिएको थियो । 'ती उपप्राध्यापकलाई प्रश्नपत्र बनाउन दिँदा उहाँले मोर्डन कलेजमा नै सोधिएको प्रश्नपत्र दिनुभयो,' उनले भने, 'यसरी तीन महिनाअघि मोर्डन कलेजको आन्तरिक परीक्षामा सोधिएको प्रश्नपत्र त्रिविको परीक्षामा पनि सोधिएको पाइयो ।'

उनले समाजिक सञ्जालले गर्दा हुबहु प्रश्नपत्रबारे जानकारी प्राप्त भएको भन्दै अबदेखि हस्तलिखित प्रश्नपत्र मार्गने बताए । 'प्राध्यापकले प्रश्नपत्र बनाउनुभन्दा अर्कोको किताबबाट साग्ने गरेको पाइएको छ,' उनले भने, 'अबदेखि हामी हस्तलिखित प्रश्नपत्र मार्गने छौँ ।' त्रिविका उपकुलपति डा. वास्कोटाले प्रश्नपत्रका हुबहु सम्बन्धमा त्रिविले प्रा. भोजराज अर्यालको संयोजकत्वमा पाँच सदस्यीय उच्चस्तरीय समिति गठन गरेको बताए । समितिका शिक्षा, विज्ञान तथा प्रविधिमन्त्री देवेन्द्र पौडेलले हुबहु प्रश्नपत्रमा संलग्नलाई कारवाही गरिने जानकारी दिए । 'हुबहु प्रश्नपत्र अख्छीपनले होइन, गल्ती गरेका हुन्,' उनले भने, 'हुबहु प्रश्नपत्र बनाउनेलाई कारवाही गर्नुपर्छ ।' समिति सभापति जयपुरी घर्तीले हुबहु प्रश्नपत्र बनाउनेलाई कारवाही गर्न निर्देशन दिइन् । 'प्रश्नपत्रका सम्बन्धमा कहाँ-कहाँ गल्ती भएको छ,' उनले भनिन्, 'ती गल्ती गर्नेलाई कारवाही गर्नुपर्छ ।' समितिका सदस्य योगेश भट्टराइले दोषीलाई कारवाही गर्नुपर्ने भन्दै त्रिवि कार्यालय तोडफोड गर्नेलाई पनि कारवाही गर्नुपर्ने बताए ।

समिति सदस्य गिरिराजमणि पोखरेलले त्रिविलाई पुनः संरचना गर्नुपर्ने धारणा व्यक्त गरे । सदस्य नवीना लामाले त्रिवि तहसनहस बन्न पुगेको भन्दै सबै मिलेर जोगाउन आवश्यक रहेको बताइन् । समिति सदस्य मनकुमारी जिसी, सरिता न्यौपाने, मानबहादुर विकलगायतले पनि त्रिविमा पटक-पटक प्रश्नपत्रमा हुने कमजोरीलाई अन्त्य गर्नुपर्ने भन्दै प्रश्नपत्रको सेटबाट नभई प्रश्नपत्र वैकबाट छान्नुपर्नेमा जोड दिए ।

संसदको...

समयदेखि नै सत्तापक्ष र प्रतिपक्षबीच विवाद बढ्दै गएको थियो । त्यसकारण संवैधानिक नियुक्तिका लागि पटकपटक अध्यादेशको साहरा लिन थालियो । एमालेका तत्कालीन अध्यक्ष केपी शर्मा ओली प्रधानमन्त्री भएको बेला अध्यादेश जारी गर्दै यसअघि संवैधानिक परिषदमा सर्वसम्मत निर्णय गर्ने परम्परालाई तोडका थिए । उनले बहुमत भए पुग्ने व्यवस्था गरेका थिए ।

संवैधानिक परिषद ६ सदस्यीय रहने प्रावधान छ । तर, तत्कालीन उपसभामुख शिवमाया तुम्बाहाम्फेले राजीनामा दिएपछि संवैधानिक परिषदमा पाँच जना सदस्य मात्र रहन पुगेका थिए । त्यसवेला संवैधानिक परिषदको बैठकको गणपुरक संख्याका लागि तीन सदस्य अनिवार्य उपस्थिति हुनुपर्थ्यो । तर, सभामुख, विपक्षी दलको नेता र प्रधानन्यायाधीश उपस्थित नहुने बित्तिकै आवश्यक गणपुरक संख्या नपुगेर धेरैपटक परिषदको बैठक स्थगित भएका थिए । तत्कालीन प्रधानमन्त्री केपी शर्मा ओलीले यस्तो अवस्था आएपछि फेरि अध्यादेश जारी गर्दै बैठकमा उपस्थिति सदस्यको बहुमतले निर्णय गर्नसक्ने भन्दै संशोधन गरेका थिए । त्यसवेला ओलीको पक्षमा राष्ट्रिय सभाका अध्यक्ष मात्र थिए । त्यसपछि उनीहरू दुईको उपस्थितिमा नै संवैधानिक परिषदले आवश्यक

निर्णय गरेको थियो । अहिलेको संसदको बनावटअनुसार पनि प्रधानमन्त्री शेरबहादुर देउवालाई परिषदको बैठक राखेर निर्णय गर्न सजिलो छैन । पाँच सदस्यीय संवैधानिक परिषदमा राष्ट्रिय सभाका अध्यक्ष गणेश तिम्लिस्ना र विपक्षी दलका नेता केपी शर्मा ओली एकातिर छन् । बैठकमा प्रधानन्यायाधीश उपस्थित नभए, तटस्थ बसे वा विपक्षमा मत हालेको खण्डमा परिषदमा देउवा अल्पमतमा पर्ने खतरा बढ्दै गएको छ । यी सबै विषयलाई ध्यानमा राखेर नै प्रधानमन्त्री देउवाले सत्ता गठबन्धनको सहमतिमा उपसभामुखको निर्वाचन गर्न लगाएका हुन् । उपसभामुख गठबन्धनले जितेको खण्डमा संवैधानिक परिषदमा देउवा सजिलो बहुमतमा हुनेछन् ।

को हुन् पुष्पा र विद्या ?

शुक्रबार हुने उपसभामुख निर्वाचनमा कांग्रेसकी पुष्पा भुसाल र एमालेकी विद्या भट्टराईको मात्र उम्मेदवारी परेको छ । भुसाल अर्घाखाँची र भट्टराई कास्कीका हुन् । अर्घाखाँची पोखराथोककी भुसाल ०२८ सालदेखि राजनीतिमा छिन् । नेपाली कांग्रेसको महिला विभाग र कानून विभागमा लामो समय क्रियाशील रहेकी उनले नेपाल महिला संघको महासचिव भएर पनि काम गरिन् । महिला अधिकार र समानताको पक्षमा वकालत गर्दै आएका भुसालले राजनीतिसँगै विश्वविद्यालयमा प्राध्यापन, कानून व्यावसाय र राजनीतिलाई एकसाथ अगाडि बढाएकी थिइन् । ०१७ साल फागुन १ गते जन्मिएकी भुसालले कानूनमा स्नातक र राजनीतिशास्त्रमा स्नातकोत्तर गरेकी छन् । त्रिभुवन विश्वविद्यालयमा १७ वर्ष प्राध्यापन गरेकी भुसाल वरिष्ठ अधिवक्तासमेत हुन् । ०६४ सालको संविधानसभा सदस्य निर्वाचनमा अर्घाखाँचीबाट निर्वाचित भएर उनले संविधान निर्माणमा भूमिका खेलेकी थिइन् । यसैगरी ०६३ सालको अन्तरिम संविधान मस्यौदा समितिमा समेत कांग्रेसका तर्फबाट प्रतिनिधित्व गरेकी भुसाल ०७४ साल चैत २ गते भएको उपसभामुखको चुनावमा शिवमाया तुम्बाहाम्फेसँग पराजित भएकी थिइन् । तत्कालीन वाम गठबन्धनकी उम्मेदवार तुम्बाहाम्फे २ सय १ र भुसालले ५८ मत प्राप्त गरेका थिए ।

तुम्बाहाम्फेले राजीनामा दिएपछि रिक्त भएको सोही पदमा भुसालले फेरि उम्मेदवारी दिएकी हुन् । यसपटक उनलाई कांग्रेससहित पाँच दलीय गठबन्धनमा आवद्ध माओवादी केन्द्र, एकीकृत समाजवादी, जनता समाजवादी पार्टी र राष्ट्रिय जनमोर्चाको समर्थन छ । उनको पारिवारिक पृष्ठभूमि राजनीति हो । उनी ०१५ सालको बिपी कोइरालाको मन्त्रिपरिषदमा स्वास्थ्यमन्त्री रहेका काशीनाथ गौतमकी छोरी हुन् । ०१७ सालमा पञ्चायत सुरु भएपछि काशीनाथ गौतम १४ वर्ष सपरिवार भारत निर्वासित हुँदा पुष्पा पनि सँगै थिइन् । यसैगरी उपप्राध्यापकको जागिर छोडेर सांसद भएकी विद्या भट्टराई विद्यार्थी आन्दोलनबाट राजनीतिमा सक्रिय भएकी नेतृ हुन् । ०४२ सालमा कक्षा ७ मा अध्ययन गर्दादेखि नै अनेरास्ववियुसँग नजिक भएर काम गरेकी विद्या पञ्चकन्या क्याम्पसमा अध्ययन गर्दा विद्यार्थी आन्दोलनमा होमिइन् । उनले अखिल नेपाल महिला संघ जिल्ला समिति काठमाडौँको कोषाध्यक्षसमेत भएर काम गरिन् । ०५० सालमा अनेरास्ववियु महिला विभाग प्रमुख भएर काम गरेकी उनी ०५५ सालमा अनेरास्ववियुको केन्द्रीय सचिव पनि भइन् । यसैगरी ०५६ सालमा अखिल नेपाल महिला संघ केन्द्रीय सदस्य र कार्यालय सचिव, बुद्धिजीवी परिषद सदस्य हुँदै विद्या प्राध्यापक क्षेत्रमा प्रवेश गरिन् । ०६२/६३ सालको जनआन्दोलनपछि एमालेको संघीय मामिला विभागको सदस्य भएर काम गरकी विद्यासँग उच्च शिक्षा पाठयक्रम निर्माण समितिको सदस्य भएर काम गरेको अनुभव पनि छ ।

त्रिभुवन विश्वविद्यालयमा खुला सेवा आयोग परीक्षा पास गरी ०७२ सालदेखि रत्नराज्य क्याम्पसमा स्थायी रूपमा उपप्राध्यापकको जागिर सुरु गरेकी उनी रविन्द्र अधिकारीको निधनपछि तत्कालीन नेकपाको निर्णय मानेर कास्की-२ बाट प्रतिनिधिसभा सदस्यको उम्मेदवार भएकी थिइन् । उनी निर्वाचनमा विजयी पनि भइन् । उनी नाताले एमाले नेता राजन भट्टराईकी बहिनी र पूर्वपर्यटनमन्त्री स्व. रविन्द्र अधिकारीकी धर्मपत्नी हुन् । अहिले एमालेले उनलाई उपसभामुखको उम्मेदवार बनाएको छ ।

को हुन्...

स्पष्ट पारिदिन एमालेलाई पत्र लेखेका थिए । एमालेलाई लेखेको पत्रमा उनले भनेका छन्, 'म राजनीतिक पार्टीमा आवद्ध नरहेको तथा गभर्नरजस्तो जिम्मेवार पदमा रहेको व्यक्ति कुनै पार्टी विधेयक कुनै समितिमा रहने, बस्ने भन्ने कल्पना बाहिरको विषय हुँदाहुँदै यस प्रकारको भ्रम उक्त समिति गठनले सिर्जना गरेको हुँदा यस विषयमा स्पष्ट पारी मलाईसमेत जानकारी गराइदिनु हुन अनुरोध गर्दछु ।' उनले पठाएको पत्रको जवाफ दिन पनि एमालेले कुनै विलम्ब गरेन । एमालेले असार २९ गते नै गभर्नर अधिकारीको पत्रको जवाफ फर्काउँदै भन्यो, 'हाम्रो कमिटी र विभागहरूमा सार्वजनिक पद धारण गरेका व्यक्तिहरू रहने कुनै वैधानिक व्यवस्था छैन । तसर्थ खोटाडका एम. अधिकारी भनि उल्लिखित व्यक्ति तपाईं राष्ट्र बैकको गभर्नर महाप्रसाद अधिकारी नभएको स्पष्ट गर्दछु ।'

बीमालेख हरायो

मेरो निम्न व्यहोराको नेपाल लाईफ इन्स्युरेन्सको विमालेख हराएकोले पाउनुहुने महानुभावले नजिकको प्रहरी चौकी वा तलको ठेगानामा सम्पर्क गरिदिनुहुन विनम्र अनुरोध गर्दछु ।

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नाम परिवर्तनसम्बन्धी सूचना

डोस्रोपटक प्रकाशित मिति : २०७९/०३/३१ गते

यस कम्पनीको मिति २०७९/०३/३१ मा सम्पन्न विशेष साधारणसभामा निर्णयबमोजिम साविक कम्पनी उत्सव फुटवेयर इण्डस्ट्रिज प्रा.लि. (Ustav Footwear Industries Private Limited) को नाममा रहेको सम्पूर्ण चल, अचल सम्पति तथा तिर्नु, व्यहोर्नुपर्ने कर दायित्व आदि परिवर्तित नाममा **सतकभिर फुटवेयर एण्ड गार्मेन्ट उद्योग प्राइभेट लिमिटेड (प्रा.लि. नं ५०१०८/०६४/०६५) (Satkabir Footwear And Garment Udhogy Private Limited)**को कम्पनीले सार्ने, व्यहोर्ने गरी कम्पनी रजिष्टरको कार्यालयको मिति ०७/०९/०३/२७ गतेको निर्णयबमोजिम नाम परिवर्तन गरिएको व्यहोरा सम्बन्धित सबैको ज्ञानकारीका लागि यो सूचना प्रकाशित गरिएको छ ।

सतकभिर फुटवेयर एण्ड गार्मेन्ट उद्योग प्राइभेट लिमिटेड
 चन्द्रमिरी नगरपालिका-५, काठमाडौँ

नाम परिवर्तनको सूचना

कम्पनीको मिति २०७९/३/१४ को विशेष साधारण सभाको निर्णय बाट साविक कम्पनी नेपाल टेन्ट एण्ड टारपोलिन (अंग्रेजीमा **Nepal Tent & Tarpolien**) प्रा.लि. को नाममा रहेको सम्पूर्ण चल अचल सम्पति तथा कम्पनीले तिर्नु व्यहोर्नु पर्ने कर दायीत्व आदि परिवर्तित नाम नेपाल टेन्ट एण्ड टारपोलिन (अंग्रेजीमा **Nepal Tent And Tarpaulin** प्रा.लि. (प्रा.लि. नं. १०४७०७) कम्पनीले सार्ने व्यहोर्ने भएको हुँदा नेपाल टेन्ट एण्ड टारपोलिन (अंग्रेजीमा **Nepal Tent & Tarpolien**) बाट नेपाल टेन्ट एण्ड टारपोलिन (अंग्रेजीमा **Nepal Tent And Tarpaulin**) प्रा.लि. (प्रा.लि. नं. १०४७०७) हुने गरि नाम परिवर्तन भएको सूचना प्रकाशित गरिएको छ ।

थपिँदै कोरोना संक्रमित

■ सौर्य समाचार



काठमाडौँ । पछिल्लो २४ घण्टाको अवधिमा थप २ सय ६० जनामा कोरोना भाइरसको संक्रमण पुष्टि भएको छ । स्वास्थ्य तथा जनसंख्या मन्त्रालयका अनुसार देशभरका प्रयोगशालामा ३ हजार ८ सय ४४ नमुना परीक्षण गरिएको थियो ।

त्यसक्रममा २ सय ६० जनामा संक्रमण पुष्टि भएको हो । यससँगै देशभर कुल सक्रिय संक्रमितको संख्या १ हजार १ सय ७ पुगेको छ । २ हजार २७ जनाको पिसिआर विधिबाट परीक्षण गर्दा २ सय १४ जनामा संक्रमण पुष्टि भएको हो ।

यसैगरी १ हजार ८ सय १७ जनाको एन्टिजेन विधिबाट परीक्षण गर्दा ४६ जनामा संक्रमण देखिएको मन्त्रालयले जनाएको छ । मन्त्रालयका अनुसार पछिल्लो २४ घण्टाको अवधिमा ४८ जना संक्रमणबाट मुक्त भएका छन् ।

योजना विभागमा राखेको थियो । त्यतिबेला पनि अधिकारीले आफू कुनै पनि राजनीतिक दलको सदस्य नरहेको र त्यस्तो सदस्यता लिने मनसायसमेत नभएको भन्दै नाम हटाइदिन अनुरोध गर्दै पत्र लेखेका थिए । त्यतिबेला एमालेका कार्यालय सचिव कृष्णगोपाल श्रेष्ठले अधिकारीलाई जवाफ फर्काउँदै भुलवश नाम पर्न गएको बताएका थिए । विहीवार राष्ट्रिय सभामा माओवादी केन्द्रका नेता नारायणकाजी श्रेष्ठले एम. अधिकारी को हुन् ? भनेर एमालेले सार्वजनिक गर्नुपर्ने माग गरे । उनले भने, 'कि त एम. अधिकारी महाप्रसाद अधिकारी होइन भनेर पुष्टी गर्ने कागजात चाहियो, होइन भने आलटाल गरेर पन्छिन पाइँदैन । विवाद आएपछि अधिकारीले राजीनामा दिनुपर्छ । विधि र नैतिकता कायम हुनुपर्छ ।' नेपाली कांग्रेसका महासमन्त्री गगन थापाले पनि बुधवार संसदमा बोल्दै गभर्नर अधिकारीलाई मौद्रिक नीति सुधारसँगै सेयर बजारमा भएको लगानीलाई सुधार गर्ने नीति ल्याउन सुझाएका थिए । ब्यांगत्मक ढंगले उनले अधिकारीलाई ध्यानाकर्षण गर्दै भनेका थिए, 'राष्ट्र बैकले जे सुधार गर्ने भनेर भने पनि अपेक्षाकृत परिणाम नआएपछि यसलाई सच्याइनुपर्छ । मैले यो गभर्नर अधिकारीलाई भनेको हो । एमालेको अर्थ योजना विभागका सदस्य मिस्टर एम. अधिकारीलाई भनेको हो भनेर बुझ्नुभयो भने म क्षमा चाहान्छु ।'

यसरी एउटा सार्वजनिक पदमा आसिन व्यक्तिमाथि सार्वभौमसत्ता सम्पन्न संसदमा कुरा उठेपछि प्रमुख प्रतिपक्षी दल एमालेले पनि एम. अधिकारी को हुन् भन्ने विषयमा स्पष्ट पार्नु आवश्यक देखिन्छ । वास्तवमै एम. अधिकारी भन्ने अझै व्यक्ति हुन् भने उनलाई पनि अगाडि ल्याउन सक्नुपर्छ । तर, एमालेले यसतर्फ कुनै चासो देखाएको छैन । यसैबीच, गभर्नर अधिकारीको वखास्तीको माग गर्दै माओवादी निकट विद्यार्थी संगठन अनेरास्ववियु क्रान्तिकारीले विहीवार विरोध प्रदर्शन गरेको छ । काठमाडौँको प्रदर्शनी मार्गीस्थित रत्नराज्य कलेज अगाडि अखिल क्रान्तिकारीले एमाले नेता एम. अधिकारीलाई गभर्नर पदबाट बर्खास्त गर्न माग गरेका हुन् । त्यस क्रममा उनीहरूले सडक अवरुद्ध गर्दै टायर वालेर प्रदर्शनसमेत गरेका थिए ।

यसैगरी नेकपा माओवादी केन्द्र निकट संगठन वाइसिएलले गभर्नर महाप्रसाद अधिकारीविरुद्ध अख्तियार दुरुपयोग अनुसन्धान आयोगमा उजुरी दिएको छ । विहीवार वाइसिएलका नेताहरू काठमाडौँको टंगाल पुगेर उजुरी दिएका हुन् । शैक्षिक योग्यता ढाँटेर राष्ट्रसेवक भई भ्रष्टाचार गरेको भन्दै वाइसिएलले उनीविरुद्ध उजुरी गरेको हो । यसैगरी राष्ट्रियसभाका सांसद नारायणकाजी श्रेष्ठले विहीवारको बैठकमा गभर्नर अधिकारीले तत्काल राजीनामा दिनुपर्ने बताएका छन् । बैठकको विशेष समयमा बोल्दै उनले नेकपा एमालेको अर्थ तथा योजना विभागका सदस्य एम. अधिकारी भनेर उल्लेख भएको र त्यो उनको संक्षिप्त नाम हो भन्ने रहेको उल्लेख गरे । २०७३ सालमा उक्त विभागमा महाप्रसाद अधिकारीको नाममा रहेको र अहिले एम. अधिकारीको नाममा रुपान्तरित भएर अर्थ तथा

योजनाविद् भनेर राखिएको उनको दाबी छ । 'विवाद भएर सबैलाई उहाँ नै हो भन्ने लागेकाले कि त होइन भन्ने पुष्टि भएको कागज सार्वजनिक गर्नुपर्न्यो, होइन भने विवाद आयो भनेर उहाँले राजीनामा दिनुपर्न्यो,' सांसद श्रेष्ठले भने ।

एमाले...

आएका छन् । एमालेले हाले गठन गरेको अर्थ तथा योजना विभागमा एम. अधिकारीको नाम परेपछि गभर्नर अधिकारी नै एम. अधिकारी हुन् भन्ने चर्चा छताछुल्ल भएको छ । उनी हुन् वा होइन भन्ने कुराको पुष्टी हुन एमालेले अर्को एम. अधिकारी खडा गर्न सक्नुपर्छ । त्यो पनि खोटाडकै नागरिकतासहित । अर्को कुरा महाप्रसाद अधिकारी व्यक्ती मात्रै होइनन्, सार्वजनिक पद धारण गरेर बसेका जिम्मेवार अधिकारी पनि हुन् । यस विषयमा उनले पनि स्पष्टीकरण दिइसकेका छन् । तर, एमालेले पार्टीकै लेटर प्याडमा प्रस्टीकरण दिनु जरुरी थिएन । एमालेले देश र जनताप्रति जिम्मेवार भएको भए एम. अधिकारी भन्ने व्यक्ति उहाँ हो भनेर सार्वजनिक गर्नुपर्थ्यो । यसमा एमाले नैतिक रूपमा चुकेको छ ।

अहिले राजनीतिक विचार र सिद्धान्तमा हिँडेको कुनै पनि पार्टी देखिदैन । आफ्नो स्वार्थका लागि जे पनि बोलिदिने र जे पनि गरिदिने परिपाटी एमालेमा मात्रै होइन, अन्य पार्टीमा पनि छ । राजनीतिक दलले आफ्नो पार्टीमा राम्रो मान्छे लिन चाहनु नराम्रो कुरा होइन । तर, कस्ता व्यक्तिलाई लिने भनेर ऐन र नियम कानून पनि हेर्नुपर्छ । सरकारी तलब खाएर कुनै पनि दलको कार्यकर्ता हुन पाइँदैन ।

अर्थ...

एम. अधिकारी यो हो भनेर सार्वजनिक गर्न एमालेलाई के अफठारो छ ?

होइन, अफठारो केही हुँदैन । तर, यसको पनि केही एउटा प्रक्रिया हुन्छ नि । व्यक्ति को हो भनेर खोज्ना होइन । उहाँ (महाप्रसाद अधिकारी) हो कि होइन भनेर खोज्ना हो । उहाँ आफैँ पनि म होइन भन्नुभएको छ । जिल्लास्थित पार्टीले पनि होइन भनेको छ । केन्द्रीय कार्यालयले पनि होइन् भन्यो । यति भनिसकेपछि आशंका के रहन्छ र ?

सार्वजनिक चासोको विषय भएकाले व्यक्ति देखाई दिँदा एमालेलाई नै सजिलो हुन्थ्यो नि होइन र ?

यसमा पार्टीलाई कुनै आफठारो हुँदैन । ०७३ सालमै अधिकारीले म पार्टीमा छैन भन्ने कुराको जवाफ दिइसक्नुभएको छ । त्यतिबेले पार्टीले तपाईं हुनुहुन्न पनि भनिसकेको छ । त्यतिबेला पार्टीले तपाईंको नाम भुलचुकले पर्न गयो भनेर जफाव दिएको थियो । यो त निहुँ खोजाइ मात्रै हो ।

कसले निहुँ खोजेको ?

अर्थ मन्त्रालयबाट भएका वैथितिलाई उहाँ (गभर्नर) ले एकपछि अर्को गर्दै रोकिदिनुभयो । अर्थ मन्त्रालयमार्फत जे जति बदमासी भए, अथ त्यसलाई रोक्ने मामलामा साथीहरूले रिस पोखेका हुन् । उहाँले त्यति भनिसकेपछि यसमा थप पुष्टी गरिरहनु आवश्यक नै छैन ।

कृषि मन्त्रालय
 कृषि विभाग

कृषि पूर्वाधार तथा कृषि यान्त्रिकरण प्रवर्द्धन केन्द्र
 हरिहरभवन, ललितपुर

बृटवल उपमहानगरपालिका वडा नं. १५ मा निर्माण हुने थोक तरकारी बजार निर्माण तथा सञ्चालन सम्बन्धी वातावरणीय प्रभाव मूल्यांकन प्रतिवेदन तयारीको लागि क्षेत्र निर्धारण (Scoping) सम्बन्धी सार्वजनिक सूचना

प्रथम पटक प्रकाशित मिति : २०७९/०३/३१

लुम्बिनी प्रदेश बृटवल उपमहानगरपालिका वडा नं. १५ स्थित रतनपुर र मुक्तिधाम टोल क्षेत्रमा रहेको सार्वजनिक जग्गा र वन क्षेत्रमा सुविधा सम्पन्न थोक तरकारी बजार निर्माण तथा सञ्चालन प्रस्ताव गरिएको छ । सो कार्यको लागि वातावरण संरक्षण ऐन २०७९ तथा नियमावली २०७७ बमोजिम क्षेत्र निर्धारण प्रतिवेदन तयार गर्ने सिसिलिामा निम्न वातावरणीय क्षेत्रहरूको बारे लिखित राय सुझाव लिनुपर्ने भएकोले सोही बमोजिम यो सार्वजनिक सूचना प्रकाशित गरिएको छ ।

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|---|---|
| प्रस्तावको नाम | बृटवल उपमहानगरपालिका वडा नं. १५, रतनपुर र मुक्तिधाम टोलमा थोक तरकारी बजार निर्माण तथा सञ्चालन |
| प्रस्तावको नाम तथा ठेगाना | नेपाल सरकार कृषि मन्त्रालय, कृषि विभाग, कृषि पूर्वाधार तथा यान्त्रिकरण प्रवर्द्धन केन्द्र |
| प्रस्तावको व्योहोरा | लुम्बिनी प्रदेश रुपन्देही जिल्ला बृटवल उपमहानगरपालिका वडा नं १५ स्थित रतनपुर तथा मुक्तिधाम टोल क्षेत्रमा सरकारी तथा वन क्षेत्र स्वामित्वमा रहेको स्थानमा अत्याधुनिक सुविधा सम्पन्न तरकारी बजार निर्माण तथा सञ्चालन प्रस्ताव गरिएको छ । सामुदायिक वन तथा सार्वजनिक स्वामित्वमा रहेका किता नम्बर १४६ तथा १८८ लगायतको कुल १९ विघा १० कठ्ठा १५.२५ धुर क्षेत्रफलमा यो प्रस्ताव कार्यान्वयनको लागि स्थान पहिचान गरिएको छ । उक्त क्षेत्रमा तरकारी बजारको लागि कृषि उपज संकलन, भण्डारण, प्रशोधनको लागि दश मुख्य विर्की कक्षसहितको भवनसहित भण्डार भवन पनि टयाकी, फोहोर मैला व्यवस्थापन केन्द्र, भित्रि पहुँच मार्ग निर्माण, पार्किङ, प्रशासनिक भवन, अतिथि गृह, शित भण्डार केन्द्र, शौचालय इत्यादिलगायत पूर्वाधार निर्माण गरी बजार निर्माण तथा सञ्चालन गरिने प्रस्ताव छ । |
| प्रभावित स्थान | लुम्बिनी प्रदेश, रुपन्देही जिल्ला बृटवल उपमहानगरपालिका वडा नं. १५ |
| प्रस्ताव सञ्चालनबाट प्रभाव पर्न सक्ने वातावरणीय क्षेत्रहरू | १) भौतिक २) जैविक ३) सामाजिक, आर्थिक तथा सांस्कृतिक ४) रासायनिक ५) मानवीय क्रियाकलापहरू र तिनका अवयवहरू तथा त्यसका अवयवहरूबीच अन्तरक्रिया र अन्तरसम्बन्ध आदि । |

उक्त प्रस्तावबाट पर्न सक्ने प्रभावहरू टोल, वडा तथा त्यस क्षेत्रका सम्बन्धित विद्यालय, स्वास्थ्य संस्था, तथा सरोकारवाला संघ संस्था तथा व्यक्तिहरूलाई यो सूचना प्रथम पटक प्रकाशित भएको मितिले सात (७) दिन भित्र निम्न ठेगानामा आइपर्ने गरी राय सुझाव उपलब्ध गराइदिनुहुन अनुरोध गरिन्छ । यस बमोजिमको राय सुझावको प्रतिलिपि स्थानीय उपमहानगरपालिका तथा सम्बन्धित वडा कार्यालयलाई पनि दिन सकिने व्योहोरा अवगत गराइन्छ ।

राय सुझाव पठाउने ठेगाना

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| कृषि पूर्वाधार तथा यान्त्रिकरण प्रवर्द्धन केन्द्र कृषि विभाग हरिहरभवन ललितपुर फोन नं. : ०१५४२४२२८ इमेल : campid2075@gmail.com | टोटल म्यानेजमेन्ट सर्भिस प्रा. लि. कमलपोखरी, काठमाडौँ फोन नं. ०१४४३९१८२, ०१४४३९१८७ इमेल : info@tms.com.np |
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गाउँमै निःशुल्क अल्ट्रासाउन्ड



ग्रामीण अल्ट्रासाउन्ड सेवाले स्थानीय महिला लाभान्वित हुने वडाध्यक्ष मिश्रले बताए । उनले घण्टौं हिँडेर अल्ट्रासाउन्ड गर्ने सदरमुकाम सन्धिखर्क आउनुपर्ने समस्याको समाधान गरी गाउँमै स्वास्थ्य सेवा दिन अल्ट्रासाउन्ड सेवा सुरु गरिएको बताए । उनले भने, 'यी र यस्तै कार्यक्रमका साथ बागीलाई जिरो होम डेलिभरी वडा बनाउने अभियानमा लागेका छौं ।' उनले आफूले चुनावमा घोषणा गरेअनुसार मालारानी-५ बागीका जनतालाई स्वास्थ्य सेवा घरदैलोमै पुऱ्याउने प्रयास भइरहेको बताए । यस्तै उनले गर्भवती आमा तथा नवजात शिशुका लागि निःशुल्क एम्बुलेन्स सेवा प्रदान गर्ने तयारी भइरहेको समेत जानकारी दिए । वडाध्यक्ष मिश्रले बागी तथा मालारानीको स्वास्थ्य सेवाको विकास र विस्तारमा लागि रहेको बताए ।

प्रदेश स्वास्थ्य निर्देशनालय, प्रदेश स्वास्थ्य तालिम केन्द्र, स्वास्थ्य कार्यालय, स्वास्थ्यचौकी बागी र गाउँपालिकाको सहकार्यमा ग्रामीण अल्ट्रासाउन्ड सेवा विस्तार भएको हो ।

सौर्य समाचार

अर्घाखाँची । मालारानी गाउँपालिका-५ बागीको स्वास्थ्यचौकीमा निःशुल्क अल्ट्रासाउन्ड सेवा सुरु गरिएको छ । गाउँमै अल्ट्रासाउन्ड सेवा पाएपछि बागीका महिला खुसी भएका छन् । गर्भवतीलाई अल्ट्रासाउन्ड गर्न घण्टौं हिँडेर सदरमुकाम सन्धिखर्क जानुपर्ने बाध्यताको अन्त्य गर्न स्वास्थ्यचौकीमै अल्ट्रासाउन्ड सेवा सञ्चालन गरिएको मालारानी-५ बागीका वडाध्यक्ष तिलक मिश्रले बताए । गर्भमा रहेको बच्चाको अवस्था तथा आमाको स्वास्थ्य अवस्था बुझ्नका लागि अल्ट्रासाउन्ड अनिवार्य गर्नुपर्ने हुन्छ ।

गर्भवती आमा तथा नवजात शिशुको स्वास्थ्य सुधारका लागि सञ्चालन गरिएको निःशुल्क

जग्गा कीर्ते प्रकरण मालपोतका २ कर्मचारीलाई ६ वर्ष कैद

सौर्य समाचार

सप्तरी । जग्गाधनीलाई जानकारी नै नदिई जग्गा विक्री गर्ने कर्मचारीसहित पाँच जनालाई कैद सजाय भएको छ । राजविराज नगरपालिका-७ को करोडौं मूल्य पर्ने ३ कठ्ठा ९ धुर जग्गा कीर्ते गरी विक्री गर्ने कार्यमा संलग्न मालपोत कार्यालय सप्तरीका नायबसुब्बा राजविराज-५ निवासी सीताराम चौधरी र कार्यालय सहायक राजविराज-९ का हरिनारायण शर्माका दुवैजना जग्गा ६ वर्ष कैद सजाय भएको छ ।

कीर्ते गरेकामा एक वर्ष, कर्मचारी भएकाले थप दुई वर्ष तथा ठगी गरेकामा तीन वर्ष गरी ६ वर्ष कैद सजाय भएको सप्तरी जिल्ला अदालतका सूचना अधिकारी भरतमणि पोखरेलले जानकारी दिए । अर्का कर्मचारी सुनसरी दुहवी-४ का उद्व खतिवडाको कारागारमै मृत्यु भएकाले उनको हकमा मुद्दा खारेज भएको छ । कीर्ते जालसाजी मुद्दामा पुष्पका लागि थुनामा रहेका ५८ वर्षीय नायबसुब्बा खतिवडाको ०७८ पुस २ गते मृत्यु भएको थियो । उनी ०७५ साउनदेखि नै पुष्पका लागि राजविराज कारागारमा थुनिएका थिए ।

खतिवडासँगै थुनामा रहेका चौधरी र अर्का कर्मचारी हरिनारायण शर्माको कैद अवधि अर्बौं दुई वर्ष बाँकी छ । फरार रहेका शर्मा अदालतमा



हाजिर भएपछि ०७५ कात्तिक १३ गतेदेखि थुनामा छन् । कारागार कर्मचारी शर्मा श्रेस्तामा कैफियत लेखी फोटो टाँसेर फाँटवालामा पेश गर्ने गर्दथे । यसैगरी जग्गा खरिद विक्रीमा संलग्न राजविराज-७ गजेन्द्र चोककी देवराजीदेवी दास

र डाकेश्वरी नगरपालिका-८ घर भई हाल राजविराज-७ मा घर बनाइबसेकी घुरनीदेवी साहलाई चार वर्ष कैद सजाय भएको छ । दास र साहलाई कीर्ते गरेकामा एक वर्ष र ठगी गरेकामा तीन वर्ष गरी चार वर्ष कैद सजाय

भएको अदालतले जनाएको छ । प्रहरीद्वारा ०७५ असार ३२ गते पक्राउ परेकी दास ०७५ साउन १७ गते १५ लाख ५ हजार धरौटी राखी पुष्पका लागि तारेखमा रिहा भएकी थिइन् । घुरनीदेवी भने २०७५ पुस ३० गते साडे सात लाख धरौटी राखी पुष्पका लागि तारेखमा रिहा भएकी थिइन् ।

यस्तै ०७५ असार १९ गते पक्राउ परी साउन १७ गतेदेखि पुष्पका लागि थुनामा रहेका राजविराज-११ का ७८ वर्षीय फुदन साहको कैद सजाय अवधि चार वर्ष पूरा भएको छ । कैद सजाय भुक्तान भएकाले उनी रिहा भएका छन् । उनका छोरा शंकर साह तेली र शर्माका नातेदार उपेन्द्र शर्मा फरार रहेका छन् ।

उनीहरूले राजविराज नगरपालिका-७ की ६९ वर्षीया उषा अर्यालको करोडौं मूल्य पर्ने ३ कठ्ठा ९ धुर जग्गा विक्री गरेका थिए । अमेरिकामा रहेकी अर्याललाई थाई नदिई एक महिनामा दुईपटक उनको जग्गा विक्री भइसकेको थियो । उनले आफ्नो जग्गा खोजी गर्दा अर्बौंको नाममा पुगिसकेको चाल पाएपछि न्यायका लागि प्रहरी 'सिमाक्ष पुगेकी थिइन् । कीर्ते गरी आफ्नो नाममा जग्गा ल्याई विक्री गर्ने फुदन साह र खरिद गर्ने देवराजी दासलाई प्रहरीले पक्राउ गरेसँगै कर्मचारीसहितको संलग्नताको रहस्य खुलेको हो ।

१ हजार ५ सय पिन्ट रगत खपत

सौर्य समाचार

टीकापुर । नेपाल रेडक्रस सोसाइटी टीकापुर उपशाखाद्वारा सञ्चालित रक्त सञ्चार केन्द्र टीकापुरमा १ हजार ५ सय पिन्ट रगत खपत भएको छ । केन्द्रले यस वर्ष टीकापुर अस्पतालमा उपचारमा आउने विरामीका लागि रगत आपूर्ति गरेको हो । यसमध्ये केही पिन्ट रगत अन्य अस्पतालमा पनि लगिने गरिएको छ । दशक अघिदेखि रगत आपूर्ति गर्दै आएको रेडक्रसले अस्पतालमा आउने विरामीलाई रगत आपूर्ति गर्दै आएको छ । रेडक्रसले रगत आपूर्ति गर्न थालेपछि अस्पतालमा आउने विरामीले ठूलो राहत पाउन थालेका हुन् । रगत आपूर्ति सहज भएपछि अस्पतालमा शल्यक्रियाका विरामी, सुक्केरी, रक्तअल्पताका विरामी र सिकलसेलका विरामीले राहत पाएका छन् । नागरिकको रगत लिने तर अरुलाई आवश्यक पर्दा नदिने बानीले विरामीलाई चाहिने रगत आपूर्तिमा समस्या थपिँदै गएको रेडक्रस उपशाखा टीकापुरका रक्तसञ्चार केन्द्र संयोजक टेकराज विनाडी बताउँछन् । 'हामीले रक्तदाताको लिस्ट बनाएर बोलाइबोलाई



रगत आपूर्ति गर्दै आएका छौं, अभाव भएका बेला धेरैलाई अनुरोध गर्छौं, संयोजक विनाडी भन्छन्, 'रगत दिएपछि मात्र पाइन्छ भन्ने सोच विकास हुन आवश्यक छ । हामीले हरेक उत्सव तथा कार्यक्रममा रक्तदान गर्न प्रोत्साहन गर्दै आएका छौं ।'

रक्तसञ्चार केन्द्रलाई टीकापुर स्थित सन्त निरंकारी मण्डल, मानव धर्म सेवा समितिलागायतका संस्थाले नियमित रक्तदान कार्यक्रम गर्दै आएका छन् भने पछिल्लो समय राजनीतिक दल र तिनका भातृ संगठन र विभिन्न

संघसंस्थाले समेत रक्तदान कार्यक्रम गर्दै आएका छन् । यसरी रक्तदानबाट जम्मा भएको रगत रक्तसञ्चार केन्द्रले आफूसँग राख्ने र बढी भए धनगढी पठाउने गरेको छ । रक्तसञ्चार केन्द्रले भजनी, लम्की, जोशीपुर, जानकीवाट पनि रगत संकलन गर्ने गरेको छ ।

हरेक वर्ष नियमित रक्तदान गर्दै आएको संस्था सन्त निरंकारी मण्डलका केन्द्रीय प्रभारी नरबहादुर रावल रगत मानिसको जीवन बचाउनका लागि आवश्यक पर्ने भएकाले गर्दै आएको बताउँछन् । 'हामीले नागरिकलाई आवश्यक भएका बेला पनि

गर्ने गरेका छौं, नागरिकको भलाइ र जीवन बचाउनका लागि रगत नालीमा होइन् नाडीमा बगाऔं भन्ने सन्देश दिन रक्तदान गर्दै आएका छौं, उनले भने ।

टीकापुर अस्पताल व्यवस्थापन समितिका अध्यक्ष भूपट्ट सोदारी रक्त सञ्चार केन्द्र अस्पतालमा आउने विरामीको जीवन बचाउन गरेको कार्य सराहनीय रहेको बताउँदै सेवा थप विस्तारमा सवैको सहयोग राख्नुपर्ने बताउँछन् । 'अस्पतालमा शल्यक्रियालागयतका सेवा लिन आउने विरामीलाई धेरै राहत भएको छ । दिनहुँ रगत अभाव भएका बेला रेडक्रसले दिएको सेवामा राहत भएको छ', उनी भन्छन्, 'मानिसको जीवन बचाउनका लागि सेवा नियमित र थप विस्तार हुन आवश्यक छ ।'

नागरिकलाई रगत आपूर्तिमा सहजताका लागि कैलालीको टीकापुर नगरपालिका, जानकी गाउँपालिकाका आफ्नो पालिकाका नागरिकलाई दुई पिन्ट रगत निःशुल्क दिने व्यवस्था मिलाएका छन् । यसरी मिलाइएको व्यवस्थाअनुसार ती स्थानीय तहले रेडक्रसमा लाग्ने शुल्क एकमुष्ट उपलब्ध गराउने गरेका छन् ।

निष्पक्षता र मूल्यांकनका आधारमा न्याय हुनुपर्छ

सौर्य समाचार

दमौली । नेपाली कांग्रेसका वरिष्ठ नेता रामचन्द्र पौडेलले न्याय, निष्पक्षता र मूल्यांकनका आधारमा पार्टीभित्र न्याय हुनुपर्ने बताएका छन् । नेपाल प्रेस युनियन तनहुँ शाखाले बिहीबार दमौलीमा आयोजना गरेको पत्रकार सम्मेलनमा बोल्दै वरिष्ठ नेता पौडेलले पार्टीभित्र कसैलाई पनि अन्याय हुन नहुने धारणा राखे । 'पार्टीभित्र भिन्न मत राख्नेको पनि कदर हुनुपर्छ', उनले भने ।

वरिष्ठ नेता पौडेलले कांग्रेस लोकतान्त्रिक पार्टी भएकाले सवैको मतको कदर गर्नुपर्ने उनको भनाइ थियो । वरिष्ठ नेता पौडेलले विगतका सरकारले गरेका गल्ती बोहोत्याउने छुट्टै वर्तमान सरकारलाई नभएको बताए । आगामी निर्वाचनमा उम्मेदवार बन्नेबारे सञ्चारकर्मीले सोधेको प्रश्नमा पौडेलले पार्टीले आफ्नो आवश्यकता कसरी महसुस गर्छ त्यसपछि मात्रै आफूले धारणा सार्वजनिक गर्ने बताए । 'मेरो इच्छामा मात्र भरपर्ने कुरा होइन, पार्टीले मेरो आवश्यकता महसुसलाई कसरी लिन्छ त्यसपछि मात्रै कुरा हुन्छ', उनले भने, '१४औं महाधिवेशनमा सभापतिले देशलाई तपाईंको आवश्यकता छ, स्वास्थ्यको स्थान गर्नुहोस् भन्नुभएको थियो ।'

वरिष्ठ नेता पौडेलले अहिलेको गठबन्धन स्थिरताका



लागि भएको प्रष्ट पारे । मुलुकलाई स्थिरता कायम गरी विकासको बाटोमा अगाडि बढाउने आफूहरूको मूल लक्ष्य रहेको पौडेलको भनाइ थियो । 'अहिले कांग्रेस र कम्युनिस्टको सवाल होइन, मुलुकको स्थिरताको सवाल हो', पौडेलले भने । मुलुकमा स्थायित्व र सुशासनको जग बसालेर राजनीति छान्छन मन रहेको वरिष्ठ नेता पौडेलले बताए । राष्ट्र बैकका गभर्नर पार्टीको कमिटीमा बस्नु संवैधानिक र कानून विपरित रहेको उनको भनाइ थियो । 'मलाई व्यवस्थाको चिन्ता भएकाले जिल्ला आउन कमी भएको थियो, अब विकासमा हलचल आउँछ', उनले भने ।

धुलो दूधको कारखाना उत्पादनको तयारीमा

सौर्य समाचार

हेटौँडा । वागमती प्रदेश सरकारले गौरवको आयोजनाको रूपमा लिएको धुलो दूधको कारखानाले अब उत्पादन दिने तयारीमा पुगेको छ । हेटौँडा उपमहानगरपालिका-१० सिसौघारीको दुई बिघा जमिनामा सरकारले ४१ करोड २२ लाख ७५ हजारको लगानीमा निर्माण गरेको यो कारखानामा पाउडर प्लान्टको उपकरण जडान गर्ने काम अन्तिम चरणमा पुगिसकेको प्रादेशिक कृषि तथा पशुपक्षी विकास मन्त्रालयले जनाएको छ । दुग्ध उत्पादक किसानले उत्पादन गरेको दूध खेर जान नदिने प्रदेश सरकारले एक वर्षभित्र हेटौँडामा दुग्ध पाउडर प्लान्ट निर्माणका लागि आर्थिक वर्ष ०७७/७८ मा काठमाडौं इजी इन्फ्रा प्रालिसँग सम्झौता गरेको थियो ।

निर्माणको जिम्मा पाएको कम्पनीले कोरोना महामारीको असरले समयसीमाभित्र निर्माण सम्पन्न गर्न नसकिएको जनाउँदै तीन महिना म्याद थपेर काम गरेको कम्पनीका प्रमुख उत्तम पौडेलले जानकारी दिए । उनले अबको दुई महिनामा प्लान्ट पूर्णरूपमा निर्माण सम्पन्न भई

सरकारलाई हस्तान्तरण गरिनेसमेत जनाए ।

उक्त प्लान्टमा वागमती प्रदेशसँगै अन्य चार प्रदेशका किसानले उत्पादन गरेको दूध ल्याएर पाउडर बनाउनका लागि सहज गरिने बताइएको छ । प्रदेश-१, मधेश प्रदेश र गण्डकी प्रदेशका केही जिल्लासहित वागमती प्रदेशका किसानले उत्पादन गरेको दूध खपत गरी पाउडर बनाउने मन्त्रालयको योजना छ । पाउडर प्लान्ट सञ्चालनका लागि प्रदेश-१ को सुनसरी, धरान, भुपा, मधेश प्रदेशको महोत्तरी, सर्लाही, रौतहट, पर्सा, बारा तथा गण्डकी प्रदेशको नवलपरासी, तनहुँलागायत जिल्लाबाट दूध आयात गरिने जनाइएको छ । उक्त प्लान्ट सञ्चालन पश्चात् चार प्रदेशका करिब २२ हजार किसान लाभान्वित हुने मन्त्रालयको अनुमान छ भने किसानबाट दैनिक ६० हजार लिटर दूध खरिद गरिने जनाइएको छ । किसानले उत्पादन गरेको दूधबाट दैनिक पाँच मेट्रिक टन पाउडर दूध उत्पादन र प्याकिङ गर्ने लक्ष्यसहित मन्त्रालयले काम गरिरहेको छ । प्लान्टबाट उत्पादित पाउडर दूध सात बट्टे प्रदेशका स्थानीय बजार, होटल र सर्वसाधारण उपभोक्तालाई सहज ढंगबाट विक्री वितरण गरिने मन्त्रालयले जनाएको छ ।

स्थानीय तहमा कृषि शाखा अर्भौ ओभेलमा



सौर्य समाचार

बागलुङ । आगामी आर्थिक वर्षको नीति तथा कार्यक्रम र बजेट ल्याएका स्थानीय तहले ससर्त बाहेकका योजनामा कृषि शाखालाई ओभर्लेभै राखेका छन् । पालिका तहमा कृषिको विकास नहुनामा दक्षप्राविधिक अभाव भएको र स्थानीय तहले प्राथमिकतामा कृषि शाखालाई नराखेको गुनासो आउन थालेको छ । लामो समयसम्म गाउँपालिका तथा नगरपालिकामा कृषि प्राविधिक नखटाउने र जनप्रतिनिधिले पनि कृषिको विकासलाई विकास नमान्ने प्रवृत्ति रहेको सरोकार बालाले बताए ।

कृषि ज्ञान केन्द्र बागलुङको आयोजनामा जिल्लाका सवै पालिकाको कृषि शाखाको समन्वयात्मक बैठकमा सहभागी हुन आएका कृषि प्राविधिकले आफ्नो शाखा ओभर्लेभै परेको गुनासो गरे । उनीहरूले भौतिक विकास, सडक, खानेपानी र सिँचाइका आयोजना भए विकास मान्ने, तर कृषि फसल उत्पादन, सीप

हस्तान्तरण र उत्पादनको बजारीकरणमा ध्यान नदिएको बताए । ०७४ सालमा स्थानीय निर्वाचन भएपछि लामो समयसम्म कुनै पनि पालिकामा कृषि शाखामा कर्मचारी र प्राविधिक शून्य भएको थियो । कर्मचारी अभावमा सामान्य सूचनासमेत पाउन नसकेर किसान पीडित भए । कृषि ज्ञान केन्द्र पनि नभएकोले सश्रीयताको मर्मअनुसार किसानले सेवा पाउन सकेका थिएनन् । लामो समयपछि शाखा स्थापना भए पनि कर्मचारी भने अर्भौ अभाव छ । आगामी आर्थिक वर्षका लागि भने पालिका तहमा कृषि अधिकृत राख्न सरकारले बजेट विनियोजन गरेको छ । यद्यपि राजनीतिक दल र जनप्रतिनिधिले अर्भौ कृषि तथा भेटेनरी क्षेत्र प्राथमिकतामा नपारेको प्राविधिकले बताए । 'कृषिका धेरै कार्यक्रम सम्पन्न गर्ने सकिएन, केही कार्यक्रम प्राविधिक नभएकोले फिर्ता भए' बरेड गाउँपालिकाका कृषि प्राविधिक सोमराज रावलले भने, 'समयमा विजु पाउनेदेखि सीप र प्रविधि हस्तान्तरणका कामसमेत रोकिएका थिए ।' व्यावसायिक किसानले बजारीकरण गर्न

पूर्णखोप सुनिश्चितता जिल्ला बन्थो कालीकोट

हस्त चोलागाई

कालिकोट । कालिकोट पूर्ण खोप सुनिश्चितता जिल्ला घोषणा भएको छ । बुधवार एक कार्यक्रमबीच जिल्लालाई पूर्ण खोप सुनिश्चितता जिल्ला घोषणा गरिएको हो । स्थानीय श्रोतको उपयोग, स्वामित्व र सहभागीता, पूर्ण खोप जिल्ला हाम्रो प्रतिबद्धता भन्ने नाराका साथ भव्य कार्यक्रमको आयोजना गरी जिल्लालाई पूर्ण खोप सुनिश्चितता घोषणा गरिएको छ । देशकै ६५औं पूर्ण खोप सुनिश्चितता जिल्ला घोषणा गर्नेमा कालिकोट परेको छ । बुधवार सदरमुकाम माम्मा बाजागाजासहित जिल्लालाई पूर्ण खोप सुनिश्चितता जिल्ला

घोषणा गरिएको हो । जिल्लाका नौ बट्टे पालिकामा रहेका १६ महिनादेखि २३ महिनासम्मका बालबालिका कोही पनि खोप लगाउनबाट बञ्चित नभई निरन्तर खोप लगाइएको लगायतका सूचकहरू पूरा भएपछि जिल्लालाई पूर्ण खोप सुनिश्चितता जिल्ला घोषणा गरिएको स्वास्थ्य सेवा कार्यालयले जनाएको छ । घोषणा जिल्ला समन्वय समितिका प्रमुख तथा खोप व्यवस्थापन समितिका संयोजक धनजित बहादुर शाहीको अध्यक्षता, संविधानसभा सदस्य तुलाराज विष्टको प्रमुख आतिथ्यता, स्थानीय सरकारका प्रमुख, राजनीति दल तथा जिल्लाका सरोकारवालाहरूको सहभागीतामा उक्त घोषणा गरिएको छ । यस्तै

कार्यक्रममा रास्कोट नगरपालिका प्रमुख धर्मराज शाही, पंचालभरना गाउँपालिका अध्यक्ष देवजंग शाही, महावै गाउँपालिका अध्यक्ष खेमबहादुर सिंह र खाँडाचक्र नगरपालिका प्रमुख कमलबहादुर शाहीको मात्र उपस्थिति रहेको छ । जिल्लाका नौ बट्टे पालिका मध्ये पंचालभरना गाउँपालिका खोप लगाउनेमा पहिलो बनेको छ । बुधवार जिल्ला पूर्ण खोप सुनिश्चितता घोषणा कार्यक्रममा पंचालभरना गाउँपालिका स्वास्थ्य शाखा प्रमुख विरेन्द्र संज्याललाई नगद १० हजारसहित सम्मानित गरिएको छ । यस्तै विभिन्न संघसंस्थालाई योगदान गरेको भन्दै सम्मानित गरेको थियो ।

सम्पादकीय

नागरिकता समस्यालाई नगिजोलौं

नागरिकता प्रमाणपत्र वितरणसम्बन्धी कानून निर्माणमा बिलम्ब हुँदै गएको छ। नेपाली नागरिकसँग विवाह भएर आएका विदेशी महिला, नेपालमै जन्मेका विदेशी, नेपाली महिलालसँग विवाह गरी आएका विदेशी पुरुष, तथा नेपालमै जन्मेको आधारमा नागरिकता पाएकाहरूका सन्तानलाई कुन प्रावधान अन्तर्गत नागरिकताको प्रमाणपत्र प्रदान गर्ने ? भन्ने मामिला निकै पेचिलो हुँदै आएको छ। पञ्चायतकालदेखि नै नेपालमा तीन खालका नागरिकता प्रमाणपत्र वितरण गरिँदै आएको छ। ती हुन्, 'वंशज, अंगीकृत र जन्मसिद्ध।' जो वर्तमान नेपालको भूगोलभित्रै थातथलो भएका नागरिकहरू हुन् उनीहरूलाई वंशज मानिएको छ। वंशजको नागरिकता सन्ततीका सन्दर्भमा केही विवाद छैन। जो नेपाली नागरिकसँग विवाह गरी आएका छन्, उनीहरूलाई तत्काल अंगीकृत नागरिकता दिने गरिएको छ। तर, विवाह गरेर आउनासाथ नागरिकता दिनु उचित कि ? अनुचित ? भन्ने मामिलामा विवाद छ। यसैगरी लामो समयदेखि नेपाल आएर बसोबास गरी नेपालमै जन्मिएकाहरूलाई जन्मसिद्धको आधारमा नागरिकता दिइएको थियो। यो प्रचलनलाई खारेज गर्ने कि ? यथावत राख्ने भन्ने प्रश्न एकातिर छ भने अर्कातिर जन्मसिद्ध नागरिकता सन्तानहरूलाई कस्तो खालको नागरिकता प्रमाणपत्र दिने ? भन्ने मामिलामा पनि विवाद छ। यही विवादका कारण नागरिकता वितरणसम्बन्धी कानून बन्न नसक्दा जन्मसिद्ध नागरिकता सन्तानहरू ठूलो समस्यामा छन्। नेपाली नागरिकसँग विवाह गरेर आउने महिलाहरू पनि समस्यामा छन्।

नेपालमा नागरिकता वितरणको समस्या निकै पेचिलो हुनुको मुख्य कारण हो, 'सन् १९५० को नेपाल-भारत सन्धी।' उक्त सन्धीमा नेपाल र भारतको सीमा खुला हुनुपर्ने प्रावधान छ। दुवै देशका नागरिकहरू एकअर्को देशमा गएर निर्वाध रूपमा बसोबास गर्न पाउने तथा पैसा र व्यवसाय गर्न पाउने प्रावधान छ। दुवै देशबीच वैवाहिक सम्बन्धको युवाँ पुरानो परम्परा छ। तर समस्या कहाँतिर छ भने भारतको जनसंख्या डेढ अर्बको हाराहारीमा छ, नेपालको जनसंख्या तीन करोड पनि छैन। जन्मका आधारमा नागरिकता दिने प्रावधानलाई निरन्तरता दिने हो भने नेपालमा केही वर्षभित्रै भारतीयहरूको बहुमत पुग्ने निश्चित छ। तर, जन्मका आधारमा नागरिकता दिने प्रचलनलाई निरन्तरता दिन एकथरीको चर्को दबाव छ। जून कुरा नेपालजस्तो देशका लागि कुनै पनि हालतमा स्वीकार्य हुन सक्दैन। तर, जन्मसिद्ध नागरिकता पाइसकेका मानिसहरूका सन्तती र विवाह गरेर आएका महिलाको समस्या भने पेचिलो छ। नागरिकताको अभावमा उनीहरूले बैंकको खाता खोल्नसमेत पाएका छैनन्, लोकसेवा आयोगको परीक्षा दिने, पासपोर्ट बनाएर विदेश जाने लगायतमा मामिला त परै जाओस्। यस्तो समस्यालाई धेरै दिन निरन्तरता दिनु अन्याय हुन्छ। यस्तो अन्यायले विद्रोह जन्माउँछ।

संविधान जारी भएको सात वर्ष बितिसक्यो पनि नागरिकता ऐन बन्न नसक्नु हाम्रो मुलुकको नीति निर्माण तहमा रहनेहरूको अन्यायता हो। धेरै प्रयास र छलफलपछि नागरिकता विधेयक संसदको पूर्ण बैठकद्वारा पारित हुने अवस्थामा पुगको थियो। तर सरकारले हालै उक्त विधेयक खारेज गरी नयाँ शिराबाट विधेयक तर्जुमा गर्ने निर्णय गरेको छ। कुनै पनि नयाँ विधेयक संसदमा दर्ता भई पारित हुन कम्तिमा पनि दुई महिना समय लाग्छ। त्यसैले संसदको यो कार्यकालमा नागरिकतासंबन्धी ऐन आउने संभावना क्षीण भएको छ। नागरिकताका नाममा सस्तो राजनीति गर्नेलाई फेरि पनि बल पुगेको छ। हाम्रो जस्तो मुलुकले नागरिकता प्रदान दुई वटा आधारमा मात्रै गर्नुपर्छ। पहिलो आधार वंशज र दोस्रो आधार वैवाहिक अंगीकृत। पञ्चायतकालमा जन्मका आधारमा नागरिकता दिने गलत परम्परा बसालियो। यो परम्परालाई कुनै पनि हालतमा निरन्तरता दिनु हुन्न। वैवाहिक अंगीकृतका हकमा आजको आजै नागरिकता दिने राजन्यकालिन परम्परालाई पनि गणतन्त्रमा निरन्तरता दिनु हुन्न। तर, एक वर्षभन्दा लामो समय सीमा राख्नु हुन्न। नक्कली विवाह हो भने अनुसन्धानको पाटो छुँदै छ, तर सक्कली विवाहलाई शंका गर्नु हुँदै हुँदैन। सक्कली विवाह हो कि नक्कली ? भन्ने कुरा एक वर्षको अनुसन्धानमा मज्जाले थाहा पाउन सकिन्छ। जहाँसम्म वंशजको आधारमा नेपाली नागरिकता पाएका महिलाले विदेशी नागरिकबाट पाएका सन्तानलाई कुन वर्गको नागरिकता दिने ? भन्ने प्रश्न छ, यसबारे बृहत अध्ययन तथा छलफल जरुरी छ।

मननीय



युद्ध

युद्धको अन्त्य भएको केवल वीरगति प्राप्त गरेको सैनिकले मात्र देखेको हुन्छ।

-प्लेटो

जब धनीले युद्ध छेड्छन् तब गरिबहरू मर्ने गर्दछन्।

-जीन सार्टी

युद्धको तयारी र स्थगन एकैपटक गर्न सकिँदैन।

-अल्बर्ट आइन्स्टाइन

युद्ध शान्तिका समस्याबाट टाढा भाग्ने कायर तरिका हो।

-थोमस म्यान

युद्धको सुरुवात राजनीतिज्ञले गर्छन्, सैनिकले होइन।

-विलियम वेष्टमोरल्याण्ड

युद्ध कुनै समस्याको सामाधान होइन।

-बेन्जामिन डिस्ट्रेली

भ्रातृत्व चहान्छौं भने हतियार त्याग।

-पप जोन पौल द्वितीय

युद्धको अन्त्य गरिएन भने यसले हाम्रो अन्त्य गर्छ।

-एच. जि. वेल्स

बहुमतको सरकार बन्ने गरी चुनावी तालमेल



डा. डिला संगौला

चौथौं महाधिवेशन लगत्तै भएको स्थानीय तहको निर्वाचनमा नेपाली कांग्रेस पहिलो पार्टी भएको छ। यसमा आदरणीय पार्टी सभापति शेरबहादुर देउवालागायत सिंगो केन्द्रीय समिति नै धन्यवादको पात्र बनेको छ। देशभरका पालिकाहरू मध्ये करिब आधामा नेपाली कांग्रेसको नेतृत्व कायम भएको छ। बाँकी पालिकाहरूमा पनि नेपाली कांग्रेसका वडा अध्यक्ष तथा सदस्यहरूको उपस्थिति विगतमा भन्दा धेरै नै राम्रो भएको छ। सुकृष्णपूर्ण रणनीति तथा कार्यनीतिको परिणाम हो यो। स्थानीय निर्वाचनमा निश्चय नै केही कमीकमजोरी भएका छन्। ती कमीकमजोरीहरू सुधाने हो भने आगामी निर्वाचनमा नेपाली कांग्रेसले अझै ठूलो सफलता हासिल गर्ने निश्चितजस्तै छ।

अब करिब चार महिनापछि प्रदेशसभा र प्रतिनिधिसभाको निर्वाचन हुँदै छ। यी निर्वाचनमा समेत कांग्रेसले सके बहुमत नसके पनि ठूलो दलसहित सरकारको नेतृत्वमा पुगनुपर्ने कुरामा दुई मत छैन, किनकी नेपाली कांग्रेसको नेतृत्व मुलुकको आवश्यकता हो भन्ने कुरा विभिन्न घटनाक्रमले पुष्टि गरिसकेको छ। देशको राजनीतिमा नेपाली कांग्रेसले विभिन्न भूमिका निर्वाह गरेको छ। कहिले प्रमुख प्रतिपक्ष त कहिले सत्तापक्षको भूमिकामा नेपाली कांग्रेस छ। नेपाली कांग्रेसले कहिले करिब दुईतिहाइ बहुमतको एकमना सरकार हाँकेको छ।

कहिले सुविधाजनक बहुमतको एकमना सरकार हाँकेको छ। कहिले विभिन्न दलहरूको संयुक्त सरकारको नेतृत्व गरेको छ। संयुक्त सरकारको नेतृत्व गर्दा पनि नेपाली कांग्रेस अन्य पार्टीहरूले भन्दा राम्रो परिणाम दिएको जनताले देखेभोगेका छन्। त्यसैले नेपाली कांग्रेसको अहिले जारी बैठकले सिंगो मुलुकको ध्यान केन्द्रित गरेको छ।

करिब सातदशक लामो यात्रा पार गरिसकेको लोकतान्त्रिक पार्टी नेपाली कांग्रेसले

आफ्नो स्थापनाकाल २००३ सालदेखि ०७९ सालसम्म आइपुग्दा धेरै अनुभव बटुलेको छ। कस्तो कार्यनीति तथा रणनीति अपनाउंदा चुनाव जितिन्छ। कस्तो रणनीति तथा कार्यनीति अपनाउंदा चुनाव जित्न सकिन्छ ? भन्ने प्रचुर अनुभव नेपाली कांग्रेसलाई भइसकेको छ। हरेक घटनाको इतिहास साक्षी छ। नेपाली जनताले आशा भरोसा गरेको सधैं जनताको सार्वभौमसत्ता, राष्ट्रिय अखण्डता, मुलुकको स्वाधिनताका लागि संघर्ष गर्ने नेपाली कांग्रेस आजको अवस्थामा अझ बढी क्रियाशील, संगठित भई एकताबद्ध हुन जरुरी छ। आधुनिक नेपालको परिवर्तनको मूल संवाहक शक्ति नेपाली कांग्रेसले अहिलेको परिस्थितिमा आफ्ना नीति अवधारणा समयसापेक्ष रूपान्तरण गरी (समुन्नत नेपाल सम्पन्न नागरिक) को लक्ष्य आवश्यक छ। परिणाममुखी नीति कार्यक्रम तथा योजनाको निर्माण सफल कार्यान्वयन कानूनी शासन, आर्थिक अनुशासन तथा सुशासन समग्र विकासका आधार स्तम्भ हुन्।

सधीय लोकतान्त्रिक गणतन्त्रको स्थापनापछि बनेको अधिल्लो सरकारमा नेपाली जनताले आफ्नो भविष्यप्रति विश्वस्त हुन सकेनन्। अब हुने निर्वाचनपछि बन्ने सरकार कांग्रेसको हुने र जनतालाई विश्वस्त पार्ने सांगठनिक, राजनीतिक, आर्थिक, सामाजिक पक्षमा समेत आमूल परिवर्तन गरी योग्य मान्देल्याई योग्य ठाउँको अवधारणा अनुरूप उम्मेदवार चयनमा ध्यान दिन जरुरी छ। नत्र अहिलेको स्थानीय निर्वाचनमा उदाएका स्वतन्त्र उम्मेदवारको विजय र फेरी सलबलाइरहेको आगोको राग र तापको फिल्लाले कांग्रेसलाई नछुला भन्न सकिन्छ। त्यसैले यो बैठकमा निम्न बुँदामा आफ्नो धारणा राख्न चाहन्छु।

स्थानीय तहको निर्वाचनसम्बन्धी विवेचना : नेपाली कांग्रेस स्थानीय तहको निर्वाचनमा सत्ता गठबन्धन दल बीचको चुनावी तालमेलका कारण धेरै सिट जित्न सफल भएको छ। अहिलेको निर्वाचनको परिणामलाई हेर्दा केन्द्रीय निर्वाचन परिचालन समितिको प्रतिवेदन अनुसार गठबन्धनविना उम्मेदवारी दिएका पालिकाहरूमा ४८ प्रतिशत जीत निकालेको छ भने गठबन्धन गरेर उम्मेदवारी दिएका पालिकाहरूमा ५२ प्रतिशत जीत निकाल्न सफल भएको छ। कांग्रेस एक्ले निर्वाचनमा जाँदा पनि कमजोर भएको त देखिँदैन, तर गठबन्धन गरेर जाँदा बढी सफलता मिलेको पुष्टि भएको छ। तर, कमी कमजोरी तथा सिक्नुपर्ने पाठ धेरै रहे। मुख्य कसजोरी उम्मेदवार छनौटमा देखियो। विधानतः धेरैजसो पालिकाको टिकट सम्बन्धित स्थानीय र प्रदेश समितिले नै गरेका हुन्। तर आवश्यक मापदण्ड र मूल्यांकनको पद्धती अनुरूप टिकट

वितरण गर्न नसक्दा अधिल्लोपटक जितेका १ सय २६ पालिकामा यसपटक जीत निकाल्न सकिँदैन। यो मेरो र त्यो तेरो भन्ने भावनाले ग्रसित नभई उम्मेदवारको सही टिकट वितरण गरिएको भए नेपाली कांग्रेसलाई साँचेभन्दा बढी सफलता प्राप्त हुने थियो। राजनीति दलहरूको गठबन्धन र निर्वाचन आयोगको निर्देशन समेतका कारण स्थानीय तहमा महिला नेतृत्व खुम्चियो। देशभरि ७ सय ५३ स्थानीय तह मध्ये यसपटक २५ पालिकाको नेतृत्व गर्ने अवसर महिलाले पाएका छन्। संवैधानिक प्रावधानअनुसार राजनीतिक दलहरूले पालिका प्रमुख/अध्यक्ष/उपप्रमुख/उपाध्यक्षमध्ये एक महिला उम्मेदवार बनाउनुपर्नेमा गठबन्धन गरिएका पालिकामा भने प्रमुख वा उपप्रमुख मध्ये एउटा पदमा मात्र उम्मेदवारी दिँदा पुरुषलाई अघि सारिका कारण यसपालि नेपाली कांग्रेसबाट महिला प्रमुखको संख्या घट्न पुग्यो। २५ प्रमुख महिला मध्ये आठ जना नेपाली कांग्रेसबाट निर्वाचित भएका छन्। यो निरासाजनक परिणाम हो। अब आउने निर्वाचनमा प्रत्यक्षमा महिलालाई बढी उम्मेदवारी दिइनुपर्दछ।

भ्रातृ तथा शुभेच्छुक संस्थाको पूर्णता : भ्रातृ तथा शुभेच्छुक संस्था नेपाली कांग्रेसको मेरुदण्ड र संगठनको आधारशिला हुन्। भ्रातृ तथा शुभेच्छुक संस्थाहरूको क्रियाशीलता, सशक्तताविना पार्टी बलियो हुन सक्दैन। भ्रातृ संस्थाको अधिवेशन समयमै हुन नसक्दा तदर्थ समिति गठन गरिएको छ। त्यो समितिलाई छिट्टै पूर्णता दिई संगठनको विस्तार, परिचालन र सुदृढीकरण गरिनुपर्दछ।

विभागको गठन : नेपाली कांग्रेसको विधानमा महाधिवेशन सम्पन्न भएको ६ महिनाभित्र केन्द्रीय विभाग सहितका संघसंस्थाहरूलाई पूर्णता दिनुपर्ने व्यवस्था छ। १४औं महाधिवेशन सम्पन्न भएको ६ महिना बितिसकेको छ। विभाग गठनले पार्टीको संगठनमा नयाँ ऊर्जा र गतिशीलता प्रदान गर्न महत्वपूर्ण भूमिका रहन्छ। विधानअनुसार पार्टीका संगठनहरूलाई छिटोभन्दा छिटो पूर्णता दिनु जरुरी छ।

नीति तथा विधान अधिवेशन : नेपाली कांग्रेसको १४औं महाधिवेशन सम्पन्न भएको ६ महिना कटिसकेको छ। विशेष परिस्थितिमा सम्पन्न भएको यो अधिवेशनमा नेतृत्व चयनबाहेक अरु काम गर्न सकिँदैन। महाधिवेशनका दुई मुख्य जिम्मेवारी हुन्छन्। त्यसमध्ये एउटा जिम्मेवारी नेतृत्व चयन हो। अर्को जिम्मेवारी नीति निर्माण हो। विशेष कारणवस नीति निर्माणको जिम्मेवारी थाति राख्नुपर्ने वाध्यता उठ्न भयो। त्यसैले जसको नेतृत्व त्यसैको नीति भनेर सम्पन्न अधिवेशनले अब छिट्टै नै नीति अधिवेशन गर्नुपर्ने जरुरी छ। विधिको ब्याडमा नीतिको विरुवा उमानु पर्दछ। नीति समय देशकाल र परिस्थिति अनुरूप हुनुपर्दछ।

डाक्टर, नर्सहरूको योग्यताअनुसार पारिश्रमिक



तामोदर पौडेल

सकिन्छ। पढ्दा पनि लगभग ७० प्रतिशत क्लिनिकल गर्नुपर्नेहुन्छ भने पास भइसकेपछि भोलेन्टियर राख्नुको कुनै औचित्य छैन। यो त सरासर श्रम शोषण भएन ? डाक्टर, नर्सहरूको हकहितका लागि भनि नेपाल चिकित्सक संघ, नेपाल नर्सिङ एसोसियसन तथा अन्य स्वास्थ्य संघसंस्थाहरू धेरै छन्। यी संस्थाले यस्ता कुराहरूमा ध्यान दिएजस्तो देखिँदैन र यहाँका नर्सिङ होम, अस्पतालहरूले पनि आफूखुसी तलब दिन्छन् र। एउटा डाक्टर पढ्नलाई कम्तीमा ३५ देखि ५५ लाख र नर्सिङ पढ्न पाँचदेखि सात लाखसम्म खर्च हुने अनुमान गर्न सकिन्छ। यदि जागिर पाइ हाले पनि पाँचदेखि १५ हजारसम्म तलब दिइन्छ। धेरै अस्पताल नर्सिङ होमहरूले सुरुमा मासिक पाँचदेखि आठ हजार रुपैयाँ मात्र तलब दिने गरेको पाइन्छ। काठमाडौं बाहिरबाट आएका डाक्टर, नर्सलाई यस्ता खाले पारिश्रमिकमा बाँच्न धेरै हम्मे हुन्छ। यस्तो अवस्थामा डाक्टर, नर्सहरू आफ्नो स्वास्थ्यको समेत पर्वाह नगरी फरक अस्पतालमा काम गर्न बाध्य हुन्छन्। डाक्टर, नर्स पास भइसकेपछि उनीहरूले पाउने तथा बाच्ने न्यूनतम तलब कति ? अहिले नेपालमा एमबिएएस तथा नर्सिङ कलेजहरू दुवोसरी उभ्रिएका छन्।

नेपालमा नै उत्पादन भएका डाक्टर, नर्सहरूलाई सम्मानित गरी उचित रोजगारी दिन राष्ट्रले सकेको छैन। यदि हुँदाहुँदै किन कलेजहरू खोल्नलाई अनुमति दिइन्छ ? अहिले नेपालमा त्रि.वि. अन्तर्गतका ६ वटा विषिके आइएचएसअन्तर्गत सिटिभिटीलगायत ४३ वटा कलेजहरूले नर्सिङ पढाउने अनुमति पाएका छन्। त्यस्तै एउटा कलेजले वार्षिक ४० जनासम्म नर्सिङ स्टाफ उत्पादन गरिरहेका छन्। एमबिएएस र नर्सिङ पास गरेपछि विदेशिन रूचाउने आरोप पनि डाक्टर नर्सहरूलाई लाग्ने गरेको पाइन्छ। हो नेपालमा जागिर गरेर आफूले पढेको पैसा असुलगरी परिवारलाई फिर्ता दिनु त परै जाओस् आफ्नो पेट पाल्न र घर भाडा यातायात खर्चसम्म धान्न सकिँदैन। इच्छा नहुँदा नहुँदै पनि पाएसम्म विदेशिनपुग्ने बाध्यता छ हाम्रा डाक्टर नर्सहरूलाई। प्राविधिक विषय लिएर पढेका नेपालीको त यो दुर्दशा छ भने सामान्य विषय लिएर पढेका युवाको हालत कस्तो होला ? हाम्रा आदरणीय देश सञ्चालकहरूमा कहिले चेतना आउला ? भाषण गरेजस्तै वाँच्न पुग्ने पारिश्रमिक तोकेने हो कि ? चाहे कोरोना होस् वा भूकम्प घटना बुबाआमा, बलबच्चा विरामी भए पनि घरमा पाउनु धेरै गाह्रो छ। डाक्टर नर्सहरू

नेपालमा नै उत्पादन भएका डाक्टर, नर्सहरूलाई सम्मानित गरी उचित रोजगारी दिन राष्ट्रले सकेको छैन। यदि हुँदाहुँदै किन कलेजहरू खोल्नलाई अनुमति दिइन्छ ? अहिले नेपालमा त्रि.वि. अन्तर्गतका ६ वटा विषिके आइएचएसअन्तर्गत सिटिभिटीलगायत ४३ वटा कलेजहरूले नर्सिङ पढाउने अनुमति पाएका छन्। त्यस्तै एउटा कलेजले वार्षिक ४० जनासम्म नर्सिङ स्टाफ उत्पादन गरिरहेका छन्। एमबिएएस र नर्सिङ पास गरेपछि विदेशिन रूचाउने आरोप पनि डाक्टर नर्सहरूलाई लाग्ने गरेको पाइन्छ। हो नेपालमा जागिर गरेर आफूले पढेको पैसा असुलगरी परिवारलाई फिर्ता दिनु त परै जाओस् आफ्नो पेट पाल्न र घर भाडा यातायात खर्चसम्म धान्न सकिँदैन।

नत कुनै चाडपर्व केहीमा विदा पाउँछन्। देशको स्वास्थ्य सेवालालाई गुणस्तरीय बनाउन नसकेको महत्वपूर्ण भूमिका हुन्छ। नसकेको सहयोग विना डाक्टरले मात्र विरामीको उपचार गर्न गाह्रो हुन्छ। नसकेको राम्रो हेरचाह र बोलीचालीले विरामीको आधा रोग निको हुन्छ। तर देशमा नर्सहरूको दरबन्दी र सेवा सुविधा हेर्दा सन्तोषजनक छैन। खासगरी सरकारी अस्पतालमा नर्सहरूको प्रयाप्त परिचाल नहुन सकेको छैन। एक जना नर्सले आफ्नो ड्युटीमा ३० देखि ४० जना विरामीलाई एकैलेले सेवा दिनुपर्ने अवस्था छ। सरकारी अस्पतालमा नर्सको संख्या हेर्दा आजभन्दा २० वर्ष अघिको दरबन्दी विद्यमान छ। देशका सरकारी अस्पतालहरूमा १८ हजार नर्स आवश्यक रहेकामा हालसम्म आठ/नौ हजारको हाराहारीमा मात्र दरबन्दी खडा गरिएको छ। त्यसमा पनि कार्यरत नर्सको संख्या हेर्दा सात/आठ हजारको हाराहारीमा मात्र छ। सरकारले २० वर्ष अघिको दरबन्दीसमेत पूर्ति गर्न नसक्नुलाई के भन्ने ? जनशक्ति अभावकै

आगामी चुनावी रणनीति : चुनाव जित्न रणनीति र कार्यनीति दुवैको आवश्यकता पर्दछ। आगामी चुनावमा गठबन्धनसहित गए बढी सिट हासिल गर्ने रणनीति होला तर यतिले मात्रै पुग्दैन। चुनावी तालमेलका लागि सिटको फाँडफाँड गर्दा अपनाउनुपर्ने रणनीतिबारे सघन गृहकार्य गर्नुपर्नेहुन्छ। बहुमत प्राप्त हुने संभावना नै निमित्तयान्न हुने गरी सिटको बाँडफाँड हुने खतराबाट कुनै पनि हालतमा नेपाली कांग्रेसलाई जोगाउनु जरुरी छ। साथै पार्टीबाट तय गरिने उम्मेदवार योग्य र सक्षम हुनु जरुरी छ। साथै लोकप्रिय हुनु पनि जरुरी छ। तर को सक्षम छ, को योग्य छ ? को लोकप्रिय छ ? भन्ने पहिचानका लागि टिकट दिन मापदण्ड र मूल्यांकन पढाई अपनाउन आवश्यक छ। त्यसैले रणनीति वाच्य र आन्तरिक दुवै हुनु पर्दछ। तब मात्र परिणाम हात लाग्दछ।

पार्टी र सरकार सञ्चालनको अवस्था : पार्टी सञ्चालनमा पार्टीका सभापतिको साथै पदाधिकारीहरूको भूमिका पनि महत्वपूर्ण रहन्छ। अहिलेको नेतृत्व हेर्दा पार्टी सभापतिमा परिपक्व नेतृत्व देखिन्छ भने पदाधिकारीमा अधिकांश युवा पिढी आएका छन्। तर, पार्टी सञ्चालनमा नयाँ वा रूपान्तरण भएको देखिँदैन। सरकार पनि जनताप्रति उत्तरदायी र जिम्मेवार बन्नु नै पर्दछ।

राष्ट्रिय राजनीतिमा कांग्रेस :नेपालको राष्ट्रिय राजनीतिमा कांग्रेस सफल भएको छ। किमकी पाँच वर्षको लागि प्रतिपक्षको जिम्मेवारी पाएको कांग्रेस आज सरकारको नेतृत्वमा छ। कांग्रेसले नेतृत्वमा स्थानीय निर्वाचन सम्पन्न भई बाँकी निर्वाचन पनि हुँदैछन्। राष्ट्रिय मुद्दाहरूमा एमसिसीको अनुमोदनले मुलुकलाई समृद्धितर्फ लैजाने नयाँ आयाम थपेको छ। यता एमसिसीको सवालमा सरकारको स्पष्ट दृष्टिकोण र अडानले परराष्ट्र नीतिमा अब्बल सावित भएको छ। तर, कोरोनाले थलिपएको अर्थतन्त्र, रूस र युकेनको युद्धका कारण भित्रिएको आर्थिक संकटले जनजीवन असहज र भयावह बन्दैछ। महँगो र मूल्यवृद्धिले जनता अक्रान्त छन् त्यसतर्फ ध्यान दिन जरुरी छ।

जागरण अभियान : जागरण अभियान पार्टी संगठनभित्र नेता, कार्यकर्ता र जनतालाई जोड्ने महत्वपूर्ण कडी हो। जसको माध्यमबाट वैचारिक, सांगठनिक, सुदृढीकरण र परिचालनमा नयाँपान आउने गर्दछ। स्थानीय निर्वाचनमा संचालन गरिएको घर घर जाओँ कांग्रेस जिताओँ अभियानले पहिलो पार्टी बन्न परिणाम दियो। आगामी निर्वाचनमा अगाडी प्रदेश र संघको सरकार समृद्धि आधारसहित जनताको घरआँगनमा जागरण अभियान सञ्चालन गरिनु पर्दछ। जय नेपाल।

(केन्द्रीय सदस्य डा.संगौलाले नेपाली कांग्रेसको जारी केन्द्रीय समितिको बैठकमा प्रस्तुत गरेको दृष्टिकोणको संपादन अंश)

कारण कतिपय जिल्ला अस्पताल र स्वास्थ्य चौकीमा नर्सको काम श्रेणीविहीन कर्मचारीले गरेका छन्। जसले गर्दा विरामीले पाउने स्वास्थ्य सेवा पनि खस्किएको छ। नर्सिङ कार्डिनलमा दर्ता भएको तथ्यांकलाई हेर्दा देशभरका निजी तथा सरकारी अस्पतालहरूमा ४८ हजार नर्स कार्यरत भएको देखिन्छ। तर सरकारले आवश्यक दरबन्दी सिर्जना गर्न नसक्नु र अर्कातर्फ नर्सहरूको उत्पादन बसेंन सरकारी तथा निजी कलेजहरूले ६/सात हजार गरिरहेका छन्। थप दरबन्दी सिर्जना हुन नसक्दा कतिपय नयाँ नर्सहरू भोलियन्टरका रूपमा काम गर्न बाध्य छन्। निजी स्वास्थ्य सेवा तथा नर्सिङ होमहरू हेर्ने हो भने हरेक टोल, गल्लीहरूमा खुलिरहेका छन् र खुल्ने क्रम पनि जारी नै छ। तर नर्सहरूलाई दिइने पारिश्रमिक सरकारी नियम विरुद्ध छ। निजी अस्पतालहरूले आफू खुसी आठ/१० हजारमा काम गर्न लगाइरहेका छन्। यस्तो हुँदा धेरै नर्सहरू विदेश पलायन भइरहेका छन्। निजी क्षेत्रबाट नर्सिङ पढ्दा कम्तीमा ६ लाख लाग्छ। सरकारीमा केही सस्तो भए पनि कोटा भएकाले नाम निकाल्न गाह्रो छ। त्यसमाथि पनि राजनीतिक भागवण्डाका कारण सामान्य परिवारका विद्यार्थीले नाम निकाल्न सजिलो छैन। यस्तो अवस्थामा नर्सहरूले पढाइ सकेपछि सजिलै काम पाउने अवस्था छैन। यदि पाइहाले पनि सधैं कम तलबमा काम गर्नु परिरहेको छ। यस्तो अवस्थामा नर्सहरूको मनोबल कसरी उच्च होला ? राज्यले तत्काल आवश्यक दरबन्दी सिर्जना गरी नर्सहरूको मनोबल उच्च राख्नु जरुरी छ।

आफूले आफैँ नीति बनाउनु त राम्रो भूमिका खेलेको छैन सरकारले। नेपाल नर्सिङ संघले बनाएको मापदण्डसमेत लागू गर्न आलाटाल गरिरहेको गुनासो संघको छ। सरकारले त्यसतर्फ ध्यान दिनु जरुरी देखिन्छ। नर्सको पैसागत सुरक्षा, सेवा सुविधाका लागि जनसंख्या तथा स्वास्थ्य मन्त्रालयमा नर्सिङ परामर्श शाखा पनि खोलासकेको छ। तर, मन्त्रालयले उक्त शाखासँग कहिल्यै पैसागत परामर्श गरेको देखिँदैन। यस क्षेत्रको समग्र सुधारका लागि राज्यले समयसापेक्ष मापदण्ड बनाउन हिलाइ भइसकेको देखिन्छ। उत्पादित नर्सहरूलाई रोजगारीको प्रत्याभूति र न्यूनतम तलब सुविधा तोक्न नसकेको हो भने सरकारको स्वीकृति लिई सञ्चालन भइरहेका नर्स उत्पादन गर्ने कारखानाका रूपमा रहेका कलेजहरू पनि आफ्नो नियन्त्रणमा लिई बन्द गर्नुपर्ने देखिन्छ।

डेउडा सुदूरपश्चिमको संस्कृति र सभ्यता हो : प्रतीक

■ सौर्य समाचार



काठमाडौं । गायक/संगीतकार विक्रम कुँवर 'प्रतीक' ले भूपडीका आवाज, पुर्चौडी घुमौला, मान्छे, मान्छे विचको भेदभाव, काँछे मेरी मैना चणी, लिपुलेक हाप्पे हो, जाउँ है साथी लगायतका गीत तथा एल्बम ल्याएका छन् ।

पुर्चौडी नगरपालिका ५, कुवाकोट, बैतडीमा जन्मिएका ३७ वर्षीय गायक प्रतीक दुई दशकभन्दा लामो समयदेखि राजनीति तथा सांस्कृतिक क्षेत्रमा क्रियाशील छन् । समाजशास्त्रमा स्नातकोत्तर गरेका उनी जनसांस्कृतिक महासंघ नेपालको केन्द्रीय उपाध्यक्ष तथा नेकपा (माओवादी केन्द्र) सुदूरपश्चिम प्रदेश समिति सदस्यसमेत हुन् । नेपालमा ठुल-ठुला राजनीति आन्दोलन भए पनि त्यसको मर्म अनुसारको संस्कृति निर्माण हुन नसक्दा वारम्बार जनताले दुःख पाइरहेको बताउने प्रतीकले राजनीतिक नेतृत्वले यसमा सचेत हुनुपर्ने धारणा राख्छन् । नेपालको भौगोलिक, सांस्कृतिक, क्षेत्रीय, जातीय तथा बहुराष्ट्रियतालाई आत्मसात् गर्दै राज्य र राजनीतिक दलले विभेदरहित राज्यप्रणाली बनाउनु पर्नेमा जोड दिँदै उनले समाज रुपान्तरणका निमित्त सांस्कृतिक पक्षमा ध्यान दिनुपर्ने बताउँछन् । सुदूरपश्चिम प्रदेशमा रहेर राजनीति तथा संस्कृतिका क्षेत्रमा काम गरिरहेका जनवादी गायक प्रतीकसँग डेउडा संगीतका बारेमा गरिएको छोटो कुराकानी:

डेउडा गीत संगीतको अवस्था कस्तो छ ?

- डेउडा गीत संगीतको अवस्था सामान्य नै रहेको छ, जुन स्तरमा देशभित्र र बाहिर यसको चर्चा र महत्व फैलिँदै

जानुपर्ने हो खासै त्यो भने हुन सकिरहेको छैन ।

खासगरी सुदूरपश्चिम तथा कर्णालीको मौलिक पहिचानको रूपमा स्थापित डेउडा लगायतका अन्य गीत संगीतको संरक्षण, विकास तथा प्रवर्द्धनका निमित्त के कस्ता अभ्यास भइरहेका छन् ?

-यहाँले भन्नुभएभन्ने डेउडा खासगरी सुदूरपश्चिम र कर्णालीको मौलिक पहिचान र संस्कृति हो । यसको जगेना, संरक्षण र थप विकासमा सम्बन्धित निकाय लाग्न जरुरी छ । यसको निमित्त विभिन्न क्षेत्रबाट पहल र कोसिसहरु फिर्ना रूपमा मात्रै भइरहेका छन् । खासगरी यो क्षेत्रमा लागेका संघ-संस्था र कलाकारहरुको आफ्नो प्रयास र योगदान रहिआएको छ । कलाकारको आफ्नो निजी प्रयासले मात्रै विकास र संरक्षण प्रयाप्त छैन । त्यसकारण सरकारी स्तरबाटै योजनाबद्ध ढंगले यसको विकास र महत्वबारे आवश्यक पहल चाल्न आवश्यक छ ।

विद्यालय तथा विश्वविद्यालयका पाठ्यक्रममा समेत डेउडा लगायतका संस्कृतिका विषयलाई खासै समेटेको पाइँदैन ?

-हो, सही कुरो भन्नुभयो । डेउडा केवल गीत मात्रै होइन यो सुदूरको संस्कृति र सभ्यता हो । यसलाई सरकारले पाठ्यक्रममा समावेश गर्नुपर्ने हो । यसमा कसैको ध्यान गएको देखिँदैन । अब विद्यालय र विश्वविद्यालयका पाठ्यक्रममा समावेश गर्नका लागि स्थानीय र प्रदेश स्तरको सरकारले सुरुवात गर्न जरुरी छ ।

केन्द्रिकृत सोचका कारण मौलिक संस्कृति लोप हुने अवस्थामा पुगेका छन् । यसको जिम्मेवारी कसले लिने ?

-आधुनिकताको नाममा पश्चिमा संस्कृतिले नराम्रोसँग प्रभाव जमाएको देखिन्छ, जसको कारण मौलिक संस्कृति र हाम्रा परम्परा विस्तारै लोप हुनेतिर गइरहेको अवस्था छ । यसको मुख्य जिम्मेवारी त राज्यकै हो, तर राज्यलाई घचघच्याउने दायित्व हरेक तहका सांस्कृतिककर्मीको पनि हो । जसको लागि हरेक क्षेत्रका सरकारले पहल चाल्न अति आवश्यक छ ।

नेपाल संगीत तथा नाट्य प्रज्ञा प्रतिष्ठान, स्थानीय, प्रदेश तथा संघीय सरकारले के कस्ता काम गर्नुपर्ने ?

-हाम्रो संस्कृति र मौलिकता जोगाउनलाई यहाँले माथि भन्नुभएका विभिन्न संघ-संस्था, प्रतिष्ठान र खासगरी तिनै तहको सरकारले बेला-बेलामा गोष्ठी, छलफल, भेला, अन्तर्क्रिया, प्रतियोगिता लगायतका विविध गतिविधिहरु गर्ने, सो क्षेत्रमा लागेका सप्टालाई सम्मान, पुरस्कार, सहयोग तथा प्रोत्साहन गर्नुपर्दछ ।

यहाँ जनसांस्कृतिक महासंघ नेपालमा पनि आबद्ध हुनुहुन्छ, मौलिक संस्कृति जगेना गर्न राजनीतिक रूपमा के कस्ता कार्य गर्नुपर्ने ?

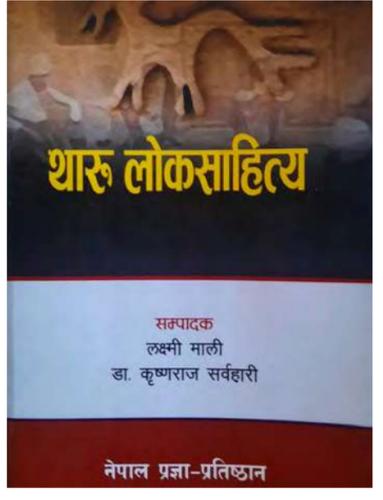
-राजनीतिक रूपमा पनि माथि भनेका कार्य गर्न हामीले तिनै तहको सरकारलाई आफ्ना कार्यक्रम र योजनासहित बेला-बेला खबरदारी गर्नुपर्ने देखिन्छ । ताकी तिनै तहको सरकारले यसलाई गम्भीरतापूर्वक लिँदै संरक्षण र जगेनाको लागि सकारात्मक भूमिका निर्वाह गरोस् ।

प्रतिष्ठानले ल्यायो 'थारू लोकसाहित्य'

■ सौर्य समाचार

काठमाडौं । साहित्यकारद्वय लक्ष्मी माली तथा डा कृष्णराज सर्वहारीको सम्पादनमा 'थारू लोकसाहित्य' प्रकाशनमा आएको छ । थारू समुदायका विविध भाषिका अन्तर्गतको लोकसाहित्य समेटिएको यो पुस्तक नेपाल प्रज्ञा प्रतिष्ठानले प्रकाशित गरेको हो । नेपालको तराई-मधेशका पूर्वदेखि पश्चिमसम्म रहेका थारू समुदायका साहित्यलाई पुस्तकमा समावेश गरिएको छ ।

पुस्तकमा मोरङिया थारू लोकसाहित्यबारे रामसागर चौधरी, सप्तरीया थारू लोक साहित्यबारे नन्दलाल चौधरी, चित्तौनिया थारू लोकसाहित्यबारे कारी महतोका आलेख राखिएको छ । यस्तै, रुपन्देहीको थारू लोकसाहित्यको अवस्थाबारे वमवहादुर थारू, डंगौरा थारू लोकसाहित्यबारे भूमिका थारू र बुनु थारूका लेख रहेका छन् । त्यस्तै, डेउडा थारू लोकसाहित्यबारे पवनकुमार थारू, कठरिया थारू लोकसाहित्यबारे विष्णुप्रसाद कठरिया तथा रानाथारू लोकसाहित्यबारे करम सिंह राना तथा बासमतीकुमारी रानाको



आलेख पुस्तकमा समेटिएको सम्पादक डा. सर्वहारीले जानकारी दिए ।

डा. सर्वहारीका अनुसार समावेश सबै लेखको थारू भाषामा अनुवाद पनि समेटिएकाले थारू भाषाको विविधता बुझ्न स्वयम् थारू भाषीलाई पनि पुस्तकले मद्दत गर्नेछ ।

'थरी थरी भोले' मा खुमन र अञ्जली

■ सौर्य समाचार

काठमाडौं । तिजलाई लक्षित गरी गायक खुमन अधिकारी र शान्तीश्री परियारले 'थरी थरी भोले' बोलको गीत सार्वजनिक गरेका छन् । गीतमा गोपाल जिएम, नरेश खाती, रुपी सिन्जाली र प्रेमा रानाको समूह गायन रहेको छ । लोक तथा डान्सिड शैली तयार पारिएको गीतलाई रविन लामिछानेले लेखेका छन् । गायक अधिकारीले संगीत भरेको गीतमा सुनिल परियारको एरेन्ज रहेको छ ।

सार्वजनिक गीतको भिडियोमा गायक खुमन अधिकारी, मोडल अञ्जली अधिकारी, अभिषेक खड्का लगायतका कलाकारको



अभिनय छ । गायत्री थापाले निर्देशन गरेको भिडियोमा जेरी भण्डारीको छायांकन तथा नवीन घर्तीमगरको सम्पादन रहेको छ । लोक, आधुनिक लगायतका गीतमा शब्द तथा स्वर भदैं आएको गायिका गायत्री पछिल्लो समय गीत भिडियो निर्देशनमा समेत सक्रिय छन् । 'थरी थरी भोले' गीत शिवदर्शन फिल्मस्वाट निर्माण तथा सार्वजनिक गरिएको हो ।

'अम्रिका' सार्वजनिक



■ सौर्य समाचार

काठमाडौं । गायक सुधन गैरे र गायिका मेलिना राईको युगल आवाज रहेको 'अम्रिका' बोलको

प्रेमिल भावमा तयार पारिएको गीतको भिडियोमा मोडल सरोज अधिकारी र आशमा विश्वकर्माको प्रेम र रोमान्स मिश्रित अभिनय छ । पवन सुस्लिङको छायांकन रहेको गीतको भिडियोलाई दिग्गज शाहले सम्पादन गरेका छन् । गम्भीर विष्टको कोरियोग्राफी रहेको भिडियोलाई गणेश शाहीको निर्देशनमा तयार पारिएको हो । 'अम्रिकामै बसेर घरजम गरौंला', 'मेरा केही शर्त छन् गर पूरा', 'तिमीतिरै यो मन छोडिदिए', लगायतका गीत भिडियोमा समावेश गरिएको छ । भिडियो गायक गैरेको युट्युब च्यानल 'एसजी मेलोडी' मार्फत सार्वजनिक गरिएको छ । गायक गैरे लामो समयदेखि अमेरिकामा बस्दै आएका छन् ।

यसअघि गायक गैरेको स्वरमा रहेको 'उडी जाने जेट', 'माया किन मोडियो', 'सानो' बोलको गीत भिडियो स्रोतामाफ आइसकेका छन् । डिभी परेर अमेरिका जाने सपना बोकेको प्रेमिल जोडीको रमाइलो कथामा यो भिडियो तयार पारिएको छ ।

'आमा' पहिलो चलचित्र

■ सौर्य समाचार

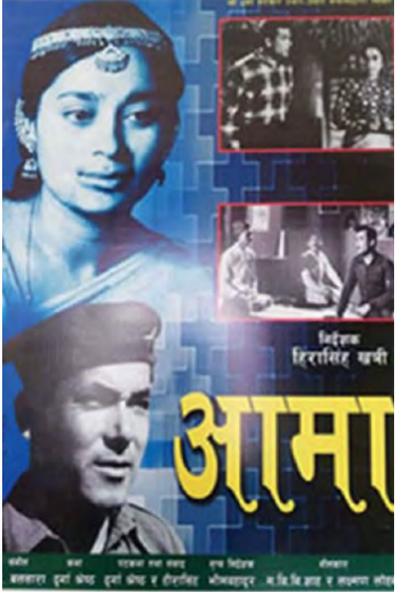
काठमाडौं । चलचित्र विकास बोर्डले 'आमा' लाई नेपालको पहिलो चलचित्रको मान्यता दिएको छ । नेपाली चलचित्र उद्योगमा कुन चलचित्र पहिलो बनेको भन्ने विवाद लामो समयदेखि चलिरहेको थियो । विसं २०२२ सालमा प्रदर्शन भएको 'आमा' र २००६ सालमा प्रदर्शनमा आएको 'हरिशचन्द्र' बीच कुन पहिलो भन्ने विवाद चलिरहेको थियो । यो विवादलाई आधिकारिक रूपमा टुंग्याउँदै बोर्डले आफ्नो आधिकारिक वेबसाइटमा विसं २०२२ सालमा प्रदर्शनमा आएको 'आमा' लाई पहिलो नेपाली चलचित्र भनेर राखेको छ ।

नेपाली चलचित्रविज्ञले डिबी परियारले निर्देशन गरेको 'हरिशचन्द्र' भारतमा बनेको नेपाली भाषी चलचित्र भएकाले यसलाई पहिलो भन्न नहुने जिकिर गर्दै आएका थिए । उनीहरूले कोलकाताको रुपश्री सुटिड

स्टुडियोमा निर्माण गरिएको 'हरिशचन्द्र' नेपालमा नबनेकाले नेपालीभाषी मात्रै भन्नुपर्ने तर्क गर्दै आएका थिए ।

यो विवाद चलेपछि कुन चलचित्र पहिलो भन्ने बारेमा तत्कालीन चलचित्र निर्देशक समाजले सञ्चार मन्त्रालयलाई पहिलो नेपाली चलचित्रको आधिकारिता माग्दै ज्ञापन पत्र बुझाएको थियो । तर, मन्त्रालयले यसबारेमा कुनै जवाफ दिएको छैन । यसैबीच चलचित्र विकास बोर्डले 'आमा' लाई पहिलो नेपाली चलचित्रको मान्यता दिएको हो ।

भारतीय निर्देशक हिरासिंह खत्रीले २०२२ सालमा प्रदर्शनमा आएको 'आमा' लाई निर्देशन गरेका थिए । तत्कालीन पञ्जाबी शासनको प्रचारका लागि सरकारको प्रचार विभागले निर्माण उक्त चलचित्रमा अभिनेत्री भुवन चन्द, अभिनेता शिवशंकर मानन्धर, चैत्यदेवी, बसुन्धरा भुसाल लगायतका कलाकारले अभिनय गरेका थिए ।



लघुकथा समालोचना विमोचित



■ सौर्य समाचार

काठमाडौं । साहित्यकार ममता श्रेष्ठ मृदुलद्वारा लिखित 'समकालीन लघुकथा विवेचना' समालोचना संग्रह बजारमा आएको छ । राजधानीमा बिहीबार साहित्यकार प्राडा सावित्री मल्ल कक्षपति, कथाकार पद्मावती सिंह, लघुकथा समाजका केन्द्रीय अध्यक्ष श्रीओम श्रेष्ठ रोदन, सचिव तुलसीहरि कोइराला, सप्टा साँभ अमेरिकाका संस्थापक अध्यक्ष प्रभाव इच्छुक, कृतिका लेखक ममता मृदुल, प्रतिलिपि अधिकार कार्यालयका रजिस्टार विष्णुकुमारी भट्टराईले संयुक्त रूपमा उक्त कृतिको विमोचन गरे ।

कार्यक्रममा प्राडा सावित्री मल्ल कक्षपतिले नेपाली लघुकथा समालोचनाका क्षेत्रमा नवीन कृति आएको जिकिर गरिन् । उनले विधातात्विक समालोचनाका आधारमा कृति आएको बताइन् । उनले भनिन्, 'लघुकथा विधा अत्यन्त लोकप्रिय बनेको र यसमा मेरो बहिनी पुस्ताले प्रतिनिधित्व

गरेकोमा अत्यन्त खुसी लागेको छ ।' उनले बाहिरबाट यो कृति लघुकथा संग्रहजस्तो देखिए पनि समालोचनात्मक रहेको सुनाइन् । डा. कक्षपतिले फेसबुकजस्तो सामाजिक सञ्जालमा आएका लघुकथा सामग्री स्रोतका रूपमा सकलन गरिएकाले यसले नयाँ पद्धतिको सुरुवात गरेको जिकिर गरिन् । उक्त कार्यक्रममा प्रतिलिपि अधिकारको कार्यालयका रजिस्टार विष्णुकुमारी भट्टराईले कुनै पनि विधाको गहन अध्ययन र विश्लेषणविना समालोचना गर्न नसकिने धारणा व्यक्त गरिन् ।

उनले लघुकथालाई गहिरो अध्ययन र विश्लेषण गर्नु चानचुने विषय नभएको बताइन् । उनले भनिन्, 'यस कार्यका लागि उहाँले ठूलो साहस गर्नुभएको छ ।' कार्यक्रमका प्रमुख अतिथि कथाकार पद्मावती सिंहले आफूले लामा खालका कथा लेखे पनि लघुकथा थोरै मात्र लेख्न सकेको सुनाइन् । उनले लघुकथा चोटिलो र प्रहारात्मक हुनुपर्नेमा जोड दिइन् । उनले भनिन्, 'आफू बहिनी पुस्ताले प्रतिनिधित्व

लेखनबारे जानकार छु । लघुकथालाई चोटिलो र प्रहारात्मक पार्नुपर्ने भएकाले यो ज्यादै कठिन कार्य पनि हो । अर्क त्यसको समालोचनात्मक कृति अर्क महत्वपूर्ण छ ।' सिंहले पछिल्लो विधालाई बहिनीपुस्ताले नेतृत्व गरेकोमा आफू निकै हर्षित बनेको बताइन् ।

लघुकथा समाजका केन्द्रीय अध्यक्ष श्रीओम श्रेष्ठ रोदनले समालोचनाको पुस्तकाकारका रूपमा यो कृति पहिलो पटक आएको बताए । उनले भने, 'लघुकथा संग्रहका पुस्तक, लघुकथाको विधा सिद्धान्त र फुटकर समालोचना प्रकाशित भए पनि कृतिगत तहमा यो नै पहिलो पुस्तक हो ।' उनले कृतिभित्र केही कमीकमजोरी रहे पनि त्यसको समीक्षा र सुधार हुँदै जाने जनाउँदै लघुकथाको यो पुस्तक आउनु आफैमा एउटा उपलब्धि भएको बताए । लेखक तुलसीहरि कोइरालाले सहजीकरण गरेको कार्यक्रममा राजेश खनाल, तथा दायित्व प्रकाशनका अध्यक्ष रामप्रसाद पन्तले मन्तव्य व्यक्त गरेका थिए ।

भारत सरकारले गृह, विनि लगायत केही वस्तुहरूमा लगाएको निर्यात प्रतिबन्ध नेपालको इकमा लागू नहुने नेपालका लागि नवनिर्वाचित भारतीय राजदूत नवीन श्रीवास्तवले बताएका छन्। नवनिर्वाचित भारतीय राजदूत श्रीवास्तवले नेपाल उद्योग वाणिज्य महासंघद्वारा आयोजना गरिएको औपचारिक भेटवार्तामा सो कुरा बताएका हुन्।

पोखराको लेकसाईड स्थित सेवीगरदेखि सराङकोटसम्म जाने केवलकारको नियमित मर्मत सम्भार गर्न शुक्रबार देखि ६ साउन सम्म बन्द गरिने भएको छ। केवलकारको सेवा ७ साउनको बिहान ९ बजे देखि साँझ ६ बजे सम्म यथावत रूपमा सञ्चालन हुने पनि उल्लेख छ।

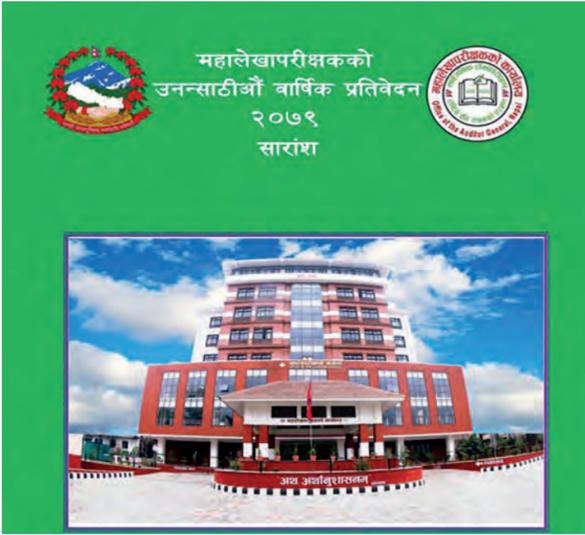


उपयोगविनै व्याजको व्ययभार

सौर्य समाचार

काठमाडौं । सरकारले आर्थिक वर्ष २०७७/७८ मा लिएको ऋणको उपयोग विनै व्याज तिरेको देखिएको छ। आन्तरिक र बाह्य ऋण उपयोग नै नगरिकन व्याज तिरेको कारण राज्यलाई थप व्ययभार बढेको महालेखा परीक्षकको ५९औं प्रतिवेदनमा देखाइएको छ।

सरकारले तिनै बाँकी ऋण १७ खर्ब ३७ अर्ब ६३ करोड ६८ लाख रहेको छ। जसमध्ये बाह्य ऋणको अंश ९ खर्ब ३४ अर्ब ६९ करोड ५२ लाख र आन्तरिक ऋणको अंश ८ खर्ब २ अर्ब ९४ करोड १६ लाख रहेको छ। उक्त वर्ष सरकारको ऋण दायित्व ३ खर्ब ४ अर्ब २३ करोड ४४ लाख थप भएको पनि महालेखाको प्रतिवेदनमा उल्लेख छ। आर्थिक वर्ष २०७७/७८ मा आन्तरिक ऋणबाट २ खर्ब २५ अर्ब प्राप्त गर्ने लक्ष्य राखेकोमा २ खर्ब २२ अर्ब ७८ करोड प्राप्त भएको देखिएको छ। आन्तरिक ऋणमध्ये चालुतर्फ सशर्त अनुदान, विशेष अनुदान र समपूरक अनुदान तर्फ ३३ अर्ब ६४ करोड खर्च भएको महालेखाले जनाएको छ। पुँजीगततर्फ सवारीसाधन खरिद लगायतका शीर्षकमा १ खर्ब २२ अर्ब



१५ करोड खर्च गरेको देखिएको छ। वित्तीय व्यवस्था तर्फ २३ अर्ब ४ करोड खर्च मध्ये सार्वजनिक संस्थानमा ऋण लागानी तर्फ ९ अर्ब ५८ करोड र शेर

लानी तर्फ १३ अर्ब २६ करोड खर्च गरेको पनि प्रतिवेदनमा उल्लेख छ। प्राप्ति भएको आन्तरिक ऋण र उपयोग भएको रकम बीचको फरक ४३ अर्ब ९५

करोड उपयोग गर्न सकेको देखिदैन। तर पनि सरकारले व्याज तिरेर व्ययभार बढाएको देखिएको छ।

प्रतिवेदनका अनुसार विभिन्न ५६ संस्थामा नेपाल सरकारको स्रोतबाट गत वर्षसम्म १ खर्ब १८ अर्ब १५ करोड ४४ लाख ऋण लागानी भएकोमा यो वर्ष विभिन्न १० संस्थामा १४ अर्ब ३ करोड ८४ लाख थप लागानी भएको देखिन्छ। लागानी भएकोमध्ये १ संस्थाको समायोजन गरी १ करोड ८८ लाख र ३ संस्थाबाट साँवा फिर्ता भएको १५ करोड ८१ लाख समेत १७ करोड ६९ लाख घटाई यस वर्षसम्म १ खर्ब ३२ अर्ब १ करोड ५९ लाख लागानी भएको देखिएको छ। वैदेशिक स्रोतबाट गत वर्षसम्म विभिन्न ३८ संस्थामा १ खर्ब ७९ अर्ब ४६ लाख लागानी भएकोमा सो वर्ष विभिन्न ५ संस्थामा २१ अर्ब २८ करोड २९ लाख थप लागानी भएको देखिन्छ। लागानी भएकोमध्ये १ संस्थाको समायोजन गरी ३२ करोड १७ लाख र ४ संस्थाबाट साँवा फिर्ता भएको ३ अर्ब ६ करोड ५४ लाखसमेत ३ अर्ब ३८ करोड ७१ लाख घटाई १ खर्ब ९६ अर्ब ९० करोड ५ लाख लागानी भएको देखिएको छ। २०७७/७८ सम्म कुल

३ खर्ब २८ अर्ब ९१ करोड ६४ लाख ऋण लागानी भएको पनि प्रतिवेदनले देखाएको छ। ऋणको स्रोतगत विवरण अनुसार महालेखा नियन्त्रक कार्यालयले गत वर्षको जिम्मेवारी र यो वर्ष समेत विभिन्न आयोजनाको खर्च भन्दा बढी प्राप्त भएको भनी देखाएको ४२ आयोजनाको ५५ अर्ब ६९ करोड ७५ लाख ऋणात्मक रकम समायोजन गरी २०७८ अपाहा मसान्तमा १२ अर्ब ३६ करोड ९१ लाख शोधभर्ना प्राप्त हुन बाँकी देखाएको छ। उक्त ऋणात्मक देखिएको आयोजनाको प्राप्त रकम समायोजन नगरी हिसाब गर्दा वर्षान्तमा ६७ अर्ब ९८ करोड ६६ लाख शोधभर्ना हुन सकेको छैन। २०७८ असार मसान्तमा ११ अर्ब ५६ करोड ९८ लाख शोधभर्ना प्राप्त हुन बाँकी देखिएको छ। प्रतिवेदन अनुसार शेर तथा ऋण लागानी तर्फ २०७६/७७ सम्म प्राप्त हुनुपर्ने व्याज ४३ अर्ब ८१ करोड ९४ लाख बाँकी रहेकोमा यो वर्ष थप १० अर्ब ६९ करोड २९ लाखसमेत ५४ अर्ब ५१ करोड २३ लाख व्याज प्राप्त हुनुपर्नेमा अझै ४६ अर्ब १० करोड २१ लाख प्राप्त हुन नसकेको पनि उल्लेख छ।

नेप्सेमा दोहोरो अंकको वृद्धि

सौर्य समाचार

काठमाडौं । साताको चौथो दिन नेप्से परिसूचक दाहोरो अंकले बढेको छ। नेप्से १४ दशमलव ७१ अंकले बढेर २ हजार १ दशमलव ५३ अंकमा पुगेको हो।

साताको पहिलो दिन सोमबार नेप्से घटेको थियो भने मंगलबार देखि सुधार हुन थलोको हो। चालु आर्थिक वर्षको कारण बृक क्लोज गर्नुपर्ने भएकाले पनि नेप्से बढेको हो। नेप्से सँगै सेन्सेटिभ इन्डेक्स १ दशमलव ७८ अंकले बढेर ३ सय ८३ दशमलव १४ अंक पुगेको छ।

बिहीबार २ सय २० कम्पनीका ६२ लाख १० हजार ९०८ किता सेयर किनबेच भएको छ। उक्त दिन २ अर्ब ४१ करोड १८ लाख ३४ हजार ५९९ को कारोबार भएको छ। नेप्सेका १३ उपसमूहमा १३ वटै उपसमूहको परिसूचक बढेका छन्। जसमध्ये जलविद्युत उपसमूहको परिसूचक सबैभन्दा बढी २ दशमलव शुन्य ४ प्रतिशत बढेको छ। वित्त र लघुवित्तको सेयरमूल्य १ प्रतिशतभन्दा बढी बढेको छ बाँकी अन्य उपसमूहको परिसूचक शून्य प्रतिशत भन्दा माथिले बढेका छन्।

एनआईबिएल प्रगति फन्डको मूल्य सकारात्मक सर्किट लेभलमा कारोबार भएको छ। त्यस्तै, प्रभु सेलेक्ट र अपर तामाकोशीको मूल्य ७ प्रतिशतभन्दा बढी बढेको छ भने बोटलर्स नेपाल तराईको मूल्य ६ प्रतिशतभन्दा बढी बढेको छ। यता पुर्देन्सियल इन्व्हेस्टमेन्टको सेयरमूल्य ५.०१ प्रतिशत घटेको छ।

कारोबार रकमका आधारमा एनआईसी एसिया बैंकले ३० करोड १८ लाख ८६ हजार रुपैयाँ बराबरको सेयर कारोबार गरेको छ। अपर तामाकोशीको १४ करोडभन्दा बढीको सेयर खरिदबिक्री भएको पनि नेप्सेले जनाएको छ।

कपोरेट

ग्लोबल आइएमई बैंक युरोमनी अर्वाइडबाट सम्मानित



काठमाडौं । ग्लोबल आइएमई बैंक लिमिटेड 'युरोमनी अर्वाइड फर एक्सलेन्स, वेस्ट बैंक नेपाल २०२२' बाट सम्मानित भएको छ।

वेलायतको लण्डनमा आयोजित एक कार्यक्रमबीच बैंकका अध्यक्ष चन्द्रप्रसाद ढकाल र प्रमुख कार्यकारी अधिकृत रत्नराज बज्राचार्यले उक्त अर्वाइड ग्रहण गरेको हुन्।

सन् १९९२ मा स्थापित यो अर्वाइड बैंकिंग क्षेत्रको एक प्रतिष्ठित र एक मात्र अर्वाइड हो। बैंकले ग्राहकलाई प्रदान गर्दै आएको सेवा, बैंकिंग क्षेत्रमा नयाँ नयाँ प्रविधिको प्रयोग तथा बैंकको उच्चस्तरीय कार्यसम्पादनका लागि यो अर्वाइड प्रदान गरिएको हो।

युरोमनी म्यागाजिन बैंकिंग क्षेत्रको गहकिलो विश्लेषण, सुभाष र समालोचनाका लागि प्रख्यात रहेको छ। युरोमनी सम्मूहमा बैंक तथा वित्तीय क्षेत्रका ख्यातिप्राप्त तथा अनुभवी व्यक्तिकरु रहेका छन्। अमेरिकाको बैंक अफ अमेरिकाले यो वर्ष विश्वको उत्कृष्ट बैंकको उपाधि प्राप्त गरेको छ।

बैंकले ७७ जिल्लामा २ सय ८९ शाखा, २ सय ६२ एटीएम, २ सय ७५ शाखा रहित बैंकिंग सेवा, ५१ एक्सटरेन्सन तथा राजश्व संकलन काउन्टर तथा ३ वटा वैदेशिक प्रतिनिधि कार्यालय समेत गरी ८ सय ७५ भन्दा बढि सेवा केन्द्रबाट २८ लाख भन्दा बढि ग्राहकहरू माफ्र सेवा प्रदान गरिरहेको पनि बैंकले जनाएको छ।

त्यसैगरी बैंकले संयुक्त राज्य अमेरिका, संयुक्त अधिराज्य, क्यानडा, अष्ट्रेलिया, मलेसिया, दक्षिण कोरिया, जापान, साउदी अरेबिया, कतार, युएई, बहराइन, कुवेत, भारत, जोर्डन, हङकङ लगायतका मुलुकबाट रेमिट्यान्स भित्र्याउँदै देशको अर्थ व्यवस्थामा महत्वपूर्ण योगदान पुऱ्याउँदै आइरहेको पनि विज्ञापितमा उल्लेख छ।

सिटिजन्स बैंक र सत्य ओमकार डेन्टल होम बीच सम्झौता



काठमाडौं । सिटिजन्स बैंक इन्टरनेसनल लिमिटेड र भैरहवा रुपन्देहीस्थित सत्य ओमकार डेन्टल होम प्रा.लि. बीच सिटिजन्स बैंकका काईवाहकलाई विशेष छुट दिने स म भन्दा री पत्र मा हस्ताक्षर भएको छ। सो

समझदारी पश्चात् सिटिजन्स बैंकका काईवाहकले सत्य ओमकार डेन्टल होम प्रालिका विभिन्न सेवा सुविधामा १५ प्रतिशत सम्म छुट पाउनेछन्। यस किसिमको सहकार्यबाट बैंकका ग्राहक लाभान्वित हुने विश्वास बैंकले लिएको छ।

बैंकले हालसम्म काई नभएका ग्राहकलाई तत्कालै नयाँ काई उपलब्ध गराउन सिटिजन्स इन्स्ट्यान्ट काईको व्यवस्था समेत गरेको छ। त्यसैगरी आफ्ना काईवाहकको सुविधालाई ध्यानमा राखी नेपाल भित्रका जुनसुकै बैंकको एटिएमबाट पैसा निकाल्दा शुल्क नलाग्ने व्यवस्था पनि बैंकले विभिन्न वचत खातामा गरेको छ।

ग्राहकको वित्तीय आवश्यकता सुरक्षित तवरले प्रदान गर्ने अभिप्रायका साथ बैंकले क्रियोस्क, ई.के.वाई.सी तथा नागरिक एप मार्फत अनलाइन खाता खोल्न सक्ने जस्ता सुविधाको सुरुवात गरी

सकेको छ। साथै बैंकका ग्राहकको बैंक सम्बन्धी जिज्ञासा तथा समस्याको छिटो भन्दा छिटो समाधान प्राप्त होस् भन्ने उद्देश्यले ग्राहक साहायता केन्द्रको समेत स्थापना गरिसकेको छ। यसबाट बैंकका ग्राहक सेवा प्रतिनिधिसँग सम्पर्क गरी आफ्ना बैंकिंग सम्बन्धी जिज्ञासा तथा समस्याको समाधान शाखामा उपस्थित नभईकन गर्न सकिने पनि विज्ञापितमा उल्लेख छ।

हाल बैंकको देशभरी फैलिएको १ सय ७८ वटा शाखा, १ सय ३० ए.टि.एम. र ९६ वटा शाखा रहित बैंकिंग ईकाईबाट करिब १४ लाख ग्राहकवर्गलाई आधुनिक बैंकिंग सेवा प्रदान गर्दै आएको पनि विज्ञापितमा उल्लेख छ।

लुम्बिनी विकास कोषमा एसबिआई बैंकको एक्सटरेन्सन काउन्टर

काठमाडौं । नेपाल एसबिआई बैंक लिमिटेडले लुम्बिनी विकास कोष परिसरमा लुम्बिनीमा एक्सटरेन्सन काउन्टर सेवा विस्तार गरेको छ। काउन्टरको उद्घाटन दक्षिण एसियाली क्षेत्रीय सहयोग संगठनका महासचिव महामहिम इसाला रुवान विराकुनले गरेका हुन्।

समारोहमा बैंकका प्रवन्ध संचालक तथा प्रमुख कार्यकारी अधिकृत दीपक कुमार दे, नायब प्रमुख कार्यकारी अधिकृत तथा प्रमुख वित्तीय अधिकृत मोहम्मद रिजवान आलम, तथा लुम्बिनी विकास कोषका कोषाध्यक्ष धुण्डिराज भट्टराई, सदस्य सचिव सानुराज शाक्यका साथै बैंकका अन्य कर्मचारी तथा लुम्बिनी विकास कोषका कर्मचारी उपस्थित रहेको पनि विज्ञापितमा उल्लेख छ।

उक्त कार्यक्रममा बैंकले आफ्नो संस्थागत सामाजिक उत्तरदायित्व अन्तर्गत लुम्बिनी विकास कोषलाई १ सय वटा इस्टेब्लिन्ड हस्तान्तरण गरेको थियो। यस पहिले लुम्बिनी क्षेत्रको सौन्दर्य अभिवृद्धि गर्नुका साथै पर्यटकीय तथा तीर्थयात्रीको आरामदायी वसाईंमा समेत सहयोग पुग्ने बैंकको विश्वास छ।

सोही कार्यक्रममा दक्षिण एसियाली क्षेत्रीय सहयोग संगठनका महासचिव महामहिम इसाला रुवान विराकुनले पीओएस मेसिन मार्फत डिजिटल डोनेशनको पनि उदघाटन गरेका थिए। डिजिटल डोनेशनले स्वदेशी तथा विदेशी आगन्तुकलाई सहज हुने अपेक्षा गरिएको छ। बैंकले देशका विभिन्न स्थानमा ९१ शाखा, २९ एक्सटरेन्सन काउन्टर, ७ प्रादेशिक कार्यालय तथा १ कर्पोरेट अफिसका साथै १२ ९ एटिएम बाट आफ्नो सेवा प्रदान गर्दै आएको पनि उल्लेख छ।

सनराइज बैंक लम्की शाखाद्वारा शैक्षिक सामग्री प्रदान

काठमाडौं । सनराइज बैंकले संस्थागत सामाजिक उत्तरदायित्व अन्तर्गत कैलालीको लम्कीमा रहेको २ सय ७ जना बालबालिकालाई शैक्षिक सामग्री सहयोग गरेको छ। बैंकले एक कार्यक्रमका विच लम्की चूहा नगरपालिका ५ चौरीमा रहेको जनजागृति माध्यमिक विद्यालयमा अध्यक्षनरत विपन्न, गरीब तथा जेठेन्दार २ सय ७ विद्यार्थी बालबालिकालाई उनीहरूको पठनपाठनमा सहयोग पुगोस भनेर शैक्षिक फोला सहयोग गरेको बैंकको लम्की शाखाका प्रमुख मातृका खड्काले जानकारी दिएका हुन्।

विद्यालय व्यवस्थापन समितिका अध्यक्ष महेश बडुवालको अध्यक्षता तथा लम्की चूहा नगरपालिकाका नगर प्रमुख सुशिला शाहीको उपस्थितिमा सहयोग सामग्री वितरण गरेको थियो। उक्त कार्यक्रममा वडा नम्बर ५ का वडा अध्यक्ष माया विष्ट समेत सहभागिता थियो। लम्कीमा बैंकको शाखा स्थापना भए सँगै बैंकले संस्थागत सामाजिक उत्तरदायित्व कार्यक्रम अन्तर्गत समुदायमा विभिन्न कार्यक्रम गर्दै आएको छ।

पछिल्लो समय संस्थागत सामाजिक उत्तरदायित्वलाई निकै प्राथमिकता दिदै बैंकले देशव्यापी रूपमा विभिन्न कार्यक्रमहरू गर्दै आएको छ। शिक्षा, स्वास्थ्य, बैंकिंग साक्षरता, वातावरण संरक्षण लगायतका विभिन्न क्षेत्रमा विभिन्न कार्यक्रमहरू भइरहेको पनि बैंकले जनाएको छ।

सि.जी मेरिडियाको उपकरण बजारमा



काठमाडौं । सि.जी.मेरिडिया सिन्चेर सिरिज अन्तर्गत इन्टर नेटको माध्यमबाट चलाउन सक्ने विविध प्रिमियम विद्युतीय उपकरण बजारमा ल्याएको छ। यी उपकरणहरू इन्टरनेटसंग जोडेपछि जहाँबाट पनि चलाउन सकिने कम्पनीले बताएको छ।

सि.जिले यस पटक आइओट सुविधा सहितको प्रिमियम मन्ट्री डोर तथा साइड रेफ्रिजेरेटर र ए.सी बजारमा ल्याएको हो। यसको लागि ग्राहकले घर र कोठा बाहिर भएको बेला पनि चाहिए अनुसार तापक्रममा कोठालाई न्यानो र सितल बनाउन सक्ने र रेफ्रिजेरेटरलाई पनि कन्ट्रोल गर्न सकिने कम्पनीले जनाएको छ। यसको मोटरमा १० वर्षको वारेन्टी र ए.सीमा ५ वर्षको वारेन्टी कम्पेसर पनि रहेको विज्ञापितमा उल्लेख छ।

के.एल.दुगड समुहको ज्ञान तखाना बजारमा

काठमाडौं । के.एल.दुगड समुहले ज्ञान ब्राण्डको नयाँ उत्पादन ज्ञान मखाना नेपाली बजारमा ल्याएको छ। के.एल.दुगड समुहले लोकप्रिय ब्राण्ड ज्ञानको ज्ञान चक्री आटा, ज्ञान मैदा जस्ता लोकप्रिय उत्पादनहरू लामो समयदेखि नेपाली बजारमा उपलब्ध गराउँदै आइरहेको पनि विज्ञापितमा उल्लेख छ।

खाद्य प्रविधिको निकै अनुभवी र दक्ष विशेषज्ञले विभिन्न तरिकाबाट यसको स्वाद र गुणस्तरको मापन परिक्षण गरी उपभोगको लागि योग्य रहेको ठहराएको छ। लिली फूलको वीउबाट बनाइने मखाना प्रोस्टिन र अन्य धेरै पोषक तत्व रहेको पनि उल्लेख छ।

उपवासको समयमा बढी उपभोग हुने मखाना दैनिक खाजाको रूपमा पनि उपभोग गर्न सकिन्छ। मखाना हल्का रोस्ट गरेर अथवा सिधै खान सकिने, खीर सहित विभिन्न स्वादिष्ट र मिठाई परिकार बनाउन पनि प्रयोग गर्न सकिने कम्पनीले जनाएको छ।

ज्ञान मखाना मुख्य डिपार्टमेन्ट स्टोरका साथै स्थानीय किराना पसलमा २ सय ग्राम प्याकमा उपलब्ध रहेको पनि विज्ञापितमा उल्लेख छ।

अजोड इन्व्हेस्टमेन्ट र कुमारी क्यापिटल सम्झौता



काठमाडौं । अजोड इन्व्हेस्टमेन्ट लिमिटेड र कुमारी क्यापिटल लिमिटेड बीच शेर र रजिष्ट्रार सेवा (आरटिएक) को लागि सम्झौता गरेको छ। बिहीबार इन्व्हेस्टमेन्टको मुख्य कार्यालयमा आयोजित एक

कार्यक्रममा बीच इन्व्हेस्टमेन्टका प्रमुख कार्यकारी अधिकृत कुमार बहादुर खत्री र कुमारी क्यापिटलका प्रमुख कार्यकारी अधिकृत अश्विन वावु श्रेष्ठले सहमतिपत्रमा हस्ताक्षर गरेका हुन्।

स्मार्टचाइस टेक्नोलोजिज र मुक्तिनाथ विकास बैंक बीच सहकार्य



काठमाडौं । नेपाल राष्ट्र बैंकबाट भुक्तानी प्रणाली सञ्चालकको अनुमतिपत्र प्राप्त स्मार्टचाइस टेक्नोलोजिज लिमिटेड र राष्ट्रिय स्तरको ख वर्गको इजाजतपत्र प्राप्त मुक्तिनाथ विकास बैंक लिमिटेडबीच स्मार्ट क्युआर मार्फत भुक्तानी सेवा प्रदान गर्नको लागि सम्झौता सम्पन्न भएको हो।

स्मार्टचाइस टेक्नोलोजिज लिमिटेडको तर्फबाट प्रमुख कार्यकारी अधिकृत नारायण प्रकाश भुजु र बैंकको तर्फबाट सहायक नायब प्रमुख कार्यकारी अधिकृत तिल बहादुर गुरुङले सो सम्बन्ध सम्झौतापत्रमा हस्ताक्षर गरेका हुन्।

नेपाल राष्ट्र बैंकको नीति र निर्देशन अनुरूप समग्र भुक्तानी प्रणालीमा नगदको भौतिक प्रयोगलाई कम गर्दै विद्युतीय कारोबारलाई बढवा दिने प्रमुख उद्देश्यका साथ क्रियाशील स्मार्टचाइस टेक्नोलोजिज लिमिटेड र विगत लामो समयदेखि सर्वसाधारणलाई सबै प्रकारका बैंकिंग सेवा सुविधा पुऱ्याउँदै आएको बैंकको यस सहकार्यबाट समग्र डिजिटल इकोसिस्टमको विकासमा थप योगदान पुग्ने पनि विज्ञापितमा उल्लेख छ।

यामाहाको बिजेता छोटो

काठमाडौं । यामाहा मोटरसाइकलका लागि आधिकारिक विक्रेता एमएडब्लू इन्टरप्राइजेजले नयाँ वर्ष २०७९ लाई लक्षित गरी सुरु गरेको अफर १ हजार गुणाले खुसी बढाउने योजनाको विजेता घोषणा गरेको छ। उक्त अफरको विजेतामा काठमाडौं निवासी तेजिञ्ज लामा छनोट भएका छन्। हिमालयन टिभीमार्फत प्रत्यक्ष प्रसारण गरिएको विजेता घोषणामा 'लक्की ड्र'मार्फत लामा विजेता भएका हुन्। कम्पनीले विजेता लामालाई २० लाख ७९ हजारको चेक यामाहा शोरूमबाट हस्तान्तरण गरेको छ।

कम्पनीको अनुसार नेपालमा सार्वजनिक गरिएको अफरमध्ये अहिलेसम्मकै सबैभन्दा भारी नगद राशि भएको उक्त नयाँ वर्ष अफर चैत १ बाट जेठको दशैँ साता सम्म चलाइएको थियो।

यसका अतिरिक्त, उक्त योजना अन्तर्गत ग्राहकले यामाहाका कुनैपनि सवारी साधन कम्पनीको अधिकारिक शोरूमबाट खरिदपश्चात् २ लाख ७ हजार ९०० रुपैयाँसम्म नगद पुरस्कार जित्ने मौका पनि प्रदान गरिएको थियो।

कम्पनीका अनुसार ग्राहकहरूले यामाहाको आधिकारिक वेबसाइटमा दैनिक रूपमा खेलाइएको डिजिटल ज्याकपट्टामा सहभागी भई उल्लेखित नगद उपहार जितेका थिए। बम्पर विजेता लामाले पोखरास्थित भिएडब्लू इन्टरप्राइजेजबाट यामाहा रेजेडआर १२५ सिक्सिको स्कुटर खरिद गरेका थिए। यामाहा रेजेडआर प्रति लिटर ५८ किलोमिटर माइलले प्रदान गर्ने बजारमा एक मात्र स्कुटर रहेको पनि कम्पनीले दावी गरेको छ।

ग्राहकको खुसी नै यामाहा नेपालका लागि सबैभन्दा महत्वपूर्ण कुरा रहेको यामाहा नेपालका कार्यकारी निर्देशक राजु क्षेत्रीले बताएका छन्। आउँदै गरेको नेपालीहरूको महान चाडपर्व दशैं-तिहारलाई अफर उत्सवमय एवम् वृहत बनाउनका निम्ति यस्तै आकर्षक अफरका लागि कम्पनीले तयारी गरिरहेको पनि क्षेत्रीले बताएको विज्ञापितमा उल्लेख छ।



बागमती प्रदेश सरकारले राष्ट्रिय खेलकुद परिषद्का पूर्व कोषाध्यक्ष ललितपुरका मीनकृष्ण महर्जनलाई प्रदेश शान पदकबाट सम्मानित गरेको छ

खेलकुद

स्पेनिस क्लब बार्सिलोनाका फ्रेन्च फरवार्ड ओसुमाने डेब्लेलेले क्लब छाड्ने हल्ला चलिरहेको बेला सम्झौता नवीकरण गरेका छन्



एन्फा क्यालेन्डरको माग गर्दै खेलाडी संघको ध्यानाकर्षण पत्र



सौर्य समाचार

काठमाडौं । अखिल नेपाल फुटबल खेलाडी संघले पाँच मागसहित अखिल नेपाल फुटबल संघ (एन्फा) लाई ध्यानाकर्षण पत्र बुझाएको छ । खेलाडी संघले विहीवार एन्फा कम्लेक्समा ध्यानाकर्षण पत्र बुझाएको हो । संघका अध्यक्ष विक्रम

लामाले एन्फाका अध्यक्ष पंकज विक्रम नेम्बाङलाई ध्यानाकर्षण पत्र बुझाएका हुन् । संघले खेलाडी प्रशिक्षक विवादमा छानविन समितिले दिएको सुझावका आधारमा प्रशिक्षकको विषयमा काम अघि बढाउन माग गरेको छ । खेलाडीलाई वर्षभरी व्यस्त राख्नेगरी एन्फाको प्रतियोगिता क्यालेन्डर सार्वजनिक गर्न माग गरिएको

छ । त्यस्तै फुटबलको वर्तमान संरचनाले खेलाडी र खेलको विकास सम्भव नभएकाले धेरै फुटबलको संरचनालाई पुनर्संरचना गर्दै नयाँ खाका तयार गरेर कार्यान्वयन गर्न, खेलाडीको स्वास्थ्य विमा र स्वास्थ्य उपचारका लागि उचित प्रबन्ध गर्न र धेरै प्रतियोगिता नहुँदा खेलाडीहरू विदेश जाने क्रम बढेका कारण यथासिद्ध क्लब फुटबलका कार्यक्रमलाई सावजनिक गर्न एन्फासँग माग गरिएको छ ।

खेलाडी संघले एन्फाको नवनिर्वाचित कार्यसमितिलाई बढाई तथा सफल कार्यकालको शुभकामना समेत दिएको छ । संघले नेपाली फुटबलको सर्वोच्च संस्था एन्फाको नयाँ नेतृत्व र कार्यसमितिसँग खेलाडी संघ हातेमालो गर्दै सहकार्य गरेर अघि बढ्ने विश्वास व्यक्त गरेको छ ।

नेपाली फुटबलको विकास, विस्तार र प्रवर्द्धनमा सहयोगी भूमिका निर्वाह गर्न संघ सधैं तत्पर र इच्छुक रहेको तथा देशको भण्डा अन्तर्राष्ट्रिय एरिनामा फर्कराउन खेलाडी संघ एन्फासँग मिलेर हरेक फुटबल गतिविधिमा सहकार्य गर्न तयार रहेको संघले जनाएको छ ।

तर, पछिल्लो समय खेलाडीको राष्ट्रिय योगदानको अवमूल्यन गर्दै भैरहेका गतिविधि र कार्य सन्तोषजनक नरहेको संघले जारी गरेको ध्यानाकर्षण पत्रमा उल्लेख छ ।

खेलाडीलाई सम्मानपूर्वक राष्ट्रिय टिमको बन्द प्रशिक्षणमा फिर्ता बोलाउने एन्फाको पछिल्लो निर्णयको खेलाडी संघले धन्यवाद दिएको छ ।

जुनियर निशाले तोडिन् सिनियरको कीर्तिमान

सौर्य समाचार

काठमाडौं । लुम्बिनीकी निशा चौधरीले १२ औं केन्द्रीय स्तरीय राष्ट्रपति रनिङ्ग सिल्ड खेलकुद प्रतियोगिताअन्तर्गत एथलेटिक्सको लडजम्पमा राष्ट्रिय कीर्तिमान बनाएकी छिन् । निशाले सिनियरको राष्ट्रिय कीर्तिमान बुधवार तोड्ने राष्ट्रिय खेलकुद परिषद् (राखेप) ले जनाएको छ ।

छात्रा लडजम्पमा निशाले ५.७७ मिटर जम्प गर्दै नयाँ राष्ट्रिय कीर्तिमान बनाएकी हुन् । यसअघि लडजम्पमा शिलाको कीर्तिमान थियो । उनले सन् २०१८ अग्लिल २३ मा ५.५५ मिटरको कीर्तिमान बनाएकी थिइन् । जुनियरमा भने यो स्पर्धाको कीर्तिमान विपना परियारको नाममा ५.०९ मिटर थियो । निशाले मंगलबार १ सय मिटर दौडमा पनि १२.५३ सेकेन्ड समय निकाल्दै जुनियर राष्ट्रिय कीर्तिमान बनाएकी थिइन् ।

राखेपको आयोजनामा त्रिपुरेश्वरस्थित दशरथ रंगशालामा निशासहित रेशु थारु, रामकुमारी थारु र सम्भना थारु सम्मिलित लुम्बिनी टोलीले ४ गुणा १ सय मिटर रिले ५४.२० सेकेन्डमा पूरा गर्दै जुनियर राष्ट्रिय कीर्तिमान बनाएको छ । यसअघि तत्कालिन पश्चिमाञ्चलको नामा ५४.४० सेकेन्डको कीर्तिमान थियो । जुनियरमै अर्को कीर्तिमान छात्र लडजम्पमा



लुम्बिनीका सलिम देवानले बनाए । उनले ६.८४ जम्प गर्दै २०६५ मा भुवन महतोको नाममा रहेको ६.५३ मिटरको कीर्तिमान भंग गरे । यसै स्पर्धामा दोश्रो भएका लुम्बिनीका सुदिप थारुले पनि भुवनको कीर्तिमान उछिन्ने क्रममा ६.६५ मिटरको प्रदर्शन गरेका थिए ।

महिला युरो पोर्चुगललाई हराउँदै नेदरल्यान्ड्स शीर्ष स्थानमा

एजेन्सी

लण्डन । डेनियल भान डे डोन्कको निर्णायक गोलमा नेदरल्यान्ड्सले बुधवार राति पोर्चुगललाई ३-२ ले पराजित गरेको छ । जितसँगै नेदरल्यान्ड्स युरो २०२२ मा समूह 'सी'को शीर्ष स्थानमा उक्लिएको छ ।

साविक विजेता नेदरल्यान्ड्सले सातौं मिनेटमा दामारिस एगुरोलाले हेडमार्फत गरेको गोलबाट अग्रता लिएको हो । एगुरोलाले शेरिडा स्पिटेको कर्नर पासलाई हेडमार्फत पोष्टको दिशा दिएका थिए । स्टेफनी भान डर गार्गले १६औं मिनेटमा हेडमार्फत नै अर्को गोल गर्दै अग्रता दोब्बर बनाइन् । स्विट्जरल्यान्डसँग पहिलो खेलमा २-२

को बराबरीमा रोकिएको पोर्चुगलले क्यारोल कोप्टाको गोलबाट पुनरागमन गर्यो । पोर्चुगलकी डिएना सिल्बाले ४७औं मिनेटमा बराबरी गोल फर्काइन् । ६२ मिनेटमा भान डे डोन्कले गरेको गोल नेदरल्यान्ड्सको जितमा निर्णायक बन्यो ।

जितसँगै दुई खेलबाट ४ अंक जोडेको नेदरल्यान्ड्स शीर्ष स्थानमा छ । समान ४ अंक जोडेको स्विडेन दोस्रो स्थानमा छ । समान एक अंक जोडेका पोर्चुगल र स्विट्जरल्यान्ड क्रमशः तेश्रो र चौथो स्थानमा छ । स्वीडेनले स्विट्जरल्यान्डलाई २-१ ले हराएको थियो । नेदरल्यान्ड्स र स्विडेनले पहिलो खेलमा १-१ को बराबरी खेलेको थियो । प्रतियोगितामा आज इटालीले बेल्जियम र आष्ट्रियाले नर्वेसँग प्रतिस्पर्धा गर्नेछ ।

स्कटल्यान्डमाथि नेपालको सहज जित

सौर्य समाचार

काठमाडौं । आसिफ शेखको अर्धशतकको सहयोगमा नेपालले आईसीसी पुरुष विश्वकप लिग टू को त्रिकोणात्मक सिरिजअन्तर्गत स्कटल्यान्डमाथि सहज जित निकालेको छ । बुधवार भएको खेलमा नेपालले स्कटल्यान्डलाई ५ विकेटले हराएको हो । टिटवुड ग्लासगोमा स्कटल्यान्डले जितका लागि दिएको १४५

रनको लक्ष्य पछ्याएको नेपालले २५ ओभर १ वलमा ५ विकेट गुमाएर लक्ष्य पूरा गर्यो । नेपालका लागि आसिफ शेखले ७१ रनको अर्धशतकीय पारी खेले । ६२ वल खेलेका उनले १० चौका र १ छक्का प्रहार गरे । त्यस्तै रोहितकुमार पौड्यालले ३४ रन बनाए । योसँगै रोहितको एकदिवसीय क्रिकेटमा एक हजार रन पूरा भएको छ । नेपालका लागि कुशल भुर्तलेले २७ तथा दिपेन्द्र सिंह ऐरीले ३ रनको योगदान

गरे । नेपालका लागि देव खनालले ४ रन बनाए । बलिडतर्फ स्कटल्यान्डका लागि गाभिन मेनले तीन विकेट लिए । त्यस्तै आन्ड्रेइन निल र रिचे वेरिन्टोनले एक-एक विकेट लिए । यसअघि टस हरेर पहिले ब्याटिङ गरेको स्कटल्यान्डले ४२ आभेरमा ५ वलमा सम्पूर्ण विकेट गुमाउँदै मात्र १४४ रन बनाएको थियो । स्कटल्यान्डका लागि काभिन मिनले ६४ रनको अर्धशतकीय पारी खेले । ६९ वल

खेलेका उनले ७ चौका र १ छक्का प्रहार गरे । त्यस्तै मार्क वाटले १७ रन बनाउँदा साफन सारिफले १६ रनको योगदान गरे । नेपालका लागि आदिल अन्सारी र सोमपाल कामीले तीन-तीन विकेट लिए । त्यस्तै सन्दीप लामिछानेले दुई विकेट लिँदा करण केसी र दीपेन्द्रसिंह ऐरीले एक-एक विकेट लिए । योसँगै रोहितको लिष्ट एमा हजार रन पूरा भएको छ ।

विश्व समाचार

भारतीय व्यापारी माल्ल्यालाई चार महिना कैद



एजेन्सी

नयाँ दिल्ली । भारतको सर्वोच्च अदालतले चर्चित व्यापारी विजय माल्ल्यालाई उनको एयरलाइन धराशायी भएको विषयसँग सम्बन्धित अदालतको न्यायको अवज्ञा गरेको कारण चार महिना लामो कारावास सजाय सुनाएको छ ।

यसअघि भारतले पूर्व अर्बपति माल्ल्यालाई विदेशबाट सपुर्दगी गराउने प्रयास गरेको थियो । उनी अर्ब पनि बेलायतको राजधानी लन्डनमा रहेको विश्वास गरिएको छ । उड्डयन र फर्मुला १ कार रेसिङमा हात हाल्नुअघि उनले 'किङ्गफिसर' ब्राण्डको विवर बेचेर आफ्नो भाग्य चम्काएका थिए ।

एक दशकअघि टाट पल्टनुभन्दा पहिले भारतमा उनको किङ्गफिसर एयरलायन्स आन्तरिक उडानमा दोस्रो सबैभन्दा ठूलो उडानको रूपमा स्थापित थियो । सोमवार सर्वोच्चले उनले ऋण तिर्न नसकेपछि आफ्नो सम्पत्ति विवरण खुलाउन नसकेको र अदालतको आदेशको अवज्ञा गरेकोमा उनी दोषी ठहर भएको जनाएको हो ।

सन् २०१७ मा पनि उनले किङ्गफिसर एयरलायन्सलाई ऋण तिर्न बाँकी रहेकै अवस्थामा आफ्ना सन्तानका नाममा ४ करोड अमेरिकी डलर हस्तान्तरण गरेर यस्तै अपराध गरेको अदालतको भनाइ छ । विलासितापूर्ण जीवनशैलीका कारण 'राम्रो समयका राजा'को उपनामले पनि चिनिने उनले बेलायतमा सुपुर्दगीविरुद्ध कानुनी लडाइँ लडेका छन् । त्यहाँ उनले जालसाजी जस्ता अभियोगहरू पनि खेपिरहेका छन् ।

एक अर्ब डलर भन्दा बढी ऋण तिर्न बाँकी रहेको अवस्थामा सन् २०१६ मा भारत छोडेका उनले आफू नभएको अडान लिएका थिए । सन् २०१८ को उत्तरार्धमा लन्डनस्थित एक अदालतले उनलाई सजाय भोग्नका लागि भारतमा सुपुर्दगी गर्न सकिने निर्णय दिएको थियो । उनले सो निर्णय विरुद्ध गरेको अन्तिम अपिल पनि लन्डनको उच्च अदालतले अस्वीकार गरेको थियो । तर अर्ब पनि उनी लन्डनमै रहेको विश्वास गरिएको छ ।

उनलाई किङ्गफिसर एयरलायन्समा थुपै आर्थिक अनियमितता गरेको पनि अभियोग लगाइएको छ । पाइलट र क्याबिन कर्लाई १५ महिनादेखि तलब दिन नसकेको स्थितिमा सन् २०१२ का २० अक्टोबर देखि किङ्गफिसरले आफ्नो उडान कार्य रोकेको थियो ।

श्रीलंका संकट राष्ट्रपति गोटाबय राजपक्ष माल्दिभ्सबाट सिंगापुर पुगे

एजेन्सी

कोलम्बो । श्रीलंकामा विरोधप्रदर्शन चर्किएपछि अकस्मात् देशबाट पलायन भएर माल्दिभ्स पुगेका राष्ट्रपति गोटाबय राजपक्ष त्यहाँबाट विमानमा सिंगापुर पुगेका छन् । सिंगापुर सरकारले उनलाई 'निजी भ्रमणका लागि आफ्नो देशमा प्रवेश' दिएको बताएको छ । उनी माल्दिभ्सबाट सिंगापुर साउदी अथरलाइन्सको एउटा विमानमा चढेर गएका थिए । अमृतपूर्व आर्थिक संकटको विरोधमा देशमा विरोधप्रदर्शन भइरहेका बेला उनी मङ्गलवार राति भागेर माल्दिभ्स पुगेका थिए । उनीसँग उनकी पत्नी र दुई अङ्गरक्षक पनि थिए ।

राजपक्ष सिंगापुरमै बस्छन् वा अन्यत्र जान त्यो उनको विचारी मात्र हो भन्ने स्पष्ट छैन । यसअघि उनले बुधवारभित्र राजीनामा दिने बताएका थिए । तर उनले अहिलेसम्म औपचारिक रूपमा पदत्याग गरेका छैनन् । राष्ट्रपति हुँदा अभियोगहरूबाट उन्मुक्ति पाएका राजपक्ष नयाँ सरकार बनेपछि हुनसक्ने गिरफ्तारीबाट जोगिन विदेश भागेको अनुमान गरिएको छ । उनी सिंगापुरमा उत्रिएको पुष्टि गर्दै त्यहाँको विदेश मन्त्रालयले भनेको छ, 'उनले शरण मागेका छैनन्, न त उनलाई कुनै



शरण दिइएको छ । सिंगापुरले सामान्यतः शरणको अनुरोध स्वीकार गर्दैन । श्रीलंकामा कर्फ्यू देश छोडेपछि राष्ट्रपति राजपक्षले प्रधानमन्त्री रिनिल विक्रमसिङ्गे कार्यवाहक राष्ट्रपति नियुक्त गरेको समाचार आयो । त्यसपछि विक्रमसिङ्गेले देशमा संकटकाल घोषणा गरे । उनले विहीवार दोस्रो दिन कर्फ्यू घोषणा गरेका बेला राजपक्ष माल्दिभ्सबाट सिंगापुरतर्फ लागेको खबर आएको हो । विक्रमसिङ्गेले स्थानीय समयानुसार विहीवार १२ बजेदेखि शुक्रवार विहान ५

बजेसम्मका लागि कर्फ्यू घोषणा गरेका छन् । अहिले श्रीलंकामा प्रदर्शन जारी छ । प्रदर्शनकारीहरूले विक्रमसिङ्गेको निवासमा आतंकीय हमला गरेका छन् । राजपक्षलाई कसले देला आश्रय ? गोटाबय राजपक्ष अब कहाँ जालान् भन्ने धेरैको जिज्ञासा छ । तर सोधिनुपर्ने सबैभन्दा महत्वपूर्ण प्रश्न उनलाई कसले आश्रय देला भन्ने हो । राजपक्ष अहिले सिङ्गापुरतर्फ लागेका छन् । त्यो उनको मध्यपूर्व जाने ट्रांजिट मात्र हो वा उनी त्यहाँ बस्छन् भन्ने स्पष्ट छैन । अनि वसिहाले भने त्यहाँ कति समयका लागि बस्छन् भन्ने पनि थाहा छैन ।

तर स्रोतहरू के भन्छन् भने सिङ्गापुर सरकारले उनलाई त्यहाँ लामो समयसम्म बस्न दिन्छ भन्ने कुरा सन्देहपूर्ण छ । उक्त समूह सानो राष्ट्रले विगतमा विवादास्पद व्यक्तिहरूलाई बस्न दिएका उदाहरणहरू छन् । उदाहरणका लागि, सिङ्गापुरमा बर्माका सैन्य नेता थेन सेन, जिम्बाब्वेका रोबर्ट मुगाबे र उत्तर कोरियाका किम जङ-अन पनि त्यहाँ बसेका थिए । तर राजपक्षलाई लामो समयसम्म आश्रय दिने उनीहरू पनि तयार नहुन सक्छन् । किनभने राजपक्ष युद्धअपराधको आरोप लागेका व्यक्ति हुन् । त्यसले गर्दा उनी विश्वव्यापी गहिरो छानविनको दायरामा जान सक्छन् ।

11. IFC Environmental and Social Performance Standards applicability to the project

| IFC Performance Standard | Description | Application |
|---|---|---|
| PS 1: Assessment and Management of Environmental and Social Risks and Impacts | Performance Standard 1 establishes the importance of (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the Company's management of environmental and social performance throughout the life of the project. | <p><u>Applicable:</u> the project will require stakeholder engagement activities and an effective Environmental and Social Management System.</p> <p>Identification of risks will be done through a complete Impact Assessment Study based on a recent and accurate baseline. Environmental and Social Management Plan will be developed to manage project impacts and implement prevention and mitigation measures.</p> |
| PS 2: Labour and Working Conditions | Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. For any business, the workforce is a valuable asset, and a sound worker-management relationship is a key ingredient in the sustainability of a company. Failure to establish and foster a sound worker-management relationship can undermine worker commitment and retention and can jeopardise a project. Conversely, through a constructive worker-management relationship, and by treating the workers fairly and providing them with safe and healthy working conditions, Company's may create tangible benefits, such as enhancement of the efficiency and productivity of their operations. | <p><u>Applicable:</u> the project will require a workforce during construction and operations, perhaps with the presence of migrant workers.</p> <p>The EIA shall undertake labour influx assessment and develop specific plans concerning labour and accommodation. The project will require development of project specific Labour Agreement detailing such topics as employment conditions, remuneration, benefits, etc. A labour GRM will be required to be developed by the Company, including HR policies.</p> <p>Labour related documents will be applicable on EPC Contractors and its sub-contractors.</p> |
| PS 3: Resource Efficiency and Pollution Prevention | Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world. These are often implemented through continuous improvement methodologies similar to those used to enhance quality or productivity, which are generally well known to most | <p><u>Applicable:</u> the project will require development of mitigation measures to reduce and where possible maximise the use of resources during construction; reduce the energy and resource usage during operations and avoid pollution from waste generation during all phases of the project. Special attention will be given to water and energy efficiency, management of waste, air quality and noise.</p> |

| IFC Performance Standard | Description | Application |
|--|--|--|
| | industrial, agricultural, and service sector companies. | |
| PS 4: Community Health, Safety, and Security | Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration and/or intensification of impacts due to project activities. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, this Performance Standard addresses the Company's responsibility to avoid or minimize the risks and impacts to community health, safety, and security that may arise from project related activities, with particular attention to vulnerable groups. | <u>Applicable:</u> due to the risks to community health, safety and security, especially during construction; the impact on the football ground users, |
| PS 5: Land Acquisition and Involuntary Resettlement | Performance Standard 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in physical or economic displacement. This occurs in cases of (i) lawful expropriation or temporary or permanent restrictions on land use and (ii) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail. | <u>Applicable:</u> Currently the land is governmental land. A process has been initiated to transfer the land titles to the project. The impact of removing the community forest on local users will be further investigated during the EIA stage. |
| PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources | Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in this Performance Standard have been guided by the Convention on Biological Diversity, which defines biodiversity | <u>Applicable:</u> the plot allocated to the wholesale market contains a registered Community Forest that will be cleared. A dedicated assessment will be required for this purpose during the EIA stage of the project |

| IFC Performance Standard | Description | Application |
|---------------------------------|--|--|
| | <p>as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems.”</p> | |
| <p>PS 7: Indigenous Peoples</p> | <p>Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat. As a consequence, Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-indigenous communities. This vulnerability may include loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and diseases.</p> | <p>Not applicable.</p> |
| <p>PS 8: Cultural Heritage</p> | <p>Performance Standard 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that Company’s protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project’s use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.</p> | <p><u>Potentially applicable:</u> to be investigated during the EIA if construction activities will affect the temple located next to the site and if chance find procedure should be applied.</p> |

12. Topographical and geotechnical survey report

Geotechnical Investigation works

Final

Report

On

Soil Investigation Works

For

The Proposed Site

Of

Development of the Agricultural Value Chain Infrastructures

At

Butwal Sub Metropolitan, ward no 15, Rupandehi.

Consultant: - Apex Techno Concern & Consultancy Pvt. Ltd., Kamalbinayak, Bhaktapur

Client: Royal HaskoningDHV, HaskoningDHV Nederland B.V. Jonkerbosplein 52 6584 AB Nijmegen

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1. INTRODUCTION

This report is prepared on the basis of soil investigation carried out for the Soil Investigation at site allocated for the construction of Residential Building at Dillibazar, Kathmandu Developemnt of the Agricultural Value Chain Infrastructutes at Butwal Sub Metropolitan, ward no 15, Rupandehi. It presents the detail of the site investigation and laboratory tests of the sample drawn at site. The soil investigation comprises of percussion drilling, Standard Penetration Test (SPT), Laboratory tests and prediction of the allowable bearing capacity of the site under consideration. The details of test and findings are summarized in the respective sections and paragraphs.

Equipments were mobilized and drilling works for four (4) bore holes were carried out as per the contract agreement. The SPT were carried out along with drawing out of both disturbed and un-disturbed soil samples at locations and depth as shown in the relevant sections. The samples so drawn at site were immediately taken to the laboratory and appropriate tests were performed.

2. OBJECTIVE

The objective of the investigation is to determine the soil formation at the project site so as to derive engineering parameters for the design of the foundation of the proposed structures.

The specific objective of the consulting services subject to these TOR is:

- To do the detailed site investigation and geotechnical investigation of the site
- To submit the detailed site and soil investigation report including engineering properties, design parameters, bearing capacity, coefficient of sub-grade reaction etc.

3. SCOPE OF WORK AND INVESTIGATION

For the purpose of the foundation design and construction of the proposed building, the following data are to be provided:

- Type of foundation
- Depth below the ground level at which the foundation is to be placed
- Allowable bearing pressure at the foundation level
- Design parameters of sub-soil strata (sub-soil profile and engineering properties of the soil strata)

The scope of soil investigation is as follows for borehole advancement to 20.0m at bore hole locations respectively:

- Standard penetration tests at 1.5m interval
- Collection of disturbed and undisturbed samples at regular interval or as and when required
- Ground water table observation
- Laboratory test and analysis of data to determine the engineering properties
- Technical report of the investigation work.

4. METHODOLOGY

A. FIELD INVESTIGATION

The proposed geo-technical investigation was performed to characterize the subsurface conditions at the site, to evaluate the bearing capacity of foundation soil and to recommend safe bearing capacity for different type of foundation including the settlement analysis and the potential of liquefaction.

Field investigation work was carried out in 2079. Drilling works were carried out using one set of percussion drilling machine. The sides of the boreholes were lined with 150mm casing pipes.

Standard Penetration tests (SPT) were carried out in the boreholes at average depth intervals of 1.5 m. Spilt spoon sampler of 35 mm internal diameter and 50 mm external diameter coupled with a standard cutting shoe at its lower end was driven into the ground at the base of the borehole by means of a 63.5 kg hammer falling from a height of 760 mm. After an initial 150 mm seating penetration the sampler was driven to a further depth of 150 mm twice to reach the final depth. The sum of the number of blows required to reach the two last final 150mm depth was recorded as the N-value.

B. WATER TABLE MONITORING

The level of water was recorded in the borehole at least 24 hours after boring was completed to establish the ground water level. There were traces of water after 24 hours of observation thus it can be said that the water table was found at 2.0m below the ground level.

However it should be noted that ground water levels may change and can vary with seasonal rainfall patterns, long term climate fluctuations and with the influence of local site conditions such as drainage patterns and presences of ground water barriers.

LABORATORY INVESTIGATION

All the requisite laboratory tests were carried out in accordance with IS standard specifications. Standard laboratory test was carried out to characterize the soil strata. The laboratory test includes the following tests: Moisture Content, Grain Size Analysis including Hydrometer, Bulk Density, Specific Gravity, Atterberg Limits, Consolidation Tests, Unconfined Compression Test and Direct Shear Tests.

a. Natural Moisture Content and Bulk Density

The natural water content and bulk density was determined from samples recovered from the split spoon sampler.

b. Specific Gravity

The specific gravity test is made on the soil sample which was grounded to pass 2.0 mm IS sieve. Specific gravity is defined as the ratio of the weight of a given volume of soil particles in air to the weight of an equal volume of distilled water at a temperature

of 4 degree C. It is important for computing the most of the soil properties e.g., void ratio, unit weight, particle size determination by hydrometer, degree of saturation etc. This method covers determination of the specific gravity of soils by means of a pycnometer.

c. Grain size Analysis

Grain size distribution was determined by dry sieving process. Sieve analysis was carried out by sieving a soil sample through sieves of known aperture size (e.g., 4.75mm, 2mm, 1.18mm, 425, 300, 150 and 75 microns) by keeping one over the other, the largest size being kept at the top and the smallest size at the bottom. The soil is placed on the top sieve and shaken for 10 minutes using a mechanical shaker. The soil retained on each sieve was weighed and expressed as a percentage of the weight of sample.

d. Atterberg Limits

The physical properties of fine grained soils (clay and silt) get affected with water content. Depending upon the amount of water present in a fine grained soil, it can be in liquid, plastic or solid consistency states. The Atterberg Test was used for determining the consistency of a cohesive (fine) soil. The Liquid Limit is the water content at which a soil has a small shear strength that it flows to close a groove of standard width when jarred in a specified manner. The Plastic Limit is the water content at which a soil begins to crumble when rolled into threads of specified size i.e., 3mm. The water content determined at a stage when the rolled thread of soil just starts crumbling. Three such tests and the average value of water content were taken as Plastic Limit. The Plasticity Index is the numerical difference between the Liquid Limit and the Plastic Limit. The liquid limit of the fine grained soils was determined using the Casagrande liquid limit device. A Plastic limit was determined using the standard 'rolling the soil into a thread of 3mm' method. Casagrande plasticity chart was employed to determine the classification of fine grained soil according to the Unified Soil Classification System.

e. Consolidation

Consolidation of soil is the process of compression by gradual reduction of pores under a steadily applied pressure. Consolidation tests are conducted for obtaining data required for settlement analysis. Consolidation tests were performed on undisturbed samples of 60 mm diameter and 20 mm thick. Two-way drainage was provided. Each increment of load was maintained until sufficient period beyond the primary consolidation has been reached. The test results are presented in terms of the $e - \log \sigma$ curves in the attached figures.

f. Unconfined Compression Test

The unconfined compressive strength of a soil specimen is the ratio of failure load and cross-sectional area of the specimen (at failure) when it is not subjected to any confining pressure. It is conducted to measure the shear strength of a cohesive soil, collected in natural state (in undisturbed form) from the field. This test is mainly used for cohesive soils to check the short term stability of foundations and the sensitivity of

a soil. In this test, a circular soil specimen is compressed axially without any confining pressure. The cross-section of the specimen increases with decrease in length.

g. Direct Shear Test

The shear strength of a soil mass is its property against sliding along internal planes within itself and is determined in this case to compute the safe bearing capacity of the foundation soil. Direct shear tests were conducted on disturbed samples collected from the three boreholes. The samples were carefully extruded from the sampling tubes and molded using standard moulds of 6.0 x 6.0 cm² cross-sectional areas and trimmed to 2.5 cm high. Solid metal plates were placed on both surfaces of the samples to prevent the dissipation of pore water during shearing. The direct shear equipment is mechanically-operated and shearing is applied at more or less constant strain rate. If the samples are cohesive they will be sheared at a relatively fast rate (duration of tests less than 10 minutes) to maintain un-drained condition. The samples were sheared at three different normal stresses (i.e., 0.5 kg/cm², 1.0 kg/cm², 1.5 kg/cm²). The direct shear test results are presented in terms of the failure envelopes to give the angle of internal frictions (ϕ) and the cohesion intercepts (c).

5. ANALYSIS OF ALLOWABLE BEARING PRESSURE

The allowable bearing pressure (q_{all}) is the maximum pressure that can be imposed on the foundation soil taking into consideration the ultimate bearing capacity of the soil and the tolerable settlement of the structure. Analysis to determine the ultimate bearing capacity and the pressure corresponding to a specified maximum settlement were performed and the minimum pressure obtained from the two analyses were adopted as the allowable bearing pressure.

A. ALLOWABLE BEARING PRESSURE BASED ON ULTIMATE BEARING CAPACITY

Since the soil in the vicinity of the foundation level has been found to be grayish color very dense gravel at greater depth, grey silty clay with high plasticity at intermediate depth, the allowable bearing capacity has been analyzed using the angle of friction and cohesion values from direct shear test results. Empirical formula of Terzaghi applicable for this type of soils has been used to obtain the allowable bearing pressure with safety factor equal to 3.

a. Hansen's Method:

$$q_{ult} = cN_c s_c d_c i_c + qN_q s_q d_q i_q W_q + 0.5\gamma B N_\gamma s_\gamma d_\gamma i_\gamma W_\gamma$$

where,

$$N_q = e^{\pi \tan \phi} \tan^2(45 + \phi/2)$$

$$N_c = (N_q - 1) \cot \phi$$

$$N_\gamma = 1.5 (N_q - 1) \tan \phi$$

$s_c, s_q, s_\gamma, d_c, d_q, d_\gamma, i_c, i_q, i_\gamma$ are shape, depth and inclination factors.

b. Terzaghi's Method:

$$q_{ult} = cN_c s_c + qN_q W_q + 0.5\gamma B N_\gamma s_\gamma W_\gamma$$

where,

$$N_q = a^2 / a \cos^2(45 + \phi/2), a = e^{(0.75\pi - \phi/2)\tan\phi/2}$$

$$N_c = (N_q - 1) \cot\phi$$

$$N_\gamma = \tan\phi / 2 * (K_{p\gamma} / \cos^2\phi - 1)$$

$K_{p\gamma}$ is a factor

c. Effect of water table:

- i) If water table is likely to permanently remains at or below a depth of ($D_f + B$) beneath the ground level surrounding the footing then $W_q = 1$.
- ii) If the water table is located at depth D_f or likely to rise to the base of the footing or above then the value of W_q shall be taken as 0.5.
- iii) If the water table is likely to permanently got located at depth $D_f < D_w < (D_f + B)$, then the value of W_q be obtained by linear interpolation.

B. ALLOWABLE BEARING PRESSURE BASED ON TOLERABLE SETTLEMENT

The maximum allowable settlement for isolated footings in sand is generally 50 mm and for mat foundation in sand the allowable settlement is 75 mm (IS 1904: - 1978). For isolated footings in cohesive soil, allowable settlement is generally 75 mm and for mat foundation in cohesive soil the allowable settlement is 100 mm (IS 1904: - 1978).

a. Settlement Analysis using Schmertmann method:

The method proposed by Schmertmann (1970) states that the change in the Boussinesq pressure bulb was interpreted as related to strain. Since the pressure bulb changes more rapidly from about 0.4 to 0.6 B, this depth is interpreted to have the largest strains. Schmertmann then proposed using triangular relative-strain diagram to model this strain distribution with ordinates of 0, 0.6 and 0 at 0B, 0.5B and 2B respectively. The area of diagram is related to the settlement.

$$\text{Settlement } (\delta) = C_1 C_2 C_3 (q - \sigma'_{zd}) \Sigma I_\epsilon H / E_s$$

The Peak Value of the strain influence factor I_{ep} is

$$I_{ep} = 0.5 + 0.1 \text{Sqrt} ((q - \sigma'_{zd}) / \sigma'_{zp})$$

Square and Circular Foundation:

$$\text{For } z_f = 0 \text{ to } B/2 \quad I_\epsilon = 0.1 + (z_f/B) (2I_{ep} - 0.2)$$

$$\text{For } z_f = B/2 \text{ to } 2B \quad I_\epsilon = 0.667 I_{ep} (2 - z_f/B)$$

$$C_1 = 1 - 0.5 (\sigma'_{zd} / q - \sigma'_{zd})$$

$$C_2 = 1 + 0.2 \log (t / 0.1)$$

$$C_3 = 1.03 - 0.003 L/B \geq 0.73$$

SPT N Value Corrected for field procedures

$$N_{60} = E_m C_B C_S C_R N / 0.6$$

E_m = Hammer efficiency

C_B = Bore hole dia correction

C_S = Sampler correction

C_R = Rod Length Correction

SPT N value corrected for field procedure and overburden stress

$$(N_1)_{60} = N_{60} \sqrt{(100 \text{ Kpa} / \sigma'_z)}$$

The method of Teng (1988) can also be employed for determining settlement. This method is a modification of the method of Terzaghi and Peck (1948) such that the allowable bearing pressure could directly be obtained from the SPT values.

The allowable bearing pressure for a limiting settlement other than 25 mm (e.g. x mm) can be linearly interpolated from the allowable bearing pressure for 25 mm settlement.

$$q_a(x \text{ mm}) = q_a(25 \text{ mm})(x/25)$$

C. LIQUEFACTION:

The liquefaction resistance of an element of soil depends on how close the initial state of the soil is to the state corresponding to “failure” and on the nature of the loading required to move it from the initial state to failure state. It is evident from the literature that the failure state is different for flow liquefaction and cyclic mobility. The failure state for flow liquefaction is easily defined using the FS_L and its initiation is easily recognized in the field. Once the cyclic loading imposed by an earthquake and the liquefaction resistance of the soils has been characterized, liquefaction potential can be evaluated. The cyclic stress approach characterizes earthquake loading by the amplitude of an equivalent uniform cyclic stress and liquefaction resistance by the amplitude of the uniform cyclic stress required to produce liquefaction in the same number of cycles. The evaluation of liquefaction potential is thus reduced to a comparison of loading and resistance throughout the soil deposit of interest. Liquefaction can be expected at depths where the loading exceeds the resistance or when the factor of safety against liquefaction, expressed as, $FS_L = \frac{CSRL}{CSR}$ is less than 1.

Cyclic mobility failure is generally considered to occur when pore pressure become large enough to produce ground oscillation, lateral spreading, or other evidence of damage at the ground surface.

Maximum shear stress:

$$\tau_{\max} = a_{\max} / g * \sigma'_v * r_d$$

$a_{\max} / g = 0.2$ (Peak ground acceleration)

r_d = Stress reduction factor

The equivalent uniform cyclic shear stresses are simply taken as 65% of maximum shear stress.

$$\tau_{\max} = a_{\max}/g * \sigma'_v * r_d * 0.65$$

Triaxial cyclic stress ratio (CSR_L) from fig 9.31,

Cyclic shear stress required to cause liquefaction:

$$\tau_{\text{cyc,L}} = \text{CSR}_L * \sigma'_v$$

FS_L = $\tau_{\text{cyc,L}}/\tau_{\text{cyc}}$, is less than 1.

It should be noted that significant excess pore pressure can develop even if the computed factor of safety is greater than 1.

6. CONCLUSION

1. Soil investigation work has been carried out for the Soil Investigation at site allocated for the construction of Developemnt of the Agricultural Value Chain Infrastructutes at Butwal Sub Metropolitan, ward no 15, Rupandehi.
2. During soil investigation the water table was found at 2.0m below the ground level. Therefore, all the bearing capacity calculations have been done with the water table.
3. As per the site investigation results and then analysis associated for the measure of liquefaction, it shall be noted that there is no possibility of liquefaction.
4. On the basis of ultimate bearing capacity and allowable settlement the following allowable bearing pressures in KN/m^2 for isolated foundation have been recommended.

Bearing capacity for Mat foundation and settlement as per IS Code: 1904-1986, 65mm to 100mm on clay and 40mm to 75mm on sand. For Isolated footing 50mm for sand and hard clay, 75mm for clay, for load bearing wall 60mm.

| Footing size in m x m | Depth of footing in m | Allowable bearing capacity by Terzaghi's method in KN/m^2 | Settlement in mm | Minimum Allowable bearing capacity in KN/m^2 | Modulus of subgrade reaction in KN/m^3 |
|--------------------------|--------------------------------|---|---------------------|---|--|
| | | | 50mm | | |
| 2.0 X 2.0 | 1.5 | 132.10 | 37.2 | 132.10 | 10653.22 |

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Bore Hole Log Sheet

| Project Name : | | Development of the Agricultural Value Chain Infrastructures | | | | | | | | | | |
|----------------------------|--------------------|---|--------------|------|--|------|---------|----|---------------|-------|------------|----------|
| Location : | | Butwal Sub metropolitan, Ward no 15, Rupandehi | | | Bore Hole No: | | 1 | | | | | |
| | | | | | Water Table, m : | | 2.00 | | | | | |
| | | Diameter of Bore Hole : 6'' | | | | | | | | | | |
| Depth | Thickne ss | Soil Description | Sampling | | Penetration Blow | | | N | Group symbol | | | |
| | | | Depth (m) | Type | 15cm | 15cm | 15cm | | | | | |
| | | DCPT @10cm | | | | | | | | | | |
| 0.0-3.0 | 3.0 | Greyish Colour Gravels and Boulders. | 1.5 | DCPT | 6 | 9 | 11 | 20 | | | | |
| | | DCPT @ 10cm | | | | | | | | | | |
| | | | 3.00 | DCPT | 5 | 7 | 10 | 17 | | | | |
| | | SPT | | | | | | | | | | |
| 3.0-7.5 | 4.5 | Greyish Colour Silty Clay. | 4.50 | SPT | 9 | 12 | 18 | 30 | | | | |
| | | SPT | | | | | | | | | | |
| | | | 6.00 | SPT | 11 | 13 | 16 | 29 | | | | |
| | | SPT | | | | | | | | | | |
| | | | 7.50 | SPT | 12 | 16 | 16 | 32 | | | | |
| | | SPT | | | | | | | | | | |
| 7.5-9.0 | 1.5 | Greyish Colour Sand with Silt. | 9.00 | SPT | 10 | 14 | 14 | 28 | | | | |
| | | SPT | | | | | | | | | | |
| 9.0-12.0 | 3.0 | Greyish Colour Silty Clay. | 10.50 | SPT | 5 | 11 | 14 | 25 | | | | |
| | | SPT | | | | | | | | | | |
| | | | 12.00 | SPT | 6 | 17 | 18 | 35 | | | | |
| | | SPT | | | | | | | | | | |
| | | | 13.50 | SPT | 7 | 16 | 21 | 37 | | | | |
| | | SPT | | | | | | | | | | |
| | | | 15.00 | SPT | 9 | 18 | 26 | 44 | | | | |
| | | SPT | | | | | | | | | | |
| 12.0-20.0 | 8.0 | Greyish Colour Sand with Silt. | 16.50 | SPT | 6 | 14 | 24 | 38 | | | | |
| | | SPT | | | | | | | | | | |
| | | | 18.00 | SPT | 9 | 15 | 24 | 39 | | | | |
| | | SPT | | | | | | | | | | |
| | | | 19.50 | SPT | 11 | 19 | 25 | 44 | | | | |
| | | SPT | | | | | | | | | | |
| Total depth: 20.00m | | | | | | | | | | | | |
| Type of soil | | | | | N, Value | | | | | | | |
| Granular Soil | Compactness | | | | 0 to 4 | | 4 to 10 | | 10 to 30 | | 30 to 50 | |
| | | | | | very loose | | loose | | med. dense | dense | very dense | |
| Cohesive Soil | Consistency | | | | 0 to 2 | | 2 to 4 | | 4 to 8 | | 8 to 16 | 16 to 32 |
| | | | | | Very soft | | Soft | | med.soft | stiff | very stiff | |
| Logged by : | | Shiva | | | Verified by : <u>S. K. Jain</u> | | | | | | | |
| Checked by : | | Rajya | | | | | | | | | | |

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Bore Hole Log Sheet

| Project Name : | | Development of the Agricultural Value Chain Infrastructures | | | | | | | | | | |
|----------------------------|--------------------|---|-------------|------|------------------|------------------------------------|---------|------------|--------------|------------|------------|--|
| Location : | | Butwal Sub metropolitan, Ward no 15, Rupandehi | | | | Bore Hole No: | | 2 | | | | |
| | | | | | | Water Table, m : | | 2.00 | | | | |
| | | | | | | Diameter of Bore Hole : 6'' | | | | | | |
| Depth | Thickne ss | Soil Description | Sampling | | Penetration Blow | | | N | Group symbol | | | |
| | | | Depth (m) | Type | 15cm | 15cm | 15cm | | | | | |
| 0.0-3.0 | 3.0 | Greyish Colour Gravels and Boulders. | DCPT @ 10cm | | | | | | | | | |
| | | | 1.5 | DCPT | 5 | 13 | 13 | 26 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 3.00 | DCPT | 7 | 8 | 11 | 19 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 4.50 | SPT | 6 | 9 | 16 | 25 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 6.00 | SPT | 8 | 11 | 14 | 25 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 7.50 | SPT | 11 | 13 | 15 | 28 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 9.00 | SPT | 9 | 12 | 14 | 26 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 10.50 | SPT | 7 | 15 | 17 | 32 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 12.00 | SPT | 10 | 14 | 19 | 33 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 13.50 | SPT | 13 | 15 | 19 | 34 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 15.00 | SPT | 9 | 16 | 18 | 34 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 16.50 | SPT | 11 | 17 | 19 | 36 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 18.00 | SPT | 12 | 17 | 20 | 37 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 19.50 | SPT | 14 | 16 | 20 | 36 | | | | |
| Total depth: 20.00m | | | | | | | | | | | | |
| Type of soil | | | | | N, Value | | | | | | | |
| Granular Soil | Compactness | | | | 0 to 4 | | 4 to 10 | | 10 to 30 | | 30 to 50 | |
| | | | | | very loose | loose | | med. dense | dense | very dense | | |
| Cohesive Soil | Consistency | | | | 0 to 2 | | 2 to 4 | | 4 to 8 | | 8 to 16 | |
| | | | | | Very soft | | Soft | | med.soft | stiff | very stiff | |
| Logged by : | | Shiva | | | | Verified by : S. K. Jain | | | | | | |
| Checked by : | | Rajya | | | | | | | | | | |

Sanjujain Geotech Firm Pvt. Ltd.

Bore Hole Log Sheet

| Project Name : | | Development of the Agricultural Value Chain Infrastructures | | | | | | | | | | |
|----------------------------|--------------------|---|-------------|------|------------------------------------|------|---------|----|--------------|-------|------------|----------|
| Location : | | Butwal Sub metropolitan, Ward no 15, Rupandehi | | | Bore Hole No: | | 3 | | | | | |
| | | | | | Water Table, m : | | 2.00 | | | | | |
| | | | | | Diameter of Bore Hole : 6'' | | | | | | | |
| Depth | Thickne ss | Soil Description | Sampling | | Penetration Blow | | | N | Group symbol | | | |
| | | | Depth (m) | Type | 15cm | 15cm | 15cm | | | | | |
| 0.0-3.0 | 3.0 | Greyish Colour Gravels and Boulders. | DCPT @ 10cm | | | | | | | | | |
| | | | 1.5 | DCPT | 8 | 11 | 12 | 23 | | | | |
| | | | DCPT @ 10cm | | | | | | | | | |
| | | | 3.00 | DCPT | 6 | 9 | 11 | 20 | | | | |
| | | | 4.50 | SPT | 7 | 13 | 17 | 30 | | | | |
| | | | 6.00 | SPT | 10 | 13 | 15 | 28 | | | | |
| | | | 7.50 | SPT | 13 | 16 | 20 | 36 | | | | |
| | | | 9.00 | SPT | 11 | 13 | 18 | 31 | | | | |
| | | | 10.50 | SPT | 9 | 13 | 17 | 30 | | | | |
| | | | 12.00 | SPT | 12 | 16 | 19 | 35 | | | | |
| | | | 13.50 | SPT | 12 | 15 | 20 | 35 | | | | |
| | | | 15.00 | SPT | 11 | 16 | 20 | 36 | | | | |
| | | | 16.50 | SPT | 10 | 17 | 21 | 38 | | | | |
| | | | 18.00 | SPT | 13 | 19 | 19 | 38 | | | | |
| | | | 19.50 | SPT | 12 | 20 | 20 | 40 | | | | |
| Total depth: 20.00m | | | | | | | | | | | | |
| Type of soil | | | | | N, Value | | | | | | | |
| Granular Soil | Compactness | | | | 0 to 4 | | 4 to 10 | | 10 to 30 | | 30 to 50 | |
| | | | | | very loose | | loose | | med. dense | dense | very dense | |
| Cohesive Soil | Consistency | | | | 0 to 2 | | 2 to 4 | | 4 to 8 | | 8 to 16 | 16 to 32 |
| | | | | | Very soft | | Soft | | med.soft | stiff | very stiff | |
| Logged by : | | Shiva | | | Verified by : S. K. Jain | | | | | | | |
| Checked by : | | Rajya | | | | | | | | | | |

Sanjujain Geotech Firm Pvt. Ltd.

Bore Hole Log Sheet

| Project Name : | | Development of the Agricultural Value Chain Infrastructures | | | | | | | | | | | | |
|----------------------------|---------------|---|--------------|------|------------------|--|---------|------------|--------------|------------|----------|--|----------|--|
| Location : | | Butwal Sub metropolitan, Ward no 15, Rupandehi | | | | Bore Hole No: | | 4 | | | | | | |
| | | | | | | Water Table, m : | | 2.00 | | | | | | |
| | | | | | | Diameter of Bore Hole : 6'' | | | | | | | | |
| Depth | Thickne ss | Soil Description | Sampling | | Penetration Blow | | | N | Group symbol | | | | | |
| | | | Depth (m) | Type | 15cm | 15cm | 15cm | | | | | | | |
| 0.0-1.5 | 1.5 | Greyish Colour Gravels and Boulders. | 1.5 | DCPT | 5 | 8 | 10 | 18 | | | | | | |
| 1.5-20.0 | 18.5 | Greyish Colour Sand with Gravels and Silt. | 3.00 | DCPT | 7 | 9 | 11 | 20 | | | | | | |
| | | | 4.50 | SPT | 9 | 12 | 15 | 27 | | | | | | |
| | | | 6.00 | SPT | 11 | 16 | 17 | 33 | | | | | | |
| | | | 7.50 | SPT | 8 | 14 | 17 | 31 | | | | | | |
| | | | 9.00 | SPT | 12 | 16 | 16 | 32 | | | | | | |
| | | | 10.50 | SPT | 10 | 15 | 15 | 30 | | | | | | |
| | | | 12.00 | SPT | 11 | 16 | 16 | 32 | | | | | | |
| | | | 13.50 | SPT | 9 | 17 | 17 | 34 | | | | | | |
| | | | 15.00 | SPT | 13 | 17 | 17 | 34 | | | | | | |
| | | | 16.50 | SPT | 10 | 18 | 18 | 36 | | | | | | |
| | | | 18.00 | SPT | 11 | 18 | 19 | 37 | | | | | | |
| 19.50 | SPT | 12 | 19 | 19 | 38 | | | | | | | | | |
| Total depth: 20.00m | | | | | | | | | | | | | | |
| Type of soil | | | | | N, Value | | | | | | | | | |
| Granular Soil | Compactness | | | | 0 to 4 | | 4 to 10 | | 10 to 30 | | 30 to 50 | | | |
| | | | | | very loose | loose | | med. dense | dense | very dense | | | | |
| Cohesive Soil | Consistency | | | | 0 to 2 | | 2 to 4 | | 4 to 8 | | 8 to 16 | | 16 to 32 | |
| | | | | | Very soft | Soft | | med.soft | stiff | very stiff | | | | |
| Logged by : | | Shiva | | | | Verified by : <u>S. K. Jain</u> | | | | | | | | |
| Checked by : | | Rajya | | | | | | | | | | | | |

Sanjujain Geotech Firm Pvt. Ltd.

Bulk Density Test

Project Name : Development of the Agricultural Value Chain Infrastructures

Consultant :

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Date :

| Sample No. | Depth m | Length cm | Weight gm | Volume cm ³ | Bulk Density gm/cm ³ |
|-----------------------|---------|-----------|-----------|------------------------|---------------------------------|
| Borehole No. 1 | | | | | |
| SPT | 6.00 | 10.00 | 172.60 | 96.21 | 1.79 |
| | 9.00 | 10.00 | 187.40 | 96.21 | 1.95 |
| | 12.00 | 10.00 | 189.30 | 96.21 | 1.97 |
| | 15.00 | 10.00 | 189.90 | 96.21 | 1.97 |
| Borehole No. 2 | | | | | |
| SPT | 4.00 | 10.00 | 187.80 | 96.21 | 1.95 |
| | 7.50 | 10.00 | 182.30 | 96.21 | 1.89 |
| | 10.50 | 10.00 | 176.10 | 96.21 | 1.83 |
| | 13.50 | 10.00 | 174.00 | 96.21 | 1.81 |
| Borehole No. 3 | | | | | |
| SPT | 6.00 | 10.00 | 180.10 | 96.21 | 1.87 |
| | 9.00 | 10.00 | 175.00 | 96.21 | 1.82 |
| | 10.50 | 10.00 | 172.80 | 96.21 | 1.80 |
| | 12.00 | 10.00 | 170.00 | 96.21 | 1.77 |
| Borehole No. 4 | | | | | |
| SPT | 3.00 | 10.00 | 183.20 | 96.21 | 1.90 |
| | 7.50 | 10.00 | 184.50 | 96.21 | 1.92 |
| | 10.50 | 10.00 | 178.00 | 96.21 | 1.85 |
| | 12.00 | 10.00 | 174.70 | 96.21 | 1.82 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil,Geotech Engg. USA)

Sanjujain Geotech Firm Pvt. Ltd.

Natural Moisture Content

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

| Sample | Depth m | Wt. of Cont. + Wet Soil gm | Wt. of Cont.+ Dry Soil gm | Wt. of Water gm | Wt. of Empty Container gm | Wt. of Dry Soil gm | Moisture Content % |
|------------------------|------------|-------------------------------------|------------------------------------|-----------------------|------------------------------------|--------------------------|--------------------------|
| Bore Hole No. 1 | | | | | | | |
| SPT | 6.00 | 174.70 | 144.80 | 29.90 | 3.60 | 141.20 | 21.18 |
| | 9.00 | 206.60 | 184.90 | 21.70 | 3.60 | 181.30 | 11.97 |
| | 12.00 | 211.40 | 177.90 | 33.50 | 3.60 | 174.30 | 19.22 |
| | 15.00 | 196.10 | 182.60 | 13.50 | 3.50 | 179.10 | 7.54 |
| Bore Hole No. 2 | | | | | | | |
| SPT | 4.00 | 223.30 | 201.40 | 21.90 | 3.50 | 197.90 | 11.07 |
| | 7.50 | 243.50 | 201.70 | 41.80 | 3.50 | 198.20 | 21.09 |
| | 10.50 | 267.50 | 231.60 | 35.90 | 3.50 | 228.10 | 15.74 |
| | 13.50 | 206.30 | 189.80 | 16.50 | 3.50 | 186.30 | 8.86 |
| Bore Hole No. 3 | | | | | | | |
| SPT | 6.00 | 182.80 | 165.60 | 17.20 | 3.50 | 162.10 | 10.61 |
| | 9.00 | 217.80 | 197.50 | 20.30 | 3.50 | 194.00 | 10.46 |
| | 10.50 | 247.40 | 238.00 | 9.40 | 3.50 | 234.50 | 4.01 |
| | 12.00 | 172.50 | 156.70 | 15.80 | 3.50 | 153.20 | 10.31 |
| Bore Hole No. 4 | | | | | | | |
| SPT | 3.00 | 251.10 | 214.70 | 36.40 | 3.50 | 211.20 | 17.23 |
| | 7.50 | 255.50 | 217.60 | 37.90 | 3.50 | 214.10 | 17.70 |
| | 10.50 | 245.30 | 216.40 | 28.90 | 3.50 | 212.90 | 13.57 |
| | 12.00 | 273.30 | 240.70 | 32.60 | 3.50 | 237.20 | 13.74 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Specific Gravity Test

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

| Borehole No. | | BH-1 | | | |
|--|----|---------|---------|---------|---------|
| Depth, m | | 6.00 | 9.00 | 12.00 | 15.00 |
| Sample No. | | SPT | SPT | SPT | SPT |
| Weight of Pycnometer W_1 | gm | 519.90 | 519.90 | 519.90 | 519.90 |
| Weight of pycnometer with dry soil W_2 | gm | 774.10 | 768.20 | 770.30 | 773.10 |
| Weight of pycnometer with dry soil and water W_3 | gm | 1613.50 | 1605.10 | 1611.20 | 1617.30 |
| Weight Pycnometer full of water W_4 | gm | 1480.20 | 1480.20 | 1480.20 | 1480.20 |
| Weight of dry Soil (w_2-w_1) | gm | 254.20 | 248.30 | 250.40 | 253.20 |
| Weight of an equal volume of water (w_2-w_1)-(w_3-w_4) | gm | 120.90 | 123.40 | 119.40 | 116.10 |
| Specific Gravity | | 2.10 | 2.01 | 2.10 | 2.18 |
| Borehole No. | | BH-2 | | | |
| Depth, m | | 4.00 | 7.50 | 10.50 | 13.50 |
| Sample No. | | SPT | SPT | SPT | SPT |
| Weight of Pycnometer W_1 | gm | 519.90 | 519.90 | 519.90 | 519.10 |
| Weight of pycnometer with dry soil W_2 | gm | 764.50 | 767.00 | 769.20 | 763.10 |
| Weight of pycnometer with dry soil and water W_3 | gm | 1630.40 | 1632.10 | 1634.00 | 1631.10 |
| Weight Pycnometer full of water W_4 | gm | 1480.20 | 1480.20 | 1480.20 | 1480.20 |
| Weight of dry Soil (w_2-w_1) | gm | 244.60 | 247.10 | 249.30 | 244.00 |
| Weight of an equal volume of water (w_2-w_1)-(w_3-w_4) | gm | 94.40 | 95.20 | 95.50 | 93.10 |
| Specific Gravity | | 2.59 | 2.60 | 2.61 | 2.62 |

Tested by : Bina (Lab Technician)

Checked by : Rajya

Verified by: S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Specific Gravity Test

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

| Borehole No. | | BH-3 | | | |
|--|----|---------|---------|---------|---------|
| Depth, m | | 6.00 | 9.00 | 10.50 | 12.00 |
| Sample No. | | SPT | SPT | SPT | SPT |
| Weight of Pycnometer W_1 | gm | 519.90 | 519.90 | 519.90 | 519.90 |
| Weight of pycnometer with dry soil W_2 | gm | 772.50 | 772.60 | 774.20 | 770.20 |
| Weight of pycnometer with dry soil and water W_3 | gm | 1626.80 | 1629.80 | 1634.60 | 1605.00 |
| Weight Pycnometer full of water W_4 | gm | 1480.20 | 1480.20 | 1480.20 | 1480.20 |
| Weight of dry Soil (w_2-w_1) | gm | 252.60 | 252.70 | 254.30 | 250.30 |
| Weight of an equal volume of water (w_2-w_1)-(w ₃ -w ₄) | gm | 106.00 | 103.10 | 99.90 | 125.50 |
| Specific Gravity | | 2.38 | 2.45 | 2.55 | 1.99 |
| Borehole No. | | BH-4 | | | |
| Depth, m | | 3.00 | 7.50 | 10.50 | 12.00 |
| Sample No. | | SPT | SPT | SPT | SPT |
| Weight of Pycnometer W_1 | gm | 519.90 | 519.90 | 519.90 | 519.90 |
| Weight of pycnometer with dry soil W_2 | gm | 769.40 | 773.20 | 774.00 | 772.80 |
| Weight of pycnometer with dry soil and water W_3 | gm | 1619.90 | 1629.10 | 1627.40 | 1623.20 |
| Weight Pycnometer full of water W_4 | gm | 1480.20 | 1480.20 | 1480.20 | 1480.20 |
| Weight of dry Soil (w_2-w_1) | gm | 249.50 | 253.30 | 254.10 | 252.90 |
| Weight of an equal volume of water (w_2-w_1)-(w ₃ -w ₄) | gm | 109.80 | 104.40 | 106.90 | 109.90 |
| Specific Gravity | | 2.27 | 2.43 | 2.38 | 2.30 |

Tested by : Bina (Lab Technician)

Checked by : Rajya

Verified by: S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

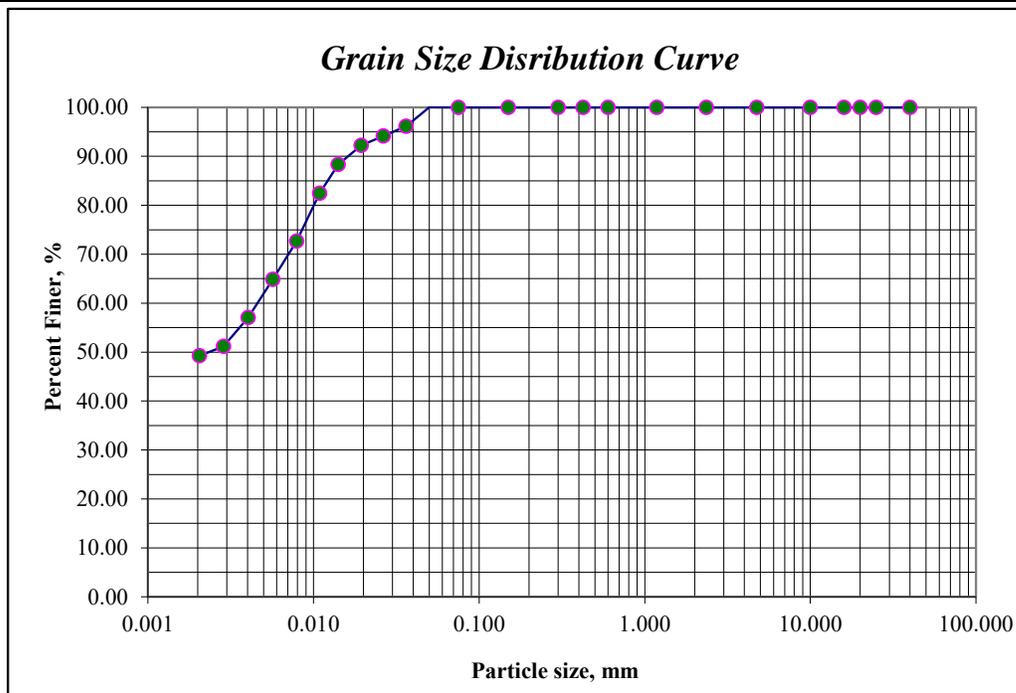
Bore Hole No : **BH - 1**

Depth (m) : 6.00

Wt. of Sample, gm : 141.10

Sample No : SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | | 0.00 | 0.00 | 100.00 |
| 2.360 | | 0.00 | 0.00 | 100.00 |
| 1.180 | | 0.00 | 0.00 | 100.00 |
| 0.600 | | 0.00 | 0.00 | 100.00 |
| 0.425 | | 0.00 | 0.00 | 100.00 |
| 0.300 | | 0.00 | 0.00 | 100.00 |
| 0.150 | | 0.00 | 0.00 | 100.00 |
| 0.075 | | 0.00 | 0.00 | 100.00 |



| | | | | |
|---------|-----------|------|---------|-------|
| Remarks | Gravel, % | 0.00 | Silt, % | 50.77 |
| | Sand, % | 0.00 | Clay, % | 49.23 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 1**

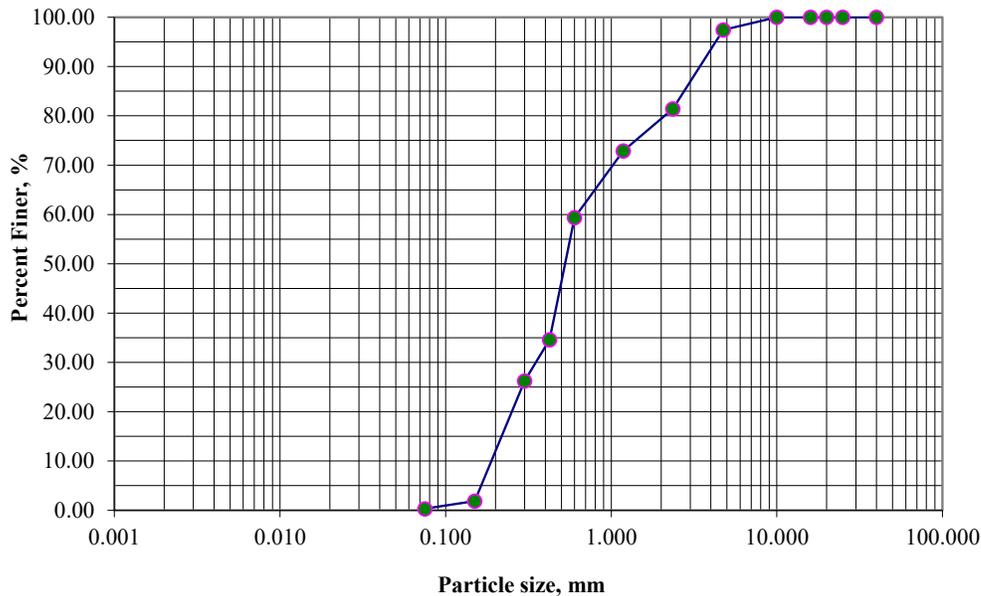
Depth (m) : 9.00

Wt. of Sample, gm : 180.30

Sample No : SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 4.60 | 4.60 | 2.55 | 97.45 |
| 2.360 | 28.90 | 33.50 | 18.58 | 81.42 |
| 1.180 | 15.40 | 48.90 | 27.12 | 72.88 |
| 0.600 | 24.40 | 73.30 | 40.65 | 59.35 |
| 0.425 | 44.60 | 117.90 | 65.39 | 34.61 |
| 0.300 | 15.10 | 133.00 | 73.77 | 26.23 |
| 0.150 | 43.90 | 176.90 | 98.11 | 1.89 |
| 0.075 | 2.80 | 179.70 | 99.67 | 0.33 |

Grain Size Distribution Curve



Remarks

| | | | |
|-----------|-------|---------|------|
| Gravel, % | 2.55 | Silt, % | 0.33 |
| Sand, % | 97.12 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 1**

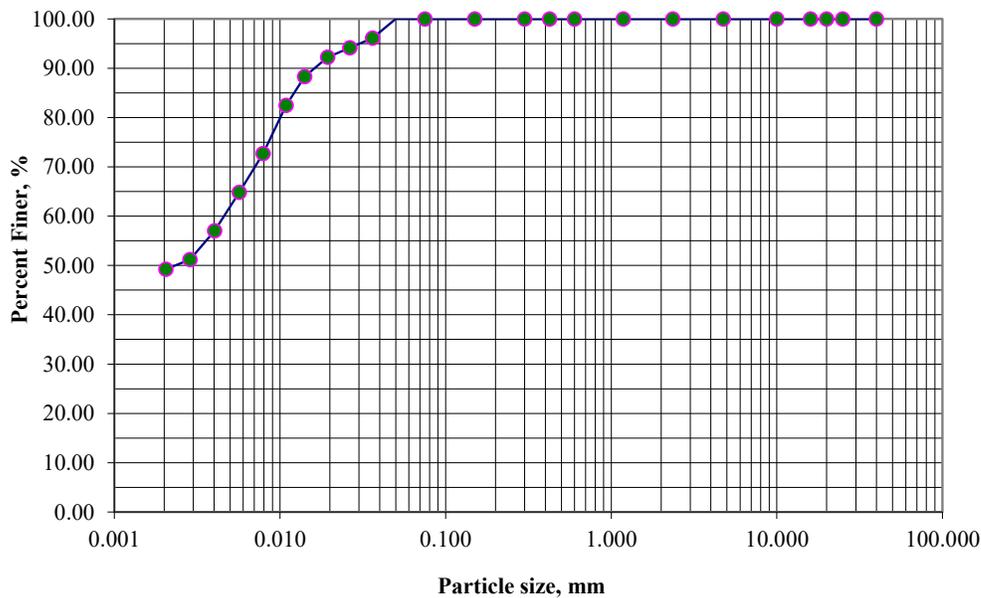
Depth (m) : 12.00

Wt. of Sample, gm : 151.40

Sample No : SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | | 0.00 | 0.00 | 100.00 |
| 2.360 | | 0.00 | 0.00 | 100.00 |
| 1.180 | | 0.00 | 0.00 | 100.00 |
| 0.600 | | 0.00 | 0.00 | 100.00 |
| 0.425 | | 0.00 | 0.00 | 100.00 |
| 0.300 | | 0.00 | 0.00 | 100.00 |
| 0.150 | | 0.00 | 0.00 | 100.00 |
| 0.075 | | 0.00 | 0.00 | 100.00 |

Grain Size Disribution Curve



| | | | | |
|----------------|-----------|------|---------|-------|
| <i>Remarks</i> | Gravel, % | 0.00 | Silt, % | 50.77 |
| | Sand, % | 0.00 | Clay, % | 49.23 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 1**

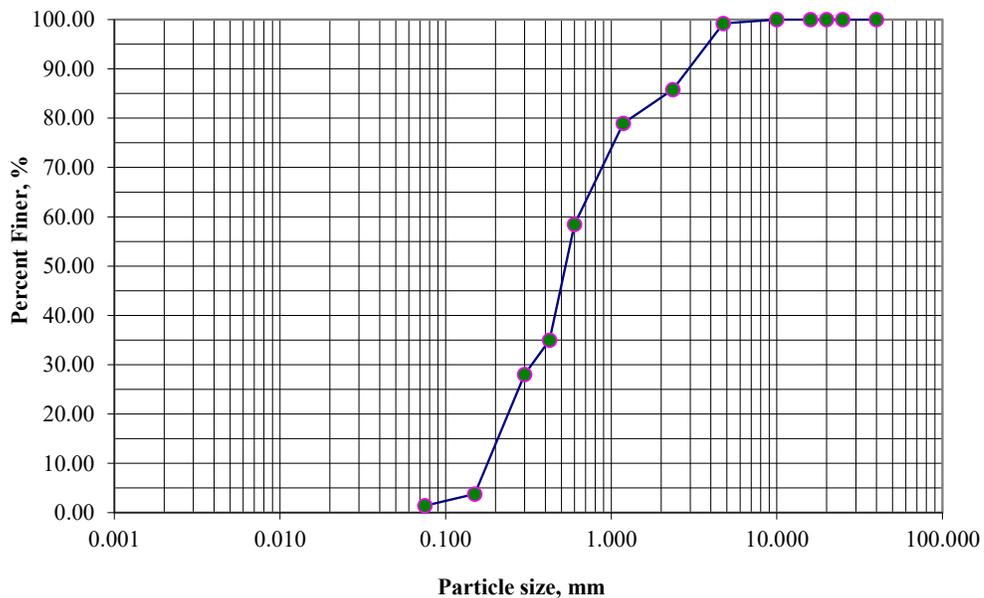
Depth (m) : 15.00

Wt. of Sample, gm : 178.90

Sample No : SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 1.40 | 1.40 | 0.78 | 99.22 |
| 2.360 | 24.00 | 25.40 | 14.20 | 85.80 |
| 1.180 | 12.30 | 37.70 | 21.07 | 78.93 |
| 0.600 | 36.60 | 74.30 | 41.53 | 58.47 |
| 0.425 | 42.00 | 116.30 | 65.01 | 34.99 |
| 0.300 | 12.40 | 128.70 | 71.94 | 28.06 |
| 0.150 | 43.40 | 172.10 | 96.20 | 3.80 |
| 0.075 | 4.30 | 176.40 | 98.60 | 1.40 |

Grain Size Distribution Curve



| | | | | |
|---------|-----------|-------|---------|------|
| Remarks | Gravel, % | 0.78 | Silt, % | 1.40 |
| | Sand, % | 97.82 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 2**

Depth (m)

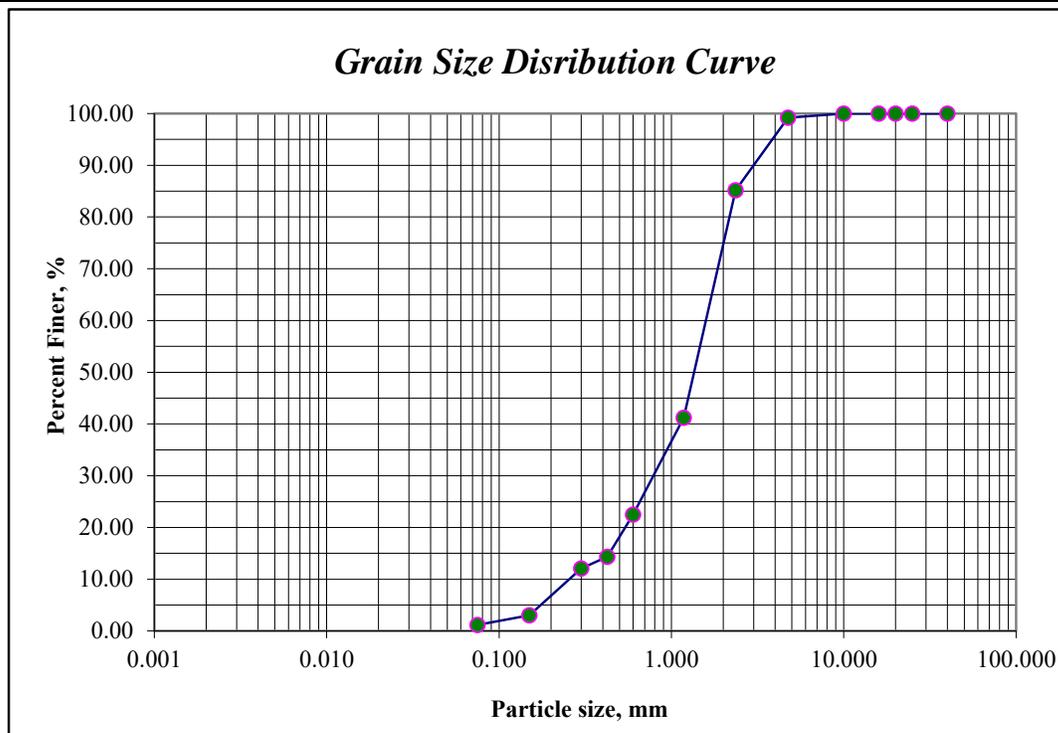
4.00

Wt. of Sample, gm : 197.70

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 1.60 | 1.60 | 0.81 | 99.19 |
| 2.360 | 27.70 | 29.30 | 14.82 | 85.18 |
| 1.180 | 86.90 | 116.20 | 58.78 | 41.22 |
| 0.600 | 37.10 | 153.30 | 77.54 | 22.46 |
| 0.425 | 16.10 | 169.40 | 85.69 | 14.31 |
| 0.300 | 4.40 | 173.80 | 87.91 | 12.09 |
| 0.150 | 17.90 | 191.70 | 96.97 | 3.03 |
| 0.075 | 3.70 | 195.40 | 98.84 | 1.16 |



| | | | | |
|---------|-----------|-------|---------|------|
| Remarks | Gravel, % | 0.81 | Silt, % | 1.16 |
| | Sand, % | 98.03 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 2**

Depth (m)

7.50

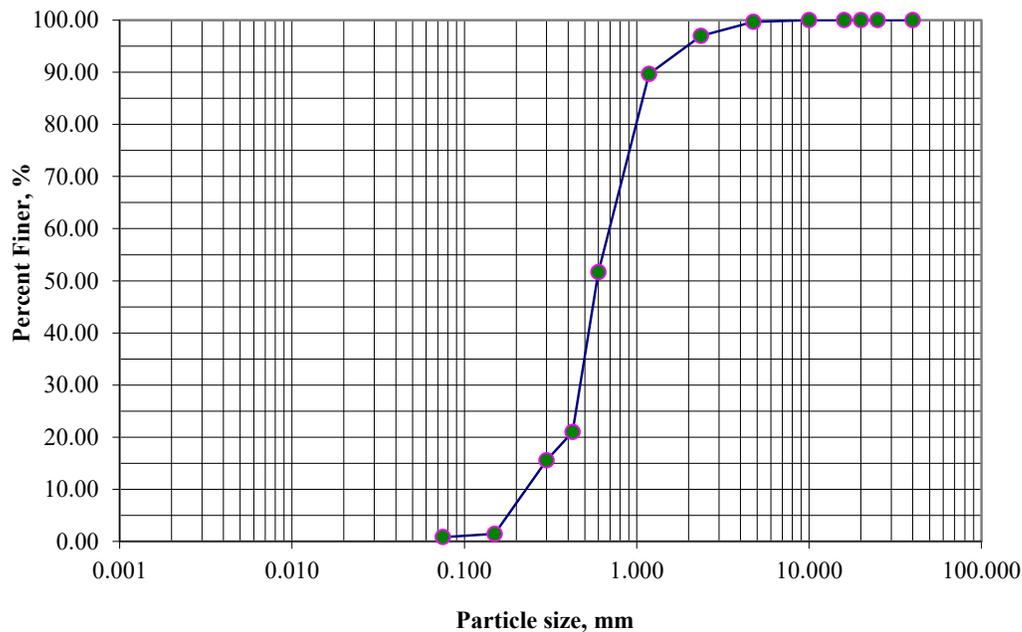
Wt. of Sample, gm : 197.10

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 0.60 | 0.60 | 0.30 | 99.70 |
| 2.360 | 5.40 | 6.00 | 3.04 | 96.96 |
| 1.180 | 14.30 | 20.30 | 10.30 | 89.70 |
| 0.600 | 75.00 | 95.30 | 48.35 | 51.65 |
| 0.425 | 60.40 | 155.70 | 79.00 | 21.00 |
| 0.300 | 10.70 | 166.40 | 84.42 | 15.58 |
| 0.150 | 27.80 | 194.20 | 98.53 | 1.47 |
| 0.075 | 1.30 | 195.50 | 99.19 | 0.81 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.30 | Silt, % | 0.81 |
| | Sand, % | 98.88 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 2**

Depth (m)

10.50

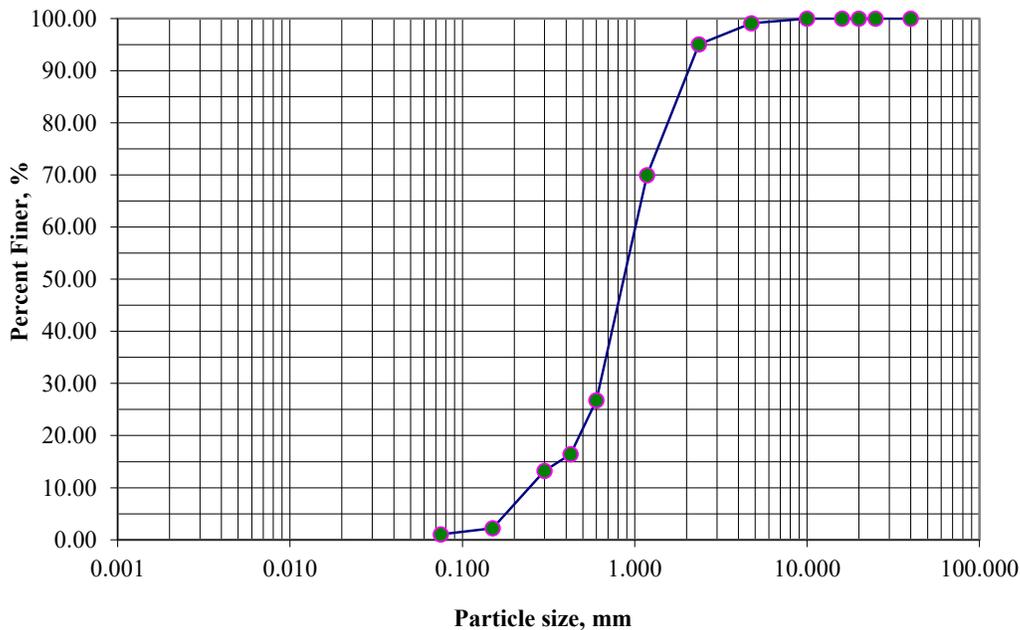
Wt. of Sample, gm : 227.60

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 2.00 | 2.00 | 0.88 | 99.12 |
| 2.360 | 9.30 | 11.30 | 4.96 | 95.04 |
| 1.180 | 57.10 | 68.40 | 30.05 | 69.95 |
| 0.600 | 98.30 | 166.70 | 73.24 | 26.76 |
| 0.425 | 23.50 | 190.20 | 83.57 | 16.43 |
| 0.300 | 7.30 | 197.50 | 86.78 | 13.22 |
| 0.150 | 25.10 | 222.60 | 97.80 | 2.20 |
| 0.075 | 2.60 | 225.20 | 98.95 | 1.05 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.88 | Silt, % | 1.05 |
| | Sand, % | 98.07 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 2**

Depth (m)

13.50

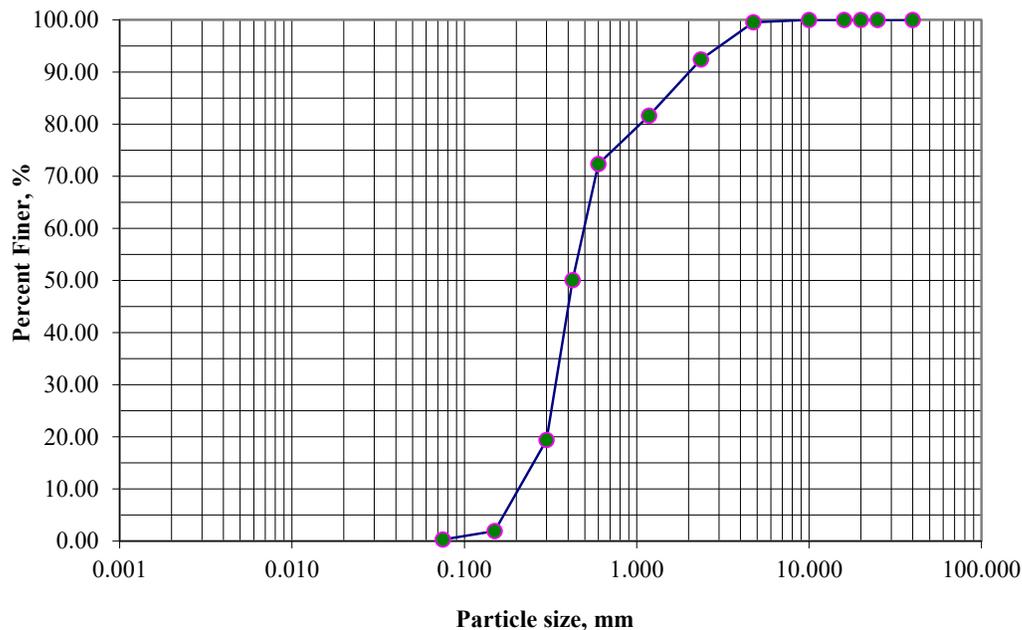
Wt. of Sample, gm : 186.10

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 0.90 | 0.90 | 0.48 | 99.52 |
| 2.360 | 13.30 | 14.20 | 7.63 | 92.37 |
| 1.180 | 20.00 | 34.20 | 18.38 | 81.62 |
| 0.600 | 17.30 | 51.50 | 27.67 | 72.33 |
| 0.425 | 41.40 | 92.90 | 49.92 | 50.08 |
| 0.300 | 21.10 | 114.00 | 61.26 | 19.40 |
| 0.150 | 65.00 | 179.00 | 96.18 | 1.91 |
| 0.075 | 6.00 | 185.00 | 99.41 | 0.30 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.48 | Silt, % | 0.30 |
| | Sand, % | 99.22 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 3**

Depth (m)

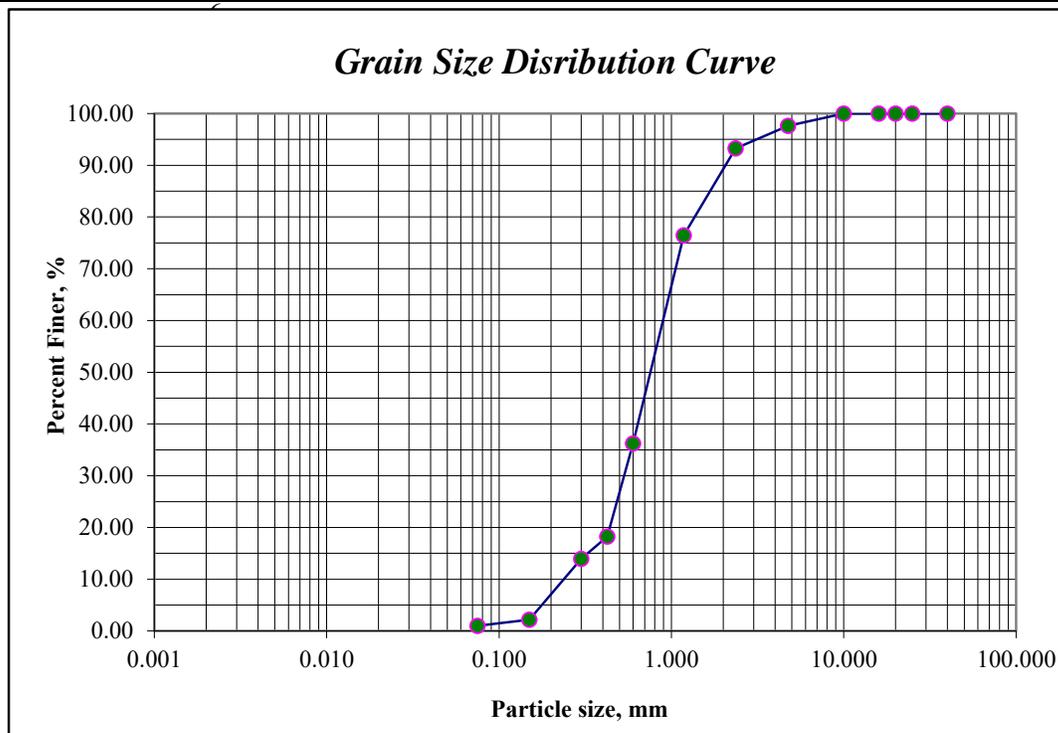
6.00

Wt. of Sample, gm : 161.60

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 3.80 | 3.80 | 2.35 | 97.65 |
| 2.360 | 7.10 | 10.90 | 6.75 | 93.25 |
| 1.180 | 27.10 | 38.00 | 23.51 | 76.49 |
| 0.600 | 65.00 | 103.00 | 63.74 | 36.26 |
| 0.425 | 29.10 | 132.10 | 81.75 | 18.25 |
| 0.300 | 7.00 | 139.10 | 86.08 | 13.92 |
| 0.150 | 19.00 | 158.10 | 97.83 | 2.17 |
| 0.075 | 1.90 | 160.00 | 99.01 | 0.99 |



| | | | | |
|---------|-----------|-------|---------|------|
| Remarks | Gravel, % | 2.35 | Silt, % | 0.99 |
| | Sand, % | 96.66 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 3**

Depth (m)

9.00

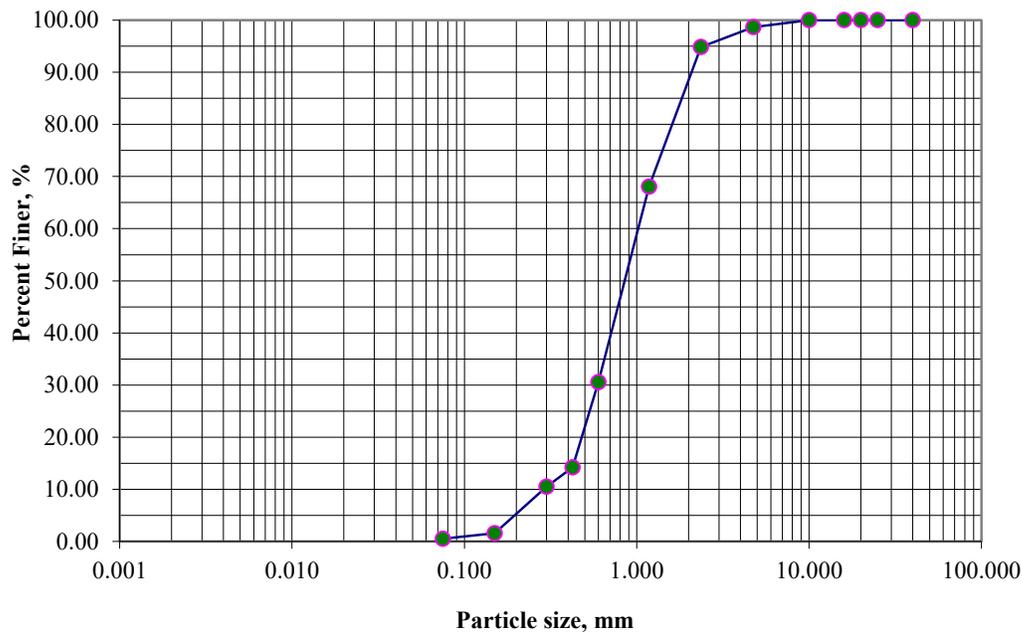
Wt. of Sample, gm : 193.90

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 2.60 | 2.60 | 1.34 | 98.66 |
| 2.360 | 7.40 | 10.00 | 5.16 | 94.84 |
| 1.180 | 51.90 | 61.90 | 31.92 | 68.08 |
| 0.600 | 72.80 | 134.70 | 69.47 | 30.53 |
| 0.425 | 31.70 | 166.40 | 85.82 | 14.18 |
| 0.300 | 7.10 | 173.50 | 89.48 | 10.52 |
| 0.150 | 17.40 | 190.90 | 98.45 | 1.55 |
| 0.075 | 2.00 | 192.90 | 99.48 | 0.52 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 1.34 | Silt, % | 0.52 |
| | Sand, % | 98.14 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 3**

Depth (m)

10.50

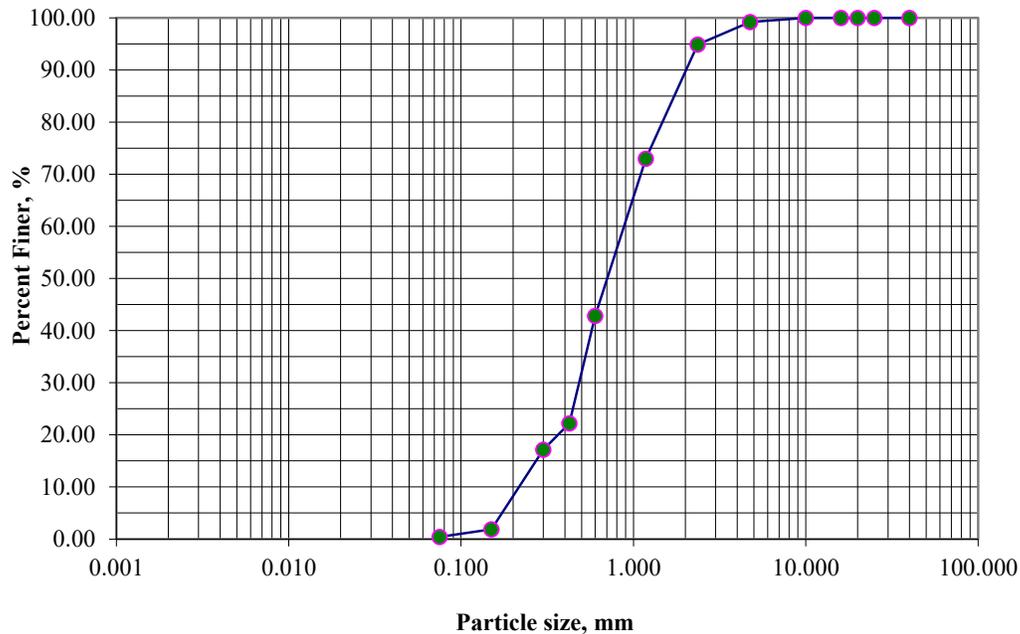
Wt. of Sample, gm : 233.40

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 1.80 | 1.80 | 0.77 | 99.23 |
| 2.360 | 10.10 | 11.90 | 5.10 | 94.90 |
| 1.180 | 51.20 | 63.10 | 27.04 | 72.96 |
| 0.600 | 70.30 | 133.40 | 57.16 | 42.84 |
| 0.425 | 48.20 | 181.60 | 77.81 | 22.19 |
| 0.300 | 11.70 | 193.30 | 82.82 | 17.18 |
| 0.150 | 35.70 | 229.00 | 98.11 | 1.89 |
| 0.075 | 3.40 | 232.40 | 99.57 | 0.43 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.77 | Silt, % | 0.43 |
| | Sand, % | 98.80 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 3**

Depth (m)

12.00

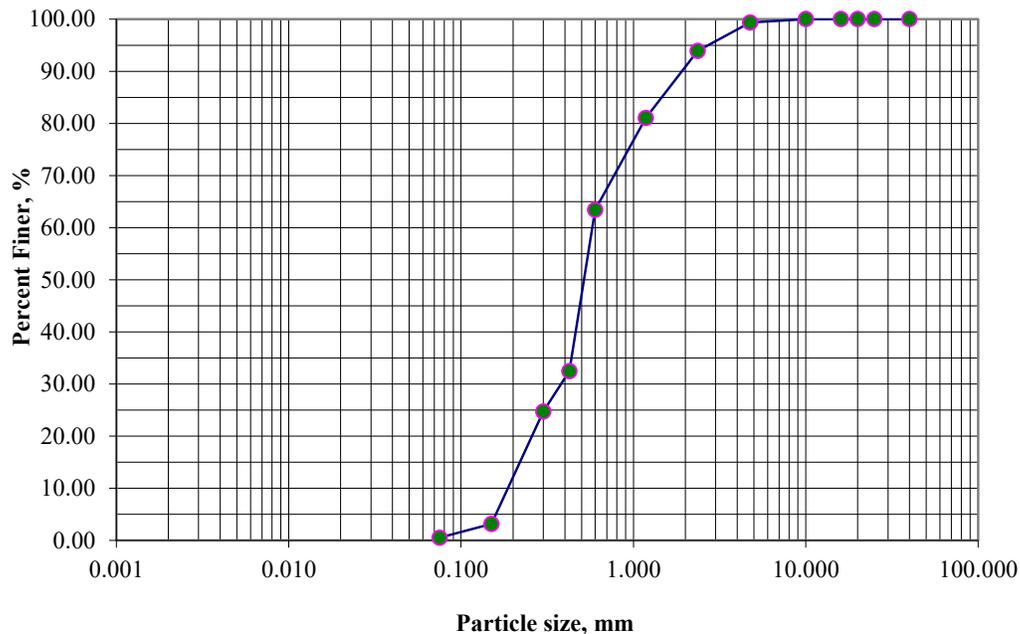
Wt. of Sample, gm : 152.50

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 1.00 | 1.00 | 0.66 | 99.34 |
| 2.360 | 8.30 | 9.30 | 6.10 | 93.90 |
| 1.180 | 19.60 | 28.90 | 18.95 | 81.05 |
| 0.600 | 26.90 | 55.80 | 36.59 | 63.41 |
| 0.425 | 47.20 | 103.00 | 67.54 | 32.46 |
| 0.300 | 11.80 | 114.80 | 75.28 | 24.72 |
| 0.150 | 32.90 | 147.70 | 96.85 | 3.15 |
| 0.075 | 4.00 | 151.70 | 99.48 | 0.52 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 0.66 | Silt, % | 0.52 |
| | Sand, % | 98.82 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 4**

Depth (m)

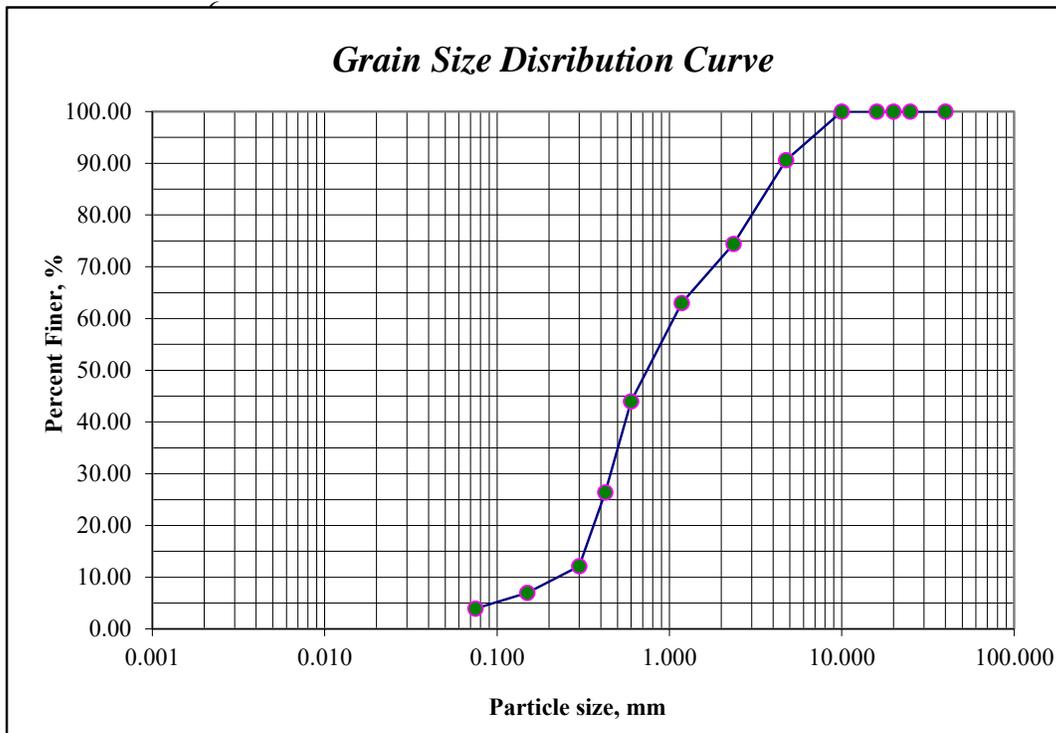
3.00

Wt. of Sample, gm : 175.10

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 16.40 | 16.40 | 9.37 | 90.63 |
| 2.360 | 28.40 | 44.80 | 25.59 | 74.41 |
| 1.180 | 20.00 | 64.80 | 37.01 | 62.99 |
| 0.600 | 33.30 | 98.10 | 56.03 | 43.97 |
| 0.425 | 30.80 | 128.90 | 73.62 | 26.38 |
| 0.300 | 25.00 | 153.90 | 87.89 | 12.11 |
| 0.150 | 9.00 | 162.90 | 93.03 | 6.97 |
| 0.075 | 5.30 | 168.20 | 96.06 | 3.94 |



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 9.37 | Silt, % | 3.94 |
| | Sand, % | 86.69 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 4**

Depth (m)

7.50

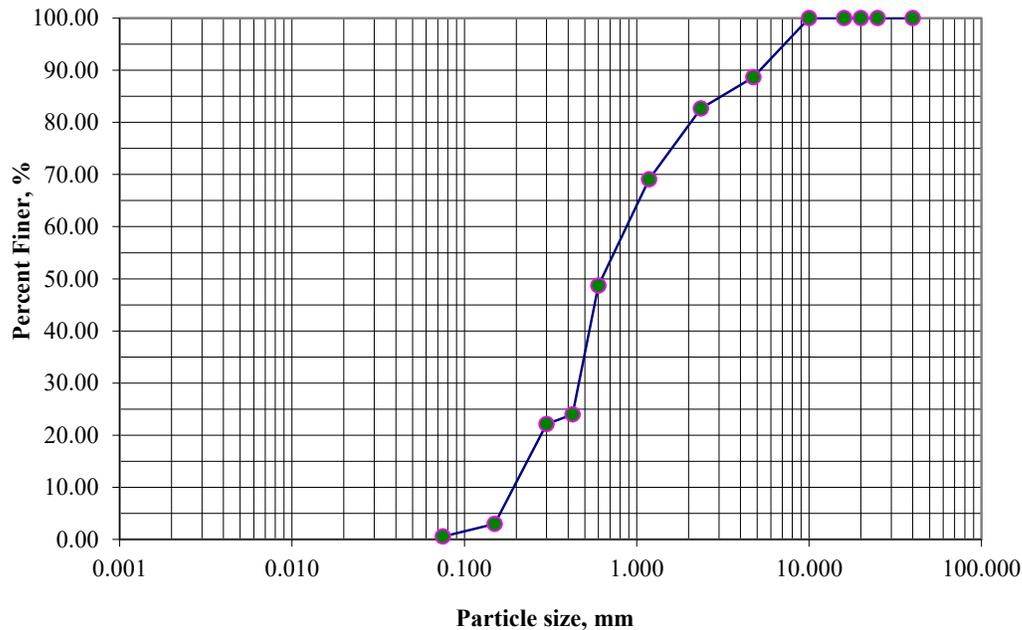
Wt. of Sample, gm : 165.30

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 18.70 | 18.70 | 11.31 | 88.69 |
| 2.360 | 10.00 | 28.70 | 17.36 | 82.64 |
| 1.180 | 22.40 | 51.10 | 30.91 | 69.09 |
| 0.600 | 33.70 | 84.80 | 51.30 | 48.70 |
| 0.425 | 40.90 | 125.70 | 76.04 | 23.96 |
| 0.300 | 3.00 | 128.70 | 77.86 | 22.14 |
| 0.150 | 31.70 | 160.40 | 97.04 | 2.96 |
| 0.075 | 4.00 | 164.40 | 99.46 | 0.54 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 11.31 | Silt, % | 0.54 |
| | Sand, % | 88.14 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 4**

Depth (m)

10.50

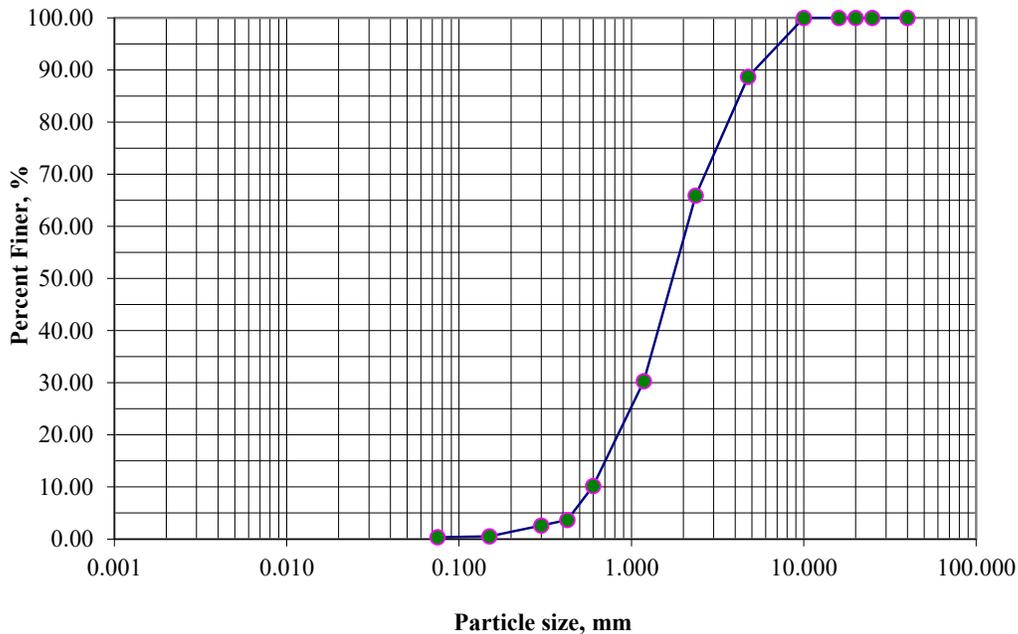
Wt. of Sample, gm : 200.60

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 22.70 | 22.70 | 11.32 | 88.68 |
| 2.360 | 45.70 | 68.40 | 34.10 | 65.90 |
| 1.180 | 71.40 | 139.80 | 69.69 | 30.31 |
| 0.600 | 40.40 | 180.20 | 89.83 | 10.17 |
| 0.425 | 13.00 | 193.20 | 96.31 | 3.69 |
| 0.300 | 2.20 | 195.40 | 97.41 | 2.59 |
| 0.150 | 4.10 | 199.50 | 99.45 | 0.55 |
| 0.075 | 0.40 | 199.90 | 99.65 | 0.35 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 11.32 | Silt, % | 0.35 |
| | Sand, % | 88.33 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjujain Geotech Firm Pvt. Ltd.

Sieve Analysis Test Result

Project Name : Development of the Agricultural Value Chain Infrastructures

Location : Butwal Sub metropolitan, Ward no 15, Rupandehi

Bore Hole No : **BH - 4**

Depth (m)

12.00

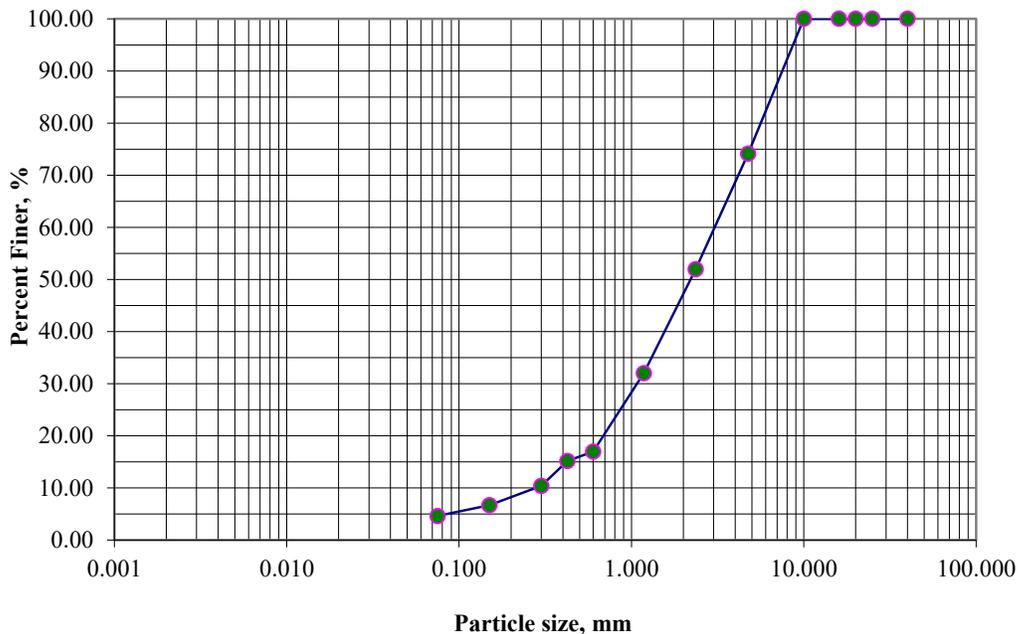
Wt. of Sample, gm : 170.60

Sample No

SPT

| Seive Size (mm) | Wt. of Soil Retained (gm) | Cumulative weight gm | Cumulative Percent retaining (%) | Percent Finer (%) |
|-----------------|---------------------------|----------------------|----------------------------------|-------------------|
| 40.000 | | 0.00 | 0.00 | 100.00 |
| 25.000 | | 0.00 | 0.00 | 100.00 |
| 20.000 | | 0.00 | 0.00 | 100.00 |
| 16.000 | | 0.00 | 0.00 | 100.00 |
| 10.000 | | 0.00 | 0.00 | 100.00 |
| 4.750 | 44.10 | 44.10 | 25.85 | 74.15 |
| 2.360 | 37.90 | 82.00 | 48.07 | 51.93 |
| 1.180 | 34.00 | 116.00 | 68.00 | 32.00 |
| 0.600 | 25.60 | 141.60 | 83.00 | 17.00 |
| 0.425 | 3.10 | 144.70 | 84.82 | 15.18 |
| 0.300 | 8.20 | 152.90 | 89.62 | 10.38 |
| 0.150 | 6.30 | 159.20 | 93.32 | 6.68 |
| 0.075 | 3.50 | 162.70 | 95.37 | 4.63 |

Grain Size Distribution Curve



| | | | | |
|----------------|-----------|-------|---------|------|
| <i>Remarks</i> | Gravel, % | 25.85 | Silt, % | 4.63 |
| | Sand, % | 69.52 | Clay, % | 0.00 |

Tested by : Bina (Lab. Technician)

Checked by : Rajya

Verified by : S.K. Jain (M.E.Civil, Geotech Eng., USA)

Sanjain Geotech Firm Pvt. Ltd.

Summary

| Bore Hole No. | Sample No. | Depth m | Natural Moisture Content % | Bulk Density gm/cm ³ | Grain Size Distribution, % | | | | Specific Gravity |
|---------------|------------|---------|----------------------------|---------------------------------|----------------------------|-------|-------|-------|------------------|
| | | | | | Gravel | Sand | Silt | Clay | |
| BH- 1 | SPT | 6.00 | 21.18 | 1.79 | 0.00 | 0.00 | 50.77 | 49.23 | 2.10 |
| | SPT | 9.00 | 11.97 | 1.95 | 2.55 | 97.12 | 0.33 | 0.00 | 2.01 |
| | SPT | 12.00 | 19.22 | 1.97 | 0.00 | 0.00 | 50.77 | 49.23 | 2.10 |
| | SPT | 15.00 | 7.54 | 1.97 | 0.78 | 97.82 | 1.40 | 0.00 | 2.18 |
| BH- 2 | SPT | 4.00 | 11.07 | 1.95 | 0.81 | 98.03 | 1.16 | 0.00 | 2.59 |
| | SPT | 7.50 | 21.09 | 1.89 | 0.30 | 98.88 | 0.81 | 0.00 | 2.60 |
| | SPT | 10.50 | 15.74 | 1.83 | 0.88 | 98.07 | 1.05 | 0.00 | 2.61 |
| | SPT | 13.50 | 8.86 | 1.81 | 0.48 | 99.22 | 0.30 | 0.00 | 2.62 |
| BH-3 | SPT | 6.00 | 10.61 | 1.87 | 2.35 | 96.66 | 0.99 | 0.00 | 2.38 |
| | SPT | 9.00 | 10.46 | 1.82 | 1.34 | 98.14 | 0.52 | 0.00 | 2.45 |
| | SPT | 10.50 | 4.01 | 1.80 | 0.77 | 98.80 | 0.43 | 0.00 | 2.55 |
| | SPT | 12.00 | 10.31 | 1.77 | 0.66 | 98.82 | 0.52 | 0.00 | 1.99 |
| BH-3 | SPT | 3.00 | 17.23 | 1.90 | 9.37 | 86.69 | 3.94 | 0.00 | 2.27 |
| | SPT | 7.50 | 17.70 | 1.92 | 11.31 | 88.14 | 0.54 | 0.00 | 2.43 |
| | SPT | 10.50 | 13.57 | 1.85 | 11.32 | 88.33 | 0.35 | 0.00 | 2.38 |
| | SPT | 12.00 | 13.74 | 1.82 | 25.85 | 69.52 | 4.63 | 0.00 | 2.30 |

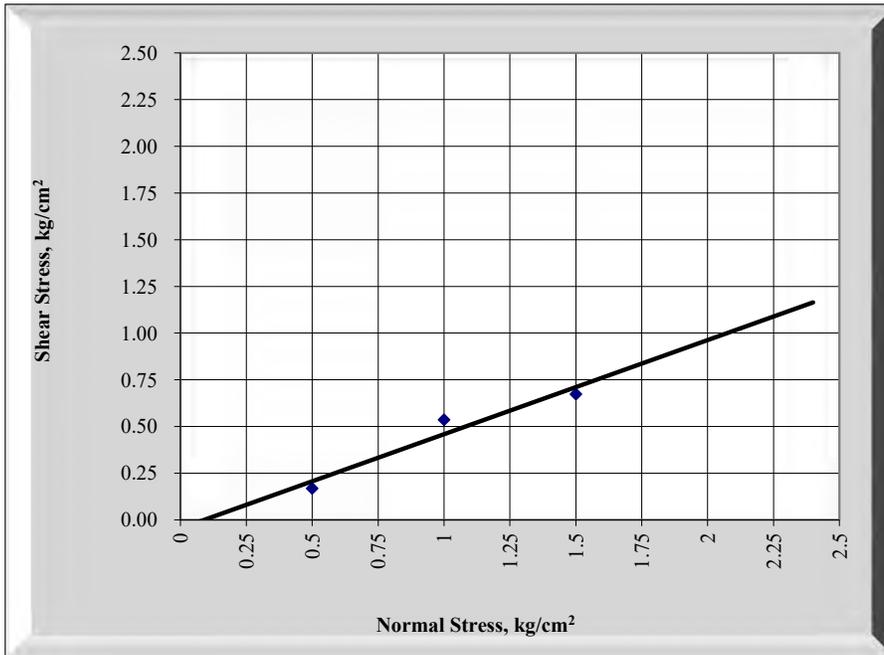
Sanjujain Geotech Firm Pvt. Ltd.

Direct Shear Test Results

Project : Development of the Agricultural Value Chain Infrastructures
 Location : Butwal Sub metropolitan, Ward no 15, Rupandehi Bina Shrestha (Lab. Technician)
 Hole No. : BH - 3 Checked by : Rajshree Shrestha, Geotech
 Sample : DS Verified by : S. K. Jain
 Depth, m : 4.5 : (M. E.Civil, Geotechnical Engg. USA.)

| SDT | cm | Test No. 1 | | Test No. 2 | | Test No. 3 | | Remarks |
|------|----|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|---------|
| | | Normal Stress | | Normal Stress | | Normal Stress | | |
| | | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | |
| | | 0.50 kg/cm ² | | 1.00 kg/cm ² | | 1.50 kg/cm ² | | |
| 0 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 0.05 | | 8.80 | 0.09 | 16.00 | 0.16 | 27.20 | 0.27 | |
| 0.1 | | 11.20 | 0.11 | 27.20 | 0.27 | 38.40 | 0.38 | |
| 0.2 | | 14.40 | 0.14 | 38.40 | 0.38 | 50.40 | 0.50 | |
| 0.3 | | 15.20 | 0.15 | 46.40 | 0.46 | 60.00 | 0.60 | |
| 0.4 | | 16.80 | 0.17 | 53.60 | 0.54 | 67.20 | 0.67 | |
| 0.5 | | | | | | | | |
| 0.6 | | | | | | | | |
| 0.7 | | | | | | | | |
| 0.8 | | | | | | | | |
| 0.9 | | | | | | | | |
| 1.0 | | | | | | | | |
| 1.1 | | | | | | | | |
| 1.2 | | | | | | | | |
| 1.3 | | | | | | | | |

Shear Diagram



Shear Parameters

ϕ , degree : 26.75
 C, Kpa : 4.53

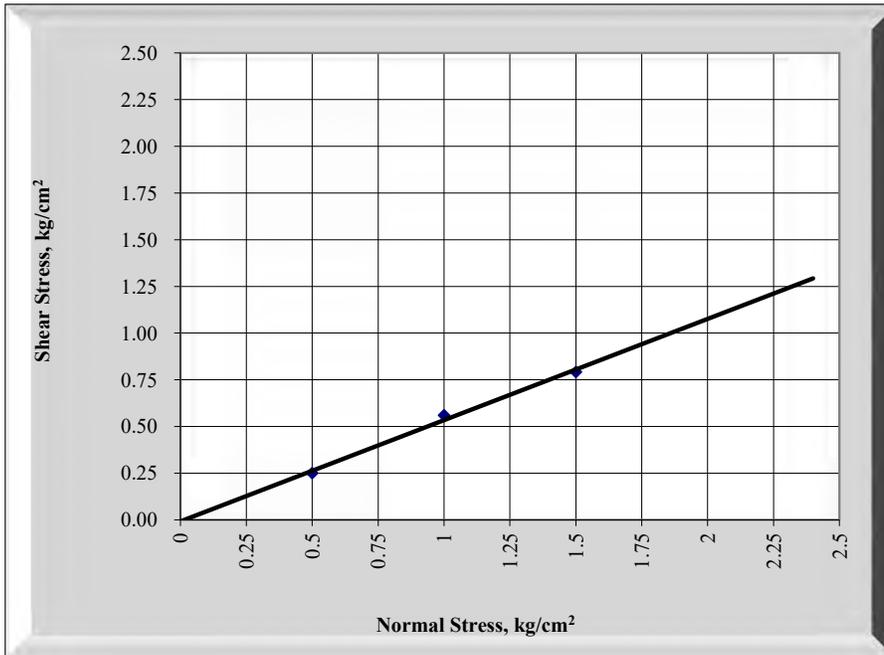
Sanjujain Geotech Firm Pvt. Ltd.

Direct Shear Test Results

Project : Development of the Agricultural Value Chain Infrastructures
 Location : Butwal Sub metropolitan, Ward no 15, Rupandehi Bina Shrestha (Lab. Technician)
 Hole No. : BH - 4 Checked by : Rajshree Shrestha, Geotech
 Sample : DS Verified by : **S. K. Jain**
 Depth, m : 6.0 : (M. E.Civil, Geotechnical Engg. USA.)

| SDT | cm | Test No. 1 | | Test No. 2 | | Test No. 3 | | Remarks |
|------|----|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|---------|
| | | Normal Stress | | Normal Stress | | Normal Stress | | |
| | | 0.50 kg/cm ² | | 1.00 kg/cm ² | | 1.50 kg/cm ² | | |
| | | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | PRDRg | SST kg/cm ² | |
| 0 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 0.05 | | 11.20 | 0.11 | 24.80 | 0.25 | 36.00 | 0.36 | |
| 0.1 | | 15.20 | 0.15 | 31.20 | 0.31 | 43.20 | 0.43 | |
| 0.2 | | 17.60 | 0.18 | 45.60 | 0.46 | 56.80 | 0.57 | |
| 0.3 | | 23.20 | 0.23 | 50.40 | 0.50 | 71.20 | 0.71 | |
| 0.4 | | 25.00 | 0.25 | 56.00 | 0.56 | 79.20 | 0.79 | |
| 0.5 | | | | | | | | |
| 0.6 | | | | | | | | |
| 0.7 | | | | | | | | |
| 0.8 | | | | | | | | |
| 0.9 | | | | | | | | |
| 1.0 | | | | | | | | |
| 1.1 | | | | | | | | |
| 1.2 | | | | | | | | |
| 1.3 | | | | | | | | |

Shear Diagram



Shear Parameters

ϕ , degree : 28.46

C, Kpa : 0.8



LEGEND

| S.No. | DESCRIPTION | SIZE | Numbers |
|-------|---|----------------|---------|
| 1 | MAIN GATE | 17000 | 1 |
| 2 | SECURITY OFFICE/GUARD ROOM | 4000 X 5000 | 2 |
| 3 | TEMPLE | 5000 X 5000 | 1 |
| 4 | WEIGHING SCALE | 16000 X 3600 | 2 |
| 5 | PARKING | 5000 X8000 | 4 |
| 6 | GENERATOR HOUSE | 20000 X 25000 | 1 |
| 7 | INCOMING GODDOWN | 12000 X 25000 | 1 |
| 8 | WASHING/SORTING AREA | 39000 X 25000 | 1 |
| 9 | OUTGOING GODDOWN | 50000 X 25000 | 1 |
| 10 | ADMINISTRATIVE BLOCK | 148000 X 65000 | 1 |
| 11 | ONION AND CABBAGE STORE / POTATO STORAGE AND PROCESSING | 7500 X 7500 | 4 |
| 12 | TOILET | 80000 X 16000 | 10 |
| 13 | WHOLESALE SHUTTER | 25000 X 17000 | 2 |
| 14 | GUEST HOUSE | 25000 X 15000 | 1 |
| 15 | MULTI PURPOSE GODDOWN | 12000 X 15000 | 1 |
| 16 | AUCTION CENTER | | |
| 17 | SECONDARY GATE EXIT | | |

| S.No. | DESCRIPTION | SIZE | Numbers |
|-------|--|---------------|---------|
| 18 | STORAGE | 32000 X 15000 | 2 |
| 19 | CENTRAL WASTE COLLECTION CENTRE | | |
| 22 | BANANA STORAGE AND PROCESSING | 85000 X 27000 | 1 |
| 23 | CANTEEN | 25000 X 15000 | 2 |
| 24 | BUS STOP | | 1 |
| 25 | AGROVETS | 20000 X 15000 | 1 |
| 26 | BID COMPOSTING | 10000 X 10000 | 1 |
| 27 | SOLID WASTE DISPOSAL SYSTEM | 20000 X 10000 | 1 |
| 28 | BANK | 20000 X 12000 | 1 |
| 29 | ELECTRONIC SIGNAGE BOARD | 4000 X 5000 | 2 |
| 30 | LANDSCAPING | | |
| 31 | WATER SUPPLY SYSTEM WITH OVERHEAD WATER TANK | 25000 X 30000 | 1 |
| 33 | GENERAL WORKSHOP | 20000 X 10000 | 1 |
| 34 | CARPENTRY WORKSHOP | 20000 X 10000 | 1 |
| 35 | SMALL MARKET STALLS AREA | | |
| 36 | SUPER MARKET | | |
| 37 | PARKING FOR DELIVERIES | | |

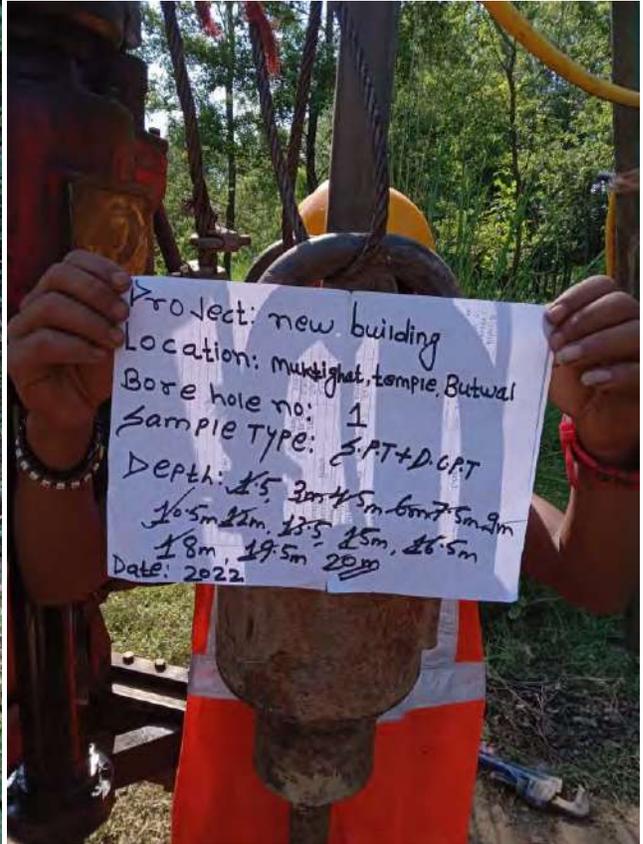
- Collection Centre
- Wholesale area
- General Facilities
- Guest house area
- Area reserved for small public farmers market and grocery
- Boundary from "GPS points of Ratanpur community forest user groups" (- assumed to be in meters not degrees)
- Boundary from PDF "proposed Agricultural Market Site Map Buiwal Sub-metropolitan"
- Road Buffer 2
- Truck Traffic
- Pedestrian Traffic



| | | | |
|---|--------------|-------|----------------|
| Invest International | Project Name | Scale | 1:1200 |
| Feasibility Study for Development of the Agricultural Value Chain Infrastructure, Nepal | Project No. | Scale | BH4289-100-100 |
| Agriculture Market at Semlar Buiwal (Rupandehi) | Scale | Scale | 060 : 001 |
| North Plot Master Plan Layout Design | Scale | Scale | 001 : 001 |

Royal HaskoningDHV
Infrastructure Sector Expert

Work in progress



Work in progress



Project: new building
Location: Masigang Amre Babuel
Bore hole no: 02
SAMPLE TYPE: 2774607
Depth: 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Date: 2023



Work in progress



Work in progress



13. Results of vegetation survey and vegetation loss

| Local name | Scientific Name | No. of trees | DBH (Average) cm | Height (Average) M | Volume (cub m) | Biomass(kg) Vol*Density |
|-----------------|-------------------------|--------------|------------------|--------------------|----------------|-------------------------|
| Bakaino(Plot 1) | <i>Melia azedarach</i> | 1 | 21 | 12 | 0.415422 | 319.87494 |
| Sisoo | <i>Dalbergia sissoo</i> | 44 | 21 | 15 | 22.84821 | 17593.1217 |
| Simal | <i>Bombax Ceiba</i> | 4 | 30 | 17 | 4.8042 | 3699.234 |
| Sisoo | <i>Dalbergia sissoo</i> | 48 | 20 | 16 | 24.1152 | 18568.704 |
| Unidentified | | 1 | 60 | 13 | 3.6738 | 2828.826 |
| Sisoo | <i>Dalbergia sissoo</i> | 6 | 20 | 15 | 2.826 | 2176.02 |
| Unidentified | | 1 | 25 | 14 | 0.686875 | 528.89375 |
| Sisoo | <i>Dalbergia sissoo</i> | 16 | 12.5 | 13 | 2.55125 | 1964.4625 |
| Teak (Plot 2) | <i>Tectona grandis</i> | 80 | 12 | 10 | 9.0432 | 6963.264 |
| Bakaino | <i>Melia azedarach</i> | 3 | 15 | 12 | 0.63585 | 489.6045 |
| Sisoo | <i>Dalbergia sissoo</i> | 40 | 12.5 | 12 | 5.8875 | 4533.375 |
| Sisoo | <i>Dalbergia sissoo</i> | 2 | 12.5 | 12 | 0.294375 | 226.66875 |
| Teak | <i>Tectona grandis</i> | 8 | 12.5 | 12 | 1.1775 | 906.675 |
| Bakaino | <i>Melia azedarach</i> | 1 | 15 | 12 | 0.21195 | 163.2015 |
| Sisoo | <i>Dalbergia sissoo</i> | 10 | 12.5 | 12 | 1.471875 | 1133.34375 |
| Teak | <i>Tectona grandis</i> | 7 | 15 | 13 | 1.6072875 | 1237.611375 |
| Teak | <i>Tectona grandis</i> | 15 | 15 | 13 | 3.4441875 | 2652.024375 |
| Sisoo | <i>Dalbergia sissoo</i> | 30 | 15 | 13 | 6.888375 | 5304.04875 |
| Sisoo | <i>Dalbergia sissoo</i> | 27 | 15 | 13 | 6.1995375 | 4773.643875 |
| Teak | <i>Tectona grandis</i> | 11 | 15 | 13 | 2.5257375 | 1944.817875 |
| Teak | <i>Tectona grandis</i> | 4 | 15 | 12 | 0.8478 | 652.806 |
| Sisoo | <i>Dalbergia sissoo</i> | 12 | 15 | 13 | 2.75535 | 2121.6195 |
| Unidentified | | 2 | 12 | 11 | 0.248688 | 191.48976 |
| Sisoo | <i>Dalbergia sissoo</i> | 25 | 15 | 13 | 5.7403125 | 4420.040625 |
| Teak | <i>Tectona grandis</i> | 3 | 15 | 12 | 0.63585 | 489.6045 |
| Sisoo | <i>Dalbergia sissoo</i> | 25 | 15 | 13 | 5.7403125 | 4420.040625 |
| Sisoo | <i>Dalbergia sissoo</i> | 33 | 15 | 13 | 7.5772125 | 5834.453625 |
| Sisoo | <i>Dalbergia sissoo</i> | 30 | 15 | 13 | 6.888375 | 5304.04875 |
| Unidentified | | 1 | 15 | 13 | 0.2296125 | 176.801625 |
| Sisoo | <i>Dalbergia sissoo</i> | 43 | 15 | 13 | 9.8733375 | 7602.469875 |

| Local name | Scientific Name | No. of trees | DBH (Average) cm | Height (Average) M | Volume (cub m) | Biomass(kg) Vol*Density |
|--------------|-------------------------|--------------|------------------|--------------------|----------------|-------------------------|
| Sisoo | <i>Dalbergia sissoo</i> | 9 | 15 | 13 | 2.0665125 | 1591.214625 |
| Sisoo | <i>Dalbergia sissoo</i> | 18 | 15 | 13 | 4.133025 | 3182.42925 |
| Sisoo | <i>Dalbergia sissoo</i> | 14 | 15 | 13 | 3.214575 | 2475.22275 |
| Sisoo | <i>Dalbergia sissoo</i> | 14 | 15 | 13 | 3.214575 | 2475.22275 |
| Sisoo | <i>Dalbergia sissoo</i> | 12 | 15 | 13 | 2.75535 | 2121.6195 |
| Sisoo | <i>Dalbergia sissoo</i> | 40 | 15 | 13 | 9.1845 | 7072.065 |
| Sisoo | <i>Dalbergia sissoo</i> | 21 | 15 | 13 | 4.8218625 | 3712.834125 |
| Simal | <i>Bombax Ceiba</i> | 1 | 30 | 18 | 1.2717 | 979.209 |
| Teak | <i>Tectona grandis</i> | 13 | 15 | 13 | 2.9849625 | 2298.421125 |
| Simal | <i>Bombax Ceiba</i> | 2 | 20 | 15 | 0.942 | 725.34 |
| Sisoo | <i>Dalbergia sissoo</i> | 13 | 15 | 13 | 2.9849625 | 2298.421125 |
| Teak | <i>Tectona grandis</i> | 1 | 15 | 13 | 0.2296125 | 176.801625 |
| Simal | <i>Bombax Ceiba</i> | 1 | 20 | 15 | 0.471 | 362.67 |
| Sisoo | <i>Dalbergia sissoo</i> | 10 | 15 | 13 | 2.296125 | 1768.01625 |
| Total | | 702 | | | | 140460.2777 |

14. Results of the Household Survey

The method employed for the social sample household survey (held over the period 12th to 18th October 2022, involved the target area of a 1 km radius from the proposed project site. Four community settlements fall in 1 km radius, those being, Ratanapur, and Muktidham of Ward no. 15 of Butwal Sub-Metropolitan City, and Ekata, and Buddha Tole of Sainamain Municipality, Ward no.1 The number of households within this range are estimated at 254 households. A 20% random sample was achieved for the survey. The sample targeted to include households that are located in the direct vicinity of the proposed site. These are referred as project affected families (PAF). Technically these are PAF, but there will not be subject to direct impact, mainly indirect impact from construction and operation of the market. The results of the survey are included in this section.

Population distribution of the surveyed households

A total of 50 households were surveyed in the proposed site. There are 203 people in the observed households. Of the total population 103 are males and 98 are females. Of the total respondents 27 were male and 23 are female. Unlike the national statistics, the male population (105) is slightly higher than the female population (98), with the average household size¹ being 4.06. The household size is higher in the surveyed population than the average household size of Butwal Sub-Metropolitan City (3.81) and lower than National level average household size (4.9) (CBS, 2021).

The Table 1 presents the population distribution of the sample households. The highest household size is seen among the Thakuri and Dalit (4.66) and lowest household size is among the Magar (3.6). However, average household size of sample households is higher than average household size of Butwal Sub-metropolitan city (3.81). The Chhetri households consisted the majority of the randomly sampled households (46%), with the Brahmin following at 11%, and other ethnicities presented as much smaller sampled populations. It can be speculated that the Chhetri make up the proportionately larger population within the four community settlements that fall into the 1 kilometre radius, those being, Ratanapur, and Muktidham of Ward no. 15 of Butwal Sub-Metropolitan City, and Ekata, and Buddha Tole of Sainamain Municipality, Ward no.1.

Table 1: Household population and average household size by caste/ethnicity

| Caste ethnicity | Total HH | M | F | Total population | Average HH size |
|-----------------|----------|-------------|------------|------------------|-----------------|
| Chhetri | 23 | 50 | 48 | 98 | 4.26 |
| Brahmin | 11 | 21 | 20 | 41 | 3.72 |
| Magar | 10 | 18 | 18 | 36 | 3.6 |
| Thakuri | 3 | 8 | 6 | 14 | 4.66 |
| Dalit | 3 | 8 | 6 | 14 | 4.66 |
| Total | 50 | 105(51.72%) | 98(48.27%) | 203 | 4.06 |

Source: TMS Field Survey, October 2022

Table 2 shows the population by sample wards. More than 75 percent of the population are in Ward No. 15 of BSMC and nearly 25 percent are in Ward No. 1 Sainamaina Municipality. In BSMC Ward No.15 male population is higher than female population while number of male and female is the same in ward no. 1 of Sainamaina.

¹ Household size is calculated by dividing the nr of households surveyed, by the total population size for that number of households

Table 2: Household Population by Wards

| Municipalities/Wards | HHs | Male | Female | Total | % |
|----------------------|-----|------|--------|-------|-------|
| BSMC, Ward -15 | 40 | 80 | 73 | 153 | 75.37 |
| Sainamaina Ward-1 | 10 | 25 | 25 | 50 | 24.63 |
| Total | 50 | 105 | 98 | 203 | 100 |

Source: TMS Field Survey, October 2022

Age group of the population

The Table 3 presents the age group of the sample population. The sample survey was carried out in four settlements, Buddha Tol and Ekata Tol from ward no 1. Sainamaina Municipality, and Muktidham Tol and Ratanpur Tol from ward No 15 of Butwal Sub-Metropolitan City, of the project area.

There are a total of 203 people within the 50 households surveyed, with a split of 105 males, and 98 females. The age group of the population has been divided into four broad categories. Statistics show that it is the economically active population (aged 15-59) that is the largest (71.93%) within the surveyed population. The elderly population (over 60 years of age) is 10.3%.

Table 3: Population distribution by age group

| Age group | Male | Female | Total | % |
|--------------------|------|--------|-------|-------|
| Less than 5 years | 5 | 4 | 9 | 4.43 |
| 5-14 years | 14 | 13 | 27 | 13.30 |
| 15-59 years | 75 | 71 | 146 | 71.93 |
| More than 60 years | 11 | 10 | 21 | 10.34 |
| Total | 105 | 98 | 203 | 100 |

Source: TMS Field Survey, October 2022

Marital Status

In the project area, the married population is higher than the unmarried population (Table 4). Single women headed households is less common than single male headed households. The population of widows and widowers is 6%. The legal age for marriage is 20 years in Nepal. In this survey, nearly 29 percent were unmarried and were below 20 years age. UNICEF defines child marriage as marriage of a girl before age 18.2. Whereas before the legal age of marriage in Nepal was 18 years for girls, a recent law forbids girls to get married before the age of 20 (Civil Code Nepal 2017). There is no report of child marriage in the project area.

2 <https://data.unicef.org/topic/child-protection/child-marriage/>.

Table 4: Marital status of the sample households

| Marital Status | Nos | % |
|----------------|-----|-------|
| Married | 124 | 61.08 |
| Unmarried | 62 | 30.54 |
| Widow | 12 | 5.91 |
| Single Woman | 1 | 0.5 |
| Single Man | 4 | 1.97 |
| Total | 203 | 100 |

Source: TMS Field Survey, October 2022

Literacy rate in the study area

The definition of the literacy used in the sample survey was whether s/he could read and write in Nepali language. The literacy rate of the project area is 91.75%. In the project area, the male and female literacy rate is 98% and 89%, respectively. Like other places in the country, literacy amongst females is lower than the literacy level amongst males in the project area.

The literacy rate was calculated by assessing those five years of age and older. There were only 9 children below the five year age group. There is some disparity between male and female literacy. This survey found that the overall literacy was 97% for males and 86% for females (See Table 5). The literacy of the 15-59 age group population is nearly cent percent. The project area is a semi-urban area and educational institutions are available in a walking distance. Therefore, the literacy rate is higher than the national level (67.9%)³.

Table 5: Literacy Rate of the Sample Households

| Gender | Literate | Illiterate | Total |
|------------|----------|------------|--------------|
| Male | 97 | 3 | 100 (97%) |
| Female | 81 | 13 | 94 (86%) |
| Total | 178 | 16 | 194 |
| Percentage | 91.75 | 8.25 | 100.0 |

Source: TMS Field Survey, October 2022

Gender Divisions at Household Level

This section presents the gender situation in the project area in terms of division of labor in agriculture, household activities, main earners in the family, decision-making responsibilities, and ownership of household assets. The gender related questions were posed to male and female household members, separately. Of the total surveyed households 55 percent male and 45 percent female were asked questions on the gender attitude and practices in the project area.

³ The literacy rate of people who are 15 years and older in Nepal is 67.9 percent which is higher in the young population of 15 to 24 years. People aged 65 or older have and literacy rate of 23.6 percent only.

Table 6: Male/Female respondents by wards

| Wards | Male | Female | Total |
|---------------------------|------|--------|-------|
| 15 BSMC | 22 | 18 | 40 |
| 1 Sainamaina Municipality | 5 | 5 | 10 |
| Total | 27 | 23 | 50 |
| % | 55 | 45 | 100 |

Source: TMS Field Survey, 2022

Of the total sampled households, there was only one female headed household in the project area. Gender related social norms and behaviour in Nepali society varies widely between the diverse groups in the high mountains, the hills, and plains of Tarai (Gurung et al., 2020). In addition, roles vary for women who follow Hindu, Buddhist, Animist, or Islamic traditions. This section examines the gender division in household level and agricultural activities.

In Nepal, the gender division of labour is highly skewed, especially when agricultural, pastoral and wage labour is combined with household, community and casual labour, and when high rates of men's out-migration to urban cities, towns and cross-border destinations in the region and beyond, are considered (ICIMOD, 2011).

Gender activities in the agricultural sector have been presented in Table 7. Paddy is the main cereal crop of the project area. The households are busy with paddy plantation in late spring and early monsoon seasons. Early winter or late monsoon is a season of harvesting of the paddy. This study has assessed the gender roles in agriculture breaking down the activities. This study examines the gender roles in land preparation, manuring, seed distribution, plantation/weeding, irrigation, harvesting, transportation, cleaning/processing, storing, and marketing under the activities.

Looking at Table 7, both males and females contribute to agriculture-related activities in all seasons of the year. This survey also saw the seasonal variation of gender activities because the monsoon season is a busy season compared to other seasons. The women's work burden also increased in this season due to the planting of paddy crops. However, the workload that women are having to carry appears quantifiably more so than that of the workload of men. According to a female key informant, men helped significantly in the time of paddy plantation (spring/monsoon) and its harvest (Monsoon/Winter), but not much assistance came from men during other periods of the cultivation cycle.

Table 7: Participation in household level agricultural activities by gender

| Activity | Spring | | | Monsoon | | | Winter | | |
|---------------------|--------|----|------|---------|---|------|--------|----|------|
| | M | F | Both | M | F | Both | M | F | Both |
| Land preparation | 2 | 9 | 19 | | 5 | 19 | 1 | 7 | 21 |
| Manuring | 2 | 12 | 15 | | 7 | 12 | | 12 | 16 |
| Seed distribution | 2 | 7 | 14 | 1 | 3 | 11 | 2 | 6 | 12 |
| Plantation/ weeding | 3 | 5 | 15 | 1 | 1 | 11 | | 5 | 15 |
| Irrigation | 8 | 3 | 10 | 4 | 3 | 9 | 4 | 4 | 9 |
| Harvesting | 2 | 5 | 21 | | 2 | 15 | 1 | 5 | 21 |

| Activity | Spring | | | Monsoon | | | Winter | | |
|---------------------|--------|---|------|---------|---|------|--------|---|------|
| | M | F | Both | M | F | Both | M | F | Both |
| Transportation | 11 | | 1 | 10 | | 1 | 10 | | 1 |
| Cleaning/processing | 2 | 4 | 15 | | 2 | 12 | | 3 | 16 |
| Storing | 3 | 8 | 17 | | 2 | 13 | 1 | 7 | 19 |
| Marketing | 5 | 3 | 11 | 1 | | 9 | | 3 | 11 |

Source: TMS Field Survey, October 2022

According to the field survey results, both male and female roles are more or less equal when it comes to participation in agricultural activities in the project area.

To find out the work divisions in the project area both male and female respondents were interviewed (27 male and 23 female). In most of the cases husbands or wives were the respondents. The husbands and wives often had similar ideas about the activities at household level. The sample survey asked some pertinent questions related to household activities and asked the respondents to rank the activities by low, equal and high participation by gender. To examine the male and female activities in the households – a categorization of “low, equal and high” scores are used by respondents. Low denotes less than fifty percent of work sharing, equal means both do the work in an equal manner and high means one does more work compared to another.

Table 8: Participation in household activities by gender

| Activity | Male | | | | Female | | | |
|------------------------------------|------|-------|------|----|--------|-------|------|----|
| | Low | Equal | High | Nr | Low | Equal | High | Nr |
| Water fetching/collecting firewood | 4 | 11 | 2 | 4 | | 11 | 5 | 3 |
| Carrying fodder | | 15 | 2 | 5 | | 16 | 11 | 3 |
| Grinding grain | | 16 | 4 | 4 | | 19 | 21 | |
| Washing cloths | | 2 | 1 | 6 | | 9 | 37 | 1 |
| Cooking and cleaning | 1 | 2 | 1 | 6 | | 10 | 38 | 1 |
| Child care | 5 | 2 | 1 | 7 | | 10 | 26 | 6 |
| Care of the elders | 2 | | | 2 | | 3 | 10 | 6 |
| Purchasing goods and commodities | 13 | 4 | 9 | 1 | | 5 | 6 | 4 |

Source: TMS Field Survey, October 2022

Main Earners in the Family

The percentage of male earners is higher than females. According to the household survey, 72% of male heads and 20% of female heads were main earners in the surveyed households. Six percent of sons were the main earners in the households.

The field survey shows that 82% of family members are currently earning an income through service, trade, and other types of jobs (See Table 8).

The survey asked the questions about the main earners of the households. Main earners means person whose income is significant for the households income. Of the total households, 72 percent were male heads as the main income earners while 20 percent of female heads were income earners. Sons in the households were the main income earners of six percent of surveyed households (See Table 8).

Table 9: Main earners in Households

| Earners | N | % |
|-------------|----|------|
| Male head | 36 | 72.0 |
| Female head | 10 | 20.0 |
| Son | 3 | 6.0 |
| Others | 1 | 2.0 |
| Total | 50 | |

Source: TMS Field Survey, 2022.

Decision-making responsibilities in the households

This sub-section focuses on the household's male and female members capacity to make decisions in agricultural activities, sale of agricultural products, sale of land and house, borrowing of credit, education of children, ritual ceremonies, family planning, participation in religious and community works. The survey data shows that there is equality between males and females regarding the given decision-making responsibilities at the household level. The Table 10 shows the household decision making responsibilities of both males and females. Looking at the responses of the male and female respondents, decisions are made consensually.

Table 10: Household Decision-making responsibilities between the gender

| Decision-making responsibilities | Male | | Female | |
|--|-------|------|--------|------|
| | Equal | High | Equal | High |
| Agriculture activities | 25 | 2 | 23 | 5 |
| Sale of agriculture product | 19 | 3 | 19 | 4 |
| Sale of land/house | 23 | 5 | 21 | 2 |
| Borrowing of credit | 21 | 6 | 21 | 2 |
| Education of children | 19 | 8 | 19 | 4 |
| Ritual ceremonies | 15 | 7 | 15 | 3 |
| Family planning | 10 | 3 | 10 | 1 |
| Participation in religious and community works | 22 | 5 | 19 | 4 |

Source: TMS Field Survey, October 2022

The survey also asked questions relating to the ownership of some selected assets. The table below shows the assets ownership between men and women. Respondents had relatively egalitarian attitude towards gender economic roles. Nepalese law also allows for joint ownership of land and residence between spouses. Both husband and wife have equal right over the property where jointly owned. Women have exclusive right over the property given to her by her parents (pewa). However, income earn from service, wage labor and agriculture including livestock are equally enjoyed by both male and female.

Table 11: Ownership of the assets by gender

| Property | Male | | Female | |
|--------------|-------|------|--------|------|
| | Equal | High | Equal | High |
| Land | 13 | 23 | 13 | 12 |
| House | 12 | 22 | 12 | 12 |
| Cash | 33 | 10 | 33 | 4 |
| Livestock | 17 | 1 | 17 | 5 |
| Bank account | 43 | 4 | 43 | 1 |
| Ornaments | 21 | 2 | 21 | 20 |
| Others | | 1 | | 2 |

Source: TMS Field Survey, October 2022

Use and Dependence on the Community Forest

Planting of trees in Ratanpur community forest began in 1985 to protect the land from squatters and floods. In 2000, according to the Chairman of the community forest, the district forest office handed over the forest to the community for its management and consumption. The survey households of the project area are the members of Ratanpur community forest. However, the households of Sainamaina Ward No. 1 are not the members of Ratanpur community forest. According to the Chairman of the community forest, the members of the community forest are exclusively from Ratanpur and Muktidham settlements, later extending the membership to the nearby settlements of the project area.

As stated in the FGD, total user members of the Community Forest User Group (CFUG) is 400, with an 11 member Executive Committee. The Executive Committee is elected by the general assembly of the CFUG. A 33 percent female member representation in the Executive Committee is mandatory according to the constitution of CFUG.

User households collect firewood, fodder and animal bedding from the community forest. The community forest is opened once a year for firewood collection, but households are allowed to collect animal fodder occasionally. A key informant says, "Firewood is equally distributed among the households". According to the participants of the FGDs, they do not use firewood for cooking and lighting purposes. As stated in the FGD meeting, they use firewood to prepare the animal fodder (Khole). Some households store the firewood obtained from the annual collection, which in turn is used for the cremation of deceased people in the Danab River.

The members of Ratanpur community forest are also members of another community forest which is located in Ward No. 12 of BSMC which is two kilometres far away from the settlement of Ward No 15. If they need timber, they rely on the other community forest in Ward No. 12.

This survey asked questions regarding forest consumption and reliance on community forest in the project area. All of the sampled households in the project area were members of the community forest. However, ten households of Sainamaina, Ward No. 1 were not the members of Ratanpur community forest but they are the members of the community forest which is out of the project area, in Ward Nr 12. See Table 12 for an understanding of overall community forest use.

Table 12: Number of households who are the members of the community forest

| Type of forest | No of HHs | % |
|-------------------|-----------|-----|
| Community forest | 50 | 100 |
| Leasehold forest | | 0 |
| Religious forest | | 0 |
| Government forest | | 0 |
| Private forest | | 0 |
| Total | 50 | 100 |

Source: TMS Field Survey, October 2022.

Consumption of forest products

As mentioned above, households collect firewood and fodder from the Ratanpur community forest. Of the total sampled households, 40 percent of the households collect firewood and 16 percent collect fodder from the community forest. None of the households are dependent on Ratanpur community forest for timber.

Table 13 shows that average firewood collection per household is 440.5 kg per annum. If we look the national average of firewood consumption, the per capita household firewood consumption amongst the surveyed households, appears low. Nepal's mean annual consumption 3060 kg per household⁴.

Similarly, fodder consumption of the project area is 130 kg per annum. This indicates that the sample households occasionally collect fodder from community forest as supplementary fodder.

Table 13: Type and amount of the forest products collected by the sample households

| Forest product | | | Quantity (kg) | | Source | | |
|---------------------|-----|------|---------------|-------------|-------------------|------------------|----------------|
| | HHs | % | Total | Average hhs | Government forest | Community Forest | Private forest |
| Timber (Cu.ft) | | | | | | | |
| Firewood (kg/bhari) | 20 | 40.0 | 8810 | 440.5 | 0 | 20 | 0 |
| Fodder (Kg/bhari) | 8 | 16.0 | 1040 | 130 | 0 | 8 | 0 |

Source: TMS Field Survey October 2022.

4 <http://lib.icimod.org/record/31877>

Public Infrastructure

All settlements in the project area are connected by road. Motorcycles, bicycles, cars, and buses are major means of transportation. Trucks, vans, and tractors are used for the transportation of the goods. The east-west highway is 500 meters away from the project area. As observed during the field visit, most of the households either have bicycles or motorcycles as a means of transportation.

Electricity is the main source of light. All houses are electrified. LPG gas is used for cooking purposes. Firewood which is collected from community forests is sometimes used for the preparation of animal fodder. They also use firewood, and wood log for the cremation of the dead.

There are some religious sites in the project area. The major religious areas are Durga Mandir, Bagiya Tole, Durga Mandir, Tallo Chamkipur, Shiva Mandir, Church, 108 Bar-Pipal Bagaichha (BSMP, 2019). Shiva temple is located in the border of the Ratanpur community forest where devotees of the local area visit regularly.

There are many public institutions that provide services to the community. Ward offices, education institutions, health institutions are found within the settlements. Water supply (provided via the Municipality), electricity (provided by National electricity), irrigation (farmer managed irrigation system), and road transportation management (provided by municipality) are the major public institutions in the project area. This section below describes the status of the major institutions in the project area.

Table 14: Available public institution in the project area (Ward No. 15)

| Available institutions | No | Remarks |
|------------------------------|----|---|
| Religious and sacred place | 5 | Temple, church and other sacred places |
| Health post | 1 | |
| Pharmacy | 2 | |
| Ward Office | 1 | Office of the ward No 15 located in the centre of the ward |
| Electricity | 1 | All houses are connected to the national grid system |
| Government schools | 3 | From pre-primary to 10+2 class |
| Private Schools | 3 | From Nursery to 10+2 level |
| Telecommunication | 1 | Nepal telecommunication has provided the services |
| Water Supply | 1 | All households are connected with water tap. Water supply and sanitation system is managed by the community |
| Agriculture cooperative | 1 | Farmers groups sell commodity in the cooperative |
| Mothers' group | 1 | |
| Commercial Bank | 1 | |
| Vocational/technical schools | 2 | |

Source: TMS Field Survey, October 2022

Health Institutions

In the project area, there are health posts and medical halls. For taking the hospital service they have to go Butwal Bazar which is 10 km far away from the project area which takes 20 to 30 minutes to reach Butwal Bazar by vehicles. The people go to district and zonal government hospitals, and private nursing homes for better treatment. The health post provides general services, and vaccination campaigns annually in the project area.

This section describes the available health facilities including their quality and affordability. Similarly, the type of diseases and mode of treatment is also described in this section. The survey data shows that there are various health facilities available, such as a hospital, primary health care centres, health posts, and pharmacies, all within less than a fifteen to twenty minute (walking) distance from all settlements in the project area.

The majority of the respondents ranked the quality of the health institutions as ‘average’ (See Table 15). Table 15 shows that the majority of respondents ranked the quality of service as ‘average’. Except for pharmacies, other health institutions are regarded as ‘cheap’ for the community, denoting affordability.

Table 15: Number of health institutions, travel time, quality, and affordability

| Type of health facilities | Average Travel time in minutes | | Quality of service (%) | | | Affordability (%) | | |
|----------------------------|--------------------------------|-------------|------------------------|---------|--------|-------------------|---------|-----------|
| | On foot | By vehicles | Not good | Average | V.good | Cheap | average | Expensive |
| Hospital | 16 | 15 | 20 | 60 | 20 | 65 | 20 | 15 |
| Primary health care centre | 14 | 10 | 9 | 82 | 9 | 70 | 20 | 10 |
| Health post | 36 | 10 | 20 | 60 | 20 | 70 | 25 | 5 |
| Pharmacy | 8 | 5 | 20 | 50 | 30 | 12 | 10 | 78 |

Source: TMS Field Survey, October 2022.

Major diseases and illness

Members of 46% of surveyed households fell ill in the last 12 months (up until September 2022). Fever, common cold, pneumonia, diarrhoea, respiratory problem, and others were the major diseases in the surveyed households. Fever is common for all age groups. Most of the diseases occurred in the winter season.

Table 16: Major diseases and Illness in the last 12 months

| Disease | Affected persons/age groups | | Affected persons, gender | | Seasons | | |
|---------------------|-----------------------------|----------|--------------------------|--------|---------|---------|--------|
| | Children | Grown up | Male | Female | Spring | Monsoon | Winter |
| Fever | 13 | 7 | 10 | 10 | 1 | 1 | 19 |
| Common cold | 4 | 1 | 3 | 2 | | | 5 |
| Pneumonia | 2 | | 2 | | | | 2 |
| Diarrhoea | 1 | | 1 | | 1 | | 1 |
| Respiratory problem | 1 | | | 1 | | | 1 |
| Others | | 1 | | 1 | | 1 | |

Source: TMS Field Survey, October 2022

The respondents reported that they have access to different types and levels of health facilities. The district and zonal hospitals are about 10 km away from them, where they can get treatment for most of their health issues. A total of 10 persons were reported to have been hospitalized last year. Of the total patients, 50% were admitted into a private nursing home as well.

Table 17: Type of hospital where patients were admitted

| Type of health institution | HHs | % |
|----------------------------|-----|------|
| District hospital | 2 | 20.0 |
| Zonal hospital | 1 | 10.0 |
| PHC | | 0.0 |
| Central hospital | 1 | 10.0 |
| Private nursing home | 5 | 50.0 |
| Others | 1 | 10.0 |
| Total | 10 | |

Source: TMS Field Survey, October 2022

The respondents have reported their health issues of the previous year during the survey. Almost 50% of them got treatment for fever, whereas cases of appendicitis, general surgery, gastro, paralysis and pneumonia were also reported for the 10% by the respondent.

Table 18: Type of treatment for the patients

| Type of treatment | No | % |
|------------------------|----|-------|
| Appendicitis operation | 1 | 10.0 |
| General Operation | 1 | 10.0 |
| Fever | 5 | 50.0 |
| Gastro | 1 | 10.0 |
| Paralysis | 1 | 10.0 |
| Pneumonia | 1 | 10.0 |
| Total | 10 | 100.0 |

Source: TMS Field Survey, October 2022

Education Institutions

There are different types of educational institutions in the project area such as schools, and technical and vocational schools. Nabarata Higher Secondary is one of the largest governmental schools in the area. Three technical/vocational schools were found to be running privately in the area as well.

Schooling is available from pre-primary level to grade 12. Besides government schools, private boarding schools were also available. Education is free in the government schools, however, students have to pay fees at the private boarding schools, which are relatively expensive for them. The respondents have graded the existing educational institutions based on the quality and affordability in the following table:

Table 19: Respondents' feelings on the quality and affordability of the education institution

| Educational institutions | Quality | | | Affordability | | |
|--------------------------|---------|---------|------|---------------|---------|-----------|
| | Poor | Average | Good | Cheap | Average | Expensive |
| Pre-primary | 2 | 25 | 11 | 17 | 19 | 2 |
| Primary | | 12 | 14 | 18 | 15 | 3 |
| Lower Secondary | 2 | 10 | 28 | 1 | 27 | 11 |
| Secondary | 1 | 13 | 25 | 5 | 13 | 7 |
| Higher Secondary | 1 | 13 | 30 | 15 | 20 | 3 |
| University colleges | 1 | 11 | 2 | 3 | 7 | 4 |
| Technical/vocational | 2 | 12 | 32 | 2 | 35 | 8 |

Source: TMS Field Survey, October 2022

Access to Other Facilities

Access to Government Provided Service and Facilities

Most of the government services (vital registration, revenue collection) are provided from Ward Office. Up to higher secondary education courses are available within the ward. Water supply, electricity, telephone service, and road networks are available in the area. Irrigation facilities are available in some parts of the ward.

Access to Private Service facilities

Co-operatives, banks saving credit associations are providing services to the project area. Recently, the hotel, and restaurants have been established in the bazaar area of the wards. Grocery shops, dairy, and small vegetable shops are also in present in the area.

Surveyed Households' Employment, Subsistence Living and Migration

In this study occupation is classified into five broader categories i.e. agriculture, service, trade/business, labor (both agriculture/non-agriculture) and foreign employment. Agriculture includes cereal crops and cash crop income with the income from animal husbandry. Similarly, service is employment in government, non-government and private sector jobs. Trade/business includes both retailer and wholesale traders including industrial entrepreneurship. Foreign employment means earning of income living outside the country.

The members of the households stated that they engage in multiple jobs to enhance the households' financial position. The Table 20 shows that majority of the working people in the project area are engaged in service (32.74%) and about 31% are involved in agriculture. Similarly, 15.04% in foreign employment and 14.16% is in agriculture and non-agriculture labor. The share of trade/business is 7.08% (Table 20).

Table 20: Occupational distribution of 15 and above age population

| Employment | Nrs. | % |
|---------------------------------------|------|-------|
| Agriculture | 35 | 30.98 |
| Service | 37 | 32.74 |
| Trade/Business | 8 | 7.08 |
| Labor (agriculture / non-agriculture) | 16 | 14.16 |
| Foreign employment | 17 | 15.04 |
| Total | 113 | 100 |

Source: TMS Field Survey, October 2022

Agriculture contributes 27.65 to the national GDP (CBS, 2019) of Nepal and employs about 52% of the total economically active population (MoHP, New Era and ICF 2017). However, Nepal's employment structure, traditionally dominated by agriculture, has been shifting towards non-agricultural types of employment that generally provide a better income (CBS 2011).

Occupational distribution of the sample households has also been presented based on sample wards in Table 21. The figure shows that the population of BSMC Ward 15 rely more on agriculture compared to Sainamaina Ward No1. Similarly, the percentage of the service sector job is higher by 14% in Sainamaina than BSMC. The percentages of trade/business, labor and foreign employment is higher in BSMC than Sainamaina Municipality (See Table 21).

Table 21: Occupational distribution by wards

| Municipality | Settlements | No of households - Occupation | | | | | |
|---------------------------------|---------------|-------------------------------|-------------|----------------|---------------------------------------|--------------------|-----------|
| | | Agriculture | Service | Trade/Business | Labor (agriculture / non-agriculture) | Foreign employment | Total |
| Sainamaina Municipality -1 | Buddha Tol | 1 | 2 | 1 | 0 | 1 | 5 |
| | Ekata Tol | 3 | 6 | 0 | 2 | 2 | 13 |
| | Total | 4 (30.79%) | 8 (44.44) | 1 (5.55%) | 2 (11.11%) | 3 (16.66%) | 18 (100%) |
| Butwal Sub Metropolitan City-15 | Muktidham Tol | 8 | 9 | 1 | 5 | 3 | 26 |
| | Ratanpur tol | 23 | 20 | 6 | 9 | 11 | 69 |
| | Total | 31 (32.63%) | 29 (30.52%) | 7 (7.37) | 14 (14.73%) | 14 (14.73%) | 95 (100%) |
| | Percentage | 31.0 | 32.7 | 7.1 | 14.2 | 15.0 | 100.0 |

Source: TMS Field Survey, October 2022.

The study has also examined the occupational variation by caste/ethnicity in the project area. Percentages in agricultural work as a occupation remain high among the Chhetri (34.29%) compared the other groups (Table 22). Among the five caste/ethnic groups, Chhetri has a higher percentage (37.84%) in service sector job followed by Brahmin (35.13%), Magar (31.29%), Thakuri and Dalit (2.85%) respectively. In trade and business sectors Brahmin, Chhetri and Magar have a higher percentage of involvement. Of the total population, 50% of Magar are engaged in agricultural and non-agricultural labor employment followed by the Chhetri and Dalit.

Table 22: Occupational distribution by caste/Ethnicity

| Caste/ethnicity | Occupation distribution | | | | | |
|-----------------|-------------------------|-------------|----------------|-------------------------------------|--------------------|-------|
| | Agriculture | Service | Trade/business | Labor (agriculture/non-agriculture) | Foreign employment | Total |
| Brahmin | 10 (28.57%) | 13 (35.13%) | 2 (25%) | 2 (12.5%) | 1 (5.88%) | 28 |
| Chhetri | 12 (34.29%) | 13 (37.84%) | 2 (25%) | 3 (18.75%) | 7 (41.17%) | 37 |
| Magar | 11 (31.44%) | 9 (24.33%) | 2 (25%) | 8 (50%) | 7 (41.17%) | 37 |
| Thakuri | 1 (2.85) | 1 (2.70%) | 1 (12.5%) | 0 | 1 (5.88%) | 4 |
| Dalit | 1 (2.85%) | 1 (2.70%) | 1 (12.5%) | 3 (18.75%) | 1 (5.88%) | 7 |
| Total | 35 (100%) | 37 (100%) | 8 (100%) | 16 (100%) | 17 (100%) | 113 |

Source: TMS Field Survey, October 2022.

Livestock and Poultry Farming as a source of income

The surveyed households keep cow, buffalo, goat and chicken for domestic consumption and for sale at the market. They keep both local and improved breed of livestock. Livestock are kept in stall-fed way. Households sell milk (obtained from cows) and butter (made from milk) in the local collection centre. Sixteen households out of the 50 surveyed were involved in the sale of milk products. Livestock rearing and sale is also a source of income. Table 23 presents the type number, and sale price of the livestock in the sample households (over the period of September 2021 to September 2022).

Table 23: Type, number, and sale amount of livestock and poultry

| Type of livestock | Number of Livestock | | | Sales of Livestock | | | Amount | |
|-------------------|---------------------|---------|-------|--------------------|---------|-------|-----------|---------|
| | Local | Improve | Total | Local | Improve | Total | Total | Average |
| Cow | 9 | 2 | 11 | 7 | 2 | 9 | 625,000 | 69,444 |
| Oxen | 0 | 1 | 1 | 0 | 1 | 1 | 200,000 | 200,000 |
| Buffalo | 18 | 7 | 25 | 15 | 7 | 22 | 2,120,000 | 96,364 |
| Goat | 17 | 10 | 27 | 12 | 10 | 22 | 659,000 | 29,955 |
| Poultry | 8 | 76 | 84 | 5 | 75 | 80 | 81,000 | 1,013 |

Source: TMS Field Survey, October 2022

Crop Production as a Source of Income

The project area has both urban and rural characteristics. Some households grow crops for self-consumption and sale at markets while others depend only service sector jobs and business. The crops grown in the project area are paddy, maize, wheat, oil seeds, and pulses. Fruits like banana, mango, litchi, and papaya are planted in the project area. Both winter and summer vegetables and potato are produced including oilseeds. The production (and yield) of crops depends on the nature of the soil, access to irrigation facility, nutrition of soil, types of seed, human investment (involvement) in management, local climatic conditions, etc. The production of vegetables is much higher compared to the production of oilseed.

62% households grow paddy while 78% households cultivate green vegetables on their land. Table 24 shows type of crops, cropping area, production quantity and selling amount in the last 12 months.

Households produce certain commodities for their own consumption, and certain items for sale. But in many cases it is found that only after consumption that the households sell the extra produce (See Table 24).

Table 24: Crop, area, production and sale (Last 12 months)

| Crops | HHs | Area (ha.) | production in Kg | Yield ton/ha. | Sales HHs | Sale Qty (kg) | Sale Amount (Rs) | Price (Rs) |
|-----------|-----|------------|------------------|---------------|-----------|---------------|------------------|------------|
| Paddy | 31 | 8.068 | 12,500 | 3.99 | 9 | 6,650 | 229,500 | 35 |
| Maize | 12 | 1.947 | 1770 | 0.91 | 5 | 1,000 | 62,000 | 62 |
| Wheat | 7 | 1.397 | 2850 | 2.04 | 3 | 900 | 34,000 | 38 |
| Pulses | 9 | 1.287 | 555 | 0.43 | 2 | 80 | 11,500 | 144 |
| Oil crops | 12 | 1.778 | 1500 | 0.84 | 1 | 100 | 14,000 | 140 |

| Crops | HHs | Area (ha.) | production in Kg | Yeild ton/ha. | Sales HHs | Sale Qty (kg) | Sale Amount (Rs) | Price (Rs) |
|---|-----|------------|------------------|---------------|-----------|---------------|------------------|------------|
| Others | 1 | 0.012 | 50 | 4.22 | 0 | - | - | |
| All green vegetables | 39 | 3.192 | 5007 | 1.57 | 5 | 475 | 38,000 | 80 |
| Orange, banana, pear, mango, lemon, guava, litchi, papaya | 4 | 0.052 | 350 | 6.67 | 0 | - | - | |

Source: TMS Field Survey, October 2022

Wheat and maize are also grown in small quantities. Recently, farmers have started vegetable farming on their land. Farmers' groups have grown vegetables collectively taking land on a leasehold basis. They mostly grow potatoes, tomatoes, cabbage, cauliflowers, and other green vegetables. According to the farmers, they received good profits during the time of the Covid-19 pandemic, as most food was sourced locally, as opposed to awaiting foreign imports (as vegetable is generally sourced from India).

Fertilisers, tractors, and seeds are used in farming. Both family labour, and agricultural labour via formal employment are used in agricultural production.

Off-farm Activities

The adult members of the sample households profess different types of activities out of farming activities. Government and private sector services, trade (grocery shops, readymade garments, hotels, and restaurants), and labour migration for wage works are major forms of off-farm activities in the project area.

Migration Patterns

Like other parts of the country, the population of the project area have also migrated to other places for work. It is also true for the sampled HHs. 32% of households had family members migrate for wage labour elsewhere. Among the migrant population, about 44% of the population of the project area migrated to other Districts, and nearly 19% went to India for wage work. Within the surveyed HHs, 25% have migrated to other countries (i.e., Arab, Malaysia, Korea, Japan).

Migration is a common phenomenon across Nepal, which is also evident for the project area. The Table 25 shows the number of migrants' people in the project area. About 16 individuals migrated, of which 43.8% of them migrated to the adjoining districts, 25% to other countries, 18.8% percent in India and 12.5% internally within the Districts during the period of September 2021 to September 2022.

Table 25: Place of migration

| Migrant destination | No | % |
|---------------------|----|-------|
| Within district | 2 | 12.5 |
| Adjoining districts | 0 | 0.0 |
| Other districts | 7 | 43.8 |
| India | 3 | 18.8 |
| Other countries | 4 | 25.0 |
| Total | 16 | 100.0 |

Source: TMS Field Survey, October 2022

Of the total migrant workforce, about 75% were involved in professional works whereas the remaining are working as a general labourer. Most of the workforce migration takes place in the spring season (62.5%), and lower during the summers and winters, as low as 18.75% each.

Table 26: Seasons of labour migration taking place

| Season for Labour Migration | Nos. | % |
|-----------------------------|------|-------|
| Spring | 10 | 62.5 |
| Monsoon | 3 | 18.75 |
| Winter | 3 | 18.75 |
| Total | 16 | 100.0 |

Source: TMS Field Survey, October 2022

The migration is undertaken in different seasons in the project area. Most migrations occur in spring. Spring is considered a dry season when there is less agricultural work in the project area. Therefore, individuals migrate to look for income earning opportunities. If migration took place to India and other places within Nepal, migrants generally return in late spring or the early monsoon season.

Land amongst the Surveyed Households

Land Holding Pattern

Amongst the sampled HHs, 24% do not own agricultural land; these HHs might be owning small pieces of land, which they can not use for cultivation but to build their houses. The average landholding size is 6 katha (ha 0.012 ha), whereas the majority (30%) households have land size of 1 - 6 katha. The table below presents the land holding size of the surveyed HHs (See Table 27).

Table 27: Landholding size of the sample households

| Land type | Land owning HHs | |
|----------------------|-----------------|-------|
| | No | [%] |
| No Agricultural land | 12 | 24.0 |
| Less than 1 Katha | 7 | 14.0 |
| 1 - 5 Katha | 15 | 30.0 |
| 5 -10 Katha | 10 | 20.0 |
| More than 10 Katha | 6 | 12.0 |
| Total | 50 | 100.0 |

Source: TMS Field Survey, October 2022

Land Use Pattern

The land around the project area are categorised into three group:

The first category of land is Khet land (wetland). It may be irrigated or rain-fed suitable for paddy cultivation and vegetable farming.

The second category of land is dry land where irrigation facilities are not available. Such type of land is very small in the project area.

Another type of land is residential land where houses and other structures (cow sheds, outdoor toilets) are built. Most of the households have grown vegetables, and planted fruit trees within their homesteads.

Land Value

The land price of the project area varied based on its location, mainly proximity from settlements, market, road and other facilities. The prices of farmland and residential land are different as well, i.e. use also defined the land value. The land connected by the motorable roads usually have higher prices. As reported in the FGD, the price of land per Katha is in the range of 4-5 million Nepalese rupees. However, local prices vary with land prices as set by the Government.

Household Income and Expenditure

The income and expenditure has been measured based on statistics obtained for a 12 month period. Primary income sources of the locals were agriculture, animal husbandry, trade, service, and wage labour. The income level has been categorised into five groups based on the amount earned in the last twelve months (From September 2021 to September 2022).

The poverty Probability Index (PPI) is a poverty measurement tool used in this study to assess the sample household poverty. This study has assessed the poverty rate based on the household's annual income alone. As the poverty line of \$1.25 is most common for developing countries, this study utilises the \$1.25 poverty line to assess the poverty probability (Gurung et al. 2020). This study does not have information on the work of the breadwinner during the last 7 days, so this information is based on the annual income as reported by the respondents. Looking at the annual income of the households, there is no household in poverty line.

Table 28: Annual Income of the households

| Income Range (Rs) | Nr. | Percentage (%) |
|-------------------|-----|----------------|
| 100,000-300,000 | 6 | 12 |
| 300,000-600,000 | 12 | 24 |
| 600,000-900,000 | 19 | 38 |
| 900,000-1200000 | 8 | 16 |
| Above 1200000 | 5 | 10 |
| Total | 50 | 100 |

Source: TMS Field Survey, October 2022

Most of the household's income is used for purchasing food, and clothes, taking health services, schooling of the children, buying agricultural inputs, travelling, repairing the house, paying back the loan, celebrating festivals, and paying taxes to the government. The expenditure range of the households has been categorised in Table 29, below.

Table 29: Range of expenditure in the sample households

| Expenditure range | Nr. | % |
|-------------------|-----|-----|
| 200000-300000 | 15 | 30 |
| 300000-400000 | 12 | 24 |
| 400000- 500000 | 13 | 26 |
| 500000-600000 | 6 | 12 |
| Above 600000 | 4 | 8 |
| Total | 50 | 100 |

Source: TMS Field Survey, October 2022

There is a small variation among the caste/ethnic groups regarding annual income and expenditure. Table 30 shows that 38 percent of the households are within the middle income range (Rs. 600,000-900,000). Twelve percent of households have an annual income in the range of 100,000-300,000 rupees.

Similarly, the expenditure pattern of the households shows that 30% of the households lie in the expenditure range of 200,000-300,000 rupees per annum (See Table 30).

Table 30: Income and expenditure by caste and ethnicity

| Income Range (RS) | No of Households by caste/ethnicity | | | | | Total |
|-------------------|-------------------------------------|---------|-------|---------|-------|-----------|
| | Brahmin | Chhetri | Magar | Thakuri | Dalit | |
| 100,000-300,000 | 1 | 2 | 2 | 0 | 1 | 6 (12%) |
| 300,000-600,000 | 3 | 5 | 2 | 1 | 1 | 12 (24%) |
| 600,000-900,000 | 5 | 8 | 4 | 1 | 1 | 19 (38%) |
| 900,000-1200000 | 1 | 5 | 1 | 1 | 0 | 8 (16%) |
| Above 1200000 | 1 | 2 | 1 | 0 | 0 | 5 (10%) |
| Total | 11 | 23 | 10 | 3 | 3 | 50 (100%) |
| Expenditure Range | | | | | | |
| 200,000-300,000 | 4 | 5 | 3 | 1 | 2 | 15 (30%) |
| 300,000-400000 | 3 | 4 | 3 | 1 | 1 | 12 (24%) |
| 400,000- 500,000 | 1 | 8 | 3 | 1 | 0 | 13 (26%) |
| 500,000-600,000 | 2 | 4 | 0 | 0 | 0 | 6 (12%) |
| Above 600,000 | 1 | 2 | 1 | 0 | 0 | 4 (8%) |
| Total | 11 | 23 | 10 | 3 | 3 | 50 (100%) |

Source: TMS Field Survey, October 2022

Income expenditure distribution by Ward

Table 31 presents the income expenditure of the sample wards of the project area. According to the figures in the table, low income households are higher in Sainamaina than BSMC. Similarly, middle income households are higher in BSMC compared to Sainamaina. With regards to expenditure, 40% households of BSMC and 20% households of Sainamaina are lying in the middle expenditure categories (See Table 31).

Table 31: Income and expenditure distribution by Ward

| Income | Wards | | Total | % |
|--------------------|------------------|------------------|-----------|------------|
| | Sainamaina-1 | BSCM | | |
| 100,000-300,000 | 2 (20%) | 5 (12.5%) | 7 | 14 |
| 300,000-600,000 | 2 (20%) | 11 (27.5%) | 13 | 26 |
| 600,000-900,000 | 2 (20%) | 15 (37.5%) | 17 | 34 |
| 900,000-1200000 | 3 (30%) | 5 (12.5%) | 8 | 16 |
| Above 1200000 | 1 (10%) | 4 (10%) | 5 | 10 |
| Total | 10 (100%) | 40 (100%) | 50 | 100 |
| Expenditure | | | | |
| 200,000-300,000 | 2 (20%) | 5 (12.5%) | 7 | 14 |
| 300,000-400,000 | 4 (40%) | 10 (25%) | 14 | 28 |
| 400,000- 500,000 | 2 (20%) | 16 (40%) | 18 | 36 |
| 500,000-600,000 | 1 (10%) | 4 (10%) | 5 | 10 |
| Above 600,000 | 1 (10%) | 5 (12.5%) | 6 | 12 |
| Total | 10 (100%) | 40 | 50 | 100 |

Source: TMS Field Survey, October 2022

Local NGOs and Community Based Organizations

Community forest user groups, Water supply and sanitation management committee, Mothers' groups, Farmers' groups, cooperatives and saving credit groups, and farmers-managed irrigation associations are common local-level organisations that are in existence in the project area. A youth club is also active in the project area. It is the Youth club that is currently maintaining and using the football ground within the proposed Project site. There is an Organic Agriculture Commodity Collection centre run by the Butwal Organic Agricultural Products Collection Centre, a cooperative in the Project area. Table 32 presents the name of organisations, and male/female memberships found within the surveyed households.

Table 32: Type and number of social organisations and memberships

| SN | Name of organisations | Number of Household involvement in different organisation | | | |
|----|------------------------------------|---|--------|------------------|--------|
| | | General members | | Executive member | |
| | | Male | Female | Male | Female |
| 1 | Farmers group | 11 | 15 | 1 | 2 |
| 2 | Cooperatives / Saving credit group | 19 | 27 | 0 | 7 |
| 3 | Community forest users group | 17 | 6 | 0 | 1 |
| 4 | Mother group | 1 | 21 | 0 | 7 |
| 5 | Drinking water users group | 20 | 13 | 0 | 2 |
| 6 | Irrigation users group | 6 | 2 | 0 | 0 |
| 7 | Income generating group | 2 | 1 | 0 | 0 |
| 8 | NGO/CBO | 3 | 0 | 0 | 0 |
| 9 | Religious groups | 15 | 11 | 0 | 3 |
| 10 | Other (detail): | 3 | 2 | 2 | 1 |

Source: TMS Field Survey, October 2022

Both male and females in the surveyed households participated in the activities of community social organisations. In the last 12 months, male participation was recorded as being higher than that of females in these organisations.

Table 33: Household members participation in the following activities by gender (last 12 months)

| Activities | Male | | | Female | | |
|----------------------------------|------|---------------------|-----------------------|--------|---------------------|-----------------------|
| | Hhs | No of Participation | Average Participation | Hhs | No of Participation | Average Participation |
| Social work | 28 | 331 | 12 | 18 | 66 | 4 |
| Religious/ritual works/functions | 14 | 232 | 17 | 10 | 22 | 2 |
| Community meetings | 25 | 286 | 11 | 14 | 52 | 4 |
| Political meetings | 5 | 214 | 43 | 2 | 5 | 3 |
| Community development | 6 | 15 | 3 | | | |
| Others | | | | | | |

Source: TMS Field Survey, October 2022

Vulnerability of Project Affected Families

By definition, these are the households that might suffer disproportionately or face the risk of being further marginalised due to the project. Specifically, these include: (i) households that are headed by women with dependents and/or fall under generally accepted indicator for poverty; (ii) household heads with disabilities; (iii) households falling under the generally accepted indicator for poverty; (iv) elderly households who are landless and with no other means of support, and (v) landless households.

Information on the households in the project area was analysed on the basis of the vulnerability parameters indicated in the definition above. Based on the analysis, six households were identified as vulnerable households. Of these, one is female-headed households as shown in Table 34.

The study team explored six vulnerable people in sampled households.

Table 34: Vulnerability of the sample households

| Type of vulnerability | No | % |
|-----------------------------|----|-----|
| Female household head | 1 | 2.0 |
| Poor | 0 | 0.0 |
| Person with disability | 1 | 2.0 |
| Chronically ill | 2 | 4.0 |
| Old age household head | 0 | 0.0 |
| Victims of the conflict | 0 | 0.0 |
| Other age dependent persons | 1 | 2.0 |
| Others | 1 | 2.0 |
| Total | 6 | |

Source: TMS Field Survey, October 2022

Food Sufficiency Level

The study area is a semi-urban area where households depend on other sources of income besides agricultural income. Agricultural production is not a primary source of income generation on which households are wholly dependent. Food sufficiency is defined in terms of own agriculture/livestock production. The food sufficiency has been examined by estimating how many months of a year a household is able to support food demand of the household from their own production. For this purpose, food sufficiency months are categorized ranging from zero month sufficiency to 9-12 months. The table shows food sufficiency from own agricultural production. Forty Six percent of all surveyed households are food sufficient for beyond a 3 month projection.

Table 35: Food sufficiency of the sample households

| Food sufficiency months | No of Households | % |
|-------------------------|------------------|-----|
| 0 Month | 12 | 24 |
| Less than 1 month | 5 | 10 |
| 1-3 months | 10 | 20 |
| 3-6 months | 10 | 20 |
| 6-9 months | 8 | 16 |
| 9-12 months | 5 | 10 |
| Total | 50 | 100 |

Source: TMS Field Survey, October 2022

Food Sufficiency of the households by Ward

The comparative food sufficiency situation of two wards has been presented in Table 36. The table shows that the food sufficiency situation is comparatively better in BSMC-15 than in Sainamaina-1. Thirty percent of surveyed households in Sainamaina have over a 3 month food sufficiency level, while the remaining 70%, do not. Bearing in mind the Sainamaina surveyed households make up 20% of the overall survey population of 50 households, this is still a fairly large proportion that may face food insecurity from not having their own agricultural production to rely on. However, as stated in an earlier section, the household statistics show that the population of BSMC Ward 15 rely more on agriculture compared to Sainamaina Ward No1. Similarly, the percentage of those involved in the services sector is higher by 14% in Sainamaina than BSMC. This evidence may point to the fact that Sainamaina Ward No 1 has a lower agricultural output as people are more engaged with a different occupational category.

Table 36: Food sufficiency of the households by wards

| Food sufficiency months | Wards | | | |
|-------------------------|--------------|-----------|-------|-----|
| | Sainamaina-1 | BSCM-15 | Total | % |
| 0 Month | 4 (40%) | 8 (20%) | 12 | 24 |
| Less than 1 month | 1 (10%) | 4 (10%) | 5 | 10 |
| 1-3 months | 2 (20%) | 8 (20) | 10 | 20 |
| 3-6 months | 1 (10%) | 9 (22.5%) | 10 | 20 |
| 6-9 months | 1 (10%) | 7 (17.5%) | 8 | 16 |
| 9-12 months | 1 (10%) | 4 (10%) | 5 | 10 |
| Total | 10 | 40 (100%) | 50 | 100 |

Source: TMS Field Survey, October 2022.

The statistics of the sample HHs revealed that 46% of HHs have food sufficiency for a period of over 3 months. When we looked into the ethnic groups, 45% of Brahmin fell into this group, and likewise 52% of Chhetri, 60% Magar, 66% Thakuri and 66% Dalit HHs fell into this group. A large portion of HHs have difficulty to fulfil their food requirement, which is worst amongst dalit, Thakuri and Magar, whereas Brahmin and Chetri have better situation but significantly. (Note - It must be noted that the survey involved a relatively small proportion of the existing ethnic groups, and the data collected and presented is only an indication of potential typical patterns).

Additionally, sampled households have other sources of income and are not dependent on subsistence level agricultural production. An earlier section noted that “The members of the households stated that they engage in multiple jobs to enhance the households’ financial position. The majority of the working age people in the project area are engaged in service (32.74%) and about 31% are involved in agriculture.”

Table 37: Food sufficiency households by caste and ethnicity

| Food sufficiency months | Caste/ethnicity | | | | | |
|-------------------------|-----------------|------------|-----------|------------|------------|-----------|
| | Brahmin | Chhetri | Magar | Thakuri | Dalit | Total |
| 0 Month | 2 (18.18%) | 5 (21.74%) | 3 (30%) | 1 (33.33%) | 1 (33.33) | 12 (24%) |
| Less than 1 month | 1 (9.09%) | 3 (13.04%) | 1 (10%) | 0 | 0 | 5 (10%) |
| 1-3 months | 2 (18.18%) | 4 (17.39%) | 2 (20%) | 1 (33.33%) | 1 (33.33%) | 10 (20%) |
| 3-6 months | 3 | 3(13.04%) | 2 (20%) | 1 (33.33%) | 1 (33.33%) | 10 (20%) |
| 6-9 months | 2 (18.18%) | 5 (21.74%) | 1 (10%) | 0 | 0 | 8 (16%) |
| 9-12 months | 1 (9.09%) | 3 (13.04%) | 1 (10%) | 0 | 0 | 5 (10%) |
| Total | 11 (100%) | 23 | 10 (100%) | 3 (100%) | 3 (100%) | 50 (100%) |

Source: TMS Field Survey, October, 2022

Community Perceptions related to Perceived Project Impacts

The survey team asked the participants their perceptions regarding the possible positive and negative impact of the proposed wholesale agriculture market on their own households. Surveyed households verbalised what they perceive as beneficial impacts of the Project and Tables 38 and 39 are summarised.

Table 38: Positive impact of the project

| Positive impact | Nr | % |
|--------------------------------------|----|------|
| Increase in income from agriculture | 27 | 54.0 |
| Increase in trade and business | 40 | 80.0 |
| Increase in employment opportunities | 42 | 84.0 |
| Increase in property values | 27 | 54.0 |
| Increase in industrial development | 8 | 16.0 |

| Positive impact | Nr | % |
|--|----|------|
| Increase in micro enterprises | 1 | 2.0 |
| Increase in transport and communication | 24 | 48.0 |
| Increase in public services and facilities | 8 | 16.0 |
| Other (detail): | 5 | 10.0 |

Source: TMS Field Survey, October 2022

Understandably, sample households perceive that the Project will provide income generation, business, and employment opportunities to the local community. It is also expected that the presence of the agro-processing facility will increase the resale value of their properties.

Sample households disclosed their views on the negative impacts of the Project during the survey interviews. The highest number of responses were shown in the order of: “Loss of public land/forest”, 74%; “Increase in pollution (incl. air, water, noise)”, 70%; “Lack of firewood/grass due to deforestation”, 42%, and “Increase in impact on habitats of wild animals”, 38%.

Table 39: Negative impact of the project

| Negative impact | No | % |
|---|----|------|
| Loss of public land/forest | 37 | 74.0 |
| Loss of income/employment | 1 | 2.0 |
| Influx of people from the outside | 9 | 18.0 |
| Threats to social stability | 2 | 4.0 |
| Increase in use of alcohol and gambling | 1 | 2.0 |
| Increase in prostitution / trafficking | 2 | 4.0 |
| Increase in pollution (incl. air, water, noise) | 35 | 70.0 |
| Increase in waste | 18 | 36.0 |
| Increase in problem of managing waste | 5 | 10.0 |
| Lack of firewood/grass due to deforestation | 21 | 42.0 |
| Increase in floods | 1 | 2.0 |
| Increase in impact on habitats of wild animals | 19 | 38.0 |
| Other (detail): | 4 | 8.0 |

Source: TMS Field Survey, October 2022

15. Flooding risk assessment report

REPORT

Flood risk assessment, Butwal Nepal

Report

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Table of Contents

| | | |
|----------|--|----------|
| 1 | Introduction | 1 |
| 2 | Rapid assessment of morphological impacts | 1 |
| 2.1 | Project area | 1 |
| 2.2 | Rapid analysis of river morphology | 2 |
| 2.3 | Possible impacts and risks | 6 |
| 2.4 | Concluding remarks and recommendations | 7 |
| 3 | Flood risk assessment | 8 |
| 3.1 | Methodology | 8 |
| 3.1.1 | Flood maps | 9 |
| 3.1.2 | Validation | 10 |
| 3.1.3 | Exposure and vulnerability of the market | 12 |
| 3.2 | Flood risk – expected direct damage | 14 |
| 3.2.1 | Baseline (without any adaptation measures) | 14 |
| 3.2.2 | Alternative A: Elevated buildings | 15 |
| 3.2.3 | Alternative B: Landfill | 15 |
| 3.2.4 | Alternative C: Landfill and elevated buildings | 16 |
| 3.2.5 | Mitigating risks with the Road corridor project | 17 |
| 3.3 | Flood risk – expected indirect damage | 17 |
| 3.4 | Concluding remarks and recommendations | 18 |

Table of Tables

| | |
|--|----|
| Table 3-1: Maximum damage values per land-use class, inflation corrected to 2021 values. source: Huizinga et al. (2017) & World Bank (2021) | 14 |
| Table 3-2: Expected flood damage and risk as Expected Annual Damage (EAD) for the baseline scenario without elevation. | 15 |
| Table 3-3: Expected flood damage and risk as Expected Annual Damage (EAD) for alternative A with elevation of buildings. | 15 |
| Table 3-4: Expected flood damage and risk as Expected Annual Damage (EAD) for alternative B with 1m landfill. | 16 |
| Table 3-5: Expected flood damage and risk as Expected Annual Damage (EAD) for alternative C with 1m landfill and elevation of buildings. | 17 |
| Table 3-6: Expected indirect damage based on expected revenue over time. | 18 |

Table of Figures

| | |
|---|----|
| Figure 2-1: An overview of the river system near the project site (GE image of 12/2022). | 2 |
| Figure 2-2 Morphological features in the reach near the project site (red arrows indicate the floodplain sedimentation apparently due to the high flow in 2003 and 2009). | 3 |
| Figure 2-3 A pictorial impression associated with sediment, morphology and vegetation features in the reach at the project site | 4 |
| Figure 2-4 Variation of morphological conditions at the bifurcation (Courtesy: Google Earth) | 5 |
| Figure 2-5 Encroachment in Dano River at upstream reach of the project site – comparing the flood extent in 2003 (left) with the current condition (right) based on Google Earth images | 5 |
| Figure 2-6 Satellite images at various period revealing the morphological variations at the tributaries | 6 |
| Figure 3-1: the hazard-exposure-vulnerability methodology as applied for the flood risk assessment. | 9 |
| Figure 3-2: flood map with a return period of 100-years. | 10 |
| Figure 3-3: Comparison of the 1/2 baseline flood map with the outline of the 2003 floodplain. | 11 |
| Figure 3-4: Comparison of the 1/100 baseline flood map with the outline of the 2003 floodplain. | 12 |
| Figure 3-5: The market classified into 6 land-use types. | 13 |
| Figure 3-6: Depth-damage functions with elevation of buildings. Without elevation, the curves shift left and originate in 0.0. | 13 |

Appendices

| | |
|----|---------------------------------|
| A1 | Satellite images and pictures |
| A2 | Flood risk maps - baseline |
| A3 | Flood risk maps – with landfill |

1 Introduction

Invest International on behalf of the Government of Nepal (GoN) has selected Royal HaskoningDHV (RHDHV) and its partners Agriplan Consultants, Nepal Agribusiness Innovation Centre (NABIC) and Total Management Services (TMS) to undertake a Feasibility Study (FS) for the development of the agricultural value chain infrastructure in Nepal. The FS is being financed as part of Invest International's Develop to Build Program (D2B) and aims to identify and develop suitable and sustainable public infrastructural measures to meet domestic demand and increase the export potential of agricultural produce.

Development of the Export Oriented Agriculture Export Market in Semlar, Butwal Sub-Metropolitan City-15, Semlar, Karsaghat has been selected as one of the most effective interventions to strengthen and develop the agricultural value chains in Nepal. Butwal shows competitive volumes of fruits and vegetables produced in the region, the availability of surplus for certain commodities, the actual need for a wholesale market in the region, the suitability of the location and the overall benefits the project can bring to the community.

This report is focussed on a flood risk assessment for the new market design, to assess the risks from erosion and flooding and to assess the impact of possible adaptation options.

Chapter 2 includes a brief assessment of morphological impacts, whereas Chapter 3 focusses on the flood risk assessment. Chapter 4 ends the report with conclusions and recommendations.

2 Rapid assessment of morphological impacts

2.1 Project area

The project area is located on the bank of Dano River, which is distributary of the Tinau River. It bifurcates near a bridge over East-West highway on Tinau River and eventually meets it again farther (more than 40 km) downstream. There are four tributaries (joining Dano river from the north side) within the reach between the bifurcation point and the project area, creating two three-way confluences as shown in Figure 2-1. It appears that these tributaries are morphologically dynamic as well.

There are some critical infrastructures nearby the river reach where the project site is located. For example, the East-West highway (including a bridge) which is less than 200 m away from the outer (right) bank of the river (towards the north) as well as two newly constructed bridges at the upstream (at the east) and downstream (at the west) of the proposed site as shown in Figure 2-1.

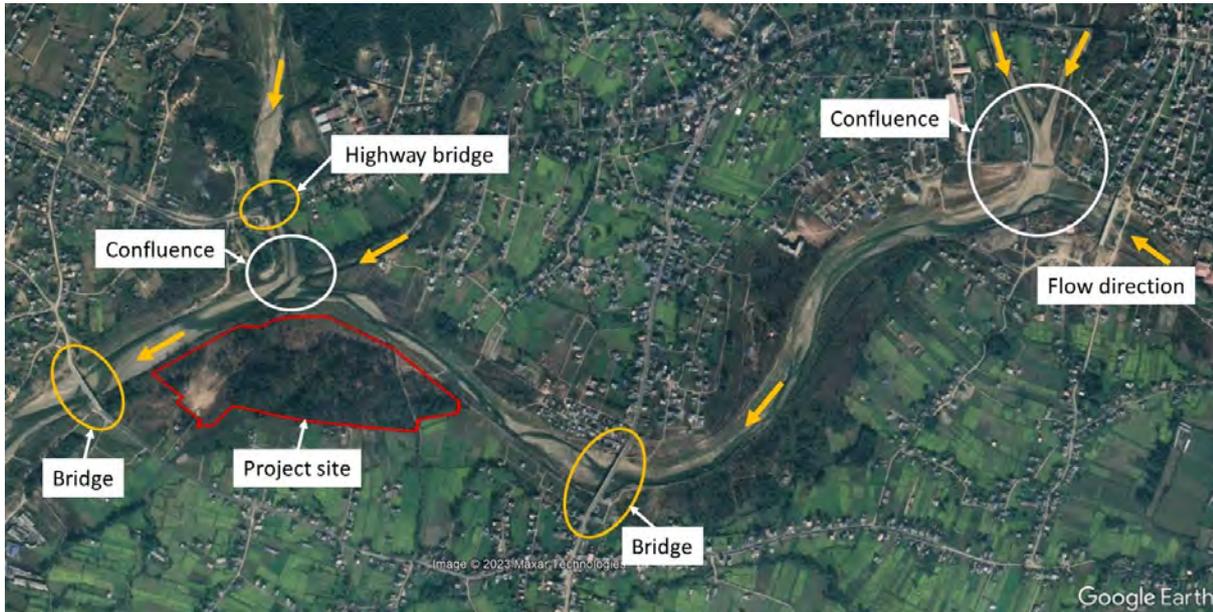


Figure 2-1: An overview of the river system near the project site (GE image of 12/2022).

2.2 Rapid analysis of river morphology

There are not much information and data that could help to understand sediment transport and morphological processes in the rivers and tributaries in a quantitative way. Moreover, the detailed morphological analysis is beyond the scope of this assignment. Nevertheless, we have attempted to carry out a rapid morphological analysis based on available images, pictures (taken during the field trip) and our preliminary judgement.

In general, the morphological feature within the reach near the project site appears to be in form of mildly meandering with alternate bars and single channel showing noticeable sandbar and deep-channel dynamics, particularly during higher flows. In this particular reach, there is no significant lateral migration (although there appears to some local bank erosion that is not visible in the satellite images). The river is wider after the confluence (that is near the project site) showing gradually growing meandering feature towards the downstream. The river has sharper meandering feature farther downstream with some noticeable meander dynamics. The river reach shows noticeable hydraulic and morphological impact during high floods (e.g., in 2003 and 2009) affecting a large part of the project site as well as the north floodplain as shown in Figure 2-2. Also, a large sediment deposition can be seen at the confluence, particularly in 2003. Some pictures from the site gives impression that the sediment characteristics is mostly graded. The sediment size along the reach near the project site appears to be finer than at Tinau River near the bifurcation (see the picture in Appendix A1). It appears that the northern tributaries also bring noticeable sediment to Dano river reach as the river looks more fluvial at the confluence and further downstream.

Some of the areas in the project site has been vegetated as can be seen from the image of 2022 in Figure 2-2. There are also some in-channel vegetations that can be inferred from the images and pictures. Figure 2-3 gives some impression about the morphological and vegetation features at some spots along the reach (see also some pictures with brief notes, presented in Appendix A1).

There are a few major aspects that should be considered/addressed given their possible flow and morphological impacts and risk on the project site, which can be outlined as follows:

- The dynamics of flow and sediment transport at the bifurcation with Tinau River: As we can see from the images (Figure 2-4), there are rapidly growing settlements (encroachment) and interventions at the

bifurcation area that appear to be resulting in the changes in flow and sediment transport conditions at Dano River.

- Settlements/encroachments along Dano River, upstream of the project area: Such an encroachment would lead to unexpected flow and morphological behaviour in downstream reach where the project site is located due to narrowing of the flow passage in the upstream reach. Figure 2-5 shows how the high flow extent looks like in 2003 and 2009 compared to how it's been encroached now resulting in significant narrowing of the river. The similar magnitude of a possible future flood under such upstream condition would have different flow and morphological impacts along the reach near the project site.
- Confluence dynamics: One of the confluences is opposite (at the north bank) of the project site, which implies that hydraulic and morphological conditions of the river near the site might also be affected by the confluence dynamics depending on the inflow conditions at the main river and the tributaries. As it can be inferred from satellite images (Figure 2-6), the tributaries are also rather dynamic that may induce hydraulic and morphological impacts on the confluence and, in turn, on the project site. This is not easy to assess without proper data and information.
- River training measures and interventions: There are quite some river measures and interventions starting from the bifurcation (Figure 2-4), along Tinau and Dano rivers as well as at the tributaries. Their effectiveness and impacts must be assessed properly.

Some additional satellite images and pictures with some descriptions are presented in Appendix A1 as well.

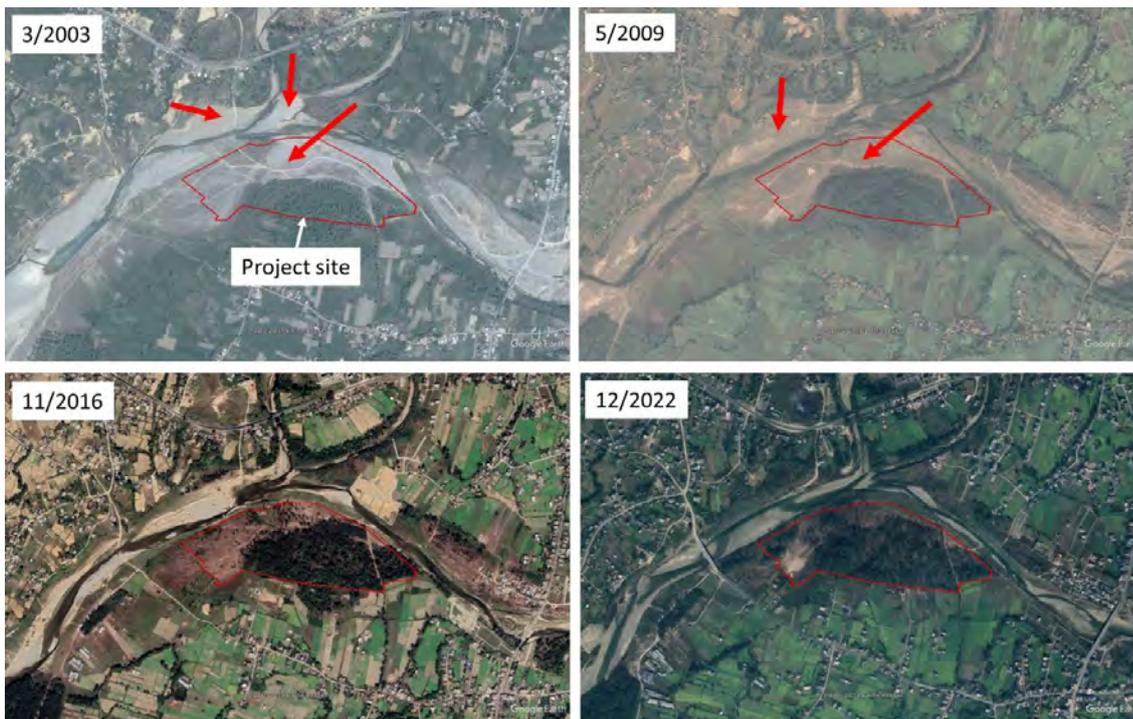


Figure 2-2 Morphological features in the reach near the project site (red arrows indicate the floodplain sedimentation apparently due to the high flow in 2003 and 2009).



Figure 2-3 A pictorial impression associated with sediment, morphology and vegetation features in the reach at the project site



Figure 2-4 Variation of morphological conditions at the bifurcation (Courtesy: Google Earth)



Figure 2-5 Encroachment in Dano River at upstream reach of the project site – comparing the flood extent in 2003 (left) with the current condition (right) based on Google Earth images

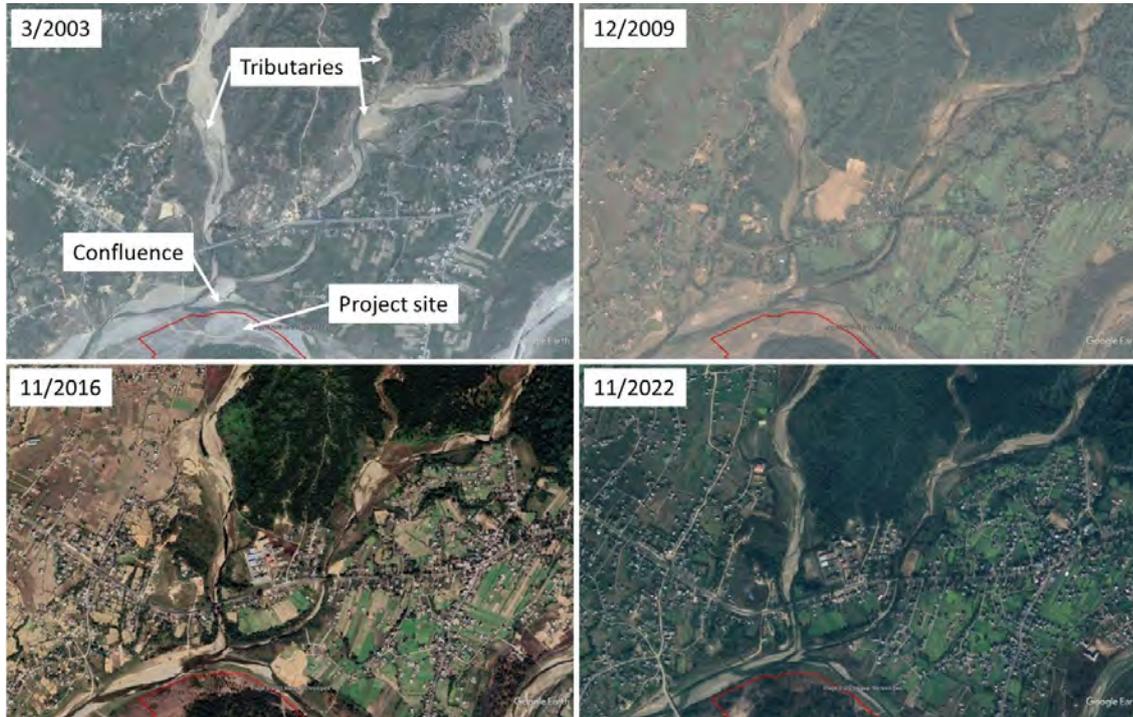


Figure 2-6 Satellite images at various period revealing the morphological variations at the tributaries

2.3 Possible impacts and risks

We must consider not only the impacts and risks on proposed infrastructure at the project site but also the impacts of project interventions that may alter the flow and morphological conditions that, in turn, would have impacts on the river reaches including surrounding lands, settlements and critical infrastructure located upstream and downstream areas.

Based on the rapid morphological analysis, presented in previous section, some possible impacts and risks can be outlined as follows:

- The site is located on the left floodplain, which is relatively fresh fluvial deposit that makes the area morphologically vulnerable. It is an inner-bend deposit with some vegetation as well as presence of cohesive materials (although this must be properly investigated before making any firm conclusion) that may not be that severe in terms of large erosion. However, it is clearly under the risk of floods with high sediment-laden flow that may lead to sediment havoc as well. Also, under certain unfavourable (local) condition given the confluence dynamics, the deep channel might change its course unpredictably leading to erosion and/or sedimentation on the project site.
- The riverbed appears to be rather high with large sandbars, almost at the level of the floodplain (this must be investigated more precisely). Such condition increases the flood and morphological hazards and risk during higher/extreme flow and sediment transport. Moreover, there is quite some in-channel vegetation, which induces additional resistance to the flow. This may be positive against the erosion; however, it may lead to higher flood levels. Also, the backwater effect due to the confluence dynamics (depending on the flow and sediment transport from the tributaries) may result in higher flood and morphological hazards and risks under extreme conditions.
- As it can be inferred from the images of 2003 and 2009 (shown in Appendix A1), the proposed site shows the indication that during high flows a large part of it forms the flood corridor with overland flow. From 2012 onwards, more vegetation has grown in these areas with less indication of erosion. However, these vegetations must be removed for building the infrastructure. Therefore, proper assessment of possible impacts and risk associated with erosion and environment must be carried out.

- The proposed project site occupies a large part of high-flow river corridor leading to significant constriction at the bend reach including the confluence with other two tributaries. This will lead to unexpected morphological behaviour making the north floodplain rather vulnerable. It should be emphasized that the East-West highway, which is an important transport infrastructure, is located less than 200 m away from the north bank. Moreover, there is a highway bridge over one of the tributaries at the similar distance from the confluence. Therefore, significant hydraulic and morphological changes at the confluence under extreme conditions would threaten these critical infrastructures. There are also two bridges on Dano River at the immediate upstream and downstream of the project site. Any drastic changes in flow and sediment transport conditions due to the constriction at the confluence area may lead to unexpected hydraulic and morphological changes at these bridge site threatening their stability. This is particularly relevant for the downstream bridge. For the upstream bridge and the near-bank settlements, the backwater effect of the constriction shall be assessed properly.
- Given the fact that the river reach shows the indication of increasing meandering feature towards the downstream of the confluence (near the project site), any interventions with drastic morphological changes might trigger more active meander dynamics with lateral migration along the downstream reaches. This must be properly analysed to assess the downstream impacts (e. g. on the bridge and settlements).

2.4 Concluding remarks and recommendations

Based on our rapid morphological analysis, following remarks and recommendations can be made:

- Given the sediment-laden feature of the river and the tributaries, the impact and risk assessment should consider sediment transport and morphological processes in a proper way apart from assessing merely the flood risks.
- It is suggested to collect some more information, satellite (radar) images and ground data, for example (but not limited to): (i) historical flow at Tinau River, Dano River and other above-mentioned tributaries including the bifurcation dynamics; (ii) some basic measurement of riverbed sediment samples, bank/floodplain materials and their variation along the river reach and tributaries (starting from the bifurcation at Tinau River); (iii) topography/bathymetry measurement of the river reach and tributaries including the floodplains that are vulnerable; (iv) proper mapping of critical infrastructures and conditions as well as existing river training structures, measures and interventions in the river and tributaries, etc. These data and information would help to carry out more accurate assessment of flow and morphological alterations under various conditions and scenarios.
- As the northside of Ward 15 is located on top of the old riverbed, it is expected that the current riverbank is mostly sand and potentially unstable. Therefore, it is highly recommended to do a geotechnical analysis to assess the need of stabilisation and reinforcement of the riverbank, which would be possible in combination with the road corridor or a landfill. However, morphological impacts of such measures along upstream and downstream reach should also be made in a proper way.
- The tributaries, north of the proposed project site, are morphologically highly dynamic as well. Therefore, hydraulic, and morphological assessment with a proper consideration of the tributaries is required.
- The impact of the removal of the vegetation at the proposed site should be assessed properly.
- It is suggested to move the proposed project site towards the south as possible given the fact that the intervention too much towards the river (on a fresh and low-elevated fluvial deposit) would increase the risk for the site itself, and also induces the unfavourable hydraulic and morphological impacts due to the flow constriction that, in turn, may threaten other critical infrastructures and settlements along the river reach and tributaries. There are already large interventions and (illegal) encroachment along the river reach, and the current project should not complement them, but rather should serve as a good example by demonstrating some adaptation and proper assessment of the impacts and risks.

- It is suggested to have some non-structural measures as well to minimize the impacts and risks, such as regular monitoring (ground and remote sensing), information and early warning system related to flow and morphological processes and extremes.

3 Flood risk assessment

The area is at risk of fluvial (riverine) flooding from the Dona River, a bifurcated section of the Tinau River. The Dona River and surrounding area has a history of flooding, such as the major flood event in 2008. More so, Dano comes from the Sanskrit term, Danav, which means demon—so named for the destructive nature of the river to local lives and livelihoods. Therefore, it is essential to assess flood risk during the development of a project such as the market, located closely to the river.

First the methodology is described, including what data sources were used. Second, the results of the flood risk assessment are shown.

3.1 Methodology

For the flood risk assessment, we apply our in-house Global Flood Risk Tool, which applies a commonly accepted hazard-exposure-vulnerability methodology, as shown in Figure 3-1. This will purely focus on direct, asset damage. An estimation of indirect, or business interruption, is made, as also described below.

Direct damage

The hazard is represented by flood maps with different return periods that show different intensity flood scenarios. The flood maps were refined from existing data by Total Management Services Pvt. Ltd. (2019)¹ for the Department of Hydrology and Meteorology of the Government of Nepal. Section 3.1.1 elaborates on how the refinement of existing data has been executed.

Exposure are the assets exposed to the hazard, in the case the to-be-developed wholesale market. The vulnerability of the assets determines the expected damage from one of the flood scenarios and associated inundation depth. Both are described in Section 3.1.2.

Indirect damage

Indirect damage, or business interruption, occurs due to the interruption of some activity by the flood. Loss of production or traffic interruption are prime examples. Even when floods are affecting areas outside the project site, indirect damage can occur as access to the site might be obstructed, or lack of crops to sell due to floods in other areas. For this assessment, we will purely focus on disruption of the wholesale market, and not external source of potential business interruption.

For indirect damage, or business interruption, an approximation is made based on the income estimates as reported in: Export-oriented Agriculture Wholesale Market Semlar, Nepal, Technical and Financial Feasibility Study Report, reference: BH4289I&BRP009F02. Results are presented in section 3.3.

¹ Total Management Services Pvt. Ltd. (2019) Preparation of Hazard Map and Fixing Warning and Danger Level at Flood Forecasting Station of East Rapti and Tinau River.

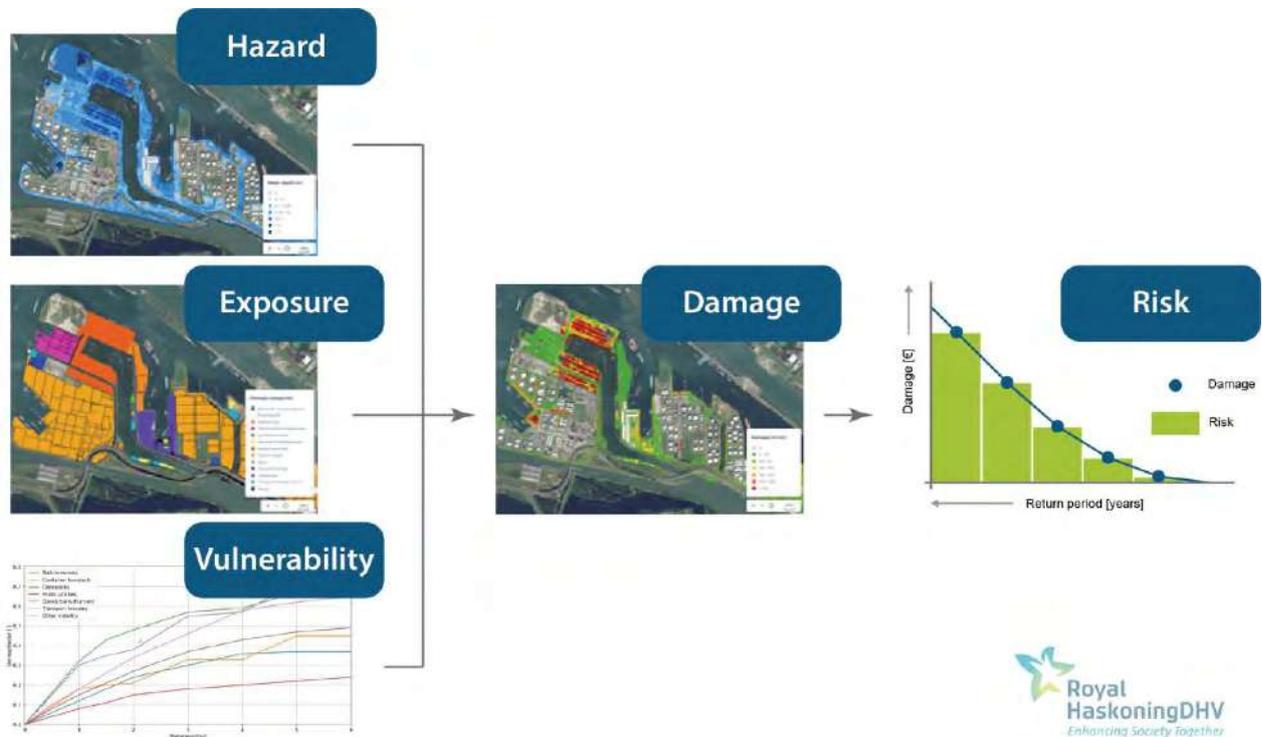


Figure 3-1: the hazard-exposure-vulnerability methodology as applied for the flood risk assessment.

3.1.1 Flood maps

As stated by Total Management Services Pvt. Ltd. (2019), no accurate Digital Terrain Model (DTM) is available for the project location, with the most accurate resolution being 30x30m. To get a better understanding of the flood risks for the project location, flood data by Total Management Services Pvt. Ltd. (2019) was refined following the steps below:

- 1) Acquiring higher quality DTM (1) for project area
- 2) Determining difference between new DTM (1) and previously used DTM (2)
- 3) Correcting calculated water levels to keep relative fit with new DTM (1) based on difference from step 2
- 4) Recalculate inundation maps based on corrected water levels (step 3) and DTM (1) (step 1)

It should be noted that the topographic survey that was done but with a local datum, or vertical reference level, that did not match the datum of any of the DTMs available. Correcting the datum did not result in reliable results, and therefore we did not use the topographic survey to validate the newly produced DTM.

To ensure validity in the produced inundation maps, a validation exercise is done at the end of this section.

Acquiring higher quality DTM (1) for project area

First, we have acquired a custom DTM made for the target location by GeoAI, based on Maxar satellite imagery. The new DTM (1) has a resolution of 0.5x0.5m, with a horizontal and vertical accuracy of 3m, based on images from 2018 that met the requirements. It should be noted that at this time the earlier discussed bridges and connecting roads were not present yet and thus they are not present in the DTM.

Determine difference in DTMs and correct water levels accordingly

The Water Surface Elevations (WSE) were modelled by Total Management Services Pvt Ltd. (2019) with a 2D Unsteady Hydrodynamic model in HEC-RAS for 6 return periods: 2-, 5-, 10-, 25-, 50-, 100-year floods. As stated before, the DTM (2) used in the flood map modelling was a mosaiced version of open-source

DTMs, with a resolution of 30x30m or courser. In addition, the DTM (2) was modified according to field surveys. However, this modified DTM (2) was not made available during time of this assessment. An approximation of the original DTM (2) level was made by extracting flood depths (30x30m grid) with the WSE (30x30m grid), both acquired from Total Management Services Pvt Ltd. (2019). The difference in reference level between both DTMs was obtained by sampling 28 different points in the landscape, accounting for cell size differences and open areas, resulting of an average deficit of 2.876 meters. To correct for this difference in reference level, the WSE were corrected accordingly.

It should be noted that the WSE was determined in a watershed-scale model, with a course resolution of 30x30m. With such models, local interactions are often excluded. Instead, the difference between return periods is often limited. As DTM (2) was unavailable, and hence the WSE needed correcting, this introduced additional uncertainty. Still, with the higher resolution DTM (1), it should give an estimate of the most vulnerable areas of the market and roughly how much damage is expected.

Create new inundation maps

The new flood maps are subsequently made by subtracting the adjusted WSE with the 0.5x0.5m DTM, resulting in the flood maps as shown in Figure 3-2 for a 100-year flood, and in Appendix A2 for all applied flood scenarios as used in this assessment (i.e., 2-, 5-, 10-, 25-, 50-, 100-year floods). As seen in Figure 3-2, inundation depths for the site for a 100-year flood range up until a little over 1 meter for certain depressions in the landscape, but on average an inundation depth of about 0.8 m.

It should be noted that accurate flood data is extremely limited in the target area. Only information of the Dona River is available. Both tributary rivers, connecting with the Dona River north of the site, have no available data to our knowledge and were not included in the study by Total Management Services Pvt Ltd. (2019). The absence of these tributaries may cause the calculated inundation maps to be an underestimation.

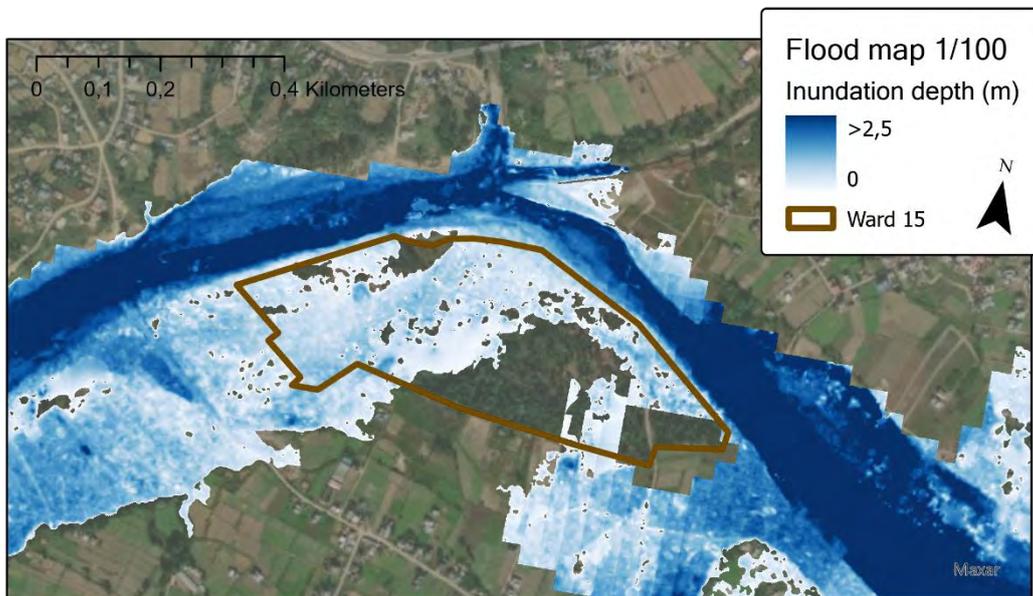


Figure 3-2: flood map with a return period of 100-years.

3.1.2 Validation

Validity of the flood maps is essential due to the uncertainty regarding the difference reference levels and necessary correction that was done by the development of them. Local records state that there has not been any flooding over the last 20 years. However, the satellite image of 2003 clearly shows outlines of a floodplain – though the return period or impact for this flood is not known. The outline of the floodplain is compared with the flood maps of a 1/2 and 1/100 per year, in Figure 3-3 and Figure 3-4 respectively. In general, the flood maps seem to be within the 2003 flood plain boundaries, with a few exceptions. As the flood maps are produced with a DEM from 2018, it is also expected there are differences within the floodplain, as also described in the rapid analysis of river morphology. More data on historical flood events, both in terms of extent, depths, and impact, could improve the analysis but is often found very difficult to collect.

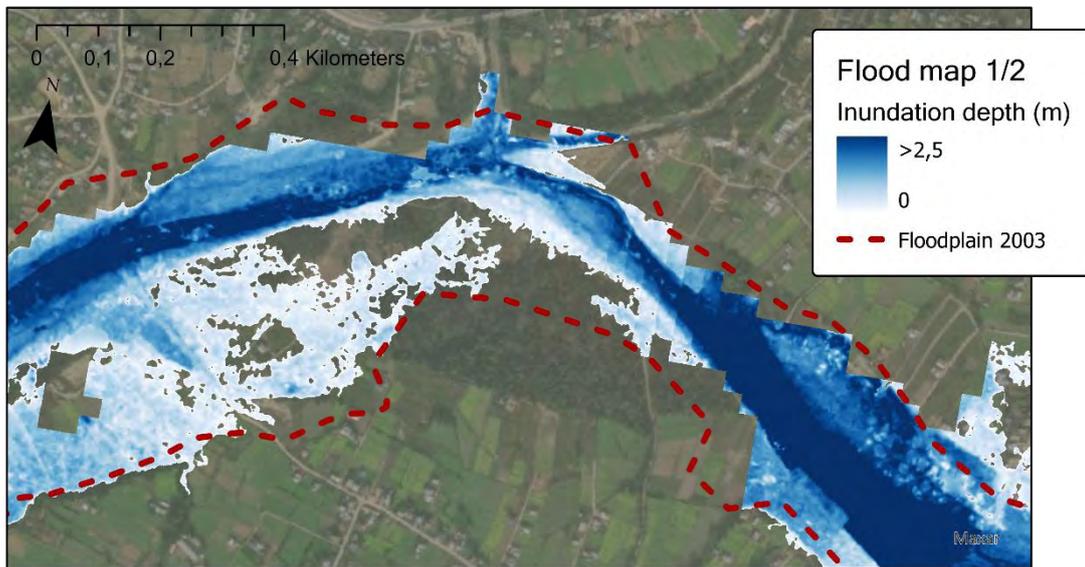


Figure 3-3: Comparison of the 1/2 baseline flood map with the outline of the 2003 floodplain.

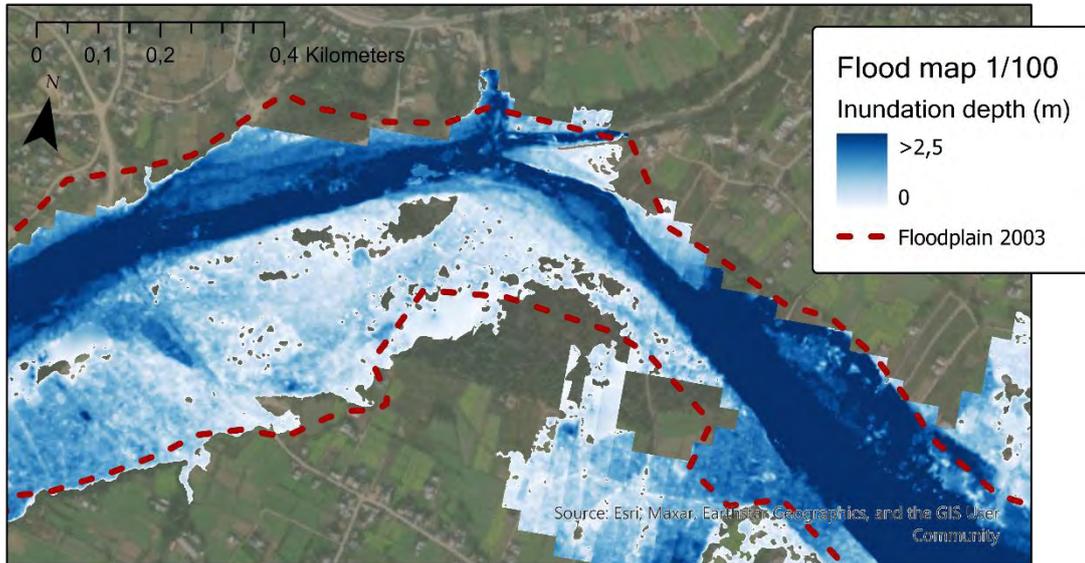


Figure 3-4: Comparison of the 1/100 baseline flood map with the outline of the 2003 floodplain.

3.1.3 Exposure and vulnerability of the market

The masterplan design has been classified into 6 land-use types, as shown in Figure 3-5: (1) Residential, (2) Commercial, (3) Industrial, (4) Transport, (5) Roads, and (6) Other. Each of the land-use types have a so-called depth-damage function, the relationship between inundation depth and the expected damage factor. For this assessment, depth-damages functions from Huizinga et al. (2017)² are applied, specific for Nepal, as shown in Figure 3-6. These curves include building damage and damage to inventory of the buildings, per land-use class. Figure 3-6 shows the modified curves for elevated buildings of 0.8m, which is the assumed mitigation measure during preliminary design, and which will be evaluated during this assessment. The accompanied maximum damage values (i.e., the expected damage if the damage factor is 1), were also taken from Huizinga et al. (2017) and corrected to 2021³. All maximum damage values were checked with CAPEX estimates to ensure realistic damage estimates.

² Huizinga, J., De Moel, H. and Szewczyk, W., *Global flood depth-damage functions: Methodology and the database with guidelines*, EUR 28552 EN, Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-67781-6, doi:10.2760/16510, JRC105688.

³ Inflation rates applied from World Bank (2021) <https://data.worldbank.org/country/nepal?view=chart>

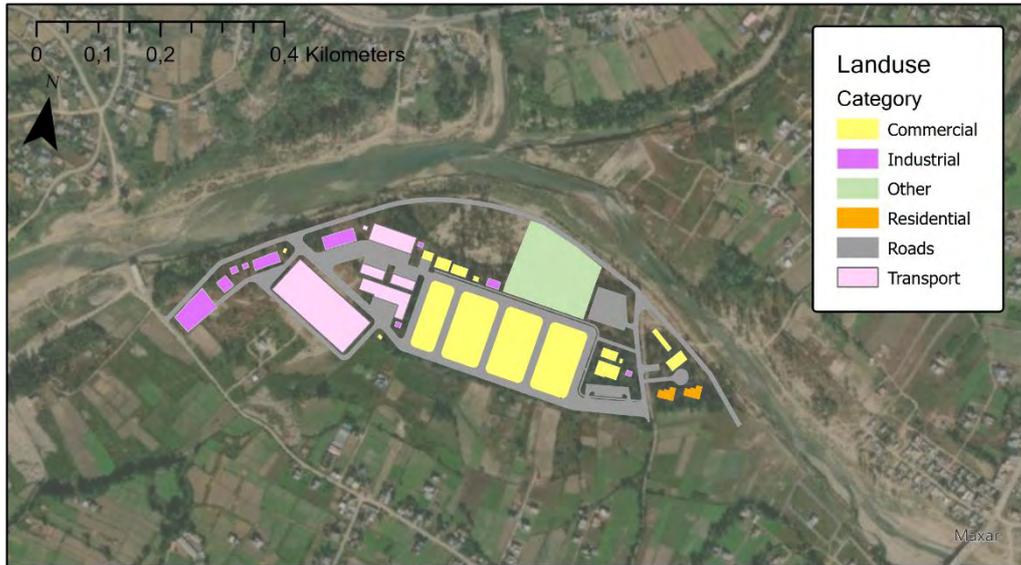


Figure 3-5: The market classified into 6 land-use types.

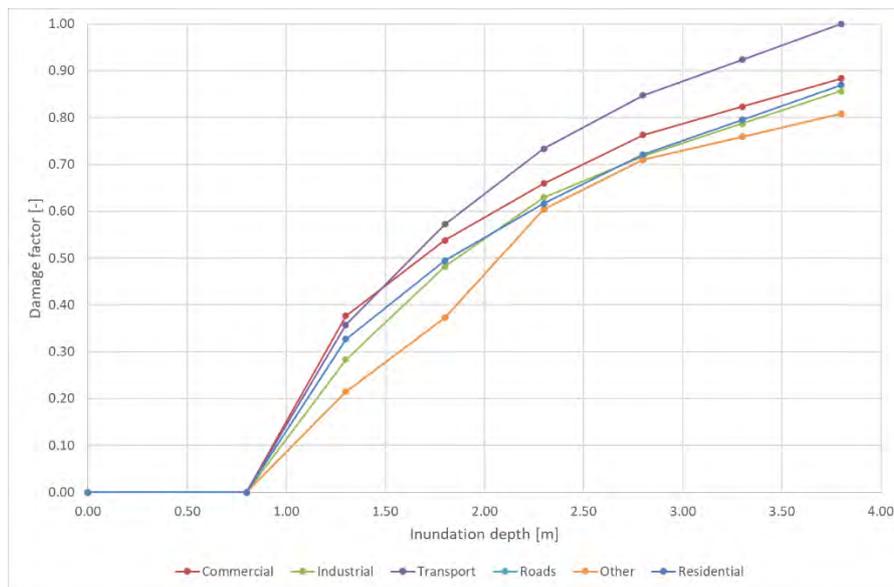


Figure 3-6: Depth-damage functions with elevation of buildings. Without elevation, the curves shift left and originate in 0.0.

Table 3-1: Maximum damage values per land-use class, inflation corrected to 2021 values. source: Huizinga et al. (2017) & World Bank (2021)

| Maximum damage values (EUR/m ²) | | |
|---|------|-------|
| Land use class | 2010 | 2021 |
| Residential | 152 | 314.1 |
| Commercial | 238 | 491.9 |
| Industrial | 221 | 456.7 |
| Transport | 44 | 90.8 |
| Roads | 1.2 | 2.5 |

3.2 Flood risk – expected direct damage

Flood risk has been assessed for four scenarios – 1 baseline and 3 alternatives:

1. A baseline scenario without any adaptation measures (section 3.2.1)
2. Alternative A: A scenario with building elevation of 0.8m (section 3.2.2)
3. Alternative B: A scenario with a landfill of 1m (section 3.2.3)
4. Alternative C: A scenario with a landfill of 1m and additional building elevation of 0.8m (section 3.2.4)

Elevation of buildings is often a very cost-effective adaptation measure for buildings, as it is very cost effective to implement during the development of a project⁴. In addition, landfill was used to flatten the area and decrease flood vulnerabilities in some of the depressions on the west side of the project site. Further landfill might be a possibility, but care should be taken without further morphological analyses. Therefore, only this alternative has been considered in this stage.

In addition, it should be noted that there are plans to build a road corridor along the riverbank at a 1m elevation, on which section 3.2.5 will elaborate.

It should be noted that data is only available for the range of return periods given. More extreme, but lower probability events, are not available to this day. Therefore, the projected risk is likely an underestimation of reality, and care should be taken interpreting the results.

3.2.1 Baseline (without any adaptation measures)

The results for flood damage per flood scenario and total expected flood risk (i.e., Expected Annual Damage) for the baseline scenario, without any building elevation or landfill, is shown in Table 3-2. Total surface area of the assets is estimated at 117,890 m². For the highest probability scenario, a 1/2 per year chance of flooding (i.e., a 50% per year chance), already has an expected damage of about 715,000 EUR. For the lowest probability event, an 1/100 per year chance of flooding (i.e., a 1% per year chance), has an expected damage of about 2.6 million EUR. Combining the different flood scenario results in the expected annual damage of about 588,000 EUR per year. This is equivalent to a little under 2% of the current estimated CAPEX. The flood risk is deemed too high to leave unmitigated. Therefore, the impact of elevating assets is evaluated in the following section.

⁴ de Ruig et al., (2020) A micro-scale cost-benefit analysis of building-level flood risk adaptation measures in Los Angeles, *Water Resources and Economics*, Vol. 32, <https://doi.org/10.1016/j.wre.2019.100147>.

Table 3-2: Expected flood damage and risk as Expected Annual Damage (EAD) for the baseline scenario without elevation.

| Land use | Area in study (m2) | Damage for different return periods (x1000 EUR) | | | | | | EAD (1000x EUR/y) |
|--------------|--------------------|---|--------------|--------------|--------------|--------------|--------------|-------------------|
| | | 2 | 5 | 10 | 25 | 50 | 100 | |
| Residential | 948 | - | - | - | - | - | - | - |
| Commercial | 29,395 | 137 | 220 | 446 | 866 | 1,114 | 1,296 | 171.0 |
| Industrial | 5,208 | 391 | 508 | 601 | 673 | 720 | 759 | 257.5 |
| Transport | 16,497 | 180 | 301 | 401 | 476 | 517 | 552 | 154.5 |
| Roads | 50,681 | 6 | 9 | 12 | 15 | 17 | 19 | 4.8 |
| Other | 15,162 | 0 | 1 | 1 | 1 | 1 | 1 | 0.3 |
| Total | 117,890 | 715 | 1,038 | 1,462 | 2,031 | 2,370 | 2,627 | 588.1 |

3.2.2 Alternative A: Elevated buildings

The results for flood damage per flood scenario and total expected flood risk (i.e., Expected Annual Damage) for the alternative scenario A, with building elevation, is shown in Table 3-3. It is assumed that the buildings are elevated by 0.8m. All the damage scenarios are at least a factor 10 lower in damages, up to factor 70 for the 1/2 per year chance flood scenario.

For the highest probability scenario, a 1/2 per year chance of flooding (i.e., a 50% per year chance), has an expected damage of about 10,000 EUR. For the lowest probability event, an 1/100 per year chance of flooding (i.e., a 1% per year chance), has an expected damage of about 273,000 EUR. Combining the different flood scenario results in the expected annual damage of about 27,600 EUR per year.

Table 3-3: Expected flood damage and risk as Expected Annual Damage (EAD) for alternative A with elevation of buildings.

| Land use | Area in study (m2) | Damage for different return periods (x1000 EUR) | | | | | | EAD (1000x EUR/y) |
|--------------|--------------------|---|-----------|-----------|------------|------------|------------|-------------------|
| | | 2 | 5 | 10 | 25 | 50 | 100 | |
| Residential | 948 | - | - | - | - | - | - | - |
| Commercial | 29,395 | 3 | 6 | 14 | 28 | 58 | 73 | 5.9 |
| Industrial | 5,208 | 1 | 15 | 48 | 89 | 119 | 147 | 14.5 |
| Transport | 16,497 | 0 | 1 | 7 | 17 | 25 | 35 | 2.5 |
| Roads | 50,681 | 6 | 9 | 12 | 15 | 17 | 18 | 4.8 |
| Other | 15,162 | - | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Total | 117,890 | 10 | 31 | 81 | 149 | 219 | 273 | 27.6 |

3.2.3 Alternative B: Landfill

The results for flood damage per flood scenario and total expected flood risk (i.e., Expected Annual Damage) for the alternative scenario B, without any building elevation, is shown in Table 3-4. The project area is

flattened and elevated slightly – as it will otherwise introduce potential soil instability. The new flood maps are shown in Appendix A3.

Compared to Alternative A, damages are still relatively high for especially the low probability scenarios. For the lower probability scenarios, damage is roughly halved. Overall, the expected annual damage of about 401.000 EUR per year is still relatively high.

Table 3-4: Expected flood damage and risk as Expected Annual Damage (EAD) for alternative B with 1m landfill.

| Land use | Area in study (m2) | Damage for different return periods (x1000 EUR) | | | | | | EAD (1000x EUR/y) |
|--------------|--------------------|---|------------|--------------|--------------|--------------|--------------|-------------------|
| | | 2 | 5 | 10 | 25 | 50 | 100 | |
| Residential | 948 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Commercial | 29,395 | 33 | 138 | 352 | 787 | 1,046 | 1,243 | 127 |
| Industrial | 5,208 | 367 | 449 | 531 | 605 | 651 | 696 | 232 |
| Transport | 16,497 | 9 | 41 | 141 | 233 | 288 | 335 | 39 |
| Roads | 50,681 | 4 | 6 | 9 | 12 | 14 | 16 | 3 |
| Other | 15,162 | 0 | 1 | 1 | 1 | 1 | 2 | 0 |
| Total | 117,890 | 412 | 634 | 1,033 | 1,638 | 2,001 | 2,291 | 401 |

3.2.4 Alternative C: Landfill and elevated buildings

The results for flood damage per flood scenario and total expected flood risk (i.e., Expected Annual Damage) for the alternative scenario C, landfill with additional building elevation, is shown in Table 3-5. The project area is flattened and elevated slightly, and additionally buildings are elevated by 0.8m.

The combination of measures mostly mitigates expected damages, with exceptions for the industrial land use, and the commercial land use for higher return periods. Still, overall expected annual damage is reduced significantly to 15.000 EUR per year.

Table 3-5: Expected flood damage and risk as Expected Annual Damage (EAD) for alternative C with 1m landfill and elevation of buildings.

| Land use | Area in study (m2) | Damage for different return periods (x1000 EUR) | | | | | | EAD (1000x EUR/y) | Risk |
|--------------|--------------------|---|-----------|-----------|-----------|------------|------------|-------------------|-----------|
| | | 2 | 5 | 10 | 25 | 50 | 100 | | |
| Residential | 948 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Commercial | 29,395 | 0 | 0 | 0 | 2 | 24 | 27 | 1 | 1 |
| Industrial | 5,208 | 1 | 14 | 47 | 88 | 117 | 145 | 14 | 14 |
| Transport | 16,497 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 |
| Roads | 50,681 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| Other | 15,162 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 117,890 | 1 | 15 | 48 | 92 | 144 | 175 | 15 | 15 |

3.2.5 Mitigating risks with the Road corridor project

In addition to the three proposed alternatives, there are already plans to build a road corridor along the riverbank. The road is already indicated in the land use map, as shown in Figure 3-55, but not part of the development of the wholesale market – the focus of this flood risk assessment. Plans already indicate a proposed elevation of 1m, acting as a dike structure. However, it is unclear when the road corridor will be developed. Especially for more extreme scenarios, such as a 200-year or 1000-year flood, inundation depths are likely higher, and this can still pose a threat to the wholesale market.

3.3 Flood risk – expected indirect damage

The expected duration of business interruption is often difficult to assess, as it varies on many conditions, such as regional or national impact, availability of emergency services, impact of infrastructure, etc. Based on the inundation maps, it is assumed that a flood for the baseline alternative will disrupt the operations of the wholesale market for 30 days. This includes the event itself, drainage of inundated areas – which will take longer in the baseline as there are a few depressions where water will accumulate – cleaning and repairs. It should be noted however, that indirect impacts from destroyed harvest in the surrounded area, or obstruction of critical infrastructure is not included in the estimates. With building elevation, repair and clean-up time for buildings are significantly reduced, halving the expected interruption duration. A landfill has the additional benefit that streets require less repair and clean-up on site infrastructure and outside features, however as the landfill is relatively shallow it is only effective for high-return period events – therefore 20 days disruption is still expected. The combination of building elevation and a landfill will reduce disruption the most. It should be noted that different frequency floods will have different disruption durations. For example, the 1/2 scenario for alternative C only impacts the area slightly, and will consequently only induce minor indirect damages, but this analysis should give a rough overview of expected indirect damage for average events.

The first three years are considered start-up years, so the revenue of year 4 till year 25 are considered for the analysis (year 0 being the construction year). Rent consists of 49% of total revenue. It is assumed that rent will be paid despite flood events and are thus not included in the below calculations.

Table 3-6 shows the results of the expected indirect damage per alternative. For the baseline, indirect damage is estimated at 41.000 EUR in year 4, increasing to 153.900 EUR in year 25. For Alternative A,

indirect damage decreases to about 20.500 EUR in year 4, increasing to 77.000 EUR in 25. The combination of measures, Alternative C is most effective, and only has about 4100 EUR of indirect damage in year 4, increasing to 15.400 EUR in year 25. Again, it is noted that this only included disruption of on-site activities.

Table 3-6: Expected indirect damage based on expected revenue over time.

| Alternative | Days of interruption | Indirect damage year 4 (x1000 EUR) | Indirect damage year 25 (x1000 EUR) |
|---|----------------------|------------------------------------|-------------------------------------|
| Baseline | 30 days | 41.0 | 153.9 |
| Alternative A – only building elevation | 15 days | 20.5 | 77.0 |
| Alternative B – only landfill | 20 days | 27.3 | 102.6 |
| Alternative C – Landfill and building elevation | 5 days | 4.1 | 15.4 |

3.4 Concluding remarks and recommendations

Invest International on behalf of the Government of Nepal (GoN) has selected Royal HaskoningDHV (RHDHV) and its partners Agriplan Consultants, Nepal Agribusiness Innovation Centre (NABIC) and Total Management Services (TMS) to undertake a Feasibility Study (FS) for the development of the agricultural value chain infrastructure in Nepal. This report is a flood risk assessment to support the development of the wholesale market. This section will provide concluding remarks and recommendations on the flood risk part of the report, for the rapid assessment of river morphology, refer to section 2.4.

Flood risk has been assessed for four scenarios – 1 baseline and 3 alternatives:

1. A baseline scenario without any adaptation measures (section 3.2.1)
2. Alternative A: A scenario with building elevation of 0.8m (section 3.2.2)
3. Alternative B: A scenario with a landfill (section 3.2.3)
4. Alternative C: A scenario with a landfill and building elevation of 0.8m (section 3.2.4)

Flood risk in the baseline scenario is deemed too significant to leave unmitigated, with an expected risk of about 588,000 EUR per year. Already alternative A is highly effective at reducing damages: all the damage scenarios are at least a factor 10 lower in damages, up to factor 70 for the 1/2 per year chance flood scenario. Total risk for alternative A is assessed at about 27,600 EUR per year. Alternatives B, with only the landfill has an expected annual damage of about 401.000 EUR per year but combining the landfill with the elevation of buildings in alternative C further reduce flood risk to about 15.000 EUR per year. The road corridor could be elevated to act as a dike structure, potentially also in combination with elevation of buildings. However, as the road corridor is not being developed as part of the wholesale market, care should be taken as it might be built with the necessary standards.

A rough estimation of indirect damage is made, of about 41.000 EUR to 153.900 EUR from reference year 4 to year 25 respectively for the baseline scenario. Compared to the direct damages in the baseline scenario, the indirect damage is considered very low. For Alternative C, indirect damage is almost completely mitigated to about 4100 EUR in year 4, increasing to 15.400 EUR in year 25.

It should be noted that data is only available for the range of return periods given. More extreme, but lower probability events, are not available to this day. Therefore, the projected risk could be an underestimation of reality, and care should be taken interpreting the results, especially for the alternatives with little damage for the lower return periods.

When landfill or the road corridor as a dike are applied as the primary adaptation measures, it should be noted that the system is highly dynamic. As stated in the concluding remarks and recommendations of the rapid analysis of river morphology, additional analysis is required to build these measures robust and sustainability.

Moreover, to improve the flood risk assessment, it is recommended to commence a high-resolution hydrological and hydraulic model to simulate:

1. Impacts of increased precipitation because of climate change.
2. If a landfill or dike could potentially worsen the impacts of floods on the north side of river, as it is obstructing peak flow of the river resulting in higher water levels in upstream adjacent areas but also at the project site itself (backwater effect)
3. The impact of the newly build bridges on the East and West side of the site.
4. The impact of additional discharge from the two tributary rivers north of the site.

A1 Satellite images and pictures

Year: 2003



Year: 2009



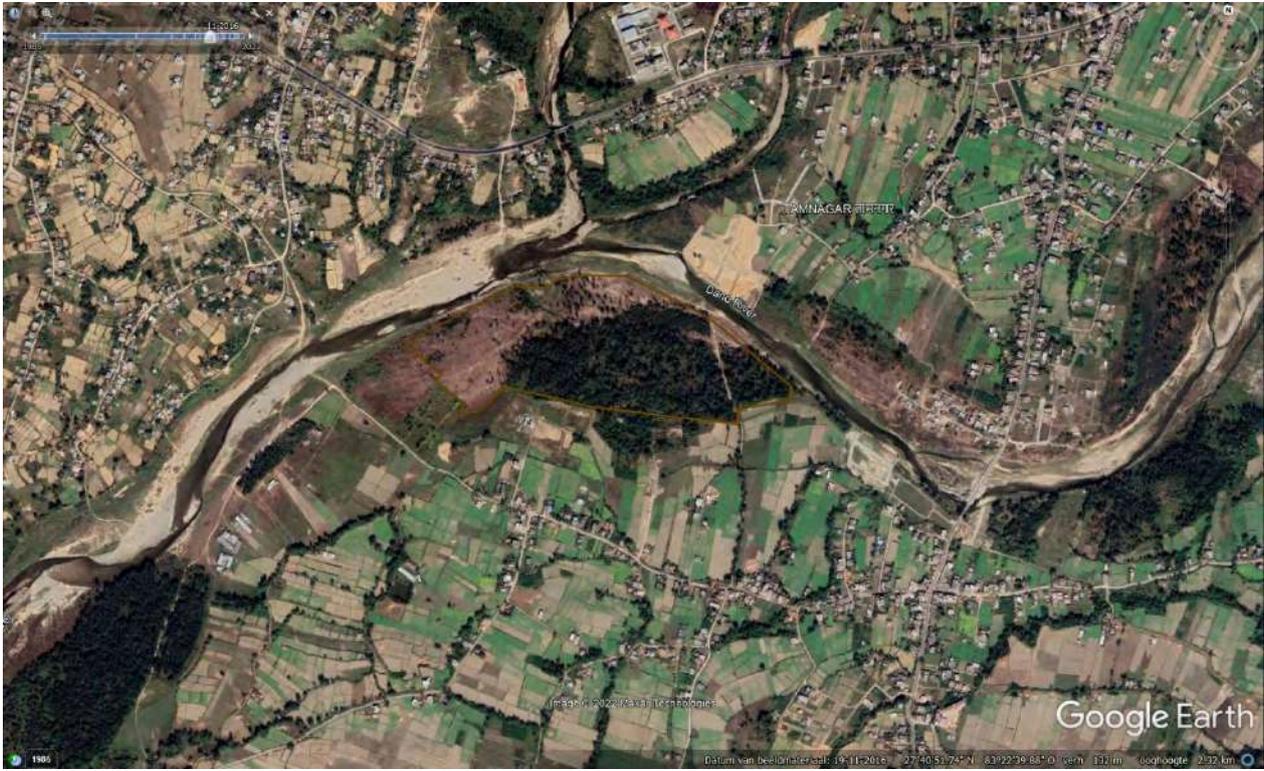
Year: 2012



Year: 2014



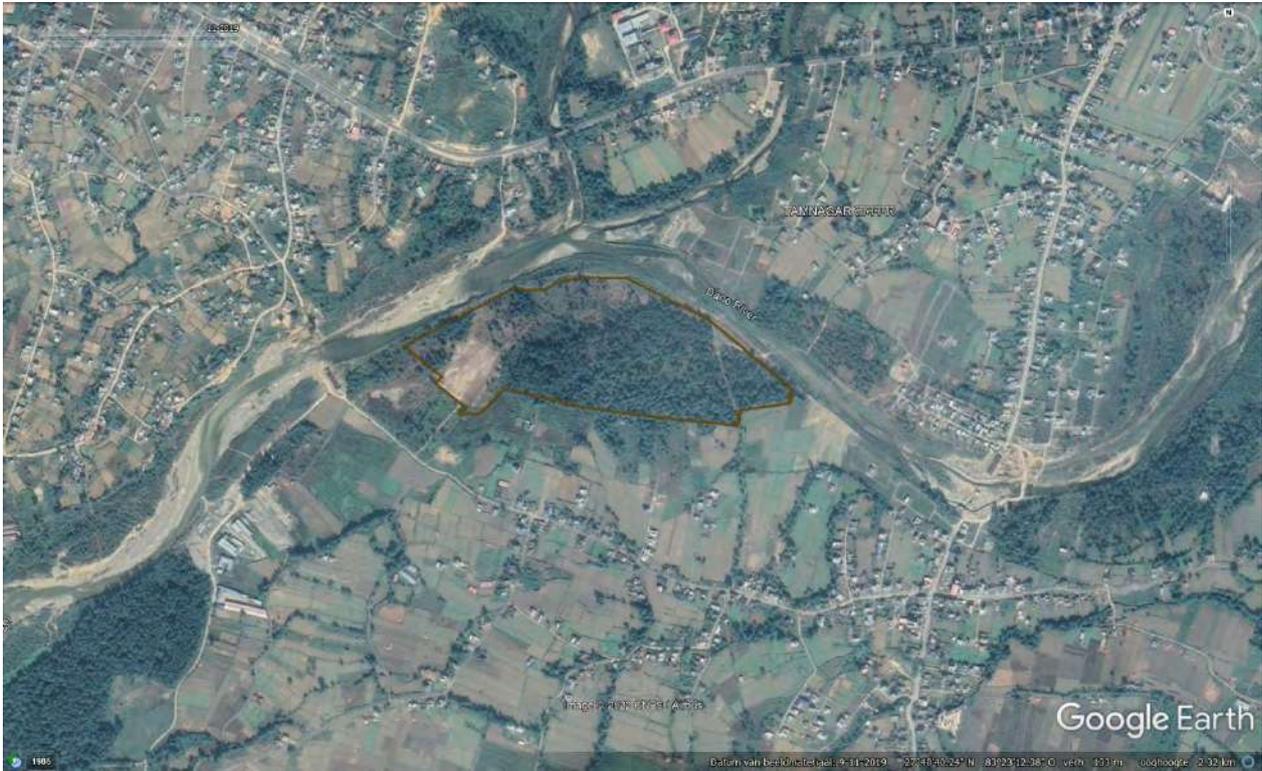
Year: 2016



Year: 2018



Year: 2019



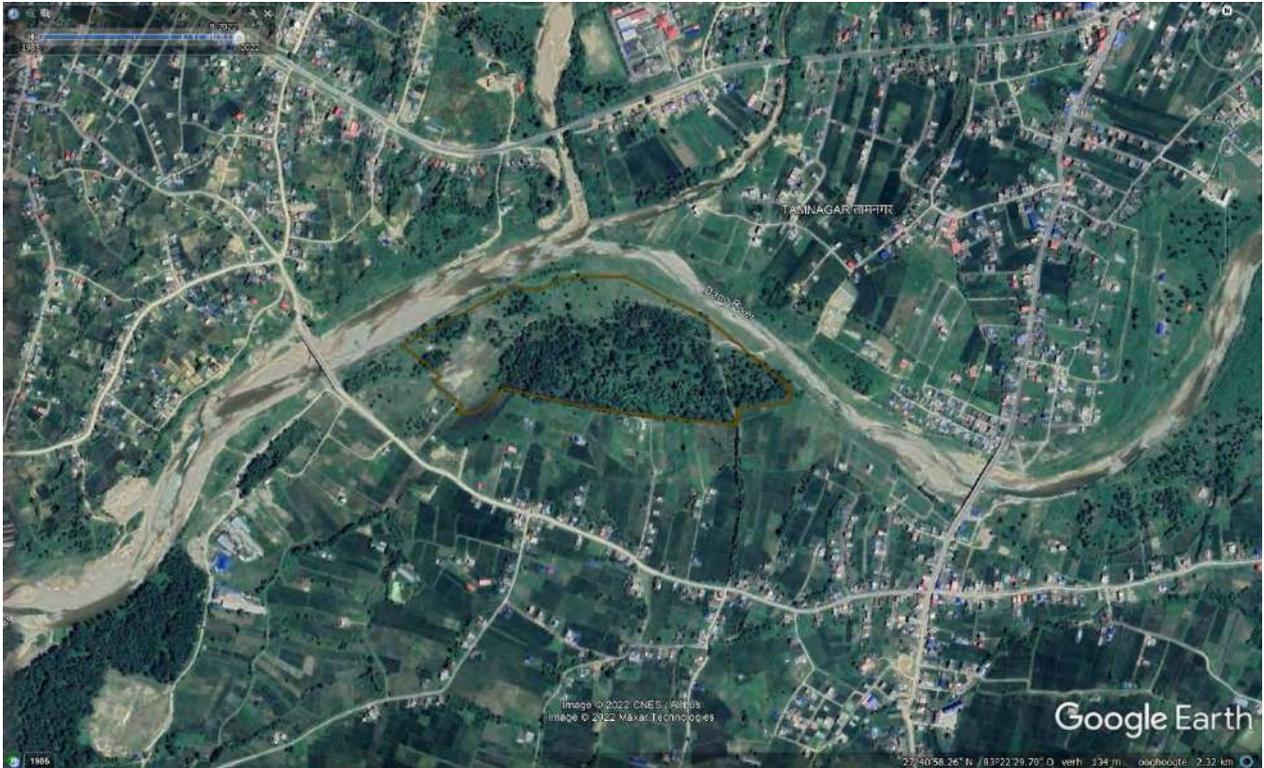
Year: 2020

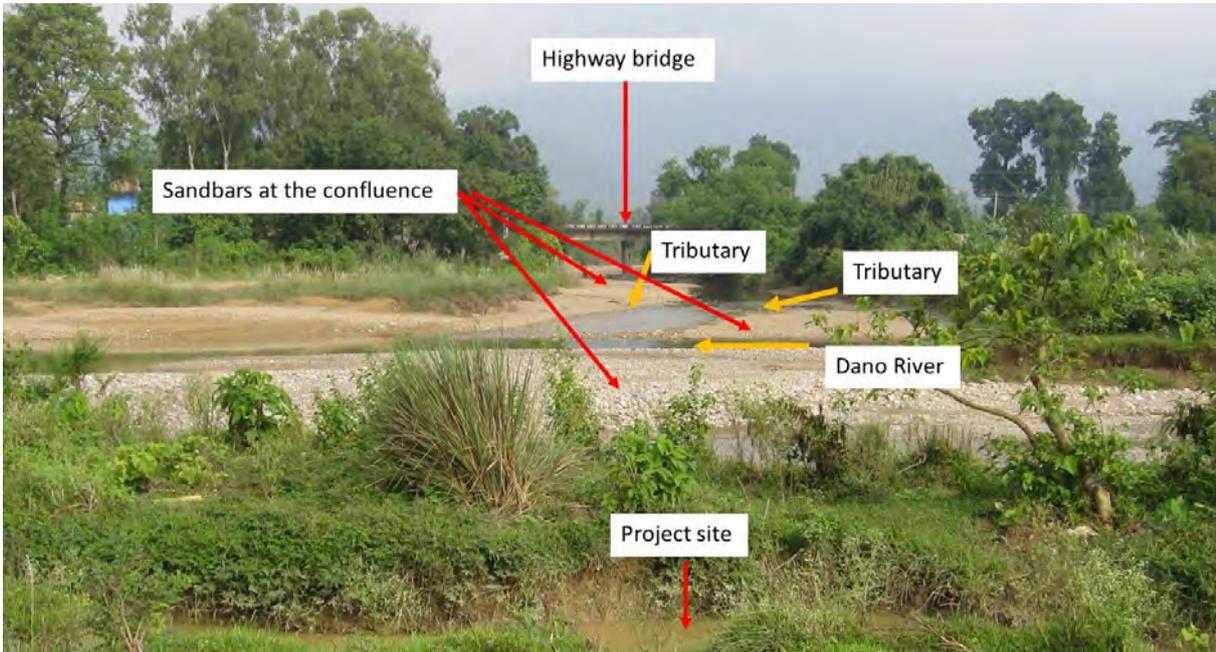
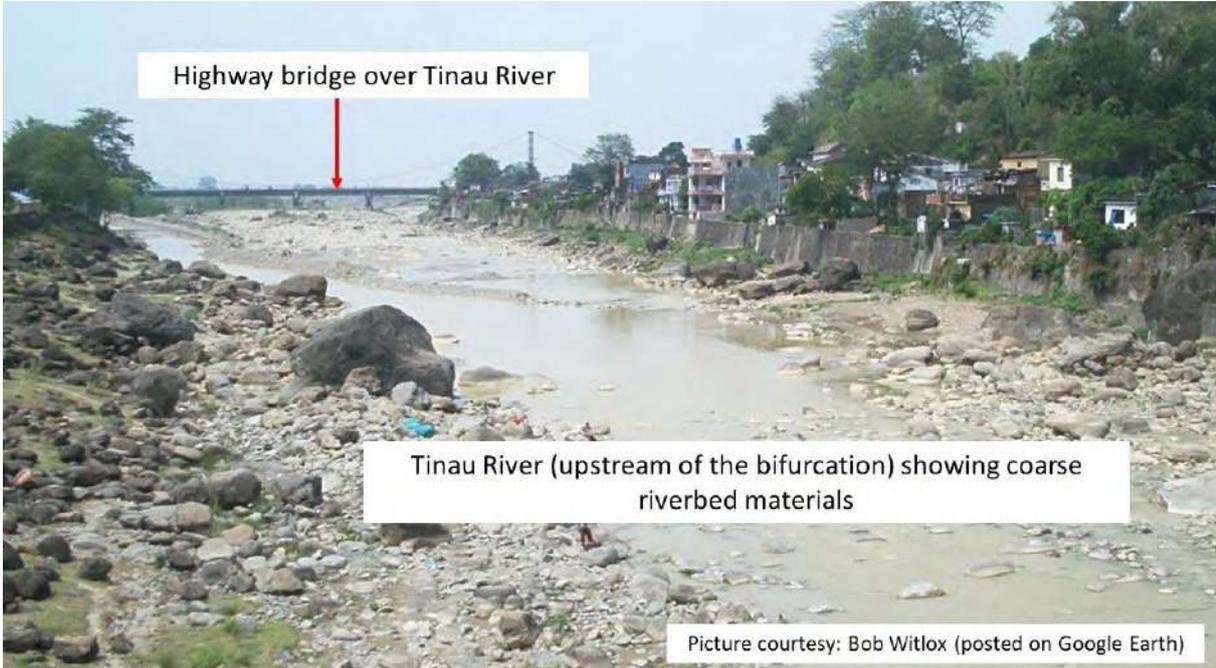


Year: 2021



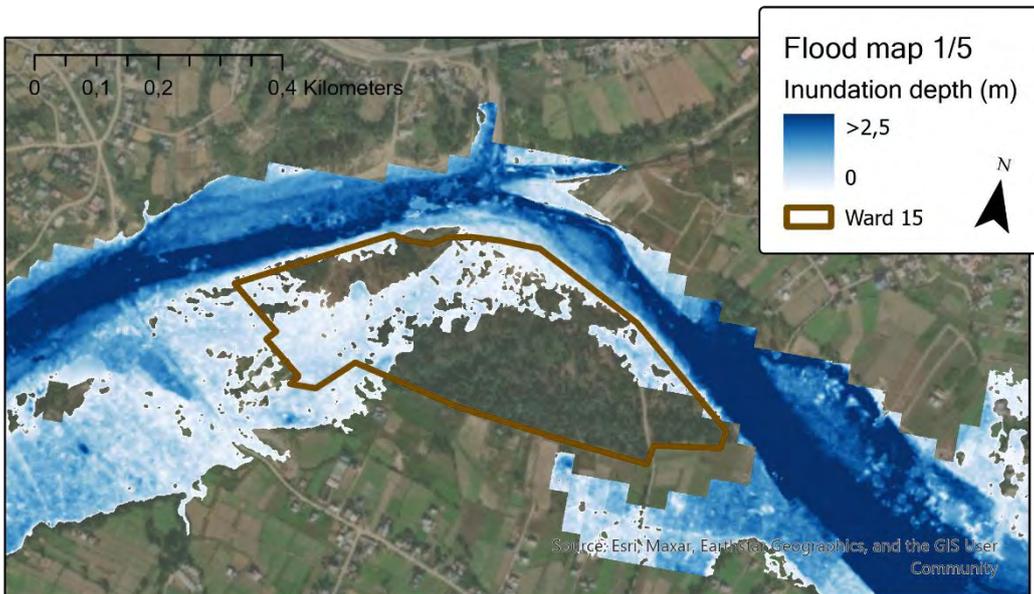
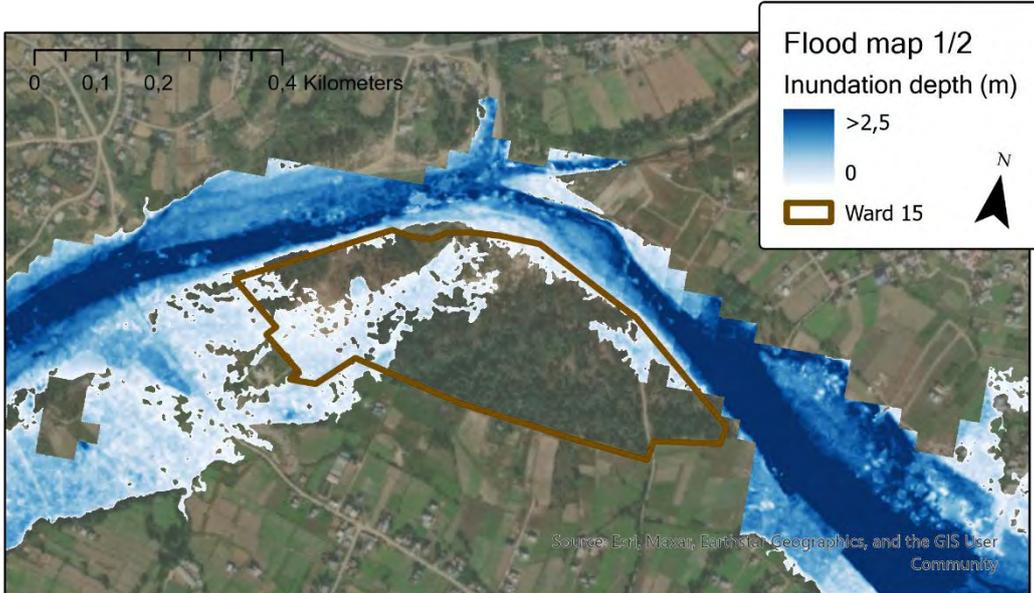
Year: 2022

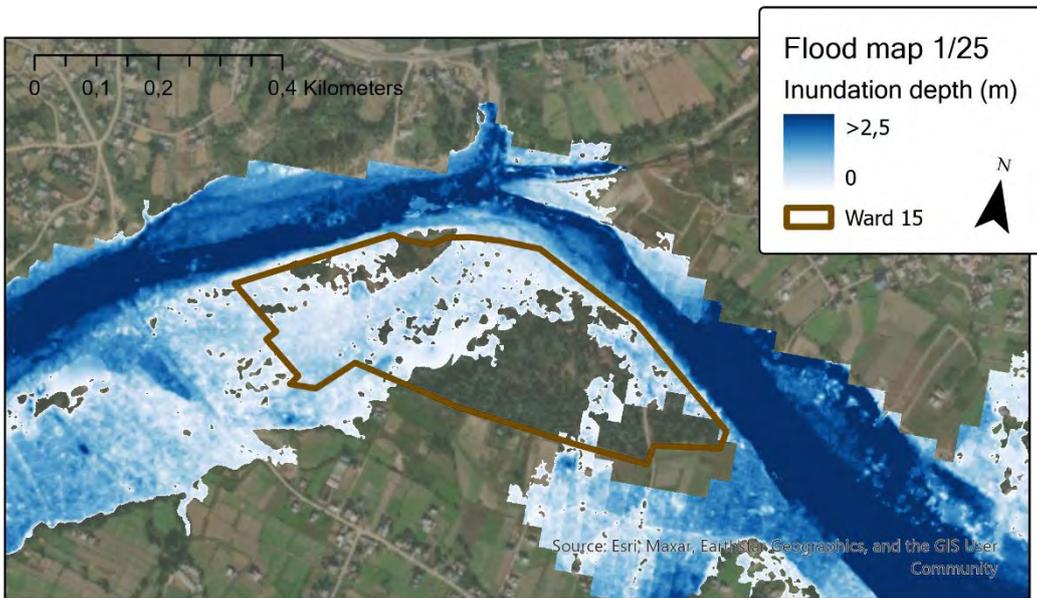
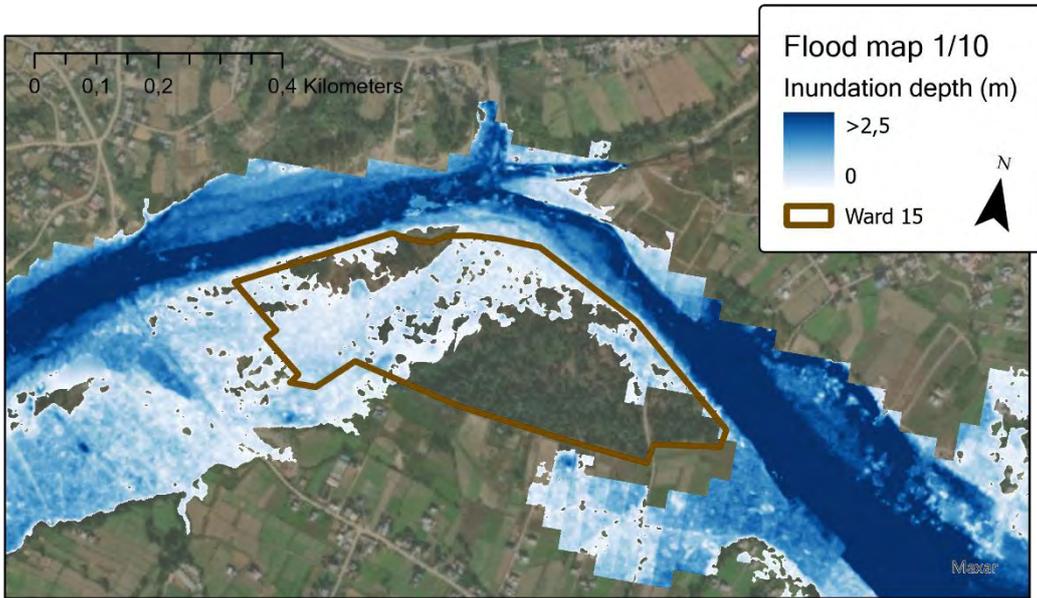


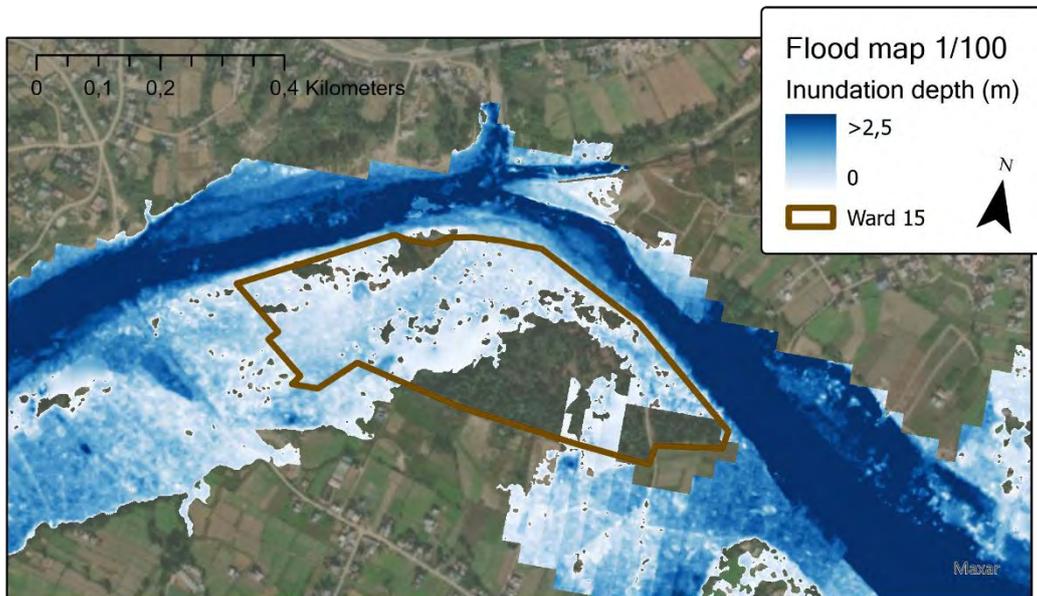
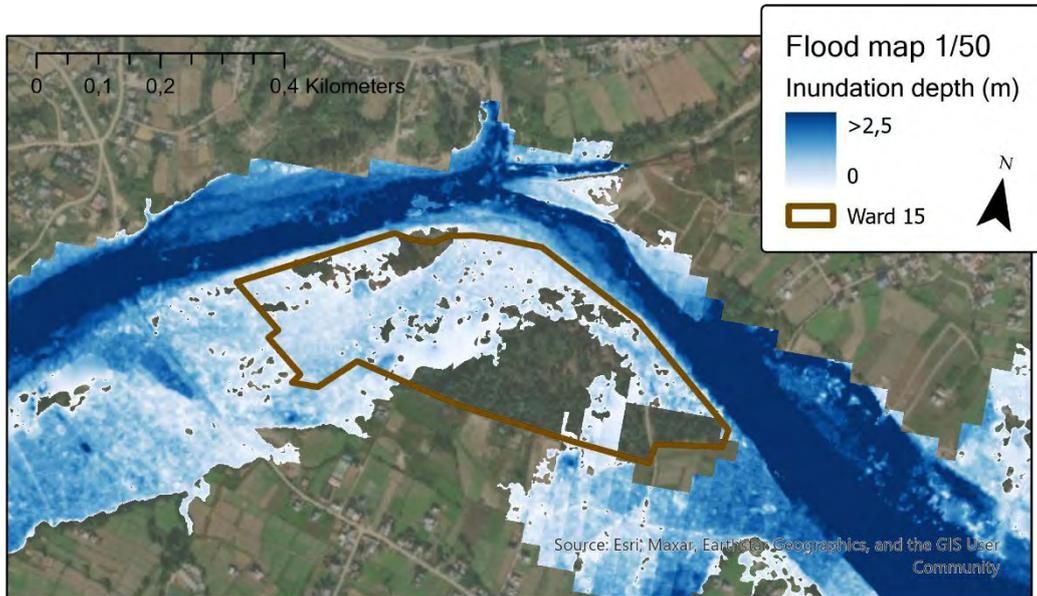




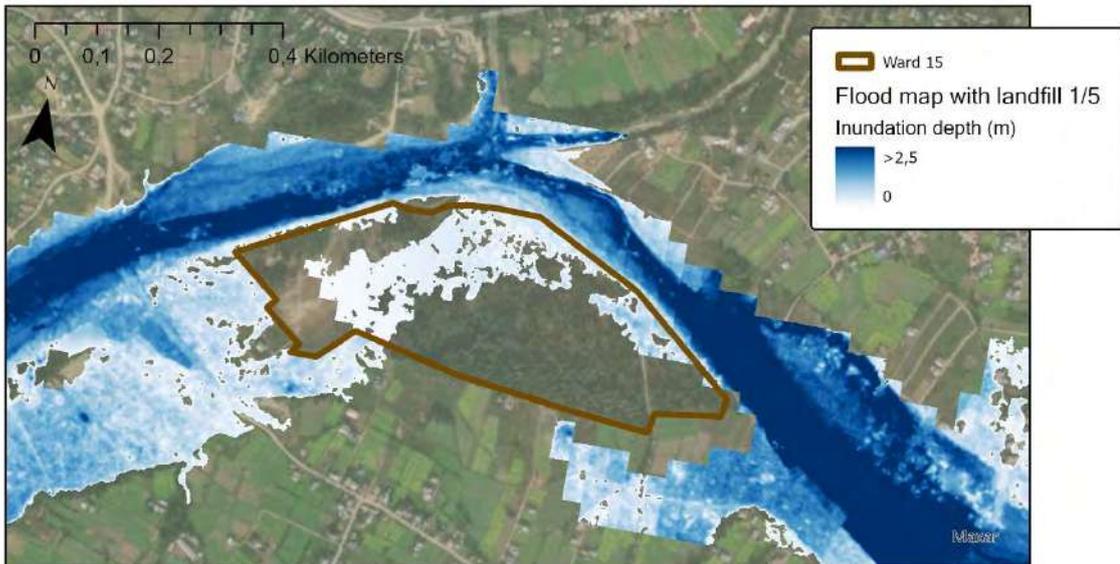
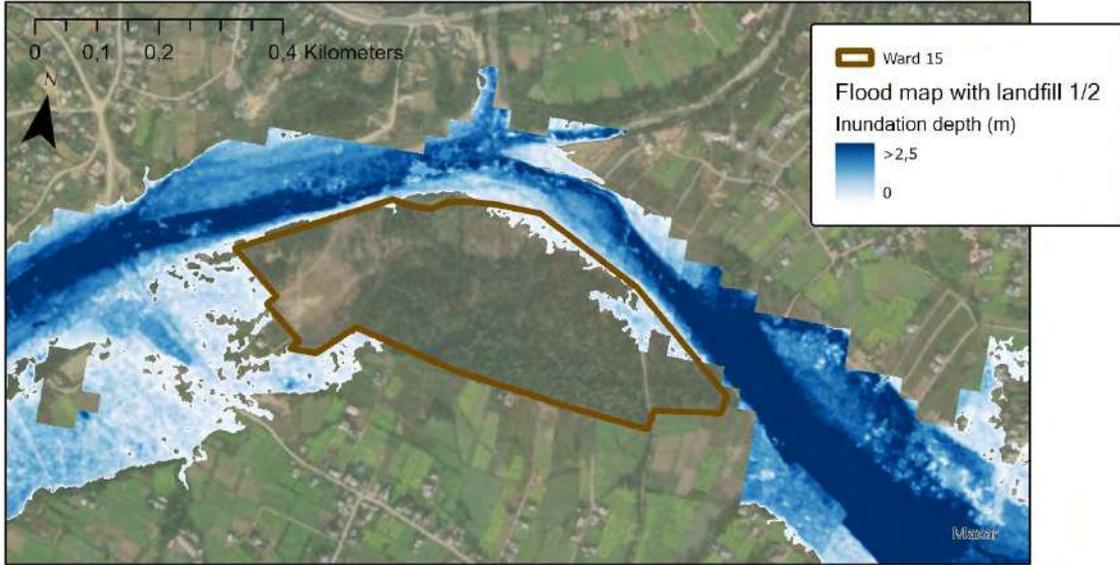
A2 Flood risk maps - baseline

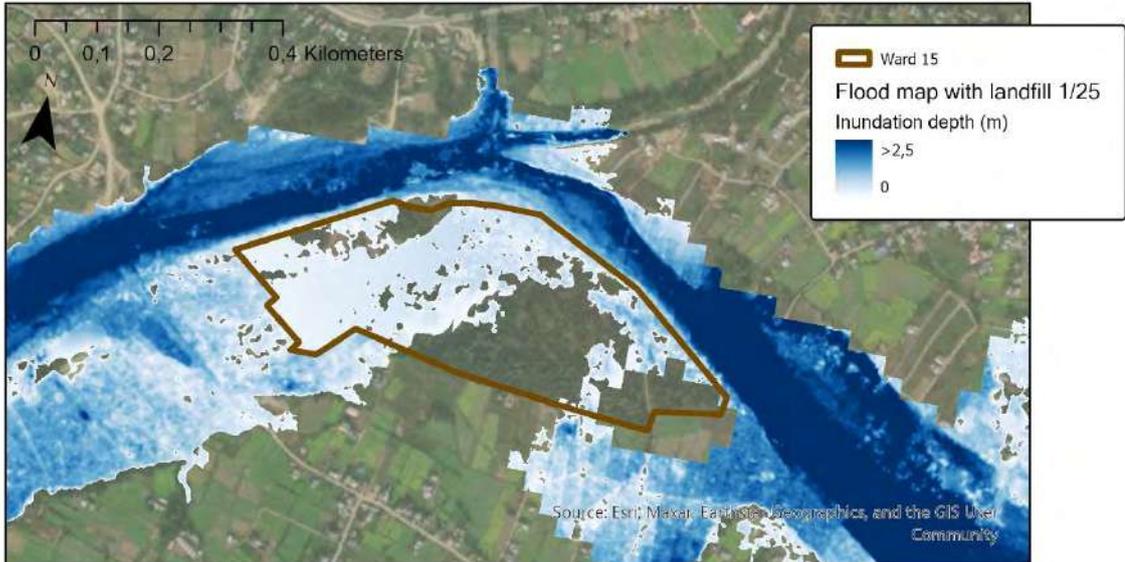
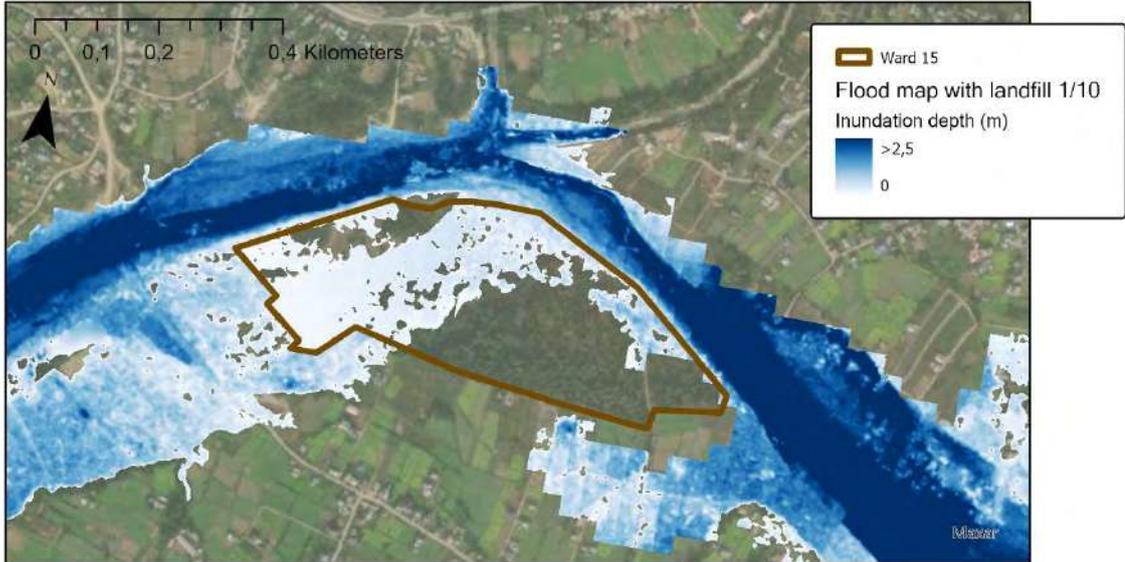


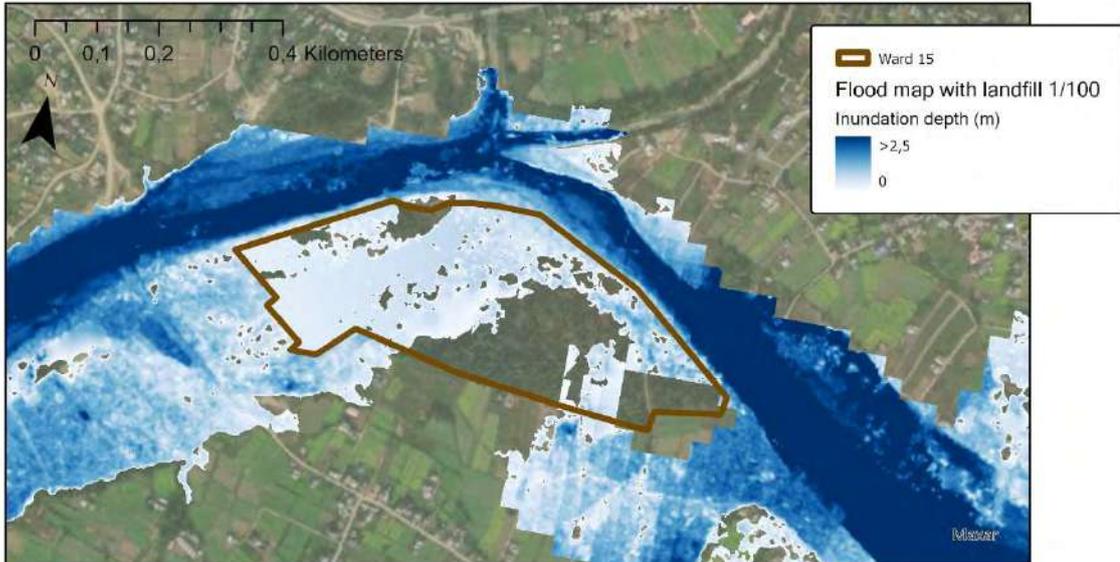
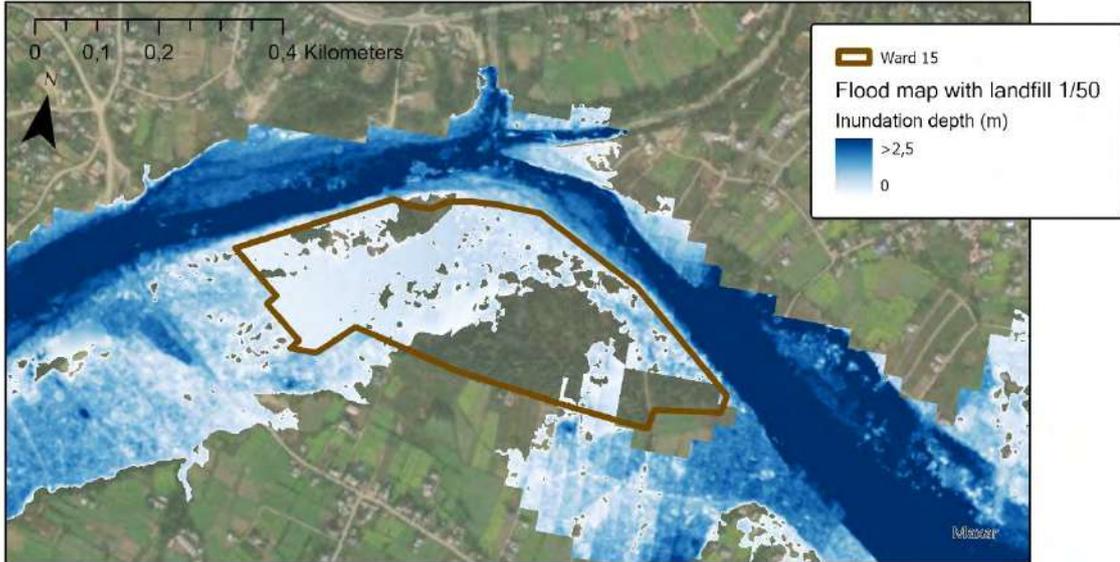




A3 Flood risk maps – with landfill







Detailed flood and morphological impact and risk assessment

Task 1: Data collection and field measurement

1. Collection of all available (historical and contemporary) ground and remote sensing data related to hydrology, hydraulics, sediment/soil, bathymetry/topography, detailed land-use, infrastructures etc.
2. Hydraulic measurement
 - a. Discharges along the main river and the tributaries
 - b. Water levels along the main river and the tributaries with the suggested stretches of the river and the tributaries (also at the confluences)
 - c. Velocity measurement along the main river and the tributaries
 - d. Discharge, velocity, and water-level measurements shall be at the same locations. However, water-level and velocity measurements shall be done in some additional locations as well (in-between, at the confluences, and near the site)
 - e. Better location for the measurements would be the bridges along the main river and the tributaries (maybe there are already some measurement locations). However, the measurements should not be affected by the bridge elements.
 - f. Assessment/mapping of the flow extent during high flows (e.g., inundation mapping using drone).
 - g. The measurement should be carried out during different flow period to capture lower and higher flows (i.e., before, during and after the monsoon).
3. River cross-section (bathymetry) measurement
 - a. About 10 km long stretch along the river Dano, starting from the confluence with Tinau
 - b. In total about 5-6 km reaches in four north tributaries (so, in total, 15-16 km)
 - c. The measurement interval should be varying (between 50 m to 500 m) depending on the morphological features (e.g., capturing sandbars and deep channels along the river and tributaries, at the bends, and the confluences with the tributaries) as well as considering the importance of the location (e.g., more regular along the reach near the project site as well as near critical infrastructures)
 - d. Given the value and importance of the proposed project development, it is suggested to measure the cross sections twice if possible (i.e., before and after the monsoon, the latter measurement can be of lower resolution for the sake of comparing the dynamics of sandbars and deep channel in some key locations)
4. Topography measurement
 - a. The cross-section measurement should also capture the floodplain topography
 - b. The topography of the project site should be measured with special care (in conjunction with cross-sections as well as in more detail where the variation is larger).
 - c. The topography of the important floodplains, for example the floodplain at the north between the river and the highway (the max extent is less than 1 km from the riverbank)
 - d. Elevation of the embankments, highways/roads, bridges in the river and the tributaries within the reach of interest (as mentioned above)
 - e. The high-resolution DTM of the area can be generated, e.g., using drone-based survey and post-processing techniques that could be feasible given the small area.
5. Sediment measurement

- a. Sediment samples at various location along the river and the tributaries, e.g., at the location of the hydraulic measurements, at the sandbars/deposits, and deep channels
 - b. Not only surface sediment but also some core sampling, particularly from the sandbars, near the confluences and near the project site), shall be taken (to the possible extent to assess the vertical sediment sorting).
 - c. Bank material sampling (with a focus on both banks along the stretch near the project site)
 - d. Grain-size distribution analysis of all the samples
 - e. Sediment concentration measurement at the same locations where the flow discharges are measured (during the monsoon period) – at least three samples over the flow depth (near the surface, in the middle and near the bed)
6. Mapping of infrastructure and assets
 - a. All the important infrastructures, their alignment, and features (e.g., roads, embankments, river training/ bank protection measures, canals, intakes/flow diversions, bridges, culverts, houses, and other critical infrastructure)
 - b. Detailed land use with a focus on the project site (e.g., vegetation types and extent, settlements, agricultural areas etc.)
 - c. Remote-sensing data in complement with the ground measurement would be useful.
 7. Geotechnical measurement of the project site and opposite banks
 8. Climate change impacts on the area
 - a. Determine how climate change will influence the area (e.g., increased precipitation) for two climate change scenarios: SSP2-4.5 and SSP5-8.5

Task 2: Modelling and analysis

1. Quality assessment and analysis of the historical data and field measurements as well as data preparation for the modelling (4-5 days)
2. Hydrodynamic modelling (15-20 days)
 - a. Developing a two-dimensional (or 1D2D coupled) hydrodynamic model with the river and tributaries including the floodplains
 - b. All the elements, e.g., embankments, roads/highway and other elements that may lead to flow congestion, shall be considered.
 - c. The model shall be verified based on the ground measurements
 - d. Scenario analysis for the risk assessment can be done for dynamic conditions (providing a synthetic flood wave with the peaks of different return period). This will help to assess not only static flow depth but also time-varying flow strength as well as the time of the inundation, in turn, the corresponding risks.
 - e. Generate flood maps with different return periods for present and future conditions (i.e.: 1, 2, 5, 10, 25, 50, 100, 200-year return period).
3. Flood-risk assessment
 - a. Exposure and vulnerability mapping, linking the identified infrastructure and assets to depth-damage curves
 - b. Calculate damage for present conditions and future conditions for all return periods.
 - c. Risk mapping as Expected Annual Damage (EAD) or Average Annual Loss (AAL) for present and future conditions.

4. Morphological analysis and modelling (17-20 days)
 - a. Morphological analysis based on ground measurement and remote-sensing data
 - b. Modelling sediment transport and morphology to support the expert judgement on morphological impacts and risks related to the interventions using a two-dimensional (depth-averaged) morphological model
 - c. Expert judgement on bank erosion and risk
5. Geotechnical analysis

Task 3: Climate resilient options – identification and appraisal

1. Identification of longlist for possible climate resilient options that should consist of a combination of nonstructural measures (land use planning, improving building and infrastructure standards and practices, early warning systems, and institutional strengthening of the disaster risk management system), nature-based solutions (e.g., blue-green urban infrastructure) and structural interventions (e.g., embankments, dredging, upstream retention, etc.). Even financial measures, such as flood insurance can be considered.
2. Using a Multi-criteria analysis to compose a shortlist of measures, integrating social, and environmental values.
3. Economic appraisal of the shortlist of measures, such as a Cost-Benefit Analysis, to find the optimal level of protection based on their CAPEX/OPEX estimates and benefit from reducing flood risk.



16. Climate impact assessment memo

Note / Memo

HaskoningDHV Nederland B.V.
Industry & Buildings

To: Specialists
From: Violeta Paginu
Date: 1 May 2023
Copy:
Our reference: BH4289-RHD-ZZ-XX-NT-Z-0001, rev 1
Classification: Internal use only
Checked by: Raffael Argiolu

Subject: ESIA Assessment Specialist Framework: Climate Change

1 Introduction

1.1 Relevance aspect

The Butwal region is highly sensitive to the impacts of climate change. The country is particularly vulnerable to the effects of extreme weather events such as floods, landslides and droughts, which can damage the market and abrupt the economic activities. The changes in rainfall pattern and temperature increase can affect crop yields and productivity, leading to food insecurity and loss of income for farmers.

Overall, the market is highly sensitive to the impacts of climate change. Sensitivity being the degree to which the market is affected, either adversely or beneficially, by climate variability or climate change. Climate change can have direct impacts to the design of agriculture investment projects and indirect impacts to the value chain of the agricultural sector. Therefore, climate change needs to be incorporated in the design to build resilience to the potential negative effects.

The Think Hazard website identifies the following hazards with a medium or high climate risks for the Butwal region:

- Extreme heat - high;
- Water scarcity - high;
- Earthquake - medium;
- Landslide – high;
- Wildfire - high;
- River flood - medium.

In addition to the above, based on the knowledge of the project area, wind and hailstones is also a possible climate induced risk.

To determine how climate change may affect the market, i.e., which climate parameters are critical to performance and durability, and in what way is the area already being affected by increasing variability and extremes in these parameters under the current climate, the following receptors were chosen to assess the exposure and potential impact of the identified physical hazards:

1. Extreme heat – change in monthly maximum temperature and the number of very hot days;
2. Heavy precipitation – change in total amount of precipitation accumulated within the 1-day and 5-days and the number of intense precipitation days;
3. Drought – change in maximum consecutive dry days and the cumulative rainfall deficit;
4. Earthquakes – Peak Ground Acceleration;
5. Landslides – landslide susceptibility score and change in precipitation intensity;

6. Wildfires - European Forest Fire Information System (EFFIS) classification.

The potential direct and indirect impacts of the identified hazards and existing mitigation measures incorporated in the design are described below.

With respect to the river flood, a separate Flood Risk Impact Assessment has been conducted, see EIA Appendix 15. The results of the flood risk assessment are processed into the final design of the wholesale market and costs of the future development.

1.1.1 Extreme heat

Changes in extreme heat events can have significant impacts on the market, including:

- Increased risk of wildfire with disruption of transportation routes;
- Shortened expiration date of products;
- Health and safety of the employees;
- Cooling capacity of crops – especially onion, carrot, cabbage;

Indirect impacts of extreme heat on the agricultural value chain can include:

- Modification in crop suitability and productivity (heat stress), potentially creating challenges and opportunities in both socioeconomic and food security terms;
- Increased proliferation of weeds, crop pests and disease outbreaks, which have the potential to severely limit crop production;
- Changes in crop water requirements.

To adapt to the effects of extreme heat, the design of the market incorporates several measures, including:

- Trees and vegetation to provide shading and help to cool the surrounding area.
- Cold storage with sufficient cooling capacity to extend the expiration date of products.
- Power supply designed for higher maximum temperatures.

1.1.2 Heavy precipitation

Changes in heavy precipitation events can have significant impacts on the market, including:

- Change in river discharge which intensifies and alters the extent of erosion;
- Elevated river water levels which lead to floods;
- Increase in waterlogging at the market;
- Increase in landslides with disruption of transportation routes or loss of electricity.

Indirect impacts of heavy precipitation on the agricultural value chain can include:

- Damages to crops from extreme weather events;
- Inability to cultivate lands due to increased waterlogging;
- Increase in pest incidence;

To adapt to the effects of heavy precipitation, the design of the market incorporates several measures, including:

- The market buildings are designed with elevation measures.

- Drainage system with overflow to the river to protect the market and its infrastructure from waterlogging. The drainage capacity is designed based on the maximum rainfall.

1.1.3 Drought

Changes in drought events can have significant impacts on the market, including:

- Increased risk of wildfires with disruption of transportation routes;
- Groundwater depletion.

Indirect impacts of droughts on the agricultural value chain can include:

- Lower yields from crop damage, stress, and/or failure;
- Loss of arable land as a result of land degradation and wind erosion;
- Reduction of water availability for rainfed crops;

To adapt to the effects of drought, the design of the market incorporates several measures, including:

- Rainwater harvesting from the roofs to reduce the demand on groundwater pumping, as well as provide a source of water in drought periods.

1.1.4 Earthquakes

Earthquakes can have a significant impacts on the market, including:

- Structural damage;
- Disruption of transportation routes;
- Broken gas lines fuelling fires;
- Loss of electricity.

To adapt to the effects of earthquakes, the design of the market incorporates several measures, including:

- The design of the buildings follows the Nepali building codes and standards to ensure the market is structurally sound and able to withstand earthquakes.

1.1.5 Landslides

Landslides can have a significant impacts on the market, including:

- Disruption of transportation routes;
- Loss of electricity.

The market is located in an area that is not directly vulnerable to landslides. The risk of landslide is more realistic for the catchment area. No measures have been therefore incorporated in the design to adapt to the effects of landslides.

1.1.6 Wildfires

Wildfires can have a significant impacts on the market, including:

- Disruption of transportation routes;

Indirect impacts of wildfires on the agricultural value chain can include:

- Destruction of crops in the path of the fire;
- Destruction of outer layers of crops not even seen by fire by smoke and heat;
- Effect to the nearby community.

To adapt to the effects of wildfires, the design of the market incorporates several measures, including:

- Fire breaks, such as no adjacent forest, are created around the market to help slow or stop the spread of wildfires.
- The building is fire-proofed with sprinkler systems to protect the market from wildfire damage.

1.2 Baseline description

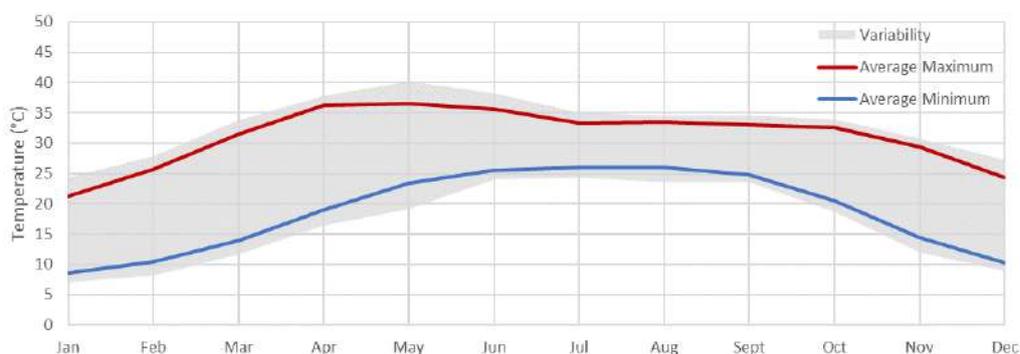
Characterized by a humid subtropical climate influenced by monsoon seasonality, Butwal has a dry season typically from October to May, followed by a rainy season that peaks in July. The climate of Nepal can be categorized in four seasons, namely:

- pre-monsoon (March–May) characterized by hot and dry weather with mostly localized precipitation;
- monsoon (June–September) characterized by widespread precipitation;
- post-monsoon (October–November) characterized by a dry season with sunny days;
- winter (December–February) cold season with precipitation mostly in the form of snow in high-altitude mountainous regions.

From the in-situ observational records from Rupandehi District for the past 30 years, the annual cycle of monthly temperature and precipitation are calculated and shown in Figure 1-1. The temperature fluctuates between 7°C in January to 40°C. The months April and May in the pre-monsoon season are the hottest months and the maximum temperature ranges from 35°C to 40°C.

Heavy precipitation events are frequent in the monsoon period. More than 80% of the rain occurs in the monsoon (June – September). Precipitation events with more than 100 mm/day are frequent in the Rupandehi District. Total average annual rainfall received in the Rupandehi District is 1,808 mm.

Nepal has a history of drought and long dry spells in the past. The central region of Nepal suffered from major drought events, among them, 1992 was the worst drought year, followed by the drought year 2015. Based on the observational data drought conditions have intensified over the past 30 years.



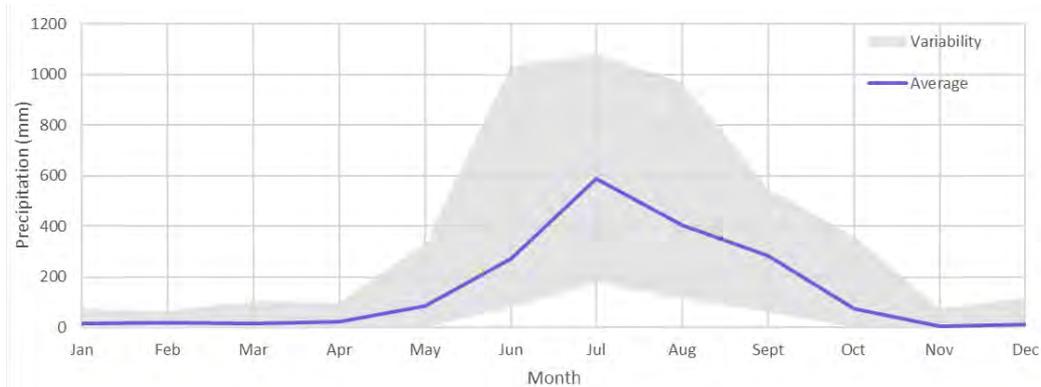


Figure 1-1: Monthly temperature and precipitation including observed variability. Source: Department of Hydrology And Meteorology: Rupandehi District meteorological station.

2 Impact assessment on climate change

2.1 Introduction

The goal of the Climate Change Risk Assessment (CCRA) is to identify and assess current and anticipated climate change risks for the market with climate change projections to determine the vulnerability to climate-based risk. Based on the characterization of projected climate change risks the CCRA seeks to inform about key hazards and their likely impacts under different climate change scenarios.

2.2 Methodology

CCRA relies on up-to-date climate data to identify and analyse how the climate has changed and is projected to change. Climate projections represent how the climate will evolve in response to greenhouse gas (GHG) concentration trajectories coupled with assumed policy actions leading to reductions in GHG emissions.

2.2.1 Climate scenarios

Climate change scenarios are constructed using climate projections from general circulation models (GCMs). GCMs estimate how a climate may change in the future for climate variables, such as temperature and precipitation. However, projections have many uncertainties and are therefore not forecast or predictions but provide possible future scenarios. Evaluation methods should recognize and accommodate uncertainty in the projections as a single or several GCMs may not represent the full range of potential climate changes in a region.

In this assessment, multiple plausible projections are considered to cover the uncertainty and define a bandwidth of future climate scenarios. The climate change scenarios used follow two shared socioeconomic pathways (SSP) scenarios for atmospheric GHG concentrations:

- **SSP2-4.5 – stabilization scenario:** Intermediate scenario leading to a warming at the end of the 21st century of more than 2°C relative to relative to the pre-industrial period (1850–1900).

- **SSP4-8.5 – business-as-usual:** Most severe scenario leading to a warming at the end of the 21st century of probably more than 4°C relative to the pre-industrial period (1850–1900). For physical risks only.

And two future periods 2040-2059 (medium term) and 2080-2099 (long term). However, considering the lifetime of the market, special focus will be dedicated to the medium term.

2.2.2 Climate projections

The basis to predict the future climate are the scenarios developed by the Intergovernmental Panel on Climate Change (IPCC). The most recent climate projections are provided by the IPCC as published in the Sixth Assessment Report (IPCC AR6, 2022) and provides projections on a global scale.

In the choice of climate projections to construct future scenarios, it is essential to work with climate data that can reproduce the climate patterns at the local scale of the project. Spatial differences arise from variances in topography, such as mountainous and coastal areas, where a single pixel does not capture the full range of climate patterns. The topography in the area of Butwal is considered uniform with minor spatial differences. Therefore, the coarser resolution of the recent IPCC AR6 climate projections are deemed sufficient to properly represent the climate.

2.2.3 Climate baseline

A climate baseline serves as the benchmark against which potential impacts of climate change are measured. The analysis of historical data helps identify trends in the climate variables and allows for the ground-truthing of the climate projections.

A current climate baseline is created to compare with the IPCC AR6 climate projections. The baseline was defined with meteorological data from the ERA5 ECMWF reanalysis model (Hersbach, et al., 2018). ERA5 provides hourly estimates of a large number of climate variables and covers the earth with a 30 km spatial resolution and a 1-hourly temporal resolution. The available resolution provides insights in the varieties over the year on a finer small scale in the past and therefore downscale the climate projections. The baseline was calculated for the period 1995-2014 to match with the changes in climate variables from the IPCC AR6 projections.

2.2.4 Hazard exposure method

The method to assess the exposure of the identified physical hazards is described below for each receptor.

Extreme heat

The impact of climate change on extreme heat are described by changes in the monthly maximum temperature and the number of very hot days, days with temperatures above 35 °C.

Heavy precipitation

Heavy precipitation events are described with the total amount of precipitation accumulated within different time windows, the 1-day and 5-days, and the number of intense precipitation days, days with rainfall exceeding 20 mm.

Drought

Droughts are periods with sustained deficit of precipitation and are described with the maximum consecutive dry days (days with precipitation less than 1mm/day) and by taken the difference between the amount of precipitation and the potential evaporation. This cumulative rainfall deficit is a robust way to quantify droughts as it considers how much 'relieve' a rain event brings in the existing hydrologic conditions. A serious drought situation is taken where the cumulative rainfall deficit is above the threshold of 300 mm.

Earthquakes

The impact of earthquakes is assessed with a probabilistic earthquake map based on a compilation of regional seismic data in Peak Ground Acceleration (PGA). The PGA is considered the most relevant dimension to quantify seismic exposure as it includes the magnitude of the earthquake and the effect on the surface that cause the actual damage. Regional differences in geological properties are therefore accounted for. Climate is not considered a direct component of earthquakes, as earthquakes are not caused by weather or climate-related phenomena.

Landslides

Characterizing the location and timing of landslide events over broad areas is extremely challenging due to the wide range of atmospheric and subsurface conditions that can result in slope failure. The exposure of landslides is based on a susceptibility score considering precipitation, the terrain, the geology, the seismic activity, deforestation, nearby roads, and historic events.

Wildfires

Weather has a significant impact on the occurrence of wildfires – how a fire starts, how aggressively it spreads, and how long it burns. The exposure to wildfires is based on meteorological conditions favourable to the start, spread and sustainability of fires. The exposure to wildfires is based on the European Forest Fire Information System (EFFIS) ‘high’ classification, higher than 30.

2.3 Impact

2.3.1 Impact of extreme heat and other climate induced events

The monthly maximum temperature is projected to increase for all months under all climate scenarios. Under SSP8.5 the increase is 1.5-2 °C and 3-5 °C, respectively for mid (2040-2059) and late century (2080-2099)(Figure 2-1). The increase in year-round maximum temperature is significant and shows projected temperatures >28 °C even for the winter months.

The changes in frequency of extreme temperature are even more significant. The projected increase in the number of very hot days, days with daily maximum temperature above 35 °C, is likely to almost double in the pre-monsoon in 2080-2099 under SSP8.5 (Figure 2-2).

Furthermore, warm days and nights, and consecutive dry days are predicted to increase while cold days and nights, and consecutive wet days will be decreasing.

It is very likely the effect of climate change makes the market increasingly exposed to extreme heat and other climate induced events. These climate events will have implications on production, transportation and storage of commodities as well as operating/worker conditions of the future market. Cold storage and power supply are designed to withstand increased temperature. HSE operation plans shall consider these climate induced events and adapt to them in the best way possible.

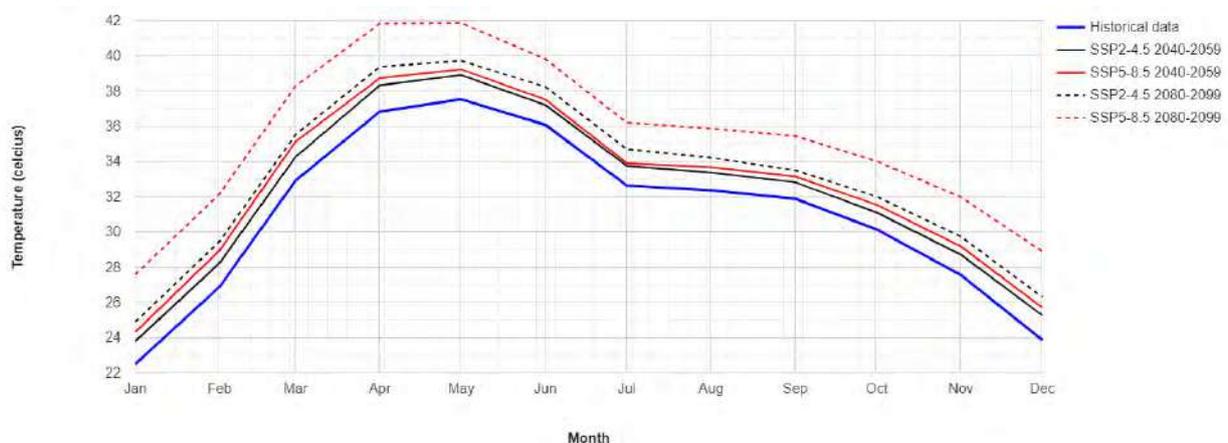


Figure 2-1: Monthly maximum temperature (average of the period)

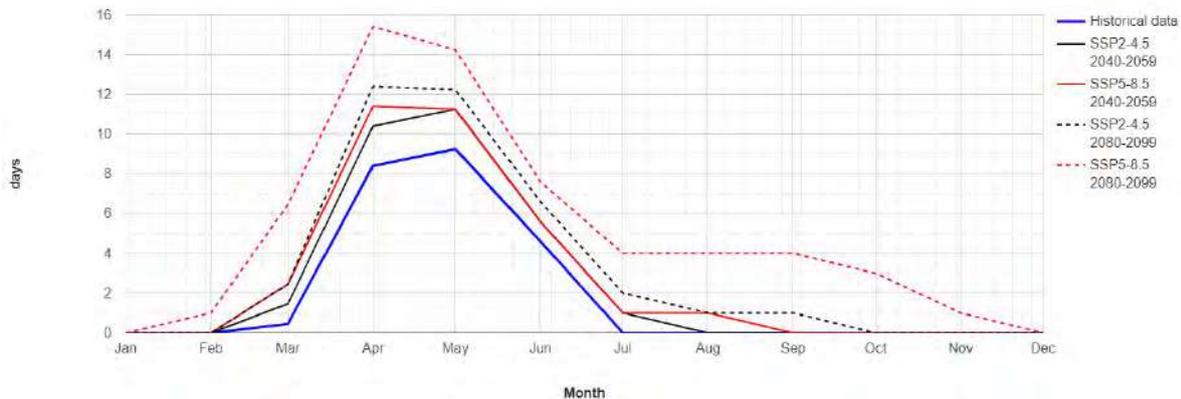


Figure 2-2: Monthly number of days with maximum temperature above 35 °C

2.3.2 Impact from heavy precipitation

The frequency of daily heavy rainfall is expected to slightly increase for the monsoon months in 2080-2099. In July an additional 2 days with heavy rainfall of more than 20 mm/day are projected in 2080-2099 under SSP8.5. No significant changes is seen for the 2040-2059 period.

The intensity of rainfall events is projected to increase for the monsoon months for all climate projections. The rainfall intensities are given for the maximum 1-day rainfall together with the maximum 5-day rainfall in Figure 2-4 and Figure 2-5.

The baseline from 1995-2014 showed a daily precipitation maximum of 100 mm/day. This is projected to increase to a maximum of 125 mm/day in August in 2080-2099 under SSP8.5. The other climate projections show only slight increases for the daily rainfall.

The changes in maximum 5-day rainfall are more significant and seen for all climate projections. The baseline showed 5-day precipitation maximum of 200 mm in August and is projected to increase to 225 mm in 2040-2059 and to 275 mm in 2080-2099 under SSP8.5.

Flood events can occur from even moderate rainfall events if it occurs simultaneously with already elevated water levels. The area is frequently affected by floods in the past. The increased rainfall intensity accumulated over multiple days means that much additional rainfall will come during consecutive days and increased risk of floods is expected.

It is likely the effect of climate change makes the market as well as connecting roads increasingly exposed to heavy precipitation and increased water elevation in the Dano River.

No further adaptation measures are defined as the buildings are elevated to decrease flood risk and a sufficient drainage system is included in the design. Further adaptation for river floods is described in the Impact assessment on flood risk, Appendix 15 to EIA.

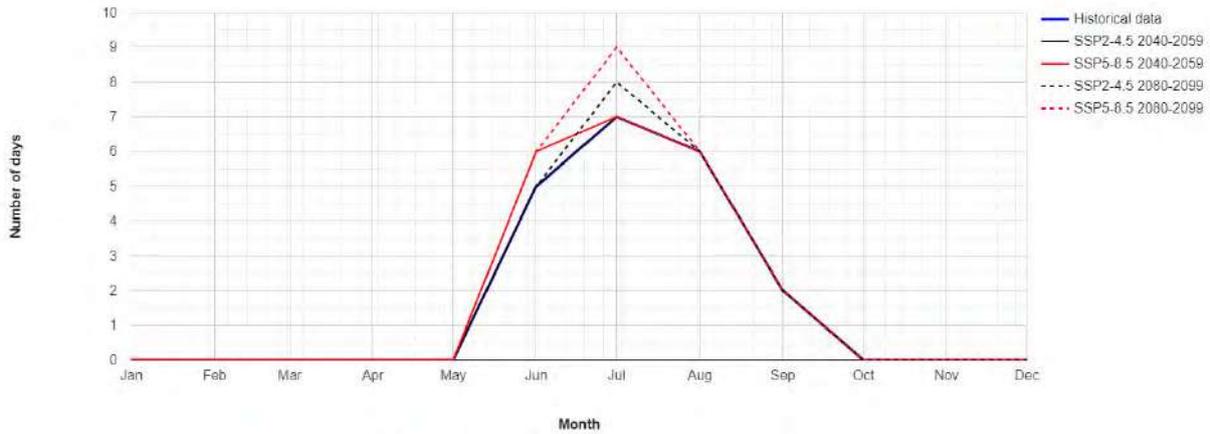


Figure 2-3: Monthly number of days with extreme rainfall (>20 mm/day)

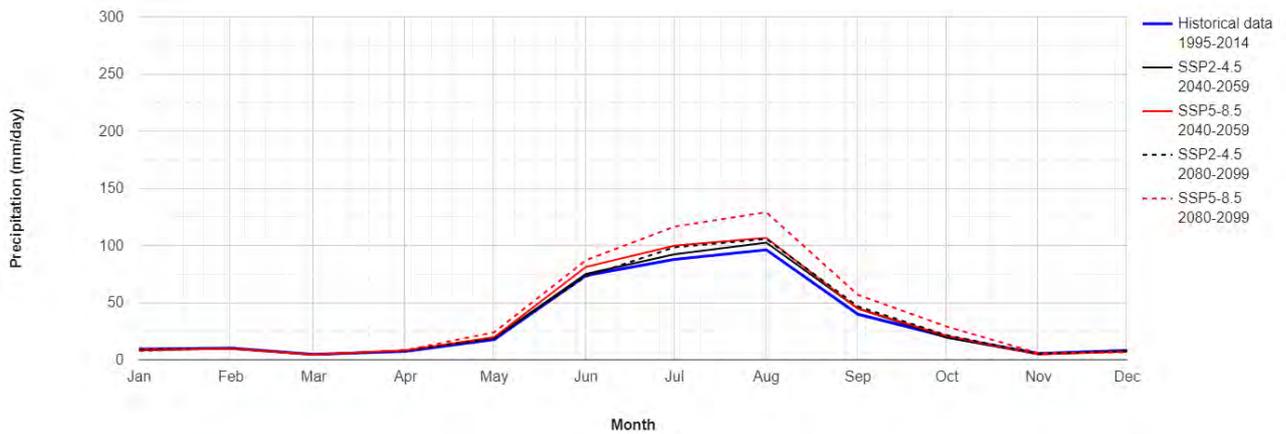


Figure 2-4: Monthly maximum 1-day precipitation

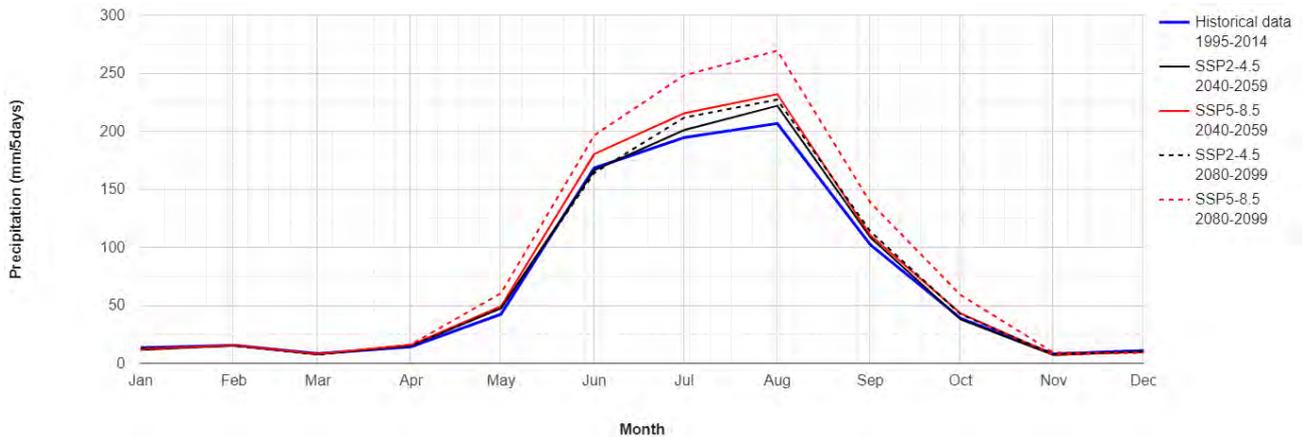


Figure 2-5: Monthly maximum 5-day precipitation

2.3.3 Impact of drought

The region around the market experiences drought seasonally for long periods every year with an average of 266 days/year. The maximum number of consecutive dry days, days with precipitation less

than 1 mm/day, is an average of 48 days. The climate scenarios show no significant change in the probability of severe drought conditions.

A study by Bagale et al. [3] showed that monitored summer and annual drought events have an increase in drought frequency and intensity recorded in the area around the market since 2005. This indicates that in the future long-term drought conditions are likely prolonged and more severe.

It is likely the effect of climate change makes the market increasingly exposed to severe drought conditions.

Further adaptation to the impact of drought is described in the impact assessment on groundwater section. Such as the measure to monitor the groundwater level in the area to prevent groundwater depletion.

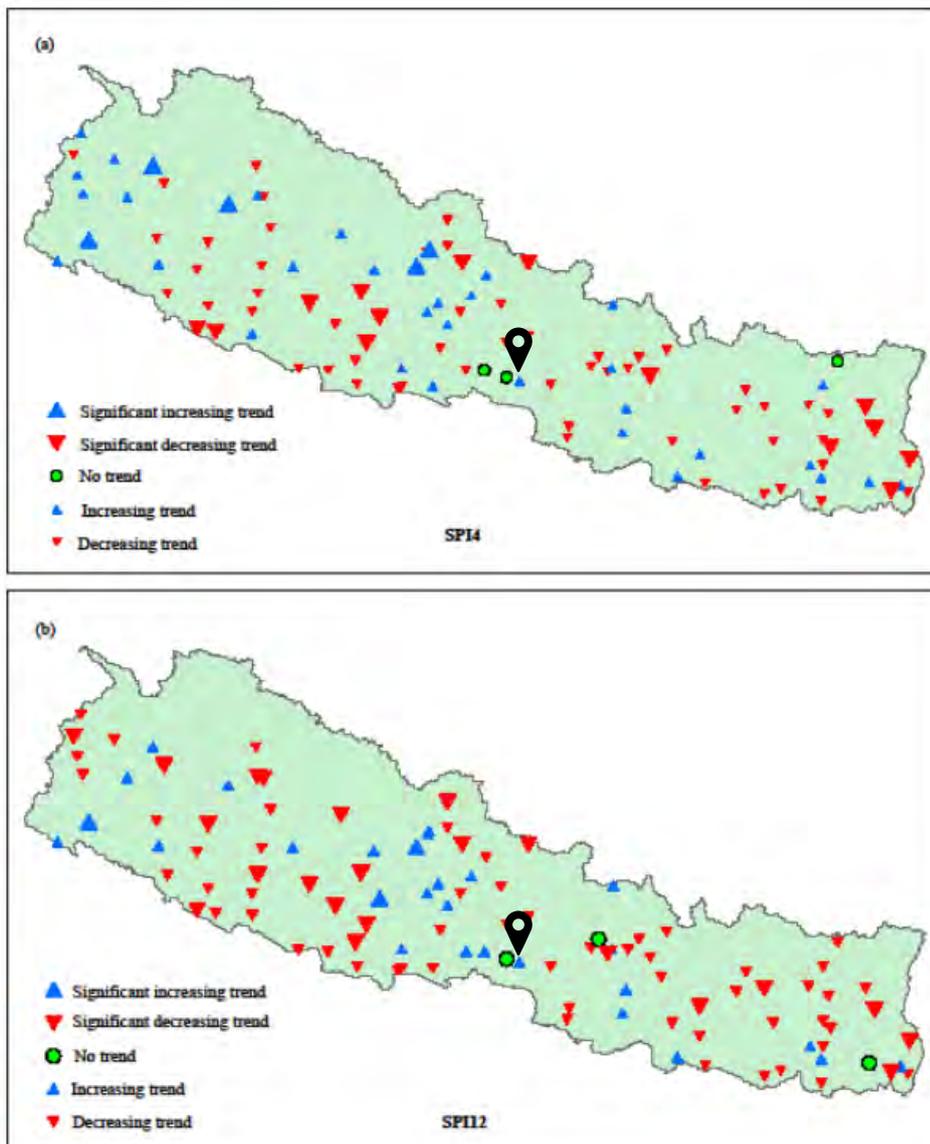


Figure 2-6: Drought trend analysis of summer (a) and annual (b). A decrease indicates increasing drought frequency [3].

2.3.4 Impact of earthquakes

The market is located in a high seismically active area where earthquakes with a ground peak accelerations (GPA) of 3.49 m/s^2 can be expected with a 10% probability of occurrence in 50 years - equivalent to the highest earthquake expected in 500 years.

An earthquake with a magnitude of 7.8 struck Nepal in April 2015. The earthquake gave minimum complete destruction in Butwal but damaged many buildings. Researchers from ETH Zürich University have found that the region still faces the threat of a much stronger earthquake, with a magnitude of 8 or higher. This is based on a model of the collision zone between the Indian and Eurasian Plates in the vicinity of the Himalayas.[4]. The 2015 earthquake did not fully release the built-up stress in the rupture zone and tension has actually increased. The occurrence of this extremely strong earthquake is expected in the coming decades, but the exact timing of the event cannot be predicted. It is very likely the market is exposed to a stronger earthquake as has been experienced in 2015.

To decrease the risk of flooding, the market buildings have been elevated. However, this elevation also increases the risk of damage from earthquakes due to instability. To mitigate this risk, the market's construction must follow international best practices and incorporate earthquake-resistant design elements such as base isolation. This will help reduce damage and decrease the likelihood of collapse during a strong earthquake.

2.3.5 Impact of landslides

The market is located in an area that is not directly vulnerable to landslides. However, the more elevated area to the north is at a higher risk of landslides. Climate change projections indicate that there will be an increase in precipitation intensity in the future, which will lead to an increase in the frequency and severity of landslides during the monsoon period.

It is likely the effect of climate change makes the transportation routes to and from the market increasingly exposed to landslides.

No measures are incorporated in the design to adapt to the effects of landslides as the market is not located in a landslide vulnerable area.

2.3.6 Impact of wildfires

The area was exposed to an average of 30 days per year to a 'high' fire weather index. In addition, historical wildfires are observed in the more elevated northern area. The expected prolonged and more severe drought conditions and increased temperatures during the pre-monsoon will enhance the intensity and frequency of favourable fire weather conditions.

It is likely the effect of climate change makes the market increasingly exposed to wildfires.

No further adaptation measures are defined as sufficient fire proofing is incorporated in the design.

3 References

- [1] IPCC AR6, “Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change,” IPCC, Cambridge University Press, 2022.
- [2] H. Hersbach, B. Bell, P. Berrisford, G. Biavati, A. Horányi, J. Muñoz Sabater, J. Nicolas, J. Peubey, R. Radu, I. Rozum, D. Schepers, A. Simmons, C. Soci, D. Dee and J.-N. Thépaut, “ERA5 hourly data on pressure levels from 1959 to present,” Copernicus Climate Change Service (C3S) Climate Data Store (CDS), 2018.
- [3] D. Bagala, M. Sigdel and D. Aryal, “Drought Monitoring over Nepal for the Last Four Decades and Its Connection with Southern Oscillation Index,” *Water*, vol. 13, no. 23, p. 3411, 2021.
- [4] L. Dal Zilio, Y. van Dinther and T. Gerya, “Bimodal seismicity in the Himalaya controlled by fault friction and geometry,” *Nature Communications*, vol. 10, no. 48, 2019.



17. Grievance redress mechanism

A grievance redress mechanism (GRM) will be established at the project site to receive and manage any grievances (complaints) such as any disagreeable decisions, practices and activities, technical and general project-related issues and disputes that may arise from the project and facilitate prompt resolution of affected person's issues, concerns, problems or claims. Affected persons may include members of the local community or construction workers. The community will be made fully aware of their rights and the procedures for doing so verbally and in writing during community meetings and consultations. The project wide GRM will address both environmental and social safeguard and other related eligible grievances/complaints raised by affected persons in a timely and culturally appropriate manner. The GRM is aimed to provide a trusted way to voice and resolve concerns linked to the project, and to be an effective way to address displaced people's concern without allowing it to escalate resulting in delays in project implementation. Hence, the Grievance Redress Committee (GRC) will be formed in advance in order to address the grievances of local community members.

The proponent will establish and publicize the GRM to receive and manage any grievances that may arise from the project and facilitate prompt resolution of affected person's issues, concerns, problems, or claims using an understandable and transparent process that is gender responsive, culturally appropriate and readily accessible to the affected persons at no costs and without retribution. Affected peoples can approach the court of law at any time and independently of the project's grievance redress process.

At the construction site, the proponent (through the construction contractor) will set up a contact point to be contacted in case of any grievances. The information will be specifically related to the construction works and provided in local language describing the project, the grievance mechanism and where and whom stakeholders can deliver their complaints, and in what form, verbal or written.

Communities within the project's area of influence will be made aware of this GRM through

- (i) community awareness raising during community meetings,
- (ii) pamphlets distributed to the general public in the direct vicinity of the project site, in Nepali and translated in local language as applicable; and
- (iii) notices on the radio and/or local newspaper.

The proponent and the contractor will appoint community engagement officers/GRM focal point. All staff of the proponent related to the project implementation and the contractors, as well as local and central government and other entities directly involved in the GRM process will receive training prior to the start. Any concerned person or group of people can file a complaint through the project's GRM, at any time and at no cost.

GRM focal will actively engage with the affected local communities and construction workers throughout pre-construction, construction and at the onset of operation, providing an opportunity for community members or workers to approach them with any grievance/complaint. Affected peoples may also lodge grievances/complaints by phone at numbers provided, by submitting a note in a suggestion box kept on site, by sending a letter,

or in person at a project-site office or at the closest project office. The GRM will follow a three-tier structure namely:

1st Level Grievance (Site Level):

During the first level grievance, the contractor's site level focal point will be in charge. All grievances/complaints will be sorted by the focal for their eligibility, level of urgency and by nature of the project. Within 3 days of receiving the application, the focal point will contact the applicant to acknowledge the receipt of the grievance, provide a complaint registration number, and set up a meeting in presence of the contractor's project manager. A formal reply will be addressed to the complainant and will be informed about the process and of his/her possibility to subsequently escalate the complaint in case no resolution was found at this stage. The contact to the second GRM will also be included. Other participants such as contractor's environment, health and safety, subcontractor's representative, proponent's Environment, Health and Safety (EHS) office when on site can be called to this meeting. The affected person(s) may come in presence of two representatives of their choice (selected so as to be gender inclusive). To keep this first level simple, the number of meeting attendees will be kept as much as possible to between 4 and 8, but ideally 4, for flexibility and ease of dialogue. The first meeting shall take place no later than one week after receipt of the grievance/complaint. The complainant and the contractor's site level focus will discuss and try to agree on the course of action to be taken to resolve the complaint. The duration for this course of action will also be discussed and agreed upon. Minutes of the meeting will be kept with signatures of all the participants to document the GRM process and will be annexed in the GRM file. If both parties agree on the resolution, steps will be taken as per agreed resolution. If both parties do not agree on a resolution, the complaint may be escalated to the second level of GRM.

The timeline for addressing the resolution will be 7 days. If the complainant has difficulty to travel to meeting location upon short notice, the location of the meeting may be flexible and focal will take remedial action, keeping the complainant informed at each stage or every fortnight, whichever the shortest will take remedial action, keeping the complainant informed at each stage or every fortnight, whichever the shortest. Such actions should be taken in the briefest delay, within a maximum time frame of 30 days. However, all simple complaints will be resolved within 7 days of the meeting being held. Following resolution, if the complainant is not happy with the resolution or if no action has been taken within the agreed timeframe, they can escalate the grievance to the second level of GRM. A log of all active complaints, even if resolved within the first level of GRM, must be communicated to PMD's focal fortnightly by the contractor's on-site focal

2nd Level Grievance (PMD Level):

The second level of GRM is headed by the proponent's project manager, supported by proponent's project-wide focal. If a complaint has not been resolved at the first level of GRM, it is escalated to the second level. If workers wish to file a complaint and are not comfortable logging it with the first level GRM, they can file it directly to this second level of GRM. All complaints will be sorted by eligibility and level of urgency and by nature (suggestions or comments, grievances/complaints related to adverse impacts of the project on an individual or group, violations of law, etc.). Just as for the first level, all grievances will be properly recorded,

and the concerned person or group will be formally informed of the receipt; timeline; and resolution. The proponent's focal will send within 3 days of receipt a letter to the complainant acknowledging receipt; within 15 days a meeting should be held and resolution action plan and timeline agreed upon with the complainant.

The meeting should aim to have between 4 and 8 members, including the project manager, proponent's focal, the complainant who may be accompanied by or represented by two representatives, the proponent's senior environment, health and safety, biodiversity and/or social officer, as well as other members if applicable, including contractor's representative, local rural office representative, community organization representative etc. As for the first level, the second level may have two outcomes: if the parties found a resolution and the complainant signed their approval of the resolution, such actions should be taken in the briefest delay, within a maximum time frame of 30 days. However, all simple complaints will be resolved within 7 days of the meeting being held. If no resolution has been reached, the grievance is forwarded to the third level of the GRM.

3rd Level Grievance (CDO Level):

In the third level GRM, the same process of logging the grievance/complaint, communicating with the complainant and reporting will be followed. The third level of GRM is handled by proponent's project manager who will form a grievance redress committee chaired by the Chief District Officer, District Administration Office and made up of the proponent's focal and environment or social officers (depending on the nature of the complaint), two representatives of the complainant, a representative of the contractor, government representatives for environment or social issues (such as but not limited to land revenue, survey, forest office, agriculture office, municipality representatives etc.), NGOs or CSOs representatives, etc, as applicable. For ease of discussion, the meeting will try to gather no more than 10 participants.

The grievance redress committee will agree on the resolution approach and action plan, inform concerned parties about actions to be taken and their timeline, and will monitor progress through regular follow-ups. Resolution will be as prompt as possible; receipt of complaint will be acknowledged to the complainant within 3 days, the resolution approach agreed upon within 15 days and actions taken within 45 days. However, all simple complaints will be resolved within 7 days of the meeting being held. Approval of the resolution by the complainant will be sought in writing. If the complainant is still dissatisfied after this stage, they may avail of the court of law.

All entries to the site's grievance/complaints register, whether resolved at initial informal level on site or at any of the three levels of the GRM, along with updates on ongoing or completed actions taken to address the grievance/complaint, will be included in monthly reports by the Contractor to the proponent and in periodic monitoring reports from the proponent and GoN.

The Proponent will monitor the overall grievance resolution process will recommend any improvements to increase the efficiency, timeliness, and fairness of the process.



18. EMP Environmental Mitigation Matrix

EMP Pre-construction

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----------------------------------|----------------|--|--|--|-----------------------------------|-----------------------------------|---|---|---------------------------|
| Physical Environment | | | | | | | | | |
| PH1 | Site clearance | Erosion and flooding risk for the wholesale market | To mitigate potential impacts from erosion, flooding, or site instability, the project design contains the following measures: levelling of the project site (fill-up the lower parts) and elevate the buildings with 0.8m (these measures are embedded in the project design). | Preventive | Project site and up/downstream | Pre-construction | Included in the project costs | Construction Contractor | Project Proponent |
| | | | Update of Flood Risk Assessment and assess the hydraulic and morphological impact of: •Removal of vegetation (i.e., trees) at the site; •Effectiveness of existing measures (i.e., gabion wall, design/presence of the Danab Road Corridor Road); •Impact of the tributaries north of the site. •Sufficiency of the proposed mitigation measures as concluded by the study. | Preventive | Project site and up/downstream | Pre-construction | 300,000 USD, excluding local data collection and surveys. | Project Proponent | MoALD, financier |
| | | | A cost-benefit analysis shall be undertaken to evaluate the effectiveness of different flood protection measures based on the hydraulic and morphological assessment. From this, it's likely to result in additional measures, such as construction of erosion protection, an additional flood wall or dike. This additional mitigation measures shall be put in place from the beginning of construction period to ensure that the site is protected during the construction phase as well. | Preventive | Project site and up/downstream | Pre-construction | Included in the update of the Flood Risk Study | Project Proponent | MoALD, financier |
| PH2 | Site clearance | Pressure on groundwater availability | Develop a (Ground) Water Sourcing Report and conduct a ground water abstraction test. | Preventive | Project site | Pre-construction and construction | 25,000 USD excluding data collection, surveys, drilling and testing | Project Proponent | MoALD, financier |
| Biological Environment | | | | | | | | | |
| B11 | Site clearance | Clearance of the community forest | <u>Compensatory plantation plan</u> Develop a reforestation plan using a plantation ratio of 1:10 for non protected and 1:25 for protected species as the project site is CF and used by the Ratanpur CFUG. Procurement of the tree saplings from the existing nurseries. Reforestation implementation to be undertaken in accordance with agreed reforestation plan at a standard ratio of 1600 seedlings per ha, unless otherwise indicated by DFO and Community Forest Groups due to local site conditions or species requirements. Selection of afforestation site in consultation with the DFO and Ratanpur CFUG. Plantation designs for each specific reforestation site identified to be developed. Management of the re-vegetated areas for the duration 5 years after plantation, then handing it over to the DFO and Community Forest Group. Alternatively, delegate management of the plantation areas to the DFO / Community Forest Group. | Compensation | Project site and surrounding area | Pre-construction | 28,272 USD | Project Proponent (in close cooperation with FDO and Ratanpur CFUG) | MoALD, financier |
| | | | Review the detail design to save the 4 trees of Simal, otherwise proceed with replantation as indicated above in the Clearance of the community forest | Avoidance | Project site | Pre-construction | Included in the replantation costs | Project Proponent (in close cooperation with FDO and Ratanpur CFUG) | MoALD, financier |
| Socio-economic Environment | | | | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|------|------------------|---|---|--|------------------------------------|------------------|---|-------------------------------|---------------------------|
| SOC1 | Land Acquisition | Loss of land under CFUG management, affecting community diversity of access to CF resources (forest products, firewood and animal fodder) | <p>A land title transfer shall take place between Government and the Project Proponent.</p> <p>1) Ratanpur community forest members in Semlar Ward 15 are also members of another community forest which is located in Ward No. 12 of BSMC which is two kilometres from Ward 15. This could be an alternative resource area. A written confirmation letter (from the Executive of the Ratanpur community forest) acknowledging the ceding of the Ratanpur community forest to the Project development, is required before start of construction).</p> <p>2) Refer to SN BI 1. A compensatory plantation will ensure recovery of lost trees. Prioritising Ratanpur CF to undertake compensatory plantation in participation with the Ratanpur CFUG, so that lost forest resources can be compensated from the plantation area.</p> <p>3) Begin local recruitment drive. Formal job application process to be communicated. Contractor Human Resource Plan to be in place in order to respond to IFC PS 2 provisions. Produce local procurement plan which initiates training and capacity building programs for locally procured labour with an unbiased blend of male and female recruits. Direct users of the CF to be targeted for recruitment.</p> <p>Initiate Grievance redress Mechanism for wider community (aligned to IFC PS1)</p> | - Mitigative - Compensatory | Surrounding available forest areas | Pre-construction | 111337,00 USD Cost to be determined before construction and aligned with MoALD | Project Proponent | MoALD, financier |

EMP Construction

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----------------------------|--------------------------------|--|---|--|--|--|--|---|---------------------------|
| Physical Environment | | | | | | | | | |
| PH3 | Site clearance | Potential impacts due to land use change from community forest to built-up/commercial | Loss of forest land will be compensated. Refer to SN BI (pre-construction) to mitigation for loss of forest due to land acquisition. | Compensation | Project site | Beginning of the construction phase | Cost to be determined before construction and aligned with MoALD | Project Proponent (in close cooperation with FDO and Ratanpur CFUG) | MoALD, financier |
| PH4 | Site clearance | Riverbank erosion and flooding risk due to community forest removal, land raise and erecting of commercial buildings in the river floodplain | Levelling of the project site and elevating the buildings by 0.8 m. Flood protection measures on the banks of the Danab river, based on the update of the Flood Risk Assessment | Preventive | Project site | Beginning of the construction phase prior to start of the monsoon season | Included as a project cost | Construction Contractor | Project Proponent |
| | | | | Preventive | On the northern part of the site and banks of the Danab river. | | | | |
| PH5 | Earthwork and site preparation | Loss of top soil to site preparation and construction work at the project site | Conservation and stockpiling of the topsoil, which can be used for restoration of the site after completion of the construction | Mitigative | Project site | During earthwork | Included as a project cost | Construction Contractor | Project Proponent |
| PH6 | Earthwork and site preparation | Potential disturbance and degradation of soil due to construction activities | (1) Avoid unnecessary excavation, (2) minimize soil compaction by using lighter machinery or avoid heavy equipment during wet conditions. (3) protect topsoil by stockpiling it and reusing it in the landscaping or grading processing, (4) limit the area of soil disturbance by staging the construction process and confining the construction activities to smaller areas at a time, (5) revegetate the area after completion of the construction at that site. | Avoidance Mitigative | Project site | During earthwork | Included as a project cost | Construction Contractor | Project Proponent |
| PH7 | Earthwork and site preparation | Contamination of soil from accidental leaks and spills | All chemicals on site shall be registered, have a complete Material Safety Data Sheet (MSDS) and a corresponding risk assessment for their use. Workers using chemicals shall be trained on correct use of chemicals (based on MSDS and risk assessment), provided with the required PPE. Additionally, workers will be trained on how to respond to chemicals spills and leaks. | Preventive | Project site | During earthwork | Included in the project cost | Construction Contractor | Project Proponent |
| | | | | Preventive | Project site | During Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| PH8 | Earthwork and site preparation | Pressure on the groundwater due to abstraction leading to yield reductions of the wells located on in site and nearby wells | (1) Conduct a (ground) water sourcing study (as part of the detailed design) and based on the results of the study develop a (ground) water conservation plan that outlines the measures to reduce (ground) water consumption during construction. (2) use water efficient technologies and practices, such as low fixtures, and recycling of water for non-potable uses, to reduce demand for water, (3) use alternative sources of water such as rainwater, treated water for non-potable uses - dust control, site cleaning, (4) promote water conservation practices among the construction workers through training and awareness programs, conduct regular inspections to ensure that water management practices are being implemented effectively. | Preventive Mitigation | Project site | During Construction phase | Included in the project cost | Construction Contractor | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|------|--------------------------------|--|---|--|--|---------------------------|------------------------------|-------------------------------|---------------------------|
| PH9 | Earthwork and site preparation | Contamination of groundwater due to accidental spillage of construction chemicals | The spilled chemicals and fuel can seep down to contaminate the soil particularly from the area where chemicals are stored and used, vehicle parking and maintenance area, mechanical yards etc. The mitigation shall include: <ul style="list-style-type: none"> •All chemicals on site shall be registered, have a complete Material Safety Data Sheet (MSDS) and a corresponding risk assessment for their use. Workers using chemicals shall be trained on correct use of chemicals (based on MSDS and risk assessment), provided with the required PPE. Additionally, workers will be trained on how to respond to chemicals spills and leaks. •Chemical and fuel storage, maintenance workshops and parking lots will be located on dedicated yards at secure distance from the Danab River and any other water sources. •These dedicated yards will be bunded, e.g., include watertight concrete floors and drainage systems connected to an oily water separation system. Recovered oil that cannot be recycled will be collected in an oil tank for removal by a waste contractor. •In case concrete floors are yet to be provided, and/or cannot be provided, then the alternative is to use drip trays. which shall be provided at the site by the contractors. •The construction site will have a spill response kit with sufficient absorbent materials like dry sand, sandbags available at all times. •The Contractor E&S officer will be responsible for training and weekly inspection of the topic on site, check availability of the spill's materials, and their correct disposal. | Preventive | Project site | During Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| PH10 | Earthwork and site preparation | Increase in Danab River sedimentation load due to construction in the river flood plain and run off from construction site | During the construction, and especially the monsoon season stormwater will accumulate on site and will require proper management. Stormwater may also wash down exposed soil from the construction site including storage sites, access roads and other sites into Danab River. As a result of this, the sediment load of the Danab River may increase degrading river water quality and increasing water turbidity. Stormwater may also carry contaminants into the river and contaminate the water. The following mitigation measures will be applied: <ul style="list-style-type: none"> •Aim for all major earthworks to be performed during the dry season (October till the mid-to-late May). •Construct stormwater collection channels, drainage control berms, sediment traps and control dams, and other means will be used as necessary to minimise cross contamination at the construction site as well as supporting facilities and workers' camp. •Potentially contaminated stormwater, e.g., from maintenance workshop areas, parking, etc., will be kept separate from other drainage at construction sites. •The collected stormwater will be treated in a sedimentary tank prior to releasing into the Danab River. Potentially contaminated stormwater shall, if necessary, be tested and treated to remove contaminants before being released into the environment (e.g., passing through an oily water separation system). | Mitigative | Project site | During construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| PH11 | Operation of the camps | Potential impacts to the Danab River water quality due to improper construction site/camp management practices | Prohibit use of Danab river for washing of equipment and disposal of waste | Preventive | Banks of the Danab river on the northern parts of the project site | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| | | | Put up the signage in Nepali and English language prohibiting use of Danab river for washing and disposal of waste | Preventive | Banks of the Danab river on the northern parts of the project site | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| PH12 | Construction activities | Deterioration of ambient air quality due to construction related emissions and dust | <p>The primary sources of air pollution are the operation of batching plants, earth excavation works, handling and transport of construction material, etc. The primary pollutants expected are dust as and combustion emissions. The mitigation measure will include:</p> <ul style="list-style-type: none"> •Calculate the construction GHG profile, especially due to clearance of the 12.47ha of CF. •Calculate the maximum electricity demand of the construction site and size diesel generators (used at site and camp), considering the operational efficiencies of the generator sets. Generator sets could be configured so that those providing the baseload run are set to run at their optimum load (based on manufacturers specifications), while those providing power during peak periods could be fitted with variable speed drives. •When more detailed information becomes available, recalculate the maximum water demand of the construction site, camp and size diesel generator and pump sets accordingly, taking into account the operational efficiency of the water pump. Generator and pump set could be fitted with a Variable Speed Drives to ensure that the loading of the generator and pump set is more responsive to changes in demand. •Undertake regular checking, upkeeping, and maintenance of the equipment and vehicles used in construction, especially in terms of their exhaust gasses. •For the construction heavy vehicles, within the carrying capacity of the vehicles, maximise the load transported in each trip in order to reduce the number of trips. •Sprinkle water during the earthworks to avoid dust being dispersed to surroundings. •Cover the stockpiled construction materials and particularly soil during the monsoon season and periods with strong wind. •Set the following rules for traffic: speed limit 20 - 30 km/hr when passing settlement areas, engine idling of vehicle maximum of 5 mins, cover the cargo. •Strictly prohibit of uncontrolled burning of solid waste on site. | Mitigative | Project site | Construction period | 10,000 USD | Construction Contractor | Project Proponent |
| PH13 | Construction activities | Increase in ambient noise levels, vibration and light due to construction works. | <p>Construction works and use of vehicles are sources of noise, light and vibration. These can affect environmental quality and increase social nuisance. The following mitigation measures are proposed:</p> <ul style="list-style-type: none"> •Place noisy activities, e.g., operation of generators as far as possible from noise sensitive receptors (e.g., consider the location of households located south from site, at est. 200m). •The starting point is that construction will take place only during daytime (7.AM – 10.PM). However, in practice delivery of construction materials may take place during night or early morning hours when it is still dark. The Contractor will, therefore, identify zones of high and low lighting requirements, focusing on only illuminating areas to the minimum extent possible to allow safe delivery of materials at night and for security surveillance. •Utilise security lights that are movement activated rather than permanently switched on. Fit all security lighting with 'blinkers' or specifically designed fixtures, to ensure light is directed downwards while preventing side spill. Eliminate any ground-level spotlights. •Provide adequate training and PPE including acoustic earplugs to the workers involved in works with a higher noise level. | Mitigative | Project site | Construction period | Included in air mitigation measures | Construction Contractor | Project Proponent |
| PH14 | Construction activities | Pollution of direct environment due to improper waste disposal | The Contractor must ensure that the waste management system is in place prior to commencement of the construction work, which include collection and sanitary disposal of waste. | Preventive | Project site | Pre-construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| | | | The segregation of biodegradable, non-degradable, hazardous waste will be done by using separate waste bins with proper signage. | Preventive | Project site | Pre-construction phase | 111337,00 USD | | |
| | | | The waste bins and temporary storage yards must be enclosed, have watertight cement floor, and include restricted access to vermin and other wildlife. Temporary storage shall be located at least 500 m away from the Danab River. Final disposal of waste will be done by locally approved waste contractors and sites. | Preventive | Project site | Construction phase | Included in the project cost | | |
| | | | Construction site will contain a WC connected to a septic tank system to be serviced and disposed by a third party on a weekly basis or each day during the hot months of the year. | Preventive | Project site | Construction phase | Included in the project cost | | |
| | | | The workers must be trained on good housekeeping and environmentally sound storage and disposal of construction related waste. | Preventive | Project site | Construction phase | Included in the project cost | | |
| Biological Environment | | | | | | | | | |
| BI3 | Site clearance Earthwork and site preparation | Fragmentation of the habitat due to land clearance and site preparation | <p><u>Conservation initiatives and minimization of forest fragmentation</u></p> <p>Maintain ground vegetation wherever or whenever it is possible to minimize tree/vegetation loss.</p> <p>Due attention to be paid and instruction will be given to the contractor to be vigilant and not to cut the trees outside the project site.</p> <p>Conservation of surrounding forest area, especially at the thinly populated site.</p> | Mitigative | Project site and surrounding forests | Construction and operation for at least 5 years | USD 10,000 per year | Construction Contractor | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>Conservation of biodiversity and ground vegetation including NTFPs and ethnobotanically important plants.</p> <p>Conservation of the forests of moderate quality and afforestation in the degraded habitats of the surrounding area.</p> <p>In case of encountering plant species of conservation significance of the herbaceous nature during clearing, care will be taken to translocate those species in suitable adjacent forest habitats in coordination with the forestry officials.</p> | | | | | | |
| BI4 | Hauling of construction materials | Increase demand for forest products placing pressure on existing forests/ wood availability | <p><u>Alternative provisions of firewood and timber</u></p> <p>Alternate sources of energy shall be supplied to the workforce.</p> <p>Awareness programs will be conducted to the working staff and labourers about the importance of forest environment and healthy ecosystem, conduct Forest and biodiversity management training</p> <p>Enforcement of strong rules and regulations to the construction workforce.</p> | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| BI5 | Construction activities | Disturbance to wildlife due to construction works | <p><u>Minimize disturbance to the wildlife</u></p> <p>The construction area will be fenced to prevent wildlife getting into the construction site to minimise accidents to the wildlife. In case of an accident, ensure emergency fauna rescue and handling procedures, including contacts with the nearest veterinary etc.</p> <p>Keep written record, supported by photographs, of any animal casualties, including a cause of death if known.</p> <p>Construction work can be very noisy and can also generate vibrations that can impact wildlife. Measures such as noise barriers, sound-absorbing materials, and vibration dampening systems can help to reduce these impacts.</p> <p>The noisy construction works and use of high intensity lights during the night shall be avoided.</p> <p>Trees are to be cleared during non-breeding season - vultures breeding season (January to March).</p> <p>Prior to the earthworks, the area will be checked by ecologists for any signs of burrows <i>etc</i> . If determined to be occupied, only manual digging under the supervision of the ecologists will be permitted.</p> <p>Excavated pits will be robustly fenced or covered to prevent fauna accidentally falling in, further an escape ramp will be provided to allow their escape.</p> | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| BI6 | Site clearance Earthwork and site preparation | Introduction of invasive non-native species by site clearance works | (1) Conduct a thorough inventory of the site before clearing, to identify any existing invasive species. (2) use least disruptive methods for site clearance, such as manual removal, rather than using machinery, which can spread invasive seeds, (3) If machinery must be used, ensure it is thoroughly cleaned before and after use, to prevent the spread of invasive seeds, (4) native plants will be considered for re-vegetation after site clearance, (5) monitor the site closely for any signs of invasive species after clearance and implement immediate control measures if necessary. | Mitigative | Project area and surrounding area | Construction Phase | Included in the project cost | Construction Contractor | Project Proponent |
| Socio-economic Environment | | | | | | | | | |
| SOC2 | Site clearance and earthworks | Restricted access to Shiva temple due to construction works | <p>1) A HSE plan and the Community Health, Safety and Security Plan (CHSSMP) must be developed by the Construction Contractor to show how they will meet project HSE and community requirements as listed in this EMP and detailed in EIA Mitigation Measure chapter. These plans shall be aligned with IFC PS4 requirements on community health and safety. These plans must reflect on the specific safety measures for visitors to the temple. Clearly demarcated construction area, fencing off the site and limiting noise disturbances to times where no scheduled prayers are in session, are factors that can be considered.</p> <p>2) As with the local community, the temple must be part of the local stakeholders database, where advisement and disclosure of construction schedule must occur. The GRM to remain available to temple members and visitors.</p> | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| SOC3 | Construction activities | Social nuisance due to traffic congestion on public roads, restricted access and delays | <p>1) A Traffic Management Plan shall be developed by the Construction Contractor. This plan shall be aligned with IFC PS 4 requirements on community, health and safety. The plan will assist in scheduling the logistics of abnormal truck loads, thus controlling traffics flows and congestion.</p> <p>2) It is recommended that routes be utilised at scheduled times of the day - that would help keep the roads free when school children are going to/returning from school, allowing children mobility without being hampered by large trucks utilising the same road.</p> <p>3) Road signage, maintaining speed limits, watering down of the road during dry periods and the acknowledgement of free roaming cattle must be addressed.</p> <p>4) A policy on Contractor Health and Safety for the duration of their work on site, must apply, and be monitored. In addition, a Contractor's Code of Conduct (especially in terms of respecting local by-laws and specific practical community concerns on which agreement may be reached), should be applied for the duration of the construction period. Regular information sharing discussions with the Contractors must be pursued, giving residents an opportunity to voice concerns and grievances throughout the duration of project construction. In addition, it is vitally important that a formal grievance management system be put in place (and should remain throughout the life of the facility).</p> | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| SOC4 | Construction activities | Health and safety risks due to increased construction vehicle movement | <p>1) Various HSE (Health, Safety Environment) plans (Hazard/ risk management, driving safety standards, Emergency Response plan) are required. Community Health, Safety and Security Plan (CHSSMP), also showing HSE communication and consultation procedure is necessary.</p> <p>2) The Community Health, Safety and Security Plan (CHSSMP) to ensure that impacts relating to people and livestock in the immediate vicinity of the project site are accounted for. The Contractor Code of Conduct and HSE MP will need to be aligned in monitoring and responding to safety/ security prevention and the reporting of incidents. For the community, the GRM becomes the most availed tool to lodge grievances / complaints relating to the use of community roads and the loss of assets or injury.</p> | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| SOC5 | Construction traffic | Deterioration of public roads due to construction vehicular traffic | Due to the movement of heavy construction vehicles, there is a strong likelihood that road damage and repair will be necessary. This can be accounted for in the Traffic management plan (see details in Health and safety risks due to increased construction vehicle movement) | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| SOC6 | Construction activities | Health impacts related to improper waste disposal (site, accommodation camp) | <p>The contractor shall develop a HSE Plan and a Community Health, Safety and Security Plan (CHSSMP) to outline measures connected to health and safety due to improper waste management on site, disposal offsite affecting both workers and nearby communities. Solid, liquid, hazardous waste items shall be tackled in a separate Waste Management Plan. These plans shall cover the following mitigation measures:</p> <ul style="list-style-type: none"> •It is important to segregate waste properly into recyclable, biodegradable, and non-biodegradable materials. This helps to reduce the amount of waste that ends up in landfills and decreases the risk of contamination. •The construction site shall be foreseen with a dedicated area, where waste can be collected, segregated and temporarily stored until collection by third party for final treatment/disposal. The area shall be covered, contained and fenced. •Composting is an effective way to reduce the amount of biodegradable waste that ends up in landfills. It also produces nutrient-rich soil that can be used for gardening and farming. The Construction Contractor shall identify and engage a waste company that can provide composting services for the project (construction phase, but especially for the operation phase of the wholesale market). •Waste should be collected and transported in a safe and hygienic manner. This includes using covered and leak-proof containers, as well as properly sealed waste trucks. •Waste will be disposed of in designated landfills that meet safety and health standards. These landfills will be located far away from residential areas to reduce the risk of contamination. The Construction Contractor together with the Project Proponent shall inspect the waste contractor to ensure the project requirements can be met. •Educating the public about the importance of proper waste disposal can help reduce the amount of waste that ends up in landfills. This includes encouraging the use of reusable bags, bottles, and containers. <p>Furthermore, the above mentioned plans, shall reflect measures as listed in the EIA, mitigation measure chapter, actions on: Safeguarding local communities from environmental pollution, Reduce risk of spreading of diseases, Safeguarding from operational health hazards</p> | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| SOC7 | Influx of construction workers | Pressure on public services and provisions due to workers-influx | <p>Formal job application process to be communicated. Contractor Human Resource Plan in place in order to respond to IFC PS 2 provisions.</p> <p>Local procurement plan. GRM for wider community to be activated. Potential for an influx of labour is not high, although if likely to happen, the reasoning for a labour influx management plan as a control measure, should be considered. Butwal will be a well utilised area by all and specific allowances with regard to healthcare services to be communicated to the local authorities, and monitored. Resolutions for possible public facility overload to be mutually agreed. Arrangements to be made and adhered to in respect to the supply and use of water and electricity, particularly if already constrained for local use. GRM for wider community to be activated.</p> <ul style="list-style-type: none"> •Increase Funding: Increased funding for government services can help to ensure that there are enough resources to meet the needs of both migrant workers and existing residents. This may involve allocating additional resources or seeking funding from other sources. •Coordinate with Community Organisations: Community organisations can help to support migrant workers and reduce the burden on government services. These organisations may provide services such as language training, job placement assistance, and social support. •Implement Health Screenings: Health screenings can help to identify and treat health issues among migrant workers before they become a burden on government healthcare services. This may involve providing vaccinations, screening for infectious diseases, and providing access to primary care. •Encourage Employer Responsibility: Employers should be responsible for providing basic services such as housing, healthcare, and transportation to their workers. This can help to reduce the burden on government services and ensure that workers are treated fairly. •Promote Self-Sufficiency: Encouraging migrant workers to become self-sufficient can help to reduce their reliance on government services. This may involve providing education and training to improve their skills and job prospects and providing access to resources such as loans and grants to start businesses. | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| SOC8 | Site clearance and earthworks | Relocation of the football field | Give priority to the re-allocation of the football ground and/or identify a temporary solution for the re-allocation of the football ground outside the proposed market during the construction phase of the project in close cooperation with the Youth representative and Chairman Ward 15. | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent Ward 15, Youth Representative |
| SOC9 | Construction activities | Workers health and safety due to construction activities | <p>To mitigate the risk of accidents involving heavy vehicles near construction sites, it is important to implement proper safety measures and procedures. This can include:</p> <ul style="list-style-type: none"> •The Construction Contractor shall develop a Construction Management Plan, covering Operational Health and Safety on site as well control measure for environmental pollution prevention. •A Policy on Contractor Health and Safety for the duration of their work on site, must apply, and be monitored. In addition, a Contractor's Code of Conduct (especially in terms of respecting local by-laws and specific practical community concerns on which agreement may be reached), should be applied for the duration of the construction. In addition, it is vitally important that a formal labour grievance management system be put in place (and should remain throughout the life of the plant). •Proper training: Workers operating heavy vehicles should be properly trained in their operation and safety procedures. •Traffic management: Traffic Management Plan should be in place to control the flow of traffic around and to construction sites and to ensure that heavy vehicles can operate safely. The plan will assist in scheduling the logistics of abnormal truck loads, thus controlling traffics flows and congestion. •Safety barriers: Physical barriers can be used to separate heavy vehicles from workers and the public, reducing the risk of accidents. •Warning signs: Signage can be used to warn workers and the public of the presence of heavy vehicles and to indicate areas where heavy vehicles are operating. •Regular inspections: Heavy vehicles should be regularly inspected and maintained to ensure that they are in safe working condition. •Worker's camp, sanitation, to be aligned to Nepalese labour law and ILO Workers' Housing Recommendation 115 and IFC/EBRD Guidance note on Worker Accommodation (Processes and Standards). Contractor (worker) Code of Conduct (on/ off site) to be developed and implemented. •Worker Code of Conduct is necessary to maintain and monitor labour as well as community social interfaces. A Worker Code of Conduct will be required to stipulate all expected discipline and behaviour from local and non-local labour. Control measures for exiting and entering of labour accommodation site to be included (with consideration of times, contraband goods such as drugs and alcohol, weapons, etc) •Labour GRM to be implemented. The community GRM must also be active so that feedback is received from various streams, lending to credibility of the information for further investigation. | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| SOC10 | Influx of construction workers | Community relations and inter-relationships | <p>1) A Community Health, Safety and Security Plan (CHSSMP) must be developed by the Construction Contractor to show how they will meet project HSE and community requirements as listed in this EMP and detailed in EIA Mitigation Measure Chapter. This plan shall be aligned with IFC PS4 requirements on community health and safety aspects.</p> <p>2) A Worker Code of Conduct shall be developed to maintain and monitor labour - community social interfaces. Behaviour of workers to be set within defined rules and requirements. Control measures for exiting and entering of labour accommodation site to be included (with consideration of times, contraband goods such as drugs and alcohol, weapons, etc)</p> <p>3) A labour GRM to be implemented. The community GRM must also be active so that feedback is received from various streams, lending to credibility of the information for further investigation.</p> <p>4) With the potential non-local labour contingent presence, communities may feel threatened and blame any criminal activity on the foreign workers in the area. A Worker Code of Conduct shall be developed to stipulate all expected discipline and behaviour from local and non-local labour.</p> <p>5) The local police service must be kept abreast of incidents, allowing them to investigate and remediate, or charge perpetrators as necessary. The mitigation measures as listed in the EIA report, section 8 on Law and order in the community shall be included in the CHSSMP implemented.</p> <p>6) The mitigation measures as listed in the EIA report, section 8 on Prioritising the project affected families in recruitment by the project and Social and Gender Inclusion in the project construction practices shall be included in the CHSSMP implemented.</p> | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| SOC11 | Construction activities | Establishment of a worker camp | The labour camp shall be established in line with Nepalese labour law, ILO Workers' Housing Recommendation 115 and the Workers' accommodation: processes and standards, guidance note by IFC and the EBRD, 2009. This guideline provides requirements in terms of how to assess the need and requirements for workers accommodation (e.g., the m2 per type of accommodation, ratio living and recreational space, required services, etc), how to assess impacts of workers' accommodation on communities, standards for workers accommodation, management practices, etc/ and provides useful framework for managing this activity. | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| SOC12 | Construction activities | Ground water availability to surrounding communities | <ul style="list-style-type: none"> Review the water supply strategy based on the results of the (Ground) Water Sourcing Study (conducted during the detailed design). Reduce water usage: The project should aim to reduce its water usage by implementing water-saving technologies or practices. This could include saving and recycling water where possible. Increase water supply: In case, the onsite wells do not provide the required water amount, the project must explore alternative sources of water, harvesting rainwater and others, e.g., installing additional low capacity wells in larger area than the site. Develop water management plans: The project could develop and implement a water management plan that outlines how water will be used, conserved, and recycled. The plan should also include procedures for monitoring and reporting on water use and any impacts on local water resources. Engage with local communities: The project should engage with local communities to understand their water needs and concerns. This could involve consulting with local water users and stakeholders, providing regular updates on water use and conservation measures, and collaborating with community groups to identify solutions to water availability challenges. | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |
| SOC13 | Construction activities | Decreased availability of natural resources (surface and groundwater water, soil) due to pollution caused by the project | <ul style="list-style-type: none"> The project will implement pollution control technologies to minimise emissions and pollution by using filters, or other air and water treatment technologies. The project will monitor air and noise quality to ensure that local communities are not exposed to harmful levels of pollutants or noise. The project sites will be fenced to prevent the noise level reaching the settlement area in vicinity. The project will engage with local communities to understand their concerns about air, noise, and pollution. This could involve consulting with local community leaders and representatives, providing regular updates on air and noise quality monitoring, and collaborating with community groups to identify solutions to pollution challenges Road signage, maintaining speed limits, watering down of the road during dry periods and the acknowledgement of free roaming cattle must be addressed. <p>See also details on Safeguarding health from the improper waste management in SOC6 The above aspects shall be included in the Construction Contractor CHSSMP.</p> | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| SOC14 | Construction activities | Impacts to the structural integrity of the Shiva Temple | Undertake regular inspection of the structural stability of the Shiva temple. | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | Project Proponent |

EMP Operation

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| Physical Environment | | | | | | | | | |
| PH15 | Operation of the market | Flooding risk affecting the wholesale market and adjoining areas. | Elevating the buildings by 0.8 m Implement the results of the update of the Flood Risk Study | Preventive | Project site and adjoining areas | Operation phase | Included in the project cost | Wholesale Market Operator | Project Proponent |
| PH16 | Climate change | Climate change increasing the flooding events | Implement the results of the update of the Flood Risk Study | Preventive | Project site and adjoining areas | Operation phase | Included in the project cost | Wholesale Market Operator | Project Proponent |
| PH17 | Abstraction of groundwater during operation | Potential impacts on the groundwater levels due to abstraction | Undertake a (Ground) Water Sourcing Study, see details in PH2, follow-up and implement the results if the study Review the project water demand during the detailed design since the current water demand estimate includes a 30% contingency post. Undertake a project water balance to improve the accuracy of the water demand. Subsequently, review and adjust the Wastewater Treatment Plant capacity, see section solid waste management below for details. Rainwater harvesting will be installed to capture and store rainwater, which can be used for non-potable purposes like cleaning and toilet flushing (this measure is currently embedded in project design of the storage and processing buildings). Implement water-efficient technologies such as low flow faucets and toilets to reduce water usage. The storm (rain) water drainage system will also have a soak pit incorporated so that water will have a better chance to recharge the groundwater than simply flow out into the Danab River. | Mitigative | Project site | Operation phase | Included in project cost | Wholesale Market Operator | Project Proponent |
| PH18 | Emissions to air during from operation of the market and related traffic | Deterioration of ambient air quality due to operation related emissions and dust | Calculate the project GHG profile considering the energy mass balance and final equipment selection. Calculate the maximum electricity demand of the wholesale market and size back up diesel generators, considering the operational efficiencies of the generator sets. When more detailed information becomes available, recalculate the maximum water demand of the operation of the wholesale market and size diesel generator and pump sets, accordingly, taking into account the operational efficiency of the water pump. Generator and pump set could be fitted with a Variable Speed Drives to ensure that the loading of the generator and pump set is more responsive to changes in demand. Ensure connecting the market to the public transportation network which could reduce the number of personal vehicles coming to the market, and hence reduce vehicular exhaust gases. Regular maintenance of the vehicles owned by the market, and set maintenance protocol for transportation vehicles, so that these vehicles run efficient, thus, minimise emitting excessive pollutants. Ensure that the roads to the market are in good condition and maintain on a regular basis to avoid dust pollution in the surrounding settlements. Consider the lobby for a direct road connection to the highway from the market, allowing suppliers to avoid local entrance roads. | Mitigative | Project site | Operation phase | USD 10,000 per year | Wholesale Market Operator | Project Proponent |
| PH19 | Operation of the market and related traffic | Increase in ambient noise levels, vibration and light due to operation of the wholesale market | One of the effective ways to reduce noise and light issues is to install barriers, such as walls (up to 2m in height), fences and vegetation that can block the noise and light, as well as absorb sound waves. This will help in keeping the noise and light within the wholesale market area. Installation of sound walls can also increase the road safety since crossing of the roads will be in dedicated placed only. Identify zones of high and low lighting requirements, focusing on only illuminating areas to the minimum extent possible to allow safe delivery of materials at night and for security surveillance. Utilise security lights that are movement activated rather than permanently switched on. Fit all security lighting with 'blinkers' or specifically designed fixtures, to ensure light is directed downwards while preventing side spill. Eliminate any ground-level spotlights. Regular maintenance of machinery and equipment can also help to reduce noise pollution. | Mitigative | Project site | Operation phase | Included in costs PH18 | Wholesale Market Operator | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------------------------------|---|--|--|--|-------------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| PH20 | Waste generation during operation of the market | Pollution of direct environment due to improper waste disposal | <p>Solid waste</p> <ul style="list-style-type: none"> The segregation of biodegradable, non-degradable, hazardous waste shall be done by using separate waste bins with proper signage. The waste bins and waste storage yards must be enclosed, have watertight cement floor, and include restricted access to vermin and other wildlife. Storage yards shall be located at least 500 m away from the Danab River. Final disposal of waste shall be done by locally approved waste contractors and sites. Ensure enough waste bins covering all areas of the market and sufficient staff to handle waste and cleaning of the facility. Market personnel and shop owners must be induced and trained on good housekeeping and environmentally sound storage and disposal of construction related waste. Collaborate with the local municipality to develop a long-term solid waste management system for the project as well as settlement. The composting facility can be developed outside the market that can process the biodegradable waste. The Wholesale Market E&S officer together with the Project Proponent shall undertake a due diligence of the waste contractor and sites used for final disposal of waste on compliance with Nepali regulation and this project requirements. Wholesale Market E&S officer shall be responsible for training on the subject, weekly inspection of waste management system on site. <p>Wastewater</p> <ul style="list-style-type: none"> Review the capacity of the Wastewater treatment Plant during the detailed design, based on the accurate water demand and water balance exercise. With respect to the Wastewater Treatment Plant (embedded in the design), effluent shall comply with the Nepali effluent standard / IFC World Bank General EHS Guidelines, which weather is more stringent. Treated effluent (when meeting the above effluent quality) shall be used for site irrigation, wheel washing or discharge to Danab River. Remaining sludge from WWTP shall be collected and disposed by approved third party, e.g., through composting. <p>Oily water</p> <ul style="list-style-type: none"> All areas of possible oil leakage shall be banded. An oily water separator shall be used to treat the contaminated 'stormwater'/service water stream to reduce volume of oil to be cleaned/recycled. Oil that cannot be recycled can be collected in an oil tank for removal by a waste contractor. The oily storm (rain) water system must be designed to contain the 1 in 100-year storm event; or the buffer capacity (reservoir size) of the possible contaminated storm water sewer must be based on a risk analysis of different release scenarios. The storm (rain) water system of the site must be able to handle all fire protection water, in case of an emergency. There should be sufficient capacity to store the water and not discharge into the environment before conducting chemical analysis. Oil traps must be included in the design of the storm (rain) water sewer. Oil recovered from oil traps must be recycled or disposed of through a certified waste contractor. | Preventive | Project site | Operation | Included in the project cost | Wholesale Market Operator | Project Proponent |
| Biological Environment | | | | | | | | | |
| B17 | Operation of the market | Terrestrial wildlife and avifauna might be displaced due to habitat modification and interferences in the project area | (1) Conduct a baseline survey to identify the species that are being affected by the market operation and their patterns of movement and habitat use. (2) Install fencing around the market site to prevent wildlife and avifauna from entering the area, and implementing measures to deter wildlife from entering the site, (3) Monitoring program to track the movement of wildlife and avifauna in and around the market site, (4) Conducting awareness and education programs for the market operators, workers, and visitors to promote responsible behaviour around wildlife and avifauna, (5) develop an emergency response plan to address any incidents involving wildlife and avifauna on the market site in collaboration of DFO. | Mitigative | Project site and access roads | Operation phase | USD 5,000/ year | Wholesale Market Operator | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----------------------------------|---|--|--|--|-----------------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| B18 | Transportation of the produces | Vermin and sanitary conditions at the wholesale market | (1) Prevent the entry and proliferation of vermin around market, such as regular cleaning and disinfection of the market area, installation of screens on doors and windows, and proper storage and disposal of waste (2) Regular inspection of the market area to identify potential sources of vermin and implementing measures to illuminate them, such as sealing gaps and cracks in walls and floors, and removing standing water and debris, (3) Providing designated waste collection areas and ensuring that all waste is properly disposed of, to reduce the attraction of vermin to the market. (4) provide adequate ventilation and lighting in the market area, to reduce the risk of vermin infestation and improve overall sanitation. (5) conduct regular cleaning and maintenance of processing and storage areas, to ensure that they are free from vermin and other pests, (6) educate market operators, workers, and visitors about the importance of maintaining good sanitary practices. | Mitigative | Project site | Operation phase | Included in the project cost | Wholesale Market Operator | Project Proponent |
| Socio-economic Environment | | | | | | | | | |
| SOC15 | Operation of wholesale market | Potential impacts to downstream bridge and communities located north of the river due to new wholesale market in a portion of the river floodplain | Implement the results of the update of the Flood Risk Study | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Market Operator | Project Proponent |
| SOC16 | Groundwater abstraction during operation | Wholesale market groundwater abstraction affecting the surrounding community well | 1) Reduce water usage: The project should aim to reduce its water usage by implementing water-saving technologies or practices. This could include saving and recycling water where possible. 2) Increase water supply: In case, the wells/tube wells are dried out, the project must explore alternative sources of water, harvesting rainwater and others. 3) Develop water management plans: The project could develop and implement a water management plan that outlines how water will be used, conserved, and recycled. The plan should also include procedures for monitoring and reporting on water use and any impacts on local water resources. 4) Engage with local communities: The project should engage with local communities to understand their water needs and concerns. This could involve consulting with local water users and stakeholders, providing regular updates on water use and conservation measures, and collaborating with community groups to identify solutions to water availability challenges. | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Market Operator | Project Proponent |
| SOC17 | Pollution of natural resources during operation | Availability of natural resources to community (surface and groundwater water, soil) due to pollution originating from the wholesale market | •Various HSE (Health, Safety Environment) plans (Hazard/ risk management, driving safety standards, Emergency Response plan) shall be develop by the Construction Contractor. Community Health, Safety and Security Plan (CHSSMP), also showing HSE communication and consultation procedure is necessary. •implementing pollution control technologies to minimise emissions. •monitoring air and noise quality. •fencing the premises to prevent the noise reaching the settlement area in vicinity. •engaging with local communities to understand their concerns about air, noise, and pollution. •maintaining road signage, speed limits. •regular maintenance of the road condition. Furthermore, the HSE plans shall reflect the mitigation measures as listed in the EIA in the mitigation measure chapter 8 on, Safeguarding from operational health hazards, Safeguarding health from the improper waste management, measures to reduce the risks for community impacts and spreading of diseases. Requirements for the Emergency Response are included in the EIA, chapter 8 and shall be implemented. | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Market Operator | Project Proponent |
| SOC18 | Energy consumption during operation | Required energy consumption of the wholesale market thereby affecting overall energy availability | The wholesale market will be connected to the grid. Power will be supplemented by own solar panels. The energy demand shall be monitored and evaluated if the demand does not impact near-by communities. If an impact occurs this shall be addressed by Wholesale Market Operator and local authorities | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Market Operator | Project Proponent |
| SOC19 | Transport movements during operation | Traffic nuisance (noise, emissions, community health and safety risks) due to operation of the wholesale market affecting nearby communities | Implement measures listed in SOC 3 | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Market Operator | Project Proponent |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------|---|--|---|--|-----------------------------------|------------------|--------------------------|-------------------------------|---------------------------|
| SOC20 | Infrastructure damage | Deterioration of public roads due to intense use by the wholesale market users | The project assumes that the local municipality will maintain municipal roads. Proper, ongoing maintenance and repair will serve to reduce the dust and noise generated by traffic on poor roads and will positively contribute to increasing safety on roads. | Mitigative | Project area and surrounding area | Operation phase | N/A | Government Authority | Government Authority |
| SOC21 | Waste generation during operation of the market | Nuisance, community health and sanitary risks related to wholesale market operation, including improper waste disposal | <ul style="list-style-type: none"> •It is important to segregate waste properly into recyclable, biodegradable, and non-biodegradable materials. This helps to reduce the amount of waste that ends up in landfills and decreases the risk of contamination. •The wholesale market shall be foreseen with a dedicated area, where waste can be collected, segregated and temporarily stored until collection by third party for final treatment/disposal. The area shall be covered, contained and fenced. •Composting is an effective way to reduce the amount of biodegradable waste that ends up in landfills. It also produces nutrient-rich soil that can be used for gardening and farming. The market shall identify and engage a waste company that can provide composting services for the project (construction phase, but especially for the operation phase of the wholesale market). •Waste should be collected and transported in a safe and hygienic manner. This includes using covered and leak-proof containers, as well as properly sealed garbage trucks. •Waste will be disposed of in designated landfills that meet safety and health standards. These landfills will be located far away from residential areas to reduce the market shall inspect the waste contractor to ensure the project requirements can be met •Educating the public about the importance of proper waste management can help reduce the amount of waste that ends up in landfills. This includes encouraging the use of reusable bags, bottles, and containers. <p>Furthermore, to reduce the community nuisance from the market, the following aspects shall be reflected in the project operational plans: see mitigation measures as listed i chapter 8, reduction of community impacts, reduction of risk of spreading of diseases, and prioritising the project affected families in recruitment by the market</p> | Mitigative | Project site | Operation phase | Included in project cost | Wholesale Market Operator | Project Proponent |
| SOC22 | Operation of the wholesale market | Access to and structural integrity of the Shiva Temple | Access to the Shiva temple and the structural integrity of the temple will not be affected by the operational phase activities. | N/A | N/A | N/A | N/A | N/A | N/A |



19. Experts declarations

LIST OF EIA STUDY TEAM MEMBERS

Title of the Scoping/EIA Report

Scoping Report for Export Oriented Agricultural Wholesale Market, in Semlar, Butwal

Name/Address of the Project Proponent

Ministry of Agriculture and Livestock Development, Department of Agriculture, Centre for Agriculture Infrastructure Development & Mechanization Promotion (CAIDMP), Hariharbhawan, Lalitpur, Nepal

| SN | Name | Academic Qualification | Expertise | Experiences of Environment Assessment | Signature |
|----|-----------------|---|---|---|---|
| 1 | Eric Pereira | BSc. Civil Engineering | Feasibility Study Technical Lead, Technical Design and Financial assessment | 35 years of international relevant experience and contributed to more than 10 environmental assessments |  |
| 2 | Dr Lars De Ruig | PhD Flood risk and adaptation | Climate Resilience Expert Flooding Risk Impact Assessment | 5 years of international relevant experience and contributed to more than 5 environmental and flooding risk impact assessments |  |
| 3 | Violeta Paginu | MSc. Environment Management MSc. Agriculture Science BSc. Agricultural engineering and plant protection | Forest and Physical Environment, Impacts Assessment from project Emissions and Discharges | 15 years of international relevant experience and contributed to more than 20 environmental and social impact assessments and due diligence |  |
| 4 | Kim Moonsaym | Post graduate in Anthropology, University of South Africa BA, Anthropology and Psychology, University of Durban- Westville | Industry, Energy and Asset Management Social Specialist | 25 years of international relevant experience |  |

| SN | Name | Academic Qualification | Expertise | Experiences of Environment Assessment | Signature |
|----|----------------------|--|---|---|---|
| 5 | Taco Hoencamp | Master's degree in Irrigation and Water Management | Environmental, Health and Safety Expert | 30 years of international relevant experience and contributed to more than 25 environmental and social impact assessments and due diligence |  |
| 6 | Laura Bergsma | MSc. Earth Surface and Water BSc. Earth Sciences | Climate change specialist | 3 years of international relevant experience and contributed to more than 5 10 environmental & climate risks impact assessments |  |
| 7 | Pepijn van Ravesteyn | VU University of Amsterdam, Master of Hydrology Utrecht University, Bachelor of Environmental science | Water Management Hydrogeologist | 5 years of international relevant experience |  |

DECLARATION FROM PROJECT PROPONENT

Title of the Scoping/EIA Report: Scoping Report for Export Oriented Agricultural Wholesale Market, in Semlar, Butwal

Name/Address of the Project Proponent: Ministry of Agriculture and Livestock Development, Department of Agriculture, Centre for Agriculture Infrastructure Development & Mechanization Promotion (CAIDMP), Hariharbhawan, Lalitpur, Nepal

I declare the following:

- (i) I have read and checked the content of this Scoping report;
- (ii) My study team members have conducted the study professionally using acceptable methodologies;
- (iii) The study findings are correct to the best of my knowledge; and have not been altered in any manner;
- *(iv) The issues/impacts and mitigating measures proposed are, to the best of my knowledge, reliable, practical and adequate to comply with the relevant legal requirements; and
- (v) I and my team shall be accountable for any misleading information in any part of this report

Signature:



Name: Eric Pereira

Subject /Expertise: Feasibility Study Technical Lead, Technical Design and Financial assessment

Date: 17-4-2023

Official stamp:



**Applicable only for EIA report*

DECLARATION FROM EIA STUDY TEAM MEMBERS

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- (ii) I have allowed the Scoping study team to conduct the scoping study professionally and independently;
- (iii) The study findings are correct to the best of my knowledge; and have not been altered in any manner;
- *(iv) The issues/impacts and mitigating measures proposed are, to the best of my knowledge, reliable, practical and adequate to comply with the relevant legal requirements; and
- (v) I and my team shall be accountable for any misleading information in any part of this report

Signature: 

Name: Dr Lars De Ruig

Subject /Expertise: Climate Resilience Expert, Flooding Risk Impact

Assessment Date: 17-4-2023

Official stamp:



**Applicable only for EIA report*

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Signature:

Name: Violeta Paginu

Subject /Expertise: Forest and Physical Environment, Impacts Assessment

from project Emissions and Discharges

Date: 17-4-2023

Official stamp:



**Applicable only for EIA report*

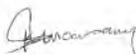
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Signature: 

Name: Kim Moonsamy

Subject /Expertise: Environmental and Social Expert

Date: 17-4-2023

Official stamp:



**Applicable only for EIA report*

DECLARATION FROM IEE STUDY TEAM MEMBERS

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I declare the following:

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- (v) I and my team shall be accountable for any misleading information in any part of this report

Signature:



Name: Taco Hoencamp

Subject /Expertise: Environmental, Health and Safety Expert

Date: 17-4-2023

Official stamp:



**Applicable only for EIA report*

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- (v) I and my team shall be accountable for any misleading information in any part of this report

Signature:



Name: Laura Bergsma

Subject /Expertise: Climate change specialist

Date: 17-4-2023

Official stamp:



**Applicable only for EIA report*

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- (v) I and my team shall be accountable for any misleading information in any part of this report

Signature: 

Name: Pepijn van Ravesteyn

Subject /Expertise: Water Management Hydrogeologist

Date: 17-4-2023

Official stamp:



**Applicable only for EIA report*

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex: Procurement Risk Matrix

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

PDR Annex 9a: IFAD Procurement Risk Matrix - Part A Country Level

IFAD PRM - Part A Country Level

Based on MAPS II – ASSESSMENT OF NATIONAL PROCUREMENT SYSTEM

| Pillar I – Legal, Regulatory and Policy Framework | | | | | |
|--|--|--|--|--|-----------------|
| Indicator # and Sub- Indicator # | Sub-Indicator Description¹ | Findings regarding possible non-compliance with IFAD PPF | Inherent Risk of non- compliance with Project Objectives & IFAD PPF | Proposed Mitigation measure/s | Net Risk |
| 1 | The public procurement legal framework achieves the agreed principles and complies with applicable obligations. | | | | |
| 1(a) | Scope of application and coverage of the legal and regulatory framework | There exist Public Procurement Act (PPA), 2007 and Public Procurement Regulation (PPR), 2007 (with 12 th amendment July 2022) of the government of Nepal. This applies for all government offices/projects, departments, ministries; all companies, commissions, corporations, authorities etc. | L | | L |

¹ The Indicators and Sub-Indicators are extracted from OECD-MAPS II of 2017 in order to harmonise with other MDBs and to save time and effort in conducting Part A assessments in case a recent MAPS II assessment has been conducted for the borrower's country system. The criteria to be applied in assessing each Sub-Indicator are those of OECD-MAPS II.

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| | | formed by the government of Nepal; Universities, investigation/research centers etc. who have been receiving grant (more than 50%) from the government of Nepal; local authorities including those institutions who have been categorized as "public authority" by the govt of Nepal | | | |
| 1(b) | Procurement methods | <p>Methods are generally consistent; Procurement methods for goods/works are ICB, LIB, NCB, Sealed quotation, National Shopping (with three quotations) and Direct purchase and for consultancy services; QCBS, QBS, FBS, LCS, National Shopping</p> <p>(with minimum 3 proposals/CV) and Direct purchase have been provisioned in PPA/PPR. However, the threshold of procurement method is different. However, provision of Consultants Qualification Selection (CQS) has not been made.</p> | L | Government/MoF needs to increase the threshold of each method. | L |
| 1(c) | Advertising rules and time limits | Advertising rules and time limits for goods/works; | L | . | L |

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| | | <p>For ICB contracts- National Daily Newspapers, website of respective office/PPMO; could be used international communication medium, with minimum 45 days of time period.</p> <p>For NCB contracts- National Daily Newspapers and website of respective office/PPMO with minimum 30-day notice; For sealed quotation- National Daily Newspaper and website of respective office/PPMO with minimum 15-day notice; For NS (NRs 100,000 to 1,000,000) and direct purchase (up to NRs 100,000), giving minimum 7-day notice.</p> <p>PPA/PPR, in general, requires international consulting forms for the amount > NRs 100 million advertisement of which is done through National Daily Newspapers, website of respective office/PPMO; could be used international communication medium with minimum 45 days of time period.</p> <p>For QCBS consultancy services advertisement is done through National Daily newspapers and through websites of respective</p> | | | |
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| | | <p>office/PPMO with minimum 15-day time period for EOI and minimum 30 days for the submission of RFP proposals (for services > NRs 2 million requires EOI as per PPA/PPR). For Services having estimated amount less than NRs 2 million could be done by selecting minimum 3 forms from the standing list for the submission of technical and financial proposal through RFP by giving minimum 15-day notice. For services NS (firm/individual) having estimated amount NRs 100,000 to 500,000 with minimum 3 proposals/CV and direct purchase (up to NRs 100,000) giving minimum 7-day notice.</p> | | | |
| 1(d) | Rules on participation | <p>As per PPR (12th Amendment) the threshold of domestic bidder (NCB) for works is up to NRs 5 billion. Beyond that threshold there is a need for ICB contract. Domestic preference of 5% has been provisioned to all the domestic bidders for the international bidding. Also, if there is J/V of international bidder with local bidder (having share > 25%), they are also eligible obtaining domestic</p> | L | | L |

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| | | <p>preference of 5%. For goods the threshold for domestic bidder (NCB) is up to NRs 200 million. There is mandatory provision of open competition through bid documents (NCB) for amount greater than NRs 20 million for goods and works. PPR requires Sealed Quotation [similar to NCB but for smaller threshold (NRs 500,000 to NRs 2 million) with 15-day time period for bidding]; As per 11th & 12th amendment of PPR direct purchase (NS) (with minimum 3 quotations)for Goods and Works from NRs 100000 to NPs 1000,000; Direct purchase (NS) (with minimum 3 quotations/CV) for consultancy (firms/individual) from NRs 100000 to 500,000; Direct purchase for repairing/maintenance work of vehicles, equipment and electric devices from the authorized dealer's service centers is up to NRs 500,000. There is a provision of direct purchase, as earlier, up to NRs 100,000 for goods ,works and Consultancy services.</p> <p>Consultancy services, in general, EOI from international consulting firm should be invited for the services amounting NRs</p> | | | |
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| | | 150 million or more. For services amounting NRs > 20 million, PPA/PPR requires invitation of EOI and for amount NRs 500,000 to 2 million, firm could be selected from the standing list. | | | |
| 1(e) | Procurement documentation and specifications | <p>Procurement documentation generally complies. To ensure good governance in procurement system of the Public Entity, Public Procurement Monitoring Office (PPMO) has been established. PPMO has developed</p> <p>Standard bidding documents (SBD) for goods, works and consultancy services. There are Standard Bidding Documents for ICB, NCB, Sealed Quotation, Direct Purchase for Goods and Works. There are REOI template, SRFP for Lump Sum and Time-Based Contracts for consultancy services. Specifications are prepared by the respective offices as per their requirements.</p> | M | Attention has to be given by the IA while preparing specifications to address the SECAP risks. | M |
| 1(f) | Evaluation and award criteria | General frame work of evaluation and award criteria for goods, works and consultancy services have been mentioned in PPR and PPMO defines other necessary details if required. | M | IA needs to form Technical sub-committee for the evaluation of technical proposal if there are not enough technically qualified | M |

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| | | PPA/PPR requires a permanent evaluation committee in every office headed by (i) the chief or a senior officer (as far as possible Technical person), (ii) Chief of accounts section, (iii) subject matter specialist, and (iv) legal officer (if a post exists in the office). However, experts are invited for evaluation based on the necessity of technical experts. Evaluation committee formed by the project evaluates the document on the basis of approved criteria. | | members in the permanent evaluation committee. | |
| 1(g) | Submission, receipt and opening of tenders | Submission, receipt and opening of tenders are generally done by the respective offices in time as mentioned in the notice. During the opening of the tender, representatives from the bidder side, project side and office of the comptroller General are invited. Minutes of bid opening is prepared. However, electronic submission is done through PPMO e-GP System: www.bolpatra.gov.np/egp . There is no practice of making available bid opening minutes to the bidder/consultants. | M | IA need to ensure that Bid opening minutes be available to the bidders/consultants | M |

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| 1(h) | Right to challenge and appeal | Public procurement Act 2007 provides for complaint to the Public Entity (PE) within 7 days of publication of Letter of Intent to Award and the PE to respond within 5 days. If the Bidder is not satisfied with the response or no response is provided by the PE, then the Bidder may complain to the Review Committee within 7 days of the PE's response or no response. The Review Committee is headed by either Judge/ex Judge of high court or ex Secretary of Government of Nepal. However, complaints cannot be lodged to the Review Committee for procurement valued at less than NPR 20 million. | L | | L |
| 1(i) | Contract management | Only the Project Manager has the ultimate authority for contract management as the chief of the office. The Project Manager assigns the contract management functions to the relevant officer if S/he feels so. | M | <p>1. PPMO needs to address the contract management role of the respective officer;</p> <p>2. IA needs to clearly mention the contract management role of respective officer in the contract document i.e. SCC;</p> <p>3.The PIM should elaborate on this.</p> | M |
| 1(j) | Electronic Procurement (e-Procurement) | There exists the provision in PPA/PPR for e-procurement through PPMO through e-GP | L | 1.PPMO, IA needs to encourage using e-GP system. | L |

| | | | | | |
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| | | <p>System: www.bolpatra.gov.np/egp.</p> <p>The trend of e-procurement is increasing day by day; especially accelerate during COVID pandemic period.</p> | | <p>2. Opportunity of capacity building trainings to the contractors/consultants on using e-GP system to be provided by PPMO, IA, FCAN etc.</p> | |
| 1(k) | Norms for safekeeping of records, documents and electronic data. | PPA/PPR has provisioned norms for safekeeping of records, documents of each procurement activity with minimum 7 years from the date of completion of such activity. | M | 1. Need to introduce provision in the PPA/PPR for electronic data safekeeping. | M |
| 1(l) | Public procurement principles in specialized legislation | Accountability, competition, fairness, transparency, efficiency, effectiveness, economy and value for money are the PPA/PPR's principles that applies for all government projects | L | | L |
| 2 | Implementing regulations and tools support the legal framework | | | | |
| 2(a) | Implementing regulations to define processes and procedures conditions | <p>Public Procurement Regulation 2007 (12th amendment July 2022)</p> <p>are the implementing regulations that define process and procedures?</p> | L | | L |

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|----------|--|--|---|--|---|
| 2(b) | Model procurement documents for goods, works and services | PPMO issues standard bidding documents for ICB, NCB, sealed quotation and direct purchase for goods and works. There are REOI template, SRFP for Lump Sum and Time-based Contracts for consultancy services. | L | | L |
| 2(c) | Standard contract | PPMO has prepared standard contract document prepared as per FIDIC for ICB, NCB, sealed quotation and direct purchase for goods and works and REOI template, SRFP for Lump Sum and Time-based Contracts for consultancy services. | L | | L |
| 2(d) | User's guide or manual for procuring entities (insert link to manual if possible) | Public Work Directive existed prior to the issuance of Public Procurement Act/Regulation. However, no manual has been issued by PPMO responsible for preparing and issuing manuals/guides etc. based on the existing procurement act/regulation. | M | <p>1.The PIM should elaborate on the required manual or user's guide;</p> <p>2. PPMO needs to develop required necessary user's guide or manual on civil/mechanical/electrical work</p> <p>Construction, consultancy services and on training.</p> | M |
| 3 | The legal and policy frameworks support the sustainable development of the country and the implementation of international obligations | | | | |

| | | | | | |
|------|--------------------------------------|---|---|--|---|
| 3(a) | Sustainable Public Procurement (SPP) | <p>The legal framework does not address sustainability comprehensively and at all stages of the procurement cycle. Also, it does not address the specific requirement for application of sustainability criteria to ensure value for money.</p> <p>There is no any separate provision in line with SPP concept in the PPA/PPR currently. However, there exist an Environmental ACT/Regulation of Nepal.</p> | M | <p>1. There is a need of developing SPP concept in PPA/PPR; PPMO needs to take initiation;</p> <p>2. PPMO needs to develop manual or user's guide on SPP</p> <p>2. The PIM should elaborate on how to integrate SECAP in procurement documents and processes;</p> <p>3. PMO staff should be trained on SECAP;</p> <p>4. The project should recruit a SECAP specialist mainly for works contracts;</p> <p>4. Each procurement process should address SECAP mitigations at all levels (qualification criteria, requirements, evaluation, contract, and contract management) especially in medium-high risk contracts.</p> <p>5. Medium-high risk construction works should be subjected to the Environmental Impact Assessment procedures before commencing procurement.</p> | M |
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|------|---|--|---|--|---|
| 3(b) | Obligations deriving from international agreement | There are obligations from the international organizations for sustainable development of the country. However, the legal framework less address sustainability comprehensively and at all stages of the procurement cycle (Nepal has developed Environmental ACT/Regulation.) | M | <p>1. There is a need of developing SPP concept in PPA/PPR; PPMO needs to take initiation;</p> <p>2. PPMO needs to develop manual or user's guide on SPP</p> <p>2. The PIM should elaborate on how to integrate SECAP in procurement documents and processes;</p> <p>3. PMO staff should be trained on SECAP;</p> <p>4. The project should recruit a SECAP specialist mainly for works contracts;</p> <p>5. Each procurement process should address SECAP mitigations at all levels (qualification criteria, requirements, evaluation, contract, and contract management) especially in medium-high risk contracts.</p> <p>6. Medium-high risk construction works should be subjected to the Environmental Impact Assessment procedures before commencing procurement.</p> | M |
|------|---|--|---|--|---|

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|--|--|---|---|--|---|
| Consolidated findings for Pillar I | Consolidated findings for pillar I can be expressed in average as M | | | | |
| Pillar II – Institutional Framework and Management Capacity | | | | | |
| 4 | The public procurement system is mainstreamed and well-integrated with the public financial management system | | | | |
| 4(a) | Procurement planning and the budget cycle | Procurement planning and the budget cycle is mainstreamed and well-integrated with the country's public financial management system. However, it is not aligned with IFAD system. In Nepal, procurement planning and budget cycle starts from mid of July not from January. | M | Needs to put effort on synchronizing from either side. | M |
| 4(b) | Financial procedures and the procurement cycle | Country's financial procedures and the procurement cycle is mainstreamed and well-integrated. However, there is non-compliance in financial procedures and the procurement cycle with IFAD system. | M | Needs to put effort on synchronizing from either side. | M |
| 5 | The country has an institution in charge of the normative/regulatory function | | | | |
| 5(a) | Status and legal basis of the | There exists government institution in charge of the normative/regulatory function | L | | L |

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| | normative/regulatory institution function. | like PPMO, Office of the Comptroller General, Office of the Auditor General. | | | |
| 5(b) | Responsibilities of the normative/regulatory function | <p>PPMO is for ensuring good governance in procurement system of the Public Entity; one of the responsibilities is to develop standard bidding documents for goods, works and services. One of the responsibilities of the Office of the Comptroller General is the treasury operation of the Government of Nepal. It releases and controls the fund to the office and does internal audit whether the procurement process adopted are in line with provision made in the PPA/PPR. It also evaluates the work performance of the account officials. Office of the Auditor General (OAG) is a constitutional body and the supreme audit institution of Nepal who conducts final audit after the end of every fiscal year.</p> | L | | L |
| 5(c) | Organization, funding, staffing, and level of independence and authority | <p>Above mentioned offices are Central level</p> <p>Government Organization, relatively independent authority funded and staffed by the government of Nepal.</p> | M | GON Needs to make those organization more independent | M |

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|----------|--|--|---|--|---|
| 5(d) | Avoiding conflict of interest | Relatively less conflict of interest | M | GON Needs to put effort on without having conflict of interest | M |
| 6 | Procuring entities and their mandates are clearly defined. | | | | |
| 6(a) | Definition, responsibilities and formal powers of procuring entities | <p>PPA/PPR clearly defines the responsibilities and formal powers of the office in-charge which depends upon the level of office in-charge. For example; responsibilities and authorities for the project manager (Gazetted Level 1st class) is as follows:</p> <p>Estimate approval: for goods, works and others up to NRs 200 million; for consultancy services up to NRs 10 million.</p> <p>Tender Approval: for goods, works and others up to NRs 500 million; for consultancy services up to NRs 50 million.</p> | L | | L |
| 6(b) | Centralized procurement body | Centralized procurement body is PPMO | L | | L |
| 7 | Public procurement is embedded in an effective information system | | | | |

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| | | | | | |
| 7(a) | Publication of public procurement information supported by information technology | Publication of public procurement information is generally made through National news- papers, respective website, notices, e-notices etc. | M | Needs improvement adopting new information technology like social media | M |
| 7(b) | Use of e-Procurement | PPA/PPR has introduced this provision. Use of e-Procurement has been started in 2015 and it is in Increasing trend- especially accelerated during COVID-19 pandemic period. | M | <p>1.PPMO needs to put more emphasis on e-procurement: needs to publish manual or users guide; needs to encourage using this through public media like newspaper, radio, TV;</p> <p>2.PPMO, FCAN, IA etc. needs to provide opportunity for capacity building training to the contractors, consultants;</p> <p>3.The PIM should also put emphasis/encourage using e-procurement;</p> | M |

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|----------|--|--|---|---|---|
| 7(c) | Strategies to manage procurement data | There are no such specific strategies to manage procurement data. | M | <p>1.PPMO needs to develop users guide or manual on this;</p> <p>2.The PIM should address on how to manage procurement data;</p> <p>3.PMO staff should be trained on this;</p> | M |
| 8 | The public procurement system has a strong capacity to develop and improve | | | | |
| 8(a) | Training, advice and assistance | There is not such specific provision of training and other for the capacity development in PPA/PPR | M | <p>1.MoF needs to provide required fund on training and capacity development activity;</p> <p>2.PPMO should develop required manual on training and capacity development activity;</p> <p>3. The PIM should address on training and capacity development activity;</p> <p>4. IA needs to provide necessary budget and train the staff time to time.</p> | M |

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| 8(b) | Recognition of procurement as a profession | There is increasing trend in the country in recognizing procurement as a profession | M | <p>1. PPMO/MoF/IA should use newspaper, radio, TV, social media highlighting the importance of qualified procurement expert and publish and distribute brochure/booklet on this.</p> <p>2. Procurement professionals should create a common platform and give pressure to the MoF/PPMO for the recognition of procurement as a profession.</p> | M |
| 8© | Monitoring performance to improve the system | Performance monitoring to improve the system is not so sound | M | <p>1. National Planning Commission/MoF/IA/PPMO should develop manual/guide on this.</p> <p>2. The PIM should address on this;</p> <p>3. PMO staff should be trained;</p> | M |
| Consolidated findings for Pillar II | | Consolidated findings for Pillar II can be expressed in average as M | | | |
| Pillar III – Public Procurement Operations and Market Practices | | | | | |

| 9 | Public procurement practices achieve stated objectives | | | | |
|-----------|--|--|---|---|---|
| 9(a) | Procurement Planning | There is the provision of procurement planning in PPA/PPR and it is in practice. However, they are not realistic one. | M | <p>1.PPMO should publish manual/guide on how to prepare a realistic Procurement Plan.</p> <p>2. The PIM should strictly address on preparation of realistic PP based on collaborative approach after market survey;</p> <p>3. Procurement officials should be trained frequently;</p> <p>4. PD should involve procurement officer during the discussion on the preparation of AWPB;</p> | M |
| Time 9(b) | Selection and contracting | In PPA/PPR there has distinct provision for selecting (direct purchase, NS, LCB, ICB including community participation) for goods and works; QCBS, QBS, LCS, FBS and direct purchase for consultancy services and contracting of public procurement. | L | | L |

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| 9(c) | Contract management in practice | In general Contract management practice exists. Only the Project Manager has the ultimate authority for contract management as the chief of the office. The Project Manager normally assigns the contract management functions to the relevant officer. | M | <ol style="list-style-type: none"> 1. PPMO should publish a manual/guide on how to manage a contract effectively; 2. The PIM should explicitly address on the effective contract management; 3. PMO staff should be trained on contract management; 4. PM should assign the contract management function in writing to the respective officer at the beginning of each FY; 5. The project should recruit a contract monitoring specialist mainly for big ticket contracts; | M |
| 10 | The public procurement market is fully functional | | | | |
| 10(a) | Dialogue and partnerships between public and private sector | There are a few dialogues and partnerships between public and private sector in practice. | M | <ol style="list-style-type: none"> 1. MoF/PPMO need to introduce more necessary provision in PPA/PPR in order to increase the dialogue and partnerships between public and private sector. 2. PPMO should publish a manual/guide on how to develop effective dialogue and | M |

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| | | | | <p>partnerships between public and private sector</p> <p>3. . The PIM should explicitly address on the effective dialogue and partnerships between public and private sector;</p> <p>4.PMO staff should be trained on making effective dialogue and partnerships between public and private sector;</p> | |
| 10(b) | Private sector's organization and access to the public procurement market | There is good access to public procurement market for the private sector organization. Most of the procurement activities on goods/works/services have been carried out by the private sector organizations | L | | L |
| 10(c) | Key sectors and sector strategies | Purchase, contracting, or subcontracting of goods, works and services, | L | | L |
| Consolidated findings for Pillar III | | Consolidated findings for Pillar III can be expressed in average as M | | | |
| Pillar IV – Accountability, Integrity and Transparency of the Public Procurement System | | | | | |

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| 11 | Transparency and civil society engagement strengthen integrity in public procurement | | | | |
| 11(a) | Enabling environment for public consultation and monitoring | There is not much enabling environment for public consultation and monitoring | M | <p>1. MoF/PPMO need to introduce necessary provision in PPA/PPR in order to make enabling environment for public consultation and monitoring.</p> <p>2. PPMO should publish a manual/guide on how to create an enabling environment for public consultation and monitoring;</p> <p>3. The PIM should explicitly address on creating an enabling environment for public consultation and monitoring;</p> <p>4. PMO staff should be trained on establishing enabling environment for public consultation and monitoring</p> | M |
| 11(b) | Adequate and timely access to information by the public | Existing procurement system provides sufficient access to the information for the public through newspapers, websites, notices at the initial stage of procurement, however, | M | 1. IA should publish bulletins, notices frequently providing sufficient information on the progress status of the project. They should use TV, FM radio and social media for | M |

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| | | there is lacking in providing sufficient information during its implementation stage. | | <p>disseminating the implementation status;</p> <p>2. The PIM should explicitly address regarding adequate and timely access to information by the public on the implementation/progress status of the project;</p> <p>3. PMO should appoint a spoke person in order to provide adequate and timely information to the public on progress status;</p> | |
| 11(c) | Direct engagement of civil society | There is very less direct engagement of civil society. | M | <p>1.MoF/PPMO need to introduce necessary provision in PPA/PPR in order to increase direct engagement of civil society;</p> <p>2. PPMO should publish a manual/guide on how to increase direct engagement of civil society;</p> <p>3. The PIM should explicitly address on creating an enabling environment for direct engagement of civil society;</p> <p>4.PMO staff should be trained on the engagement of civil society.</p> | M |

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| 12 | The country has effective control and audit systems | | | | |
| 12(a) | Legal framework, organization and procedures of the control system | There exists Office of the Comptroller General for the release of payment, ensuring basic account keeping, internal audit etc and Office of the Auditor General for final audit. | L | | L |
| 12(b) | Co-ordination of controls and audits of public procurement | There exist coordination of controls and audits | L | | L |
| 12(c) | Enforcement and follow-up on findings and recommendations | There is not enough enforcement and follow-up mechanism on findings and recommendations. | M | <p>1. MoF/PPMO need to introduce necessary provision in PPA/PPR in order to strengthen enforcement and follow-up mechanism on findings and recommendations;</p> <p>2. PPMO should publish a manual/guide on strengthening enforcement and follow-up mechanism on findings and recommendations;</p> <p>3. The PIM should address on strengthening enforcement and follow-up mechanism on findings and recommendations;</p> | M |

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| | | | | | |
| 12(d) | Qualification and training to conduct procurement audits | Auditors recruited on the basis of qualification by the Office of the Auditor General used to conduct procurement audit. However, there are few training opportunities for improving their skill. Working experience is mainly the means of upgrading the skill for conducting procurement audit. | M | 1. Office of the Comptroller General should provide the training opportunity to the auditors' time to time to conduct procurement audit; 2. The PIM should address on the requirement of auditors training time to time. | M |
| 13 | Procurement appeals mechanisms are effective and efficient | | | | |
| 13(a) | Process for challenges and appeals | Public procurement Act 2007 provides for challenges and appeals to the Public Entity (PE) within 7 days of publication of Letter of Intent to Award and the PE to respond within 5 days. If the Bidder is not satisfied with the response or no response is provided by the PE, then the Bidder may complain to the Review Committee within 7 days of the PE's response or no response. The Review Committee is headed by either Judge/ex Judge of high court or ex Secretary of Government of | L | | L |

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| | | Nepal. However, complaints cannot be lodged to the Review Committee for procurement valued at less than NPR 20 million. | | | |
| 13(b) | Independence and capacity of the appeals body | The Review Committee headed by either Judge/ex Judge of high court or ex Secretary of Government of Nepal is relatively independent and capable body. | M | GON Need to make effort on making more independent and capable | M |
| 13(c) | Decisions of the appeals body | Decisions of the appeals body are not so controversial | L | | L |
| 14 | The country has ethics and anti-corruption measures in place | | | | |
| 14(a) | Legal definition of prohibited practices, conflicts of interest, and associated responsibilities, accountability and penalties | Legal definition of prohibited practices, conflicts of interest, and associated responsibilities, accountability and penalties generally complies with IFAD PPF. | L | | L |
| 14(b) | Provisions on prohibited practices in procurement documents | There is provision on prohibited practices in SBD | L | | L |

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| 14(c) | Effective sanctions and enforcement systems | For effective sanctions and enforcement systems there exist National Vigilance Centre and Commission for Investigation of Abuse of Authority (CIAA)- a constitutional authority | L | | L |
| 14(d) | Anti-corruption framework and integrity training | There is less Anti-corruption framework and integrity training opportunity. | M | <p>1.MoF/PPMO needs to introduced the provision of anti-corruption framework and integrity training in PPA/PPR;</p> <p>2.CIAA should provide anti-corruption framework and integrity training ;</p> <p>3. PPMO should publish a manual/guide on Anti-corruption framework and integrity;</p> <p>4. The PIM should address on Anti-corruption framework and integrity;</p> <p>5. PMO staff should be trained on anti-corruption framework and integrity.</p> | M |
| 14(e) | Stakeholder support to strengthen integrity in procurement | There exists less Stakeholder support to strengthen integrity in procurement | M | 1.MoF/PPMO needs to introduced the provision of stakeholder support to strengthen integrity in procurement in PPA/PPR; | M |

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| | | | | <p>2. PPMO should publish a manual/guide on stakeholder support to strengthen integrity in procurement;</p> <p>3. The PIM should address on Stakeholder support to strengthen integrity in procurement</p> | |
| 14(f) | Secure mechanisms for reporting prohibited practices or unethical behaviour | Mechanisms for reporting prohibited practices or unethical behaviour in practice are by written applications or telephonic complain or by email. | M | <p>1. MoF/PPMO/CIAA needs to introduce the provision of secure mechanisms for reporting prohibited practices or unethical behaviour in PPA/PPR;</p> <p>2. IA should publish pamphlets, bulletins, notices etc with secure mechanisms for reporting prohibited practices or unethical behaviour including FM Radio, TV broadcasting;</p> <p>2. The PIM should address on secure mechanisms for reporting prohibited practices or unethical behaviour;</p> | M |
| 14(g) | Codes of conduct/codes of | Civil Service Act/Regulation has made some provision of Codes | L | | L |

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|--|--------------------------------------|---|--------------------------------------|--------------------------------------|--------------------------------------|
| | ethics and financial disclosure rule | of conduct/codes of ethics and financial disclosure rule. | | | |
| Consolidated findings for Pillar IV | | Consolidated findings for Pillar IV can be expressed in average as M . | | | |
| Consolidated findings at country level is M | | [to be determined by the SPO] | [to be determined by the SPO] | [to be determined by the SPO] | [to be determined by the SPO] |

Nepal

Resilient High Value Agricultural Programme (R-HVAP)

Project Design Report

Annex: SECAP Review note with annexes (ESCMP, TAA, SEP, GRM)

Mission Dates: 22 March - 10 April 2023

Document Date: 06/03/2024

Project No. 2000003750

Report No. 6673-NP

Asia and the Pacific Division
Programme Management Department

Annex 5: SECAP (ESCMP, Targeted Adaptation Assessment, Stakeholder Engagement Plan, and Grievance Redress Mechanism)

Annex 5: Social, Environment and Climate Assessment (SECAP) Review Note

Resilient High Value Agriculture Program (R-HVAP)

Social, Environment and Climate Assessment (SECAP) Review Note

1. Introduction

1. This Social, Environmental, and Climate Assessment Procedures (SECAP) background study contributes to the design of the new Resilient High Value Agriculture Program (R-HVAP) covered under IFAD's 12th replenishment cycle 2022-2024. With the development objective of 'Transition smallholder agriculture towards sustainable food systems that are profitable, inclusive and agroecological' the Program will see to achieve the following: i) Profitable – improved smallholders' livelihoods and poverty reduction; ii) Inclusive-empowered smallholders, women, and youth; and iii) Agroecological – enhanced farm ecosystem and biodiversity. The development objectives will be achieved through four interconnected outcomes: i) Enhanced capacities for transitioning to market oriented agroecological systems, ii) Improved access to climate resilient productive infrastructure, iii) Improved wholesale aggregation and distribution of agroecological commodities for domestic and export market, and iv) Strengthened policies, regulations, and institutions for smallholder agroecological production and trade. This eight-year Program will be implemented in Lumbini, Karnali, and Sudurpashchim Provinces.

2. This SECAP review note is prepared to identify potential social, environmental, and climate risks to the Program, and possible impacts of the Program, and recommend technically feasible and cost-effective adaptation and mitigation measures to be incorporated into the Program design. The review note is guided by a literature review, ten days field visits covering eight districts of Lumbini and Karnali provinces, series of thematic stakeholder consultation workshops, and wider consultations with ongoing IFAD projects in Nepal and related stakeholders.

2. Situational analysis and potential programme impacts

3. Landlocked between India and China, Nepal is among the poorest countries in the world. Twenty-five percent of its population live below the national poverty line of USD 0.50 per day (WFP, 2023). Poverty remains a key challenge of the R-HVAP targeted farmers. Traditional production-oriented farming, lack of employment generating activities, deficiency of skills, outmigration to pursue employment options, lack of gender equality and social inclusion are the key identified social challenges. The key environmental impacts facing by the Program targeted provinces include increasing agro-chemical fed agriculture resulting in air, soil and water pollution and hazardous impact on local biodiversity; unsustainable cultivation practices such as excessive tillage, farming on sloping and degraded lands leading to reduced soil fertility; increasing uptake of genetically modified crops; and poorly planned settlement and infrastructure development.

2.1 Socio-economic and nutritional assessment

Overall poverty situation

4. The growth rate of Nepal's agriculture and remittances reliant economy varies significantly from year to year. Asian Development Bank has estimated Nepal's economic growth to moderate to 4.1% in fiscal year (FY) 2023, down from an estimated growth of 5.8% in FY 2022. However, it is estimated to slight growth to 5% in FY 2024 (ADB, 2023).

5. Nepal's Gross Domestic Product (GDP) per capita reached USD 1,371 in July 2022 compared to 1,239 in July 2021 (CEIC, 2022). Nepal's economic growth is expected to slow primarily because of a restrictive monetary policy, weakened domestic demand, the withdrawal of COVID-19 relief measures, and ongoing challenges from the global economic environment (ADB,2023).

6. Despite a relatively long political transition and frequent changes in the government, the proportion of the population living below the poverty line has been decreasing steadily. Before COVID-19 hit the county, it was estimated that around 18.7% of the country's population were below the poverty line (MoF, 2019). This compares very favourably with poverty incidence rate of 41.8% in 1996, 30.6% in 2004, and 25.16% in 2011 (CBS, 2011). Multi-dimensional poverty has also seen significant reductions. The national-level multi-dimensional poverty index (MPI) fell from 59.35% in 2006 and reached 39.13% in 2011, 30.1% in 2014, and 17.4% in 2019 (NPC, 2021). Furthermore, it is estimated that 4.9 % of population is in severe MPI and 17.8 % is vulnerable to Multi-dimensional Poverty (UNDP, 2022).

7. In terms of Human development, Nepal lies behind most of the other South Asian countries. Nepal's national Human Development Index (HDI) score stood at 0.602 in 2021, which puts the country in the medium human development category (UNDP, 2022). HDI score for 2020 in urban areas (0.647) surpasses that of rural areas (0.561) with a large urban-rural gap. The HDI value also varies across provinces, Madhesh Province scores the lowest (0.51) followed by Karnali (0.538) and Sudurpashchim (0.547) (NPC, 2020).

Table 1: Multi Poverty Index per Province (NPC, 2021).

| | Province | Population Share (%) | MPI Value | Incidence (%) | Intensity (%) | Poor People (000) | Share of MPI Poor (%) |
|----------------------|-----------------|----------------------|--------------|---------------|---------------|-------------------|-----------------------|
| <i>Above average</i> | Karnali | 5.6 | 0.169 | 39.5 | 42.9 | 636 | 12.8% |
| | Madhesh | 18.7 | 0.109 | 24.2 | 45.0 | 1,296 | 12.7% |
| | Sudurpashchim | 8.7 | 0.105 | 25.3 | 41.3 | 631 | 26.0% |
| | Lumbini | 18.4 | 0.078 | 18.2 | 43.1 | 958 | 19.2% |
| | National | 100 | 0.074 | 17.4 | 42.5 | 4,980 | 100% |
| <i>Below average</i> | Koshi | 17.0 | 0.066 | 15.9 | 41.4 | 773 | 15.5% |
| | Gandaki | 8.2 | 0.035 | 9.6 | 36.4 | 227 | 4.6% |
| | Bagmati | 23.3 | 0.028 | 7.0 | 40.3 | 470 | 9.4% |

Source: NPC, 2021

8. The R-HVAP will target Lumbini, Karnali, Sudurpashchim provinces, which have the lowest HDI and MPI values, highest poor people covering 58% share of the poor people and high unemployment rates. A contiguous zone of production will be created for supply to a large wholesale market planned for construction in Semlar of Butwal Sub Metropolitan City, Lumbini Province.

Gender

9. Remarkable progress has been made relating to protection and promotion of women's rights and gender equality. Nevertheless, deeply rooted sociocultural norms still impede further progress in this area. Despite some progress in financial independence, gender gaps, gender-based violence, and disadvantageous social norms facing women and girls persist, and gains in human capital of women and girls remain untapped. Turning human capital investments into economic gains means addressing multiple barriers to women's economic empowerment, including improving their voice and agency.

10. Nepal has one of the highest rates of women's participation in agriculture in the world, making up over 73% of the agricultural workforce. Outmigration of men for employment in urban centers and abroad drives the feminization of agriculture in rural areas. Such migration has also resulted in the proportion of female-headed households which grew from 14.9% in 2001 to 25.7% in 2011 (CBS, 2012) to 31.3% in 2016 (World Bank, 2022 a). 76.4% of women aged 15-49 years engaged in agricultural work are not paid, compared

to 15.9% of women engaged in non-agricultural. In rural areas, due to migration and long-term absence of men from agricultural fields, women have now also taken up responsibilities traditionally performed by men, such as ploughing. As a result, it has not only increased the workload of women but also, has caused poor agricultural performance due to labour scarcity as well as lack of access to credit for agriculture inputs. The heavy burden of unpaid household responsibilities borne by women often leads to 'time poverty' (MoPH, 2012), (FAO, 2019).

11. Due to their low income, inadequate access to finance and markets, limited ownership of land and property, and inability to diversify their sources of income, women are particularly vulnerable to climate change. Because women farmers do not have the same access to land, water, seeds, agricultural extension, training, and credit as males, their vulnerability to climate change is compounded. Only 10% of Nepal's farms are owned by women or jointly owned by men, and households headed by women tend to plant fewer types of crops, making them more susceptible to climatic shocks (MoFE, 2022).

12. The global gender gap report by World Economic Forum puts Nepal in 96th position out of 146 countries in 2022, with an average score of 0.692 meaning that there is still more than 30% disparity between men and women in terms of (i) economic participation and opportunity, (ii) educational attainment, (iii) health and survival and (iv) political empowerment (World Economic Forum, 2022). The country stands at 133 out of 162 countries in Gender Inequality Index (GII) (UNDP, 2022). Among the ecological belts, gender inequality is more pronounced in the mountains. Karnali Province has the highest level of gender inequality, followed by Sudurpashchim and Madhesh. Relatively higher maternal mortality and fertility rates together with the lowest female shares in both secondary education and parliamentary seats are causes of greater gender inequality in the mountains and Karnali Province. Discrimination persists in the Program target provinces limiting women's equitable access to and control over productive resources such as land, capital—including credit, markets, and other available opportunities.

Youth

13. The Government of Nepal defines 'youth' as people between 16-40 years, which accounts to 40.4% of total population. Population aged 15-29, represent approximately 33% of the population of the country with over 61% of them living in rural areas (UNFPA Nepal, 2022). Nepal thus has a young population demography and overall population is projected to increase. Youth continue to face challenges related to education, civic engagement, political participation and unemployment. Youth migration is one of the major challenges in rural areas that affect agricultural activities at large. Limited economic opportunities in rural areas, high concentration of economic activities in urban areas, wider availability of low- skilled jobs in Middle Eastern Countries, low economic return of traditional agriculture, and demographic changes are powerful push and pull factors affecting the movement of youth.

14. Access to credit for investment is particularly challenging for youth, where they have few assets of their own or other income sources. Other important push factors out of agriculture and rural areas include: lack of proper visioning and planning of life; insufficient mutual discussions and understanding among couples; excessive parental control; insufficient support systems to promote youth in commercial agriculture and limited or poorly targeted public investment to promote economic activities and private investment in rural areas. In rural areas, youth who are self-employed often have little to show in terms of income and market access. The status of farming is also an important factor – with the traditional farming of their parents seen as hard and un-glamorous work, with uncertain incomes and the low social status of agriculture (often affecting their choices of marriage). Self-employment for youth is also constrained due to lack of knowledge and access to efficient production technology, lack of business skills and financial literacy, and the inability of youth to access finance. Changing the perception of farming to be a respected modern profession, with farming as a business, is important in attracting youth. Real role models and success stories are critical.

15. The challenges of young women’s participation in the labour force are even more pronounced. Newly married women in migrant families, whose husbands have migrated overseas for work, often live with the husband’s family, especially in the Terai and middle-class families. In many cases these women do not have proper communication with husbands and support system from parents-in-laws. They have little control over their own time or the resources and income of their husbands. Such women and their husbands are considered as high-risk households. The different groups within youth require specific attention with regard to the constraints and challenges of exclusion, inequality and discrimination. These groups include young women vulnerable to sexual abuse, trafficking and exploitation; historically marginalized indigenous youth; disadvantaged young women and girls; Dalit youth; young people with disabilities; youth without basic education; unemployed youth; migrant workers and their families; rural landless and land-poor youth; young bonded and forced laborers; young urban slum dwellers and squatters; conflict-affected youth; young people especially vulnerable to climate risks; sexual and gender minority youth; and young people living with HIV, among others (UNDP, 2018).

16. This situation calls for development programs supporting agricultural value chain development, entrepreneurship skill enhancement and greatly increased access to institutional finance in rural areas. Promotion of competitive, smallholder-based agriculture supply chains will help create opportunities to utilize remittances more effectively for productive purposes and ultimately encourage migration returnees and increase the investment in rural areas, increase the productivity of youths and profitability of agriculture.

Indigenous peoples

17. Nepal is a multi-lingual, multi-religious, multi-ethnic and multicultural country inhabited by over 125 caste/ethnic groups, 123 languages and 10 religious groups. National census of 2011 calculated 35.8% of the population comprises of indigenous people (IP) and the country has legally recognized 59 indigenous nationalities as *Adivasi Janajati* and classified in 5 different categories as presented in table 2. Lumbini, Karnali and Sudurpashchim Provinces have 19.58%, 13.63% and 3.61% of IPs respectively (CBS, 2012).

Table 2: Indigenous People and their Level of Marginalization

| Region | Endangered | Highly Marginalized | Marginalized | Disadvantaged | Advantaged |
|---------------------|--|---|---|--|-------------------|
| Mountain | | Shiyar, Shingsawa (Lhomi), Thudam | Bhote, Dolpo, Larke, Lhopa, Mugali, Topkegola, Walung | Bara Gaunle, Byansi (Sauka), Chhairrotan, Marphali Thakali, Sherpa, Tangbe, Tingaule Thakali | Thakali |
| Hill | Bankariya, Hayu, Kusbadiya, Kusunda, Lepcha, Surel | Baramu, Thami (Thangmi), Chepang | Bhujel, Dura, Pahari, Phree, Sunuwar, Tamang | Chhantyal, Gurung(Tamu), Jirel, Limbu (Yakthung), Magar, Rai, Yakkha, Hyoimo | Newar |
| Inner Terai | Raji, Raute | Bote, Danuwar, Mahi | Darai, Kumal | | |
| Terai | Kisan, Meche (Bodo) | Dhanuk (Rajbansi), Jhangad, Santhal (Satar) | Dhimal, Gangai, Rajbanshi, Tajpuriya, Tharu | | |
| Total Number | 10 | 12 | 20 | 15 | 2 |

18. There is extreme variation in the economic situation of indigenous people – from the *Rautes* who still make their livelihood through hunting and gathering, to the *Newars* and *Thakalis* who are well advanced in commercial and industrial activities (Bhattachan, 2012). More generally, levels of socio-economic exclusion in Nepal vary across indicators and across and within caste/ethnic groups. None of the groups has a significantly lower level of socio-economic exclusion across the broader social groups. Caste/ethnic groups having high levels of exclusion in one indicator may face higher levels of inclusion in another indicator. However, Hill Brahman/Chhetri and Hill Janajati have low rates of exclusion across a fairly high number of indicators. Within the broader groups, hill Brahmans, Newars, and Tarai Brahman/Chhetri have similar scores. In contrast, hill and Tarai dalits scored poorly across a number of indicators and often face higher levels of exclusion than other caste/ethnic groups. This above report further concludes on the poverty gap, it is narrowest among hill Brahman/Chhetri and Muslims, and widest among hill and Tarai Dalits. Disaggregated figures show that the poverty gap is wider among hill Chhetri than it is among hill Brahmans and wider among other hill Janajatis than it is among Newars (CDSA, 2014) (CDA, 2020).

19. The RHVAP will ensure the meaningful participation of indigenous people from the planning to implementation and supervision. The design process had a wider consultation with IPs in the program target areas and had a meeting with IP leading representatives including member of global steering committee of IP forum at IFAD and Asia focal person coalition of IP food system, FAO Italy, president Asian Indigenous International network. The Program will ensure inclusive and meaning participation of IPs in Agroecological Cluster Plan (PAP) *planning* process. There will be a dedicated IP focus group discussion where needed to assess their situation and integrate their demand and needs. There will representatives from IPs in Multistakeholder Platforms (MSPs), which is a key actor to design and implement R-HVAP activities. R-HVAP will have proactive targeting for IPs. They will be actively benefitted from the activities' *implementation*. As a regular practice of IFAD Nepal projects, IPs will be a key member of joint supervision and monitoring of program activities.

Marginalised groups

20. National *Dalits* Commission defines *Dalits* as the communities who, by virtue of atrocities of caste-based discrimination and untouchability, are most disadvantaged in social, economic, educational, political and religious fields, and are deprived of human dignity and social justice. Caste Based Discrimination and Untouchability (Offence and Punishment) Act 2011 has made such discrimination punishable in law. National *Dalits* Commission has scheduled 26 castes under Dalit including 7 Hill *Dalit* castes and 19 Tarai/Madhesi Dalit castes¹. Lack of productive resources and socio-cultural discrimination, lack of opportunities to advance the traditional skills of providing essential services like tailoring, making shoes, producing ornaments, preparing agriculture tools, masonry and carpentry, and opportunities to acquire marketable skills are the factors that push Dalits in the highest poverty rates.

21. The Program will have a dedicated inclusion fund to benefit pro-poor and highly marginalized communities to benefit them from the Program.

Nutrition

22. Nepal has made impressive strides in reducing the prevalence of stunting, height for age (% of children under 5) nationally, which fell from 68.2% in 1995 to 31.5% in 2019 (World Bank, 2022 a). Poor nutrition, food insecurity, and malnutrition continue to pose risks to Nepal's population, despite the country's progress in reducing stunting in children

¹ **List of Hill Dalit:** Gandharva (Gaine), Pariyar (Damai, Dargee, Suchikar, Nagarchee, Dholee, Hudke), Badi, Bishwokarma (Kami, Lohar, Sunar, Od, Chunanra, Parki, Tamata), Mijar (Sarki, Charmakar, Bhool), Pode (Deula, Pujari, Jalari) and Chyame (Kuchikar, Chyamkhal); **List of Tarai Dalit:** Kalar, Kakaihiya, Kori, Khatik, Khatwe (Mandal, Khang) Chamar (Ram, Mochi, Harijan, Ravidas), Chidimar, Dom (Marik), Tatma (Tanti, Das), Dushadh (Paswan, Hajara), Dhobi (Rajak, Hindu), Pasi, Bantar, Musahar, Mestar (Halkhor), Sarbhang (Sarbariya), Natuwa, Dhandi and Dharikar/Dhankar

under-five. The stunning prevalence for children under 5 years does vary by region and is highest in Karnali (55%). Moreover, the chronic undernutrition rate varies by maternal education and wealth levels—23% of children whose mothers have secondary education are stunted, while the rate rises to 46% whose mothers had no formal education (USAID, 2021).

23. The high prevalence of underweight adolescents, combined with the persistent and high adolescent pregnancy rate, is a disturbing trend. Adolescent pregnancy is associated with a 50% increased risk of stillbirth and neonatal death, and an increased risk of low birth weight, premature birth, asphyxia, and maternal mortality. Furthermore, the risk of stunting is 36% higher among first-born children of girls under 18 years in South Asia. (USAID, 2021). This suggests that young women should be a particular priority for the programme for unlocking issues of gender, youth and nutrition.

24. Nepal Demographic and Health Survey (NDHS), 2016 has shown that the national household food security is only 48.2% whereas in rural areas it is only about 38.8%. About 10% of households are severely food insecure. Geographically, the mountain regions suffer from more food insecurity where the %age of food secure households is 38.4% compared to Terai where the statistics is about 51%. Furthermore, the severely food insecure households in the mountain region are about 13.8% compared to 9.2% of Terai region. Among the provisional Programme working provinces, Karnali has the lowest level of food security where food secure households are only 22.5% and the severely food insecure households are about 17.5%. Madhesh province has 43.1% food secure households, and 10.7% households are severely food insecure. Food secure and severely insecure households for Lumbini and Bagmati are 48.4%, 55% and 10.2% and 8.5% respectively (MoPH, 2017).

25. Poor dietary diversity is a major causal factor of high rate of child malnutrition (36% and 27% of children under five are stunted and underweight, respectively). Poor maternal nutrition, especially among adolescent girls, significantly contributes to an intergenerational cycle of malnutrition and poverty. Inadequate infant and young child feeding (IYCF) practices also contribute to high prevalence of undernutrition. About 17% women of reproductive age have chronic energy deficiency (Body Mass Index less than 18.5) and 41% of those populations are anaemic (NDHS, 2016). Anaemia in children is more severe, As per (NDHS, 2022) 43% of children age 6–59 months are anaemic, including 25% who are mildly anaemic, 18% who are moderately anaemic, and less than 1% who are severely anaemic. Similarly, women and children also suffer from some of the world's highest levels of vitamin and mineral deficiencies, which can be imputed from the fact that Vitamin A deficiency is the cause of death of approximately 6,900 children in Nepal each year. About 2-3 % of GDP (US\$ 250 to 375 million) is lost every year in Nepal on account of vitamin and mineral deficiencies alone. The wider availability of diversified and high nutritional value foods in the household and local communities is therefore a key priority, to which R-HVAP will contribute through the development of increased local supply of a series of diversified high nutritional value foods stuff. The local crop varieties with high nutritional value and benefits will be given higher priority.

2.2 Environment and climate context, trends and implications

Landscapes and biodiversity:

26. The country is divided into five physiographic regions from north to south: i) High Himalaya (above 5,000 m) with 24% area, ii) High Mountains (3,000 – 5,000 m) with 20% area, iii) Mid-Hills (1,000 – 3,000 m) with 30% area, iv) Siwalik (500 – 1,000 m) with 12% area, and v) Terai (< 500 m) with 14% area (MoFSC, 2014). Lengthwise, all the zones extend from east to west across the country. Altitudinal and physiographic heterogeneity

affects temperature and rainfall patterns. R-HVAP targeted provinces span all five physiographic regions although the Program will focus mainly on Mid-Hills and Siwalik, with a reduced set of activities in Terai.

27. The diverse terrain and topography, along with varied climatic conditions across altitudes results in the occurrence of unique flora, fauna, livelihoods, and cultures in different regions. This includes more than 10,630 plants and 3,000 wildlife species growing in 118 different ecosystem types, 75 vegetation types, and 35 forest types. The nation-wide forest resource assessment (2010–2014) of Nepal catalogued 5.96 million hectares (ha) of forest (40.36% of total land area) and 0.65 million ha of other wooded land (4.38% of total land area). Of the total, 18.8% forests lie in Province 1, 18.7 % in Bagmati, 16.2 % in Lumbini, 16.1 % in Sudurpashchim, 13.6 in % Karnali, and only 3.9 % in Madhesh. Similarly, forests cover, 48.8% of the total province area in Lumbini, 38.4% in Karnali and 56.9% in Sudurpashchim province (DFRS, 2018). Agricultural land comprises 28.75% of total land area in 2018. Prominent threats to biodiversity, and main drivers of land use changes are unsustainable agricultural practices, increasing population, aggressive development programmes including construction of roads, hydropower plants, and expansion of urban areas; and extent of their effects are further exacerbated by the impacts of climate change. With increasing built up structures, forest cover has declined, and agricultural and shrub land have decreased (MoFE, 2022). R-HVAP's production activities will be confined to areas designated for agricultural use and will not involve areas designated for forestry, wetland and those with high biodiversity values.

28. The program will support establishing a large wholesale market in Semlar, Lumbini province. The proposed market will cover a total area of about 12.47 ha, which is currently Ratanpur Community Forest. The forest does not represent a wildlife habitat based on the site visit conducted by the Environmental Impact Assessment (EIA) team commissioned by the Investment International. The area is a below 20-year plantation with Sisoo as a dominant tree species. It is estimated that approximately 704 poles and trees will be affected but not all will be harvested to construct infrastructures. The biodiversity management focused planning are included in EIA study which includes dedicated provision and fund for planting and managing 2040 seedlings for five years. This follows the government of Nepal's provision of planting at least 10 times seedlings than expected number of harvestable trees from the site. A series of wider and inclusive consultations were done with communities and stakeholders including Ratanpur community forest user groups to seek their consent and approval. They have provided their agreement, which is documented in EIA and circulated with related stakeholders. As per the national provision, the Butwal Sub Metropolitan city has started the initial process for land title transfer through federal cabinet decisions.

29. Forest encroachment will be strictly monitored in collaboration with Divisional Forest Offices. Dependency on forest products like fodder/forage will be reduced by sufficient plantation of fodder and forage on private lands, leasehold forest lands and promotion of stall feeding. Adoption of agroecological farming will ensure the use of bio-inputs with minimal to no negative implications.

30. Water resources (WECS, 2011): Nepal is rich in water resources. There are about 6,000 rivers having drainage area of 191,000 sq. km, 74% of which lies in Nepal alone. There are 33 rivers having their drainage areas exceeding 1,000 sq. km. Rivers of Nepal can be broadly classified into three types, in accordance with their origins: the first category comprises of the four main river systems of the country: Koshi, Gandaki, Karnali and Mahakali river systems, all of them originating from glaciers and snow-fed lakes; latter three lies in R-HVAP targeted three provinces. Rivers of the second category, originating from Mahabharat range, Babai, West Rapti are located in R-HVAP target provinces. Streams and rivulets originating mostly from the *Chure* hills make up the third category; these rivers cause flash floods during monsoon rains and remain without any flow or very little flow during the dry season. This may have some implications on the program target lower belt of Lumbini and Sudurpashchim.

31. Currently, the middle mountain area of Nepal is facing significant water stress, and access to water is limited. The scarcity of water has become an increasingly significant obstacle to the livelihoods of locals and efforts to reduce poverty in many villages in the region. A recent study conducted on the springs in the mountain watershed of western Nepal determined that the springs are in a precarious state due to human activities and climate change. According to the study, around 70% of the springs are experiencing a decreasing trend in discharge, and it is crucial to undertake restoration activities promptly (Adhikari et al, 2021).

32. Protected Areas (Pas): Pas remain the dominant approach to biodiversity conservation in Nepal. Out of the total forest area 17.32% area is Pas together with core areas and buffer zones. R-HVAP working areas have 6 National Parks (NP), 2 Conservation Area (CA) and 1 Hunting Reserve (HR): Sudurpashchim- Suklaphata and Khaptad NPs, Api Nampa CA; Karnali- Rara and Shey Phoksundo NPs; Lumbini: Banke and Bardiya NPs, Krishnasar CA, and Khaptad HR. The key threats to protected area biodiversity are i) illegal hunting and trade of important wildlife species, ii) human-wildlife coexistence, iii) invasion by alien species of flora, iv) intrusion of tree species in to the grassland, and v) encroachment of forest areas for cultivation and settlement (MoFSC, 2014). R-HVAP will not work inside the protected areas and in the sensitive ecological sites and habitats of endangered wild animals.

Climate:

33. The country's annual minimum temperature varies from -4°C to 19°C while the maximum temperature ranges from 4°C to 30°C. Normal annual maximum temperature is lowest in high Himalayas (5 to 10°C) and so is normal annual minimum temperature (-5 to 0°C). Most of the low-lying southern districts in Terai and Siwaliks have the highest annual average maximum temperature above 30°C and also the highest annual minimum temperature (15 to 20°C). Nepal receives average annual rainfall of around 1,600 mm but this distribution pattern varies considerably in both north-south and east-west directions. The southern flanks of the Himalayas, such as Pokhara, receive the highest amount of rainfall (3,345 mm), while the rain shadow areas such as Dolpa and Mustang receive less than 10% of that amount (295 mm). Total annual rainfall increases with altitude up to approximately 3,000 masl and then diminishes at higher elevations (MoFE, 2022). The High Himalayas see only 400 to 1000 mm of annual rainfall which is least among all physiographic regions and the remaining regions receive 1500 to 2000 mm of annual rainfall (MoPE, 2017).

Observed climate change:

34. Over the historical period 1971-2014, average temperature has increased in all climate zones. Warming occurred in all regions of Nepal, with the highest rate of increase taking place at higher altitudes in the mountains and Himalaya regions. The number of warm days and warm nights, and warm spell duration significantly increased in most districts. The number of cool days per year decreased in most districts, with a significant decrease of cool days noted in high mountains and high Himalayan districts. Among the Nepal's five physiographic regions, trends of decreasing precipitation were observed mainly in the high mountains and high Himalayas in all seasons. The number of rainy days increased significantly in the north-western districts; and very wet days (days with annual daily rainfall >95th percentile) and extremely wet days (days with daily rainfall >99 percentile) decreased significantly in the northern districts. Extreme precipitation showed spatial variability and inconsistent trends (MoFE, 2022).

35. Annual mean temperature increase is more pronounced in the uppermost part of Karnali province and central parts of Sudurpashchim and Lumbini provinces. The annual mean precipitation has declined substantially throughout Lumbini and Sudurpashchim provinces and in the lower parts of the Karnali province. Provinces out of the proposed program areas also show a high decline in average annual precipitation during the 2000-2017 period (MoFE, 2022).

Projected Climate Change

36. Temperature in Nepal is projected to increase further until the end of the century (2100), with increases in temperature projected for all seasons under all Shared Socioeconomic Pathways (SSPs) compared to the reference period 1995 to 2014 (World Bank, 2022 b). Warm extreme events (determined by number of warm days and warm nights, and duration of warm spell) are projected to increase, while cold extremes are projected to decrease in both the medium- and long-term periods. The increase in warm days and warm nights is expected to be more pronounced in the mid hills and high Himalayas. Projected changes in average precipitation and temperature under RCP 4.5 and RCP 8.5 for medium- and long-term periods for each physiographic region is presented in table 39. However, there is considerable uncertainty regarding the precipitation projections (MoFE, 2022).

Table 3: Projected change in mean precipitation and temperature in medium- and long-term period for different physiographic regions

| Time Period | RCP 4.5 | | | RCP 8.5 | | |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 2016-2045 | 2036-2065 | 2071-2100 | 2016-2045 | 2036-2065 | 2071-2100 |
| Change in precipitation (%) | | | | | | |
| High Mountain | 2.6 | 9.5 | 12.6 | 8.0 | 14.4 | 25.1 |
| Middle Mountain | 1.7 | 7.6 | 10.3 | 6.3 | 12.4 | 21.7 |
| Hill | 2.1 | 7.2 | 9.9 | 5.8 | 11.2 | 22.6 |
| Siwalik | 1.6 | 7.4 | 9.9 | 5.8 | 11.1 | 21.9 |
| Terai | 2.1 | 7.3 | 10.2 | 5.4 | 10.6 | 22.7 |
| Change in temperature (°C) | | | | | | |
| High Mountain | 0.95 | 1.36 | 1.79 | 1.09 | 1.86 | 3.61 |
| Middle Mountain | 0.89 | 1.27 | 1.66 | 1.04 | 1.76 | 3.44 |
| Hill | 0.9 | 1.26 | 1.69 | 1.06 | 1.8 | 3.56 |
| Siwalik | 0.94 | 1.29 | 1.72 | 1.1 | 1.87 | 3.66 |
| Terai | 0.93 | 1.29 | 1.73 | 1.11 | 1.87 | 3.69 |

Source: (Ministry of Forests and Environment, 2019)

37. These climate change projections suggest that Nepal will be more exposed to climate hazards in the future. Warming in Nepal could trigger biophysical and socio-economic impacts that will impact livelihoods and well-being, including biodiversity loss, increased glacial melting, and less predictable water availability while this will also shift vegetation upwards. Of particular concern is the potential for changes to the flow and quality of water derived from glaciers, snowmelt, and rainfall, leading to excess water at certain times of the year and prolonged dry periods and extreme drought in others (MoFE, 2022).

38. The detailed climate analysis has been presented on Targeted Adaptation Assessment.

Climate hazard

39. Nepal is already exposed to range of climate-related hazards. More than 80% of property loss due to disasters is attributable to climate-related hazards, particularly water-related events such as floods, landslides and glacial lake outburst floods (GLOFs). Water-related disasters claim more than 300 lives a year, displace people, and destroy homes, farmland, and other essential infrastructure. Extreme rainfall in 2020 caused 445 flooding and landslide incidents that claimed about 430 lives and displaced more than 5,000 people (MoFE, 2022).

40. Based on the climate change knowledge portal of the World Bank, flood is the most frequent climate hazard and affects the largest number of people among all other hazards from 1980 to 2020. However, hazard statistics are available only for national level. Also, according to the ThinkHazard tool, the hazard level in Nepal for urban flood, landslide, water scarcity, extreme heat and wildfire is high and for river flood and earthquake is medium. Considering all districts from the target provinces, landslide is the biggest risk and drought is the second biggest risk in the programme area.

41. The program aims to promote the agriculture production and processing, targeting both domestic and international markets. At present, for the domestic market, the identified target commodities are nutritious cereals, off-season vegetables, fruits,

livestock, dairy, poultry, nuts and mushrooms. Similarly, for the international market, the identified target commodities are organic honey, spices, Medicinal and Aromatic Plants (MAPs), coffee, and vegetables. Further value chain analysis is needed to finalise the selection of commodities for export. Due to the unavailability of the targeted commodities mentioned above in the CARD assessment tool, the past production trends and the future yield projection of those commodities are not available.

42. **Emission:** Nepal is a negligible contributor to global GHG emissions. With 48 million tons of carbon dioxide equivalent (MtCO₂e) in 2019, Nepal contributes around 0.1% of total global GHG emissions. These come primarily from agriculture (54%) and energy (28%). Biofuels and waste (including fuelwood, dung, biogas, and agricultural waste) provide 72% of energy supply, followed by oil, coal, and hydropower. However, the country's GHG emissions are rising. Emissions increased by 26.86% between 2012 and 2019. This is linked to rising energy consumption, which doubled in the residential sector between 1990 and 2018 and, from a smaller base, increased almost tenfold in the transport and industry sectors over this period. The carbon intensity of Nepal's energy supply has also risen steadily since 1990; the largest driver of emission growth was the transport sector (WorldBank, 2022). Through the adoption of agroecological practices that contribute to carbon sequestration, the Program is anticipated to be a net zero emitter of GHGs.

Target group profiles

43. **Program participants and outreach:** The total R-HVAP direct outreach is estimated at 60,000. Out of which, women will constitute at least 50% of the total program participants and youth² 40%.

44. **Target areas:** The R-HVAP will be implemented over an 8-year period covering Lumbini, Karnali, and Sudurpashchim provinces and operate in approximately 80 Palikas. The provinces have been selected based on the highest incidence of multi-dimensional poverty³, impacts of COVID-19 on rural livelihoods⁴, location of Semlar regional wholesale market for national and international distribution, climate vulnerability, market access, potential of organic farming, and a landscape perspective to facilitate the building of an agroecological foodshed.

45. **Target groups:** The main target group consists of smallholder households engaged in mixed farming systems (less than one hectare, average is 0.7 ha for men and less than 0.5 for women)⁵ and deriving most of their income from agricultural production at different scale: subsistence, semi-commercial, and commercial. They are described mainly on the basis of poverty level, land ownership and access to input production and services.

46. R-HVAP will provide needs-based services for: (i) poor (including both poor and medium poor) and near-poor (or better off) households practicing subsistence and semi-commercial farming with scaling up potential; (ii) ultra-poor households, with a focus on women-headed households and marginalized groups (Dalits, Janajatis and IPs); and (iii) underemployed and self-employed rural youth (including returnee migrants). Poor subsistence farmers will constitute the majority of program participants being 70 % while near poor (or better off) will be approximately 25 %. Ultra-poor will account for about 5 %.

47. **Geographic targeting and cluster selection:** Within the program area, R-HVAP will adopt an agroecological cluster-based approach in selecting wards and Palikas. An agroecological cluster is a homogenous geographic unit, within or beyond one Palika, that has production potential of a diversity of high value commodities with market demand. The prioritization and selection of clusters will follow a participatory process using a set of criteria such as: (i) poverty incidence; (ii) presence and quality of Producers Organizations

² As per the national definition, youth are people between 16 and 40 years of age.

³National Planning Commission (2021). Nepal Multidimensional Poverty Index: Analysis Towards Action. Kathmandu, Nepal.

⁴ United Nations Children's Fund (2022). Child and Family Tracker (CFT). Kathmandu, Nepal.

⁵ The design mission observed during consultation with local communities that average farm size is 0.1 to 0.5 ha in the Programme target area.

(POs); (iii) proximity to road corridors; and (iv) credible market opportunities, where smallholders can profitably compete. More remote clusters will be brought into operation once the supply chains adjacent to road corridors are operational. Operations will immediately commence in Karnali province.

3. Institutional analysis

48. **Nutrition** and coordination mechanism: The second phase of ten-year multi sector nutrition plan (2012-2022) led by National Planning Commission in close collaboration with other relevant ministries completed last year. Several ministries are taking the lead on their thematic areas: i) Ministry of Agriculture and livestock development works for the agriculture and livestock related production and consumption; ii) Ministry of Women, Children and Senior citizen works on the behaviour communication change, and improve feeding habits; iii) Ministry of Education takes the lead on awareness raising through different courses specially focusing on adolescent girls; iv) Ministry of water supply looks after the post ODF activities; v) Ministry of Health works on health education with special focus on adolescent health issues; and vi) Ministry of federal administration and good governance supports on administration. Multi stakeholder nutrition coordination teams have been formed at the province, district, and the municipality levels.

49. **Gender**: Gender is not considered a crosscutting issue in Nepal anymore as it is a central concern. The Ministry of women, children and senior citizens leads the Gender issue; however, all the ministries have dedicated sections with certain human resources and a dedicated focal person. The national planning commission takes the lead on monitoring. The National Women Commission is the dedicated commission to work on the Gender inclusion and equity.

50. **Youth**: The ministry of Youth and Sports is the dedicated ministry to work on youth sector. It has various programs designed to support youth such as, 'youth empowerment and development' and 'youth and small entrepreneurs self-employment fund'. National youth council is the organization chaired by the Minister of the Ministry of Youth and Sports which has vision as 'Making the Nepalese youth strong, competent, competitive and self-reliant, to build a modern, just and affluent Nepal through their meaningful participation and promotion of their leadership capacity'.

51. **Environment and Climate Change**: A higher level coordination mechanism has been established at the highest political level for necessary policy guidance and coordination and at local level for implementation on the ground. A climate change division has been established in the Ministry of Forest and Environment solely dedicated for climate change related works. The MoALD leads on organic agriculture. The ministry has formed a National Coordination Committee for Organic Agriculture Production and Processing System (NCCOAPPS) chaired by secretary and a National Agriculture Accreditation Body (NOAAB) led by Nepal Agriculture Research Council (NARC). NARC also leads research in climate impact assessment focused on target agricultural value chains in Nepal.

2.2 Policy and regulatory frameworks

52. Nepal has transformed from a unitary administrative system to a federal governance model. The new **constitution 2015** has provisioned three administrative levels – federal, provincial and municipal levels. Elections of all three levels were successfully held in 2017 and 2018 and in 2022, one federal government, 7 provincial governments and 753 municipal governments were elected and are functional. The Constitution has provided a list of distinct and concurrent powers to all three government levels. This also includes the mandates to each government to formulate and implement laws and policies on sustainable development and environment protection and conservation.

53. **Nutrition**: The first nutrition strategy was developed back in 1978 and the government initiatives have been underway since then. The Multi-Sectoral Nutrition Plans (MSNPs) served as a common results framework for improving nutrition outcomes and setting out plans of action for implementing nutrition-sensitive policies and strategies for key sectors, including agriculture, health, and education. The Government of Nepal has

formulated a **Food and Nutrition Security Plan (FNSP)** that constitutes a chapter in the **Agriculture Development Strategy (ADS)** for the decade 2013-23. Like the ADS, FNSP has a vision to ensure national food and nutrition security with a specific focus on the agriculture sector as the main vehicle that can deliver it, as well as the main vehicle for economic growth and balance payments of the Nepalese economy as a whole. The key objective of the FNSP is to reduce hunger, malnutrition, and poverty among the poorest households by improving sustainable agriculture-based livelihoods.

54. The **ADS (2015-2035)** envisions the establishment of the following mechanisms for **ensuring gender equality and social and geographic inclusion**: i) generation and maintenance of national level GESI-based and geographic inclusion-based statistics ii) establishment and strengthening of GESI staff at central department and at district level agencies iii) enhancement of qualitative and quantitative aspects of participation of men and women farmers iv) making the agricultural extension service GESI responsive in all districts v) improvement in access of farmers (from all gender and socio-economic groups in all geographical regions) vi) promotion of GESI responsiveness in agricultural research and vii) development of a GESI strategy.

55. The ADS envisions "a self-reliant, sustainable, competitive, and inclusive agricultural sector that drives economic growth, and contributes to improved livelihoods and food and nutrition security leading to food sovereignty." The ADS has short term, medium term, and long-term targets for 5, 10, and 20 years respectively. The sustainability vision targets to increase soil fertility at 4% organic matter from the baseline of 1% organic matter in 2010 in the long term. Similarly, in the long term, it targets a 50% reduction of degraded lands and doubles the % of agribusiness GDP as a share of GDP to make it 20% and aims to maintain a constant 40% forest cover. The long-term target also aims to increase agricultural land productivity (AGDP/ha) to \$4,787 from \$1,804.

56. To improve the resilience of farmers to climate change, disasters, price volatility, and other shocks the ADS proposes i) conducting research on stress tolerant varieties and breeds, ii) establishing an early warning system, iii) establishing climate information and weather indexation systems, iv) piloting a farmer's welfare fund, v) promoting agricultural insurance, and vi) strengthening the food reserve system.

57. **Gender**: The Constitution of Nepal is a significant milestone for gender equality and social inclusion (GESI) and enshrines equal rights for women, the poor, the vulnerable and people from different social groups. Strategy against child marriage (2072 BS), National Policy on children (2069 BS), Single women protection fund regulation (2076 BS), Gender based violence mitigation fund regulation (2076 BS) emphasize participation of women, Dalits, Janajatis, Madhesis, Muslims, persons with disability and excluded communities in the formulation, implementation, monitoring, and evaluation of sectoral policies, plans and programs. They recognize the need to identify the specific barriers faced by women, the poor, the vulnerable and the excluded in the sector concerned.

58. **Youth and Social protection**: The national **youth policy 2015** has listed the major challenges faced by youth as lack of qualitative, timely and employment-oriented education, least access to vocational skills and techniques, unemployment, under employment, youth emigration, weak health, nutrition, mental strength, lack of environment of youth friendly investment and entrepreneurship, gender, religion and caste related inequalities and the negative impacts brought about by globalization and liberalization.

59. Environmental management and climate change policies: **Environment Protection Act 1996** and the corresponding **Environment Protection Rule 1997** regulate environmental issues. The act has listed the type of projects that require an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) in the prescribed manner. The Government of Nepal has formulated a **Climate Change Policy in 2019** with the aim to contribute to socio-economic prosperity of the nation by building a climate resilient society. The 2019 policy has the objectives of advancing capacity on climate change adaptation (CCA), developing ecosystem resilience, promoting green

economy by adopting low carbon economic development concept, mobilizing national and international financial resources, making effective information service, mainstreaming climate change into relevant policy, strategy, plan and programs, and also mainstreaming gender and social inclusion, including in climate change mitigation and adaptation programs.

60. In 2016, Nepal ratified the Paris Agreement and submitted a **Nationally Determined Contribution (NDC)** that investigated clean energy development, afforestation measures, sustainable transport systems, climate friendly practices in agriculture, waste management and building codes. Nepal has submitted enhanced NDC in December 2020 under the Paris agreement for the period 2021-2030. It recognizes Nepal's fragile topography, climate-sensitive livelihoods of the people and their limited adaptive capacity, which makes it one of the most vulnerable countries to climate change. Sector-wise GHG emissions reduction targets have been set for the period of 2021-2030, however no specific target has been proposed for the agriculture sector despite the sector contributing more than half of the country's total emissions. However, the aim to increase soil organic matter from 2% currently to 3.95% by 2030 may increase carbon sequestration in agricultural soils and contribute to emission reductions from the sector. The enhanced NDC also includes an adaptation component in the spirit of the Climate Change Policy (2019) and commits to, inter alia, prepare and implement climate resilient and gender-responsive adaptation plans in all 753 local governments by 2030 and the formulation of a National Adaptation Plan (NAP⁶). Adaptation priorities of relevance to R-HVAP include establishing a multi-hazard monitoring and early warning system for all provinces by 2030, strengthening the Public Weather Services (including the Agrometeorological Information System), and integrating climate risk assessment mechanisms into WASH programs.

⁶ The National Adaptation Plan for 2021-2050 (NAP) has identified 64 priority programs under ten sectors totally budget of USD 47.4 billion. Under the Agriculture and Food Security sector (total budget USD 11.2 billion), priority adaptation programs includes 1) Program on Sustainable Agriculture, Food and Nutrition Security, and Climate Health and Hygiene, 2) Commercial Animal Husbandry for Climate Resilient Rural Livelihoods (753 Model Demonstration Projects), 3) Development of Insurance, and Community and Peasant Friendly Climate Induced Risk Sharing Model and Expansion in both Agriculture and Livestock, 4) Genetic Resource Conservation Programme for Climate Resilient Agriculture in Nepal, 5) Enhancing Agriculture Productivity through Building Climate Resilient Water Management Systems, 6) Climate Smart Transformative Collective Agriculture Promotion in the Hills and Mountains, 7) Integrated Soil and Nutrient Management for Resilient Agriculture, 8) Strengthening Climate Services and Agriculture Information System, 9) National Capacity Building of Agriculture and Livestock Institutions and Professionals on Climate Change Adaptation Research, Planning and Implementation. Other nine sectors are Forest, Biodiversity and Watershed Conservation (USD 8.7 billion); Water Resources and Energy (USD 5.35 billion); Rural and Urban Settlements (USD 2.85 billion); Industry, Transport and Physical Infrastructure (USD 3.05 billion), Tourism, Natural and Cultural Heritage (USD 1.13 billion); Health, Drinking Water and Sanitation (USD 4.75 billion); Disaster Risk Reduction and Management (USD 8.05 billion); Gender, Social Inclusion, Livelihoods and Governance (USD 0.7 billion); and National Capacity Building, Research and Awareness Raising (USD 0.16 billion).

Table 6 Alignment between NDCs priorities actions and R-HVAP

| NDC programs relevant to the IFAD mandate | R-HVAP contribution to the national NDC targets |
|--|---|
| Mitigation component | |
| Energy: Increase the reliable supply of clean energy ensuring access to all, develop enabling environment to provide power to small and mid-size enterprises using distributed renewable energy generation sources | Support will be made on RETs like solar pump, dryer, lift irrigation |
| Forestry: Include social and environmental safeguards, upgrade watershed health, inclusive/proportional representation in community forest, restore and manage degraded forest land | R-HVAP will work through pro-poor leasehold forestry user groups, which will both manage forest and enhance their livelihood |
| Agriculture: Increase soil organic matter, expand fruit orchard area, improved cattle shed, increase number of organic fertilizer production plants, establish climate smart village and farms, promote sustainable agriculture practice, expand and ensure access of climate smart agriculture technologies to marginalized group, encourage community seed bank and national gene banks | Through agroecological practices, R-HVAP will significantly enhance soil and water quality |
| Waste: promote 3Rs (Reduce, Reuse, Recycle) approach, focus on co-production of energy and organic fertilizer from solid waste, wastewater and faecal sludge | R-HVAP will promote a circular agriculture model that minimises waste generation |
| GESI: Develop specific programs with dedicated resources (human and financial) to ensure full, equal and meaningful participation of women, children, youth, Indigenous Peoples and marginalized groups in climate change-related policy development; and during the planning, monitoring and implementation processes at local, provincial and national levels; Promote the leadership, participation and negotiation capacity of women, Indigenous Peoples and youth in climate change forums; Ensure gender-disaggregated data when reporting on progress and achievements. | At least half of the beneficiaries will be women, adequate targeting strategies will be adopted to include the most vulnerable communities/households. Provisions are made to ease the access of women in finance and other resources. Program support will seek to reduce drudgery. Capacity building, business skill development, and leadership development activities are provisioned in the Program. |
| Adaptation component | |
| Mobilization of climate change adaptation resource persons | R-HVAP will develop a cadre of “bare foot agroecology consultants” and lead farmers who will manage Farmer Field Schools (FFS). The Program will capacitate smallholders and stakeholders on climate resilient agriculture. |
| Adaptation measures based on circular economy and sustainable resource use will be developed and implemented | R-HVAP will continue supporting integrated water supply management, from source protection to wastewater utilization. |
| NAP implementation | R-HVAP will work on NAP identified resilient agriculture, organic value chains, small irrigation, integrating climate adaptation into palikas planning process, and promotion of RETs. |

4. Environmental and social category

61. The environmental and social category for R-HVAP is determined as substantial, based on the screening tool of SECAP 2021. The overall rating has shifted from 'moderate' to 'substantial' preliminary due to the construction activity of the Semlar wholesale market. An international Environmental Impact Assessment (EIA) study team has submitted the final draft of EIA report for approval by the Government of Nepal. The EIA study was conducted in close coordination with IFAD, also adhering to the standards outlined in SECAP 2021. The EIA report encompasses a comprehensive analysis of the social and environmental impacts associated with the wholesale market and includes a list of proposed mitigation measures. The detailed EIA report, accompanied by a dedicated environmental and social management plan, will be made available for public disclosure 120 days prior to the submission of the R-HVAP design to IFAD's board meeting scheduled for December 2023.

62. R-HVAP aims to generate positive environmental and social benefits in a comprehensive manner. The program focuses on promoting agroecological farming systems, which will contribute to revitalizing the ecological health of farms, increasing biodiversity, and building climate resilience. R-HVAP will a) encourage gradual phasing out of chemical inputs, while simultaneously providing support for homemade and commercial bio inputs, b) promote integrated farming, mulching, inter/mix cropping, biochar, and integrated pest management to maintain soil health and minimize the damage of disease and pest outbreak, c) promote renewable energy technology as part of the value chain and support market development activities, d) support water source protection, storage and water recharge ponds, ground water recharge structures multiple water use, small irrigation schemes, and efficient water use technologies to reduce water stress, e) minimize waste from agriculture, poultry, processing and market centers, and facilitate for manure production, f) promote agroforestry, fodder plantation, and stall feeding to alleviate pressure on forest, and g) anti-erosion measures for soil and water conservation.

63. The value chain activities implemented by the program will effectively reduce pollution and prioritize resource efficiency. The Semlar wholesale market will incorporate appropriate measures for managing both solid and liquid waste. Furthermore, the program's procurement plan will include provisions to ensure the sustainable management of natural resources.

64. RHVAP will not have any impact on *cultural heritage*. A small shrine on the border of Semlar market construction site will possibly be closed for a few days, which was discussed and agreed by villagers. An inclusive and meaningful participation of *Indigenous Peoples* will be ensured to address their need, demand, and consensus during Agroecological Cluster Plan (PAP) development and implementation. The program will give priority to IPs in targeting strategy. Likewise, all the RHVAP implementation will ensure *safe labour and working conditions*. Child labour, sexual harassment, gender violence will be strictly prohibited and carefully monitored. Moreover, the program, on the whole, will have positive impacts on *community health, safety, and security*. The program will not create physical and economic *resettlement*.

65. R-HVAP is a gender transformative and youth sensitive program that places a significant emphasis on social inclusion. It adopts proactive measures to specifically target women, youth, and marginalized communities. The program will enhance women's access to viable economic opportunities, generate economic and professional prospects for the youth, and ensure their active engagement in decision making process.

5. Climate risk category

66. As per the SECAP screening tool, the climate risk category of the program is determined as substantial. Following are the key themes and steps followed to assess climate risks: (i) Hazard identification: As per the ThinkHazard tool, Vulnerability and Risk Assessment (VRA) report by MoFE (2021) and design field visit; R-HVAP intervention area is likely to experience river flood, urban flood, landslides, water scarcity, extreme heat,

and wildfires. Likewise, foreseen future climate scenario predicts changes in temperature, climate variability and alterations in intensity and frequency of extreme events. (ii) Exposure Assessment: The program targets agricultural systems or livelihoods and infrastructure, especially Semlar wholesale market, that are exposed to weather-related hazards. Crop and livestock production is frequently affected by rainfall variability, prolonged droughts, changes in temperature, and pests and diseases. (iii) Sensitivity: Major income of the target population predominantly comes from agriculture and livestock. The population's vulnerability is also increasing by diseases like COVID-19. (iv) Adaptation capacity and climate resilience: Nepal still lack disaster coping capacity (DDR score of 5.5 as per the INFORM) and climate and weather information services are not effectively being delivered to farmers, rural dwellers, and end users. Basic infrastructure and technical facilities are still poor in program targeted areas. Farmers still face difficulties in accessing adequate financial credit and loans that are tailored to their needs.

67. The program will promote agroecology, integrated farming, climate smart agricultural practices. Participatory planning process will be adopted to avoid climate hazard hotspots and integrating appropriate adaptation measures. SECAP related responsibilities will be included in the terms of references of thematic specialists in PCO, PMO, and Corridor Offices. Climate risk including in-depth flood risk assessment has been conducted for wholesale market as a part of EIA study, and recommended measures will be incorporated into the EIA ESCMP.

6. Recommendations for programme design and implementation

Targeting and lessons learned:

68. The targeting strategy built on existing experiences and lessons from other IFAD investments in Nepal which have been successful in supporting poor and vulnerable households. Among them ASHA has reached the most vulnerable households as determined by the participatory vulnerability ranking following IPCCs approach and Nepal Climate Change Support Program (NCCSP)⁷ experience. By continuing this experience, R-HVAP will have strong pro-poor and inclusive focus in its targeting strategy and thus, will maximize participation from poor and marginalised households, Dalits and indigenous people, young girls, single women, and women headed households.

IFAD Mainstreaming areas:

69. RHVAP will use the following entry points to address mainstreaming themes: (i) improve women's access to viable economic opportunity (on farm and off-farm) as well as social empowerment; (ii) generate economic and professional opportunities for youth (iii) provide nutrition education and improved nutrition especially for ultra-poor vulnerable households (iv) engage in strong consultation process to ensure participation and social inclusion of potentially excluded groups.

70. **Youth participation:** Youth will be organized in groups (young men and young women) on the basis of their interest and different degrees of participation in the programme; i.e. as existing farmers' producers, agri-entrepreneurs, unskilled young agriculture labours, young returning migrants, thus being organized accordingly and receiving targeted interventions and trainings on the basis of their aspirations and interest in engaging in agricultural activities as well as skills and enterprise development (off farm/ value addition/ service provision). It is expected that 40% of youth (16-40 years) will be part of POs (about 24,000 youth led HHs engaged in agriculture) receiving program services under Component 1 and additional 760 youth (50% young women) will be trained in skills and enterprise development (e.g. training in non-agricultural activities, micro-entrepreneurs, apprenticeship training and training for youth employment). These activities will support: (i) enterprise development and self-employment and (ii) employment for youth trained in skills development and able to find employment

⁷ <https://www.opml.co.uk/projects/nepal-climate-change-support-programme>

opportunities including through apprentices. Furthermore, through an internship program a total of 60 students/ undergraduate in agriculture sector will have the opportunity to participate in 6 months internship as part of the program activities in the field at cluster level and enhance their practical knowledge in agroecology. Detailed activities and implementation arrangements are defined in the PIM.

71. **Gender:** The key challenges women face are social barriers, early marriage, and early childbirth, constrained to household and non-economic activities, relatively low education in comparison to males, malnutrition leading to health issues, non-participation in decision making, business illiteracy, and limited access to land and finance.

72. **Women participation:** Women represent at least 50% of program participants (or about 30,000, out of which 30% or 9,000 WHHs). Under component 1, they will be mobilised and organised in groups (mixed POs or women-led POs) to receive specific trainings on the basis of their interests and activities along existing or new opportunities resulting from the agroecology cluster development. Trainings will focus (but not limited to) on improved production and productivity (through FFS), enhanced Financial Education and Business Literacy (FEBL) and digital literacy combined with Gender Action Learning System (GALS) as well as leadership. The last being particularly important for women's groups representatives to actively participate in the Multi Stakeholders Platform (MSP), to ensure that women's view and interests are captured in development planning process and key decisions taken at that level during the formulation of the Agroecology Cluster Plan (PAPs). The Community Mobilisers will encourage the participation of women in the identification and planning of the investments and raise awareness regarding the importance of ensuring that women's priorities are reflected in the choices made. Activities will foster women's participation on equal basis (50%) in developing PAP and be at least 30% active participants in the MSP meetings and boards created for the planning process at all levels (wards, Palika and Province).

73. **Nutrition:** The program will encourage interventions that promote nutritionally diverse and rich foods. The local crop varieties with high nutritional value and benefits will be given higher priority. RHVAP will promote and support the development of post-harvest management, storage and processing technologies at the community and household level. A specific focus on nutrition will be developed for the poorest households (the ultra-poor). The program will provide support for improved family nutrition for the ultra-poor HHs through providing inputs for increasing production of vegetables through kitchen gardens, as well as increased production and consumption of protein rich foods through provision of goats, poultry, small ruminant. The nutrition education sessions will be designed to enhance awareness about nutrition, change attitudes, behaviours and practices that would improve nutrition outcomes of this target group. As entry point for nutrition education the program will also consider additional modules on nutrition as part of the FELB classes.

74. **Social Inclusion and Community mobilisation.** The community mobilisers will be responsible for community mobilisation. They will work in synergy at community level, including the involvement of community-based organizations and local/traditional institutions to mobilise and sensitize communities to get buy in to the Programme and enhance the demand driven nature of the intervention. This activity will be undertaken at the village level and will consist of public consultations with the community as a whole and separate interaction with special groups, such as women and youth but also marginal groups (*Dalits, Janajatis*) and Indigenous Peoples (IPs). A 4 steps process can be followed; i) initial community consultation at ward level, ii) inclusion of women and vulnerable groups, iii) documenting community meeting at ward level, and iv) Representatives appointed to participate in planning exercise and PAPs development. Further details in the PIM.

Climate and Environment

75. **Planning:** The first five-year tenure for municipalities (*Palikas* in Nepali) has completed and they started second tenure from 2022. Experience of IFAD ongoing projects and studies shows that Palikas still need additional capacity and resources to prepare

social, climate and economic resilient planning and budgeting. RHVAP will prepare inclusive and participatory Palika Agroecological Plans (PAPs) and blend them with palika's annual budget and plans. The PAP planning process will actively engage poor, marginalized, climate vulnerable, IPs, Dalits, smallholders from the settlement to Cluster level to ensure their needs and demands are adequately addressed. As needed, focus group discussion will be conducted with IPs to discuss on their specific need, plans and seek consent.

76. Agroecological practices: Nepal is one of the first countries to sign onto the World Bank's Green, Resilient, and Inclusive Development (GRID) initiative. As such, it is seeking to pursue a path over the next decade to better address climate change and build back better from the COVID-19 crisis. The country aims to address the climate threat, adapt to the new normal and contribute to reduced greenhouse gas emissions. To do so, it needs to trace a path forward for the agriculture sector that can better deliver agricultural productivity, economic growth, climate resilience and reduced greenhouse gas emissions. The shock of COVID-19 on production systems, including food and nutrition security, employment, and trade, has been considerable, highlighting the importance of building resilience across the agriculture system to deal with a range of shocks (WorldBank, 2021).

77. The IFAD supported ASHA project in Karnali and Lumbini provinces has been successfully practicing and upscaling a number of climate smart practices. Smallholders collect livestock urine and together with other allelopathic plants gathered from the forest prepare liquid fertilizer and pesticides (*jholmol*). The users have reported its efficacy in managing pests and diseases. Utilization of improved compost, vermicompost, green manure and slurry have led to increases in soil fertility, with enhanced soil microbial activity. ASHA has successfully promoted soil fertility enhancement practices such as crop rotations, intercropping, symbiotic associations, cover crops, organic fertilizers, minimum tillage, mulching and biochar.

78. Upscaling successes of ASHA and previous IFAD supported successful project, High Value Agriculture Project, RHVAP will promote commercially viable agroecology.

Further studies needed

79. This SECAP includes draft EIA for the Semlar wholesale market, stakeholder engagement plan, and targeted adaptation assessment. A detailed climate risk assessment for the wholesale market has been planned and ToRs have been developed for further study. This study will enhance 'climate management plan' to the ESMP annexed in EIA report.

Monitoring and evaluation

80. The program's M&E will well capture disaggregated data on gender, youth, socio-ethnicity, and household poverty. The program will reflect issues of gender, youth, Dalit, marginalized and disadvantage communities, and indigenous communities. The Program Coordination Unit will lead in the monitoring and evaluation process of the program together with implementing partners and stakeholders. In addition, monitoring and coordination committees comprising of PMO, representatives from province and municipal government authorities, and other financial organizations will be formed at provincial and municipality level. These committees will regularly monitor and share the report with the program office.

81. The GESI expert in coordination with M & E expert will analyse the data on periodic basis with validation in the field. This process will facilitate the take timely decision by the program management and adopt corrective actions to adhere the targeting strategy. Other participatory monitoring tools like annual outcome survey, environmental and social safeguard monitoring, and regular tracking of ultra-poor women and vulnerable groups with their problems and progress will be adopted to ensure that target groups are effectively participating and getting progress on their livelihood improvement pathways. Social risks and mitigation measures (as outlined in the ESMP) will ensure that these risks are addressed, and the very poor and vulnerable sections benefit from the program interventions.

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Annex 5a: Environment, Social and Climate Management Plan (ESCMP) Matrix

Table 4: R-HVAP programme-level Environment, Social and Climate Management Plan (ESCMP) Matrix

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|--|-------------------------------------|-------------|--|---|-------------------------|---|-----------|--|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| 1) Environmental: potential threat | | | | | | | | | |
| Over extraction of NTFPs and MAPs from forest area | NTFPs, MAPs | moderate | i) NTFPs and MAPs cultivation is confined on agriculture or fallow land, ii) proper GIS based record keeping system to trace cultivated area and production, iii) laissez with community forest user groups and divisional forest offices for NTFPs and MAPs cultivation inside forest area. | i) consultation with communities explore opportunities and ways to cultivate in fallow land; ii) consultation with forest user groups and forest offices to promote NTFPs and MAPs in forest area | PMO and cluster offices | % of NTFPs and MAPs harvest from private land | Annual | i) secondary: records of municipality, forest user groups, forest offices, GIS maps ii) primary: program database | no additional cost |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|---|---|---|---|--|-------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Encroachment or expansion of agriculture in forest area | All | Low | Program will adopt zero forest encroachment and deforestation approach. Value chain activities will be confined only in agriculture lands. To address the shortage of agricultural land, program will encourage utilizing fallow cultivable lands. The wholesale market is planned at a community forest area, the EIA and dedicated ESCMP for wholesale market further details on impact and mitigation measures. | i) Meeting with farmers to identify and explore use of abandoned land; ii) Explore with municipalities, forest user groups, and forest officials on encroachment management | PMO, cluster offices, divisional forest offices | Hector of fallow land cultivation in municipalities | Baseline/ mid-term/completion and annual. | Records from municipalities, forest user groups and forest offices | no additional cost |
| Use of chemical fertilizer and pesticides | Production | Low | Program will invest in promotion and production of bio inputs through POs and MSMEs. PAP will detail related activities at palika level. Support will be provided to farmers to shift to bio-input use and gradually phase out chemical inputs over programme implementation. The following activities will facilitate the phasing out process: i) increasing production and access of bio-inputs, ii) motivating youth and MSMEs for bio-inputs entrepreneurship, iii) | Meeting with farmers, Pos, MSMEs | PPMO. Cos | Tons of Bio fertilizer production increase Amount of bio pesticides production increase No of farmers trained in agroecology practices No of FFS conducted | Baseline/ mid-term/completion and annual. | Records of PPMO and CO activities | Embedded in component 1 |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|--|--------------------------------|-------------------------|-----------------------|-----------|----------------|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| | | | conducting a series of behavioural changes and capacity building events such as: a) actively engaging in PAP preparation, ii) 2-day market oriented agroecology orientation and training, iii) agroecology ToT for lead farmers and social mobilizers, iv) establishment of demo farms, v) farmer field school, vi) enhanced FEBL including agroecology practices etc. | | | | | | |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|---|---|--|-----------|---|--|
| | | | | | | Indicators | Frequency | Source of data | |
| Over harvesting of forest products, especially fodder, and open grazing | Goat, dairy | moderate | i) promotion of agroforestry to increase fodder; ii) shed improvement support along with provision of stall feeding and sufficient fodder plantation; iii) high nutritious hedge row plantation, cover crops suitable for fodder, iv) fodder plantation on fallow land, v) mandatory provision for sufficient fodder plantation for the goat and dairy value chain support, vi) support and collaboration with community forest and leasehold forest to increase fodder availability, vii) collaborate with forest user groups for the timber, poles needed for shed improvement and other small infrastructure related works, viii) adopt experience from VITA and HEIFER collaboration on carrying capacity and fodder management | Evidence based consultation with interested communities to establish credible and sustainable development plans for Goat and dairy value chains | PMO, cluster offices, forest user groups, divisional forest offices | i) ha of land under agroforestry, ii) number of nursery support and annual seedling supplement and plantation, iii) % of farmers using feed from sustainably managed fodder and forage sources | Annual | Farm Diaries, VC Cluster surveys, Baseline/mid-term/final impact surveys, | Goat, livestock, agroforestry, apiculture etc. support includes budget for mandatory fodder and forage |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|--|--|-------------|--|---|------------------------------|---|-----------|---|------------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Improper solid and liquid waste management | Livestock, processing centers, markets, agriculture residues | moderate | (i) Waste management plan mandatory for the program supported collection and processing centers, and markets; (ii) Work with market management board and local authorities; (iii) Recycling and reuse of waste generated during production to processing including use to make bio-compost ; (iv) Capacitate smallholders and micro entrepreneurs on sustainable waste management by easy and effective technologies and better hygiene. | Awareness, capacity building, and facilitation on easy access to new practices and technologies | PCO, PMO and cluster offices | (a) % of programme -supported collection and processing centers, markets with a waste management plan and an efficient waste management system; (b) No of capacity building events organized for smallholders and micro entrepreneurs | annual | Program infrastructure records; Training reports; Reports from field inspection visits by PIU staff | Design includes related cost |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|---|------------------------------|---|-----------|-------------------------|--|
| | | | | | | Indicators | Frequency | Source of data | |
| Excessive water extraction | All | Low | The program will generate overall positive impacts on water source and quality by: i) support water source protection, storage and water recharge ponds, ground water recharge structures multiple water use, small irrigation schemes, and efficient water use technologies to reduce water stress, ii) minimize waste from agriculture, poultry, processing and market centers, and facilitate for manure production, iii) promote agroforestry, fodder plantation, and stall feeding to reduce pressure on forest, and iv) anti-erosion measures for soil and water conservation. The PAP will include water conservation and efficient water use planning. | Awareness, capacity building, and facilitation on easy access to new practices and technologies | PCO, PMO and cluster offices | i) number of water source protection activities, ii) number of subprojects with efficient water use technologies , iii) number of small and medium water supply systems | Annual | MIS system | Included in sub component 1.3 a and other related value chain activities |
| Solar battery management | All using RETs | Low | i) ensure that RET companies have proper plan to manage battery wastage after its life cycle, ii) aware community on the proper battery management methods | Awareness and capacity building events | PCO, PMO and cluster offices | Battery disposal plan included in RET activities | Annual | RET activities document | no additional cost |
| Environmental: positive impacts | | | | | | | | | |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|--|-------------|---|--|------------------------------|---|--|--------------------------------|-----------------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| <p>Soil health and water quality improvement</p> <p>Improve agrobiodiversity</p> <p>Reduce land degradation</p> | All, excluding market related infrastructure | Positive | <p>Program will have overall positive impact on soil health by adopting agroecology approach, which will be included in PAP. I) support on regenerative agriculture, ii) gradually phasing out of chemical inputs and promotion of organic inputs, iii) promotion of integrated farming and livestock approach , iv) priority will be given to local and indigenous crops, v) local seeds will be encouraged, vi) agroforestry and sufficient fodder management for livestock, vii) encourage inter/cover/mix cropping and hedge row plantation, viii) use of fallow land, ix) household and community or cluster level to small-medium level bio inputs (compost, fertilizer, pesticide) production and use, x) promotion of Native crops and Neglected and Underutilized species (NUS) such as millet, buckwheat, barley, Karnali beans</p> <p>x) onsite technical support will be arranged</p> | Capacity building, awareness, access to technologies and finance | PCO, PMO and cluster offices | i) improve in soil health and water quality | Baseline/mid-term/completion and annual. | APR, AOS, and thematic studies | Cost included in programme design |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|--|--|------------------------------|--|---|--|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Social | | | | | | | | | |
| Beneficiary Dissatisfaction and Discrimination | All interventions | Low | Create a qualitative assessment of the aspirations of women and men of various age groups, especially the most vulnerable and marginalized (Dalits, Janajatis) through focus group discussions, to solicit feedback on the challenges being faced by them, their views on solutions and coping mechanisms, as well as feedback on the training programs and how they can be improved during all programme stages. | Community focus groups at baseline. | PCO, PMO and cluster offices | (i) Collect and monitor disaggregated evaluation data. (ii) Review number of complaints and negative data compared to positive feedback and time it took to resolve them. | Annual | Annual Outcome Survey, beneficiary list, number and quality of consultation meetings | Included in M&E |
| Women, Youth and other vulnerable categories and marginalized groups (including from Ips) are excluded from programme benefits | All interventions | Low | During Y1 conduct strong public consultation at different levels on the programme objectives, eligibility criteria and selection process for specific activities directed to specific social categories, and available grievance redress mechanisms. This should be done in partnership with Ips, CDAs, and community leaders. | Start-up workshop with all the stakeholders. | PCO, PMO and cluster offices | Ensure logframe data is disaggregated by sex, age and vulnerable groups where relevant. | Baseline/ mid-term/completion and annual. | Meeting records, program database | Included in M&E |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|--|-------------------------------------|-------------|--|--|-------------------------|---|-----------|--------------------------------------|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Gender Issues and all forms of Gender-Based Violence, including sexual harassment due to the increasing mobilization of women to participate in program activities | All interventions | Low | (i) Increase local facilitators' engagement to work with local leaders and male household's members and promote campaign for sensitization on gender equality and against gender biases. Community and Household level; (ii) Conducting gender-sensitive and participatory consultations while finalizing and designing the various sub-project activities (Component 1) during the community planning process; (iii) Gender mainstreaming actions should be developed as part of a Gender Development Plan (GDP) prepared by the Ips engaged in the implementation. | Start-up workshop with all the stakeholders. | PCO and PPMOs | (i) Collect gender-disaggregated monitoring and evaluation data to track the extent to which women have been able to participate and benefit from programme activities; and (ii) Cases of sexual harassment has to be dealt with in compliance with IFAD's Policy to Preventing and Responding to SH/SEA and reported directly to IFAD. | Annually | Grievance form, value chain database | |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|--|--|------------------------------|--|--|--|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| All possible adverse environmental and social impacts as a result of the R-HVAP activities. | All interventions | low | (i) Strictly apply the Grievance Redress Mechanism (GRM) (ii) Ensure dissemination of the GRM to local communities prior to starting programme activities, and (iii) Maintain solid documentation for the received complaints during the operation of the programme and track the level of responsiveness (provision of feedback). | i) Start-up workshop with all the stakeholders, ii) joint supervision, iii) public hearing | PCO, PMO and cluster offices | I) number of complain registered and % of the complaint resolved, ii) number of joint stakeholders supervision, iii) % of public hearing | Annual | i) Gravedance register, ii) subprojects files, iii) annual progress reports, iv) AOS | Included in M&E |
| Lack of nutrition improvement | all | Low | Gender and nutritional focused value chains, awareness of optimal nutrition practices | Awareness | PMO and cluster offices | % of household and women reporting minimum dietary diversity (MDDW) | Baseline, Midline and Endline | Baseline/mid-term/completion surveys ; Farm diaries ; and program database | no incremental cost |
| Exclusion of IPs | all | Low | i) ensure meaningful participation on Palika agroecology plan (PAP) preparing process, conduct separate IP focused group discussion where needed, ii) adopt proactive targeting strategies to benefit Ips, iii) collaborate with IP local to national organizations to update on issues and policies and to maximize benefits to Ips | Awareness, capacity building, focal group discussions | PCO, PMO and cluster offices | % of IP beneficiaries | Baseline, Midline, Endline, and annual progress report | Program database | no incremental cost |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|--|---|-------------------------|-----------------------|-------------------------------|--|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| Cultural heritage restriction and chance find | Semlar market | low | <p>ensure that the community get access to the temple and any restrictions due to construction site safety norms will be avoided or temporary in nature. (ii) No structural impacts on the temple foreseen, however, regular inspection of the structural stability will be ensured.</p> <p>Chance find: It is highly unlikely that tangible cultural heritage will be found in project construction site on the compensatory aforementioned site; however, a chance finds procedure will be adopted, if required.</p> | Consultation with contractor, villagers | Market management | | | | |
| Use of child labour | Infrastructure, processing, market | low | i) Strictly follow national and international provisions, ii) procurement plan to strictly mention on labour, working environment, community safety as per the SECAP guidelines. | Awareness | PMO and cluster offices | | Baseline, Midline and Endline | Baseline/mid-term/completion surveys ; Farm diaries ; and program database | no incremental cost |
| Climate Change | | | | | | | | | |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|---|------------------------------|--|--|--|--|
| | | | | | | Indicators | Frequency | Source of data | |
| Flood and landslides | All (including infrastructures) | High | (i) location selection: Program will develop the value chain location/site selection criteria which will exclude activities in flood and landslide prone areas and encourage to use land where farmers are traditionally doing farming ; (ii) support anti-erosion measures such as gabions, rip rap, sediment traps(iii) promotion of bioengineering and nature based solutions; (iv)Provisions of crop, livestock and other value chain based enterprises insurance ; (iv) multi and inter cropping, hedge row plantation, and minimal tillage to reduce surface runoff; (v) avoid steep slopes for cultivation (vi) climate proof infrastructure | Community awareness and capacity building with technical assistance | PCO, PMO and cluster offices | i) % farmers with multi cropping and agroforestry, ii) % of programme beneficiaries with insurance, iii) % of climate proof infrastructure | Annual Progress Report | Program database | included in component 1.3 a |
| Drought | Native crops, livestock | moderate | (i) Improve management practices: Small irrigation, water efficient technologies, infield water harvesting, water catchment pond ; (ii) Selection of drought tolerant species will be encouraged; (iii) Provisions of crop, livestock and other value | Awareness | PMO and cluster offices | % of household using improved water management practices | (a) Baseline/mid-term/final ; (b) Annual | Baseline/mid-term/final impact surveys ; Farmers' diaries. | Included in component 1.3 a, and other related section in programme design |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|--|-------------------------------------|-------------|---|---|-------------------------|---|--|--|---------------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| | | | chain based enterprises insurance | | | | | | |
| Pest and disease | All | High | (i) Promotion of IPM, and traditional and indigenous knowledge; (ii) phasing out of chemical inputs, support and promotion to homemade and commercial bio inputs (iii) Promotion of crop, livestock and other value chain based enterprises insurance | Awareness | PMO and cluster offices | % of household producing bio inputs; % of households practicing IPM | (a) Baseline/mid-term/final ; (b) Annual | Baseline/mid-term/final impact surveys ; Farmers' diaries. | Imbedded in relevant components |
| Heat stress i) decrease of milk production, ii) increase livestock mortality, iii) increased pest and disease, iv) increase water scarcity to crops | Crop, livestock, market | Moderate | i) improved shed management with adequate provision of heat stress management, ii) improve water supply, iii) heat stress tolerant seed and breed, iv) encourage plantation | Awareness, capacity building, and facilitation on easy access to new practices and technologies | PMO and cluster offices | % of shed with adequate ventilator and roof | (a) Baseline/mid-term/final ; (b) Annual | (a) Baseline/mid-term/final ; (b) Annual | imbedded in relevant components |
| Road blockage due to climatic hazards i) lack of seed, inputs, and equipment's on time, ii) obstacle on product sell, iii) increase | Production, market | Moderate | i) cold storage facility, ii) collection centre and satellite markets, iii) processing support, iv) easy and timely information flow mechanism, v) support on nature based solution as far as possible, vi) adoption of climate proof infrastructure | Awareness, capacity building, and facilitation on easy access to new practices and technologies | PMO and cluster offices | | | | imbedded in relevant components |

| Environmental, social and climate Impacts | Commodities as main driver of risks | Risk rating | Recommended Mitigation/Enhancement measures | Public Consultation Activities | Responsible Institution | Means of Verification | | | Cost Estimate & Source |
|---|-------------------------------------|-------------|---|--------------------------------|-------------------------|-----------------------|-----------|----------------|------------------------|
| | | | | | | Indicators | Frequency | Source of data | |
| production price, iv) high wastage | | | | | | | | | |

ESMP for the Semlar Agriculture Regional Wholesale Market

A. Pre-construction

Table 5: ESMP for the Semlar Agriculture Regional Wholesale Market (Pre-construction phase)

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----------------------------|----------------|---|---|--|--------------------------------|--------------------------------|-------------------------------|---|---------------------------|
| Physical Environment | | | | | | | | | |
| PH1 | Site clearance | Erosion and flooding risk for the wholesale market - Increase frequency/intensity of flooding might flood the wholesale market; - Modification of riverbanks, watercourse and hydrology might also raise sedimentation load of the Danab river. | To mitigate potential impacts from erosion, flooding, or site instability, the project design contains the following measures: levelling of the project site (fill-up the lower parts) and elevate the buildings with 0.8m (these measures are embedded in the project design). | Mitigative | Project site and up/downstream | Pre-construction | Included in the project costs | Construction Contractor | MoALD, IFAD |
| | | | Update of Flood Risk Assessment and assess the hydraulic, morphological and community health and safety impacts of: • Removal of | Preventive | To be determined | Before grant agreement signing | 75, 000 USD | Consultant procured for the flood risk assessment | IFAD and MoALD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|---------------------------|-------------------------------|---------------------------|
| | | | vegetation (i.e., trees) at the site; • Effectiveness of existing measures (i.e., gabion wall, design/presence of the Danab Road Corridor Road); • Impact of the tributaries north of the site. • Sufficiency of the proposed mitigation measures as concluded by the study. • The assessment should consider how flooding in the area can change in the future due to climate and economic development and a plan on what to do when the mitigation measures' capacities are exceeded | | | | | | |
| | | | A cost-benefit analysis shall be undertaken to | Preventive | Project site and | Before grant | Included in the update of | Consultant procured for the | IFAD and MoALD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----|------------------|---|---|--|----------------------------|-------------------|----------------------|-------------------------------|---------------------------|
| | | | evaluate the effectiveness of different flood protection measures based on the hydraulic and morphological assessment. From this, it's likely to result in additional measures, such as construction of erosion protection, an additional flood wall or dike. This additional mitigation measures shall be put in place from the beginning of construction period to ensure that the site is protected during the construction phase as well. | | up/downstream | agreement signing | the Flood Risk Study | flood risk assessment | |
| PH2 | Site preparation | Pressure on groundwater availability - Potential impacts to groundwater, due to ground water extraction for construction needs | Provision to use alternative sources of water in times of crises including the reuse of treated wastewater where possible | Preventive and mitigatory | Project site | Pre-construction | | Included in EIA report | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------------------------------|------------------|---|--|--|----------------------------|------------------|--------------------------|--|---------------------------|
| | | - Reduction in groundwater recharge as the floodplain is converted to less permeable built area | Develop a monitoring plan to detect groundwater over extraction Identify and integrate water reduction solutions in the detailed market design; both for the construction and operational phases. The solutions must align with SECAP and IFC EHS guidelines. The chosen construction contractor must show evidence on how the identified solutions are utilized in performing the construction activities before the start of the construction works. | | | | | | |
| Biological Environment | | | | | | | | | |
| BI1 | Site preparation | Use of the community forest | Develop a reforestation plan using a plantation ratio of 1:10 for non-protected and 1:25 for | Compensatory | To be determined | Pre-construction | Approximately 40,000 USD | MoALD with the support from MoFE (in close cooperation with DFO and Ratanpur CFUG) | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>protected species as the project site is CF and used by the Ratanpur CFUG. Procurement of the tree saplings from the existing nurseries. Selection of afforestation site in consultation with the DFO and Ratanpur CFUG. Evidence of Broad Community Support (BCS) must be obtained. Plantation designs for each specific reforestation site identified to be developed. Reforestation implementation to be undertaken in accordance with agreed reforestation plan at a standard ratio of 1600 seedlings per</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----|------------------|---|--|--|----------------------------|------------------|------------------------------------|---|---------------------------|
| | | | ha, unless otherwise indicated by DFO and Community Forest Groups due to local site conditions or species requirements. Management plan of the reforested area must also be included in the reforestation plan (MoALD manages the re-vegetated areas for the duration 5 years after plantation, then handing it over to the DFO and Community Forest Group or delegate management of the plantation areas to the DFO/Community Forest Group) | | | | | | |
| BI2 | Site preparation | Impact on nationally protected tree species of Simal affecting conservation goals | Review the detail design to save the 4 trees of Simal, otherwise proceed with replantation as | Avoidance or compensatory | Project site | Pre-construction | Included in the replantation costs | Contractor for the detailed design for the design revision. Otherwise, MoALD (in close cooperation with | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----------------------------------|-------------------------|--|---|--|------------------------------------|------------------|-----------------|---|---------------------------|
| | | | indicated above in the Clearance of the community forest | | | | | FDO and Ratanpur CFUG) | |
| Socio-economic Environment | | | | | | | | | |
| SOC 1 | Land use right handover | Loss of land under CFUG management, affecting community diversity of access to CF resources (forest products, firewood and fodder) | A land title transfer shall take place between Government and the Project Proponent. 1) Ratanpur community forest members in Semlar Ward 15 are also members of another community forest which is located in Ward No. 12 of BSMC which is two kilometres from Ward 15. This could be an alternative resource area. A written confirmation letter (from the Executive of the Ratanpur community forest) acknowledging the ceding of | - Mitigative - Compensatory | Surrounding available forest areas | Pre-construction | | MoALD (in close cooperation with DFO and Ratanpur CFUG) | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>the Ratanpur community forest to the Project development, is required before start of construction).</p> <p>2) A compensatory plantation will ensure recovery of lost trees. Prioritising Ratanpur CF to undertake compensatory plantation in participation with the Ratanpur CFUG, so that lost forest resources can be compensated from the plantation area.</p> <p>3) Begin local recruitment drive. Formal job application process to be communicated. Contractor Human Resource Plan to be in place in order to respond to IFC PS 2 provisions.</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------|-------------------|--|---|--|----------------------------|----------------------------|-----------------|-------------------------------|---------------------------|
| | | | Produce local procurement plan which initiates training and capacity building programs for locally procured labour with an unbiased blend of male and female recruits. Direct users of the CF to be targeted for recruitment. Initiate Grievance redress Mechanism for wider community (aligned to IFC PS1, and SECAP) 4) A formal consent letter will be received from Ratanpur community Forest User Group during design | | | | | | |
| SOC 2 | Hiring of workers | Possible human rights abuse among the project's direct and indirect workers - Child labour and forced labour may | Before any construction begins and any hiring activities, in the detailed design phase of the project: | - Preventive, mitigative and compensatory | Project site | Before any hiring activity | | Construction Contractor | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|---|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | <p>be present</p> <ul style="list-style-type: none"> - Some workers may face discrimination, gender based violence and sexual exploitation - Workers lack decent work conditions including receiving a living wage - Other forms of human rights abuse | <p>1) Quantify the number of workers needed in each project activity. Identify who will be direct workers and indirect workers.</p> <p>2) Follow the national and international provisions on labour, including SECAP and IFC standards,</p> <p>3) An orientation will be done for all the direct and indirect workers to be hired. The training orientation will aim to mitigate the presence of child labour and forced labour, work place discrimination, gender based violence, sexual exploitation, decent work conditions and grievance redress mechanism.</p> <p>4) Punitive</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: - Avoidance - Preventive - Mitigative - Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | actions need to be prescribed if the construction contractor or vendors of the wholesale market violate the human rights and human resources policy. 5) strictly include all mitigative measures into the procurement document. | | | | | | |

B. Construction

Table 6: ESMP for the Semlar Agriculture Regional Wholesale Market (Construction phase)

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----------------------------|------------------|--|--|--|---|--|----------------------------|-------------------------------|---------------------------|
| Physical Environment | | | | | | | | | |
| PH3 | Site preparation | Potential impacts due to land use change from community forest to infrastructure | Maintain urban forestry, leave maximum trees possible at the site, plant possible fruit, aesthetic, and flower species | Mitigative | Construction site | after the construction | 1000 USD | MoALD | Semlar SPIU |
| PH4 | Site preparation | Riverbank erosion and flooding risk due to community forest removal, land raising and erecting of commercial buildings on the river floodplain | Levelling of the project site and elevating the buildings by 0.8 m. Flood protection measures on the banks of the Danab river, based on the update of the Flood Risk Assessment | Preventive | Construction site | Beginning of the construction phase prior to start of the monsoon season | Included as a project cost | Construction Contractor | Semlar SPIU |
| | | | | Preventive | On the northern part of the site and banks of the Danab river based on the flood risk assessment. | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----|--------------------------------|--|---|--|----------------------------|------------------|----------------------------|-------------------------------|---------------------------|
| PH5 | Earthwork and site preparation | Loss of top soil to site preparation and construction work at the project site | Conservation and stockpiling of the topsoil, which can be used for restoration of the site after completion of the construction | Mitigative | Project site | During earthwork | Included as a project cost | Construction Contractor | Semlar SPIU |
| PH6 | Earthwork and site preparation | Potential disturbance and degradation of soil due to construction activities | (1) Avoid unnecessary excavation, (2) minimize soil compaction by using lighter machinery or avoid heavy equipment during wet conditions. (3) protect topsoil by stockpiling it and reusing it in the landscaping or grading processing, (4) limit the area of soil disturbance by staging the construction process and confining the construction activities to smaller areas at a time, (5) revegetate the area after | Avoidance Mitigative | Project site | During earthwork | Included as a project cost | Construction Contractor | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----|--------------------------------|--|--|--|----------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| | | | completion of the construction at that site. | | | | | | |
| PH7 | Earthwork and site preparation | Contamination of soil from accidental leaks and spills | All chemicals on site shall be registered, have a complete Material Safety Data Sheet (MSDS) and a corresponding risk assessment for their use. Workers using chemicals shall be trained on correct use of chemicals (based on MSDS and risk assessment), provided with the required PPE. Additionally, workers will be trained on how to respond to chemicals spills and leaks. | Preventive | Project site | During earthwork | Included in the project cost | Construction Contractor | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|---|--|----------------------------|---------------------------|------------------------------|-------------------------------|---------------------------|
| | | | <p>Chemical and fuel storage, maintenance workshops and parking lots will be located on dedicated yards at secure distance from the Danab River and any other water sources.</p> <ul style="list-style-type: none"> • These dedicated yards will be bunded, e.g., include watertight concrete floors and drainage systems connected to an oily water separation system. Recovered oil that cannot be recycled will be collected in an oil tank for removal by a waste contractor. • In case concrete floors are yet to be provided, and/or cannot be provided, then the alternative is to use drip trays. | Preventive | Project site | During Construction phase | Included in the project cost | Construction Contractor | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----|--------------------------------|---|---|--|----------------------------|---------------------------|------------------------------|-------------------------------|---------------------------|
| | | | <p>Which shall be provided at the site by the contractors.</p> <ul style="list-style-type: none"> • The construction site will have a spill response kit with sufficient absorbent materials like dry sand, sandbags available at all times. • The Contractor E&S officer will be responsible for training and weekly inspection of the topic on site, check availability of the spill's materials, and their correct disposal. | | | | | | |
| PH8 | Earthwork and site preparation | Pressure on the groundwater due to abstraction leading to yield reductions of the wells located on in site and nearby wells | (1) use water efficient technologies and practices, such as low fixtures, and recycling of water for non-potable uses, to reduce demand for water, (2) use alternative sources of water such as rainwater, | Preventive Mitigation | Project site | During Construction phase | Included in the project cost | Construction Contractor | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>treated water for non-potable uses – dust control, site cleaning, (3) promote water conservation practices among the construction workers through training and awareness programs, conduct regular inspections to ensure that water management practices are being implemented effectively.</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| PH9 | Earthwork and site preparation | Contamination of groundwater due to accidental spillage of construction chemicals | The spilled chemicals and fuel can seep down to contaminate the soil particularly from the area where chemicals are stored and used, vehicle parking and maintenance area, mechanical yards etc. The mitigation shall include: <ul style="list-style-type: none"> • All chemicals on site shall be registered, have a complete Material Safety Data Sheet (MSDS) and a corresponding risk assessment for their use. Workers using chemicals shall be trained on correct use of chemicals (based on MSDS and risk assessment), provided with the required PPE. Additionally, workers will be trained on how to respond to chemicals spills | Preventive | Project site | During Construction phase | Included in the project cost | Construction Contractor | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>and leaks.</p> <ul style="list-style-type: none"> • Chemical and fuel storage, maintenance workshops and parking lots will be located on dedicated yards at secure distance from the Danab River and any other water sources. • These dedicated yards will be bunded, e.g., include watertight concrete floors and drainage systems connected to an oily water separation system. Recovered oil that cannot be recycled will be collected in an oil tank for removal by a waste contractor. • In case concrete floors are yet to be provided, and/or cannot be provided, then the alternative is to | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>use drip trays. Which shall be provided at the site by the contractors.</p> <ul style="list-style-type: none"> • The construction site will have a spill response kit with sufficient absorbent materials like dry sand, sandbags available at all times. • The Contractor E&S officer will be responsible for training and weekly inspection of the topic on site, check availability of the spill's materials, and their correct disposal. | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| PH10 | Earthwork and site preparation | Increase in Danab River sedimentation load due to construction in the river flood plain and run off from construction site | During the construction, and especially the monsoon season stormwater will accumulate on site and will require proper management. Stormwater may also wash down exposed soil from the construction site including storage sites, access roads and other sites into Danab River. As a result of this, the sediment load of the Danab River may increase degrading river water quality and increasing water turbidity. Stormwater may also carry contaminants into the river and contaminate the water. The following mitigation measures will be applied: | Mitigative | Project site | During construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <ul style="list-style-type: none"> • Aim for all major earthworks to be performed during the dry season (October till the mid-to-late May). • Construct stormwater collection channels, drainage control berms, sediment traps and control dams, and other means will be used as necessary to minimise cross contamination at the construction site as well as supporting facilities and workers' camp. • Potentially contaminated stormwater, e.g., from maintenance workshop areas, parking, etc., will be kept separate from other drainage at construction sites. • The collected stormwater will be treated in a | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | sedimentary tank prior to releasing into the Danab River. Potentially contaminated stormwater shall, if necessary, be tested and treated to remove contaminants before being released into the environment (e.g., passing through an oily water separation system). | | | | | | |
| PH11 | Operation of the camps | Potential impacts to the Danab River water quality due to improper construction site/camp management practices -In addition to the sediments, the | Prohibit use of Danab river for washing of equipment and disposal of waste | Preventive | Banks of the Danab river on the northern parts of the project site | Construction phase | Included in the project cost | Construction Contractor | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | run-off might also pick up spilled hazardous and non-hazardous solid and liquids from the project site contaminating the Danab river | Put up the signage in Nepali and English language prohibiting use of Danab river for washing and disposal of waste | Preventive | Banks of the Danab river on the northern parts of the project site | Construction phase | Included in the project cost | Construction Contractor | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| PH12 | Construction activities | Deterioration of ambient air quality due to construction related emissions and dust | The primary sources of air pollution are the operation of batching plants, earth excavation works, handling and transport of construction material, etc. The primary pollutants expected are dust and combustion emissions. The mitigation measure will include: <ul style="list-style-type: none"> • Calculate the maximum electricity demand of the construction site and size diesel generators (used at site and camp), considering the operational efficiencies of the generator sets. Generator sets could be configured so that those providing the baseload run are set to run at their optimum load (based on | Mitigative | Project site | Construction period | 10,000 USD | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>manufacturers specifications), while those providing power during peak periods could be fitted with variable speed drives.</p> <ul style="list-style-type: none"> • When more detailed information becomes available, recalculate the maximum water demand of the construction site, camp and size diesel generator and pump sets accordingly, taking into account the operational efficiency of the water pump. Generator and pump set could be fitted with a Variable Speed Drives to ensure that the loading of the generator and pump set is more responsive to changes in demand. | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <ul style="list-style-type: none"> • Undertake regular checking, upkeep, and maintenance of the equipment and vehicles used in construction, especially in terms of their exhaust gasses. • For the construction heavy vehicles, within the carrying capacity of the vehicles, maximise the load transported in each trip in order to reduce the number of trips. • Sprinkle water during the earthworks to avoid dust being dispersed to surroundings. • Cover the stockpiled construction materials and particularly soil during the monsoon season and periods with strong wind. | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <ul style="list-style-type: none"> • Set the following rules for traffic: speed limit 20 – 30 km/hr when passing settlement areas, engine idling of vehicle maximum of 5 mins, cover the cargo. • Strictly prohibit of uncontrolled burning of solid waste on site. | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| PH13 | Construction activities | Increase in ambient noise levels, vibration and light due to construction works. | Construction works and use of vehicles are sources of noise, light and vibration. These can affect environmental quality and increase social nuisance. The following mitigation measures are proposed: <ul style="list-style-type: none"> • Place noisy activities, e.g., operation of generators as far as possible from noise sensitive receptors (e.g., consider the location of households located south from site, at est. 200m). • The starting point is that construction will take place only during daytime (7.AM – 10.PM). However, in practice delivery of construction | Mitigative | Project site | Construction period | Included in air mitigation measures | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>materials may take place during night or early morning hours when it is still dark. The Contractor will, therefore, identify zones of high and low lighting requirements, focusing on only illuminating areas to the minimum extent possible to allow safe delivery of materials at night and for security surveillance.</p> <ul style="list-style-type: none"> • Utilise security lights that are movement activated rather than permanently switched on. Fit all security lighting with 'blinkers' or specifically designed fixtures, to ensure light is directed downwards while preventing side spill. Eliminate any ground-level | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | spotlights. • Provide adequate training and PPE including acoustic earplugs to the workers involved in works with a higher noise level. | | | | | | |
| PH14 | Construction activities | Pollution of direct environment due to improper waste disposal | The Contractor must ensure that the waste management system is in place prior to commencement of the construction work, which include collection and sanitary disposal of waste. | Preventive | Project site | Pre-construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |
| | | | The segregation of biodegradable, non-degradable, hazardous waste will be done by using separate | Preventive | Project site | Pre-construction phase | Included in the project cost | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | waste bins with proper signage. | | | | | | |
| | | | The waste bins and temporary storage yards must be enclosed, have watertight cement floor, and include restricted access to vermin and other wildlife. Temporary storage shall be located at least 500 m away from the Danab River. Final disposal of waste will be done by locally approved waste contractors and sites. | Preventive | Project site | Construction phase | Included in the project cost | | |
| | | | Construction site will contain a WC connected to a septic tank system to be serviced and disposed by a third party on a weekly basis or each day during the hot months of the year. | Preventive | Project site | Construction phase | Included in the project cost | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | The workers must be trained on good housekeeping and environmentally sound storage and disposal of construction related waste. | Preventive | Project site | Construction phase | Included in the project cost | | |
| Biological Environment | | | | | | | | | |
| BI3 | Site clearance Earthwork and site preparation | Fragmentation of the habitat due to land clearance and site preparation | <u>Conservation initiatives and minimization of forest fragmentation</u> Maintain ground vegetation wherever or whenever it is possible to minimize tree/vegetation loss. Due attention to be paid and instruction will be given to the contractor to be vigilant and not to cut the trees outside the project site. Conservation of surrounding forest area, especially at | Mitigative | Project site and surrounding forests | Construction and operation for at least 5 years | USD 10,000 per year | Construction Contractor | MoALD, IFAD |

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| | | | the thinly populated site. Conservation of biodiversity and ground vegetation including NTFPs and ethnobotanically important plants. Conservation of the forests of moderate quality and afforestation in the degraded habitats of the surrounding area. In case of encountering plant species of conservation significance of the herbaceous nature during clearing, care will be taken to translocate those species in suitable adjacent forest habitats in coordination with the forestry officials. | | | | | | |
| BI4 | Hauling of construction materials | Increase demand for forest products placing pressure | <u>Alternative provisions of firewood and timber</u> | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | on existing forests/ wood availability | Alternate sources of energy shall be supplied to the workforce. Awareness programs will be conducted to the working staff and labourers about the importance of forest environment and healthy ecosystem, conduct Forest and biodiversity management training Enforcement of strong rules and regulations to the construction workforce. | | | | | | |
| B15 | Construction activities | Disturbance to wildlife due to construction works - Loss of community forest land in process of handing it over to the project; - Loss of trees and vegetation during the site clearance for the project sites; | <u>Minimize disturbance to the wildlife</u> The construction area will be fenced to prevent wildlife getting into the construction site to minimise accidents to the wildlife. In case of an accident, ensure emergency | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | <ul style="list-style-type: none"> - The terrestrial wildlife species including avifauna might displace from the project area due to habitat modifications and interferences; - Loss of flora and growth of potential invasive non-native species mostly during the site clearance and site preparation period - Disturbance to fauna from noise and lighting from construction activities; - Alteration of aquatic habitat due to removal/suspension of riverbed sediments or covering of the riverbed (this may be applicable only when the Tinau Danab Corridor Road Project is developed later | <p>fauna rescue and handling procedures, including contacts with the nearest veterinary etc. Keep written record, supported by photographs, of any animal casualties, including a cause of death if known. Construction work can be very noisy and can also generate vibrations that can impact wildlife. Measures such as noise barriers, sound-absorbing materials, and vibration dampening systems can help to reduce these impacts. The noisy construction works and use of high intensity lights during the night shall be avoided. Trees are to be cleared during</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | than the Export Oriented Agricultural Wholesale Market in Semlar, Butwal" Market, to be refined during the EIA study); | non-breeding season – vultures breeding season (January to March). Prior to the earthworks, the area will be checked by ecologists for any signs of burrows etc. If determined to be occupied, only manual digging under the supervision of the ecologists will be permitted. | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | Excavated pits will be robustly fenced or covered to prevent fauna accidentally falling in, further an escape ramp will be provided to allow their escape. | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| BI6 | Site clearance Earthwork and site preparation | Introduction of invasive non-native species by site clearance works | (1) Conduct a thorough inventory of the site before clearing, to identify any existing invasive species. (2) use least disruptive methods for site clearance, such as manual removal, rather than using machinery, which can spread invasive seeds, (3) If machinery must be used, ensure it is thoroughly cleaned before and after use, to prevent the spread of invasive seeds, (4) native plants will be considered for re-vegetation after site clearance, (5) monitor the site closely for any signs of invasive species after clearance and implement immediate control | Mitigative | Project area and surrounding area | Construction Phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | measures if necessary. | | | | | | |
| Socio-economic Environment | | | | | | | | | |
| SOC2 | Site clearance and earthworks | Restricted access to Shiva temple due to construction works | Clearly demarcated construction area, fencing off the site and limiting noise disturbances to times where no scheduled prayers are in session, are factors that can be considered. Make provision of alternative route to access the temple Place a high priority to complete works to open usual route access to temple | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

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| SOC3 | Construction activities | Social nuisance due to traffic congestion on public roads, restricted access and delays | <p>1) Traffic safety measurements should be included in the market full design.</p> <p>2) It is recommended that routes be utilised at scheduled times of the day – that would help keep the roads free when school children are going to/returning from school, allowing children mobility without being hampered by large trucks utilising the same road.</p> <p>3) Road signage, maintaining speed limits, watering down of the road during dry periods and the acknowledgement of free roaming cattle must be addressed.</p> <p>4) A policy on Contractor Health</p> | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

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| | | | and Safety for the duration of their work on site, must apply, and be monitored. In addition, a Contractor's Code of Conduct (especially in terms of respecting local by-laws and specific practical community concerns on which agreement may be reached), should be applied for the duration of the construction period. Regular information sharing discussions with the Contractors must be pursued, giving residents an opportunity to voice concerns and grievances throughout the duration of project construction. In addition, it is vitally important | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | that a formal grievance management system be put in place (and should remain throughout the life of the facility). | | | | | | |
| SOC4 | Construction activities | Health and safety risks due to increased construction vehicle movement | The Contractor Code of Conduct will need to be aligned in monitoring and responding to safety/ security prevention and the reporting of incidents. For the community, the GRM becomes the most available tool to lodge grievances / complaints relating to the use of community roads and the loss of assets or injury. | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |
| SOC5 | Construction traffic | Deterioration of public roads due to construction vehicular traffic | Due to the movement of heavy construction vehicles, there is a strong likelihood that road damage and repair will be | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | necessary. This can be accounted for in the Traffic management plan (see details in Health and safety risks due to increased construction vehicle movement) | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| SOC6 | Construction activities | Health impacts related to improper waste disposal (site, accommodation camp) | Solid, liquid, hazardous waste items shall be tackled in a separate Waste Management Plan. These plans shall cover the following mitigation measures: <ul style="list-style-type: none"> • It is important to segregate waste properly into recyclable, biodegradable, and non-biodegradable materials. This helps to reduce the amount of waste that ends up in landfills and decreases the risk of contamination. • The construction site shall be foreseen with a dedicated area, where waste can be collected, segregated and temporarily stored until collection by third party for final treatment/disposal. The area shall be | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>covered, contained and fenced.</p> <ul style="list-style-type: none"> • Composting is an effective way to reduce the amount of biodegradable waste that ends up in landfills. It also produces nutrient-rich soil that can be used for gardening and farming. The Construction Contractor shall identify and engage a waste company that can provide composting services for the project (construction phase, but especially for the operation phase of the wholesale market). • Waste should be collected and transported in a safe and hygienic manner. This includes using covered and leak-proof containers, | | | | | | |

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| | | | <p>as well as properly sealed waste trucks.</p> <ul style="list-style-type: none"> • Waste will be disposed of in designated landfills that meet safety and health standards. These landfills will be located far away from residential areas to reduce the risk of contamination. The Construction Contractor together with the Project Proponent shall inspect the waste contractor to ensure the project requirements can be met. • Educating the public about the importance of proper waste disposal can help reduce the amount of waste that ends up in landfills. This includes encouraging the use of reusable | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | bags, bottles, and containers. Furthermore, the above mentioned plans, shall reflect measures as listed in the EIA, mitigation measure chapter, actions on: Safeguarding local communities from environmental pollution, Reduce risk of spreading of diseases, Safeguarding from operational health hazards | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| SOC7 | Influx of construction workers | Pressure on public services and provisions due to workers influx | Formal job application process to be communicated. Contractor Human Resource Plan in place in order to respond to SECAP and IFC PS 2 provisions. Local procurement plan. GRM for wider community to be activated. Potential for an influx of labour is not high, although if likely to happen, the reasoning for a labour influx management plan as a control measure, should be considered. Butwal will be a well utilised area by all and specific allowances with regard to healthcare services to be communicated to the local authorities, and monitored. Resolutions for | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>possible public facility overload to be mutually agreed. Arrangements to be made and adhered to in respect to the supply and use of water and electricity, particularly if already constrained for local use. GRM for wider community to be activated.</p> <ul style="list-style-type: none"> • Increase Funding: Increased funding for government services can help to ensure that there are enough resources to meet the needs of both migrant workers and existing residents. This may involve allocating additional resources or seeking funding from other sources. | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <ul style="list-style-type: none"> • Coordinate with Community Organisations: Community organisations can help to support migrant workers and reduce the burden on government services. These organisations may provide services such as language training, job placement assistance, and social support. • Implement Health Screenings: Health screenings can help to identify and treat health issues among migrant workers before they become a burden on government healthcare services. This may involve providing vaccinations, screening for infectious diseases, and | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>providing access to primary care.</p> <ul style="list-style-type: none"> • Encourage Employer Responsibility: Employers should be responsible for providing basic services such as housing, healthcare, and transportation to their workers. This can help to reduce the burden on government services and ensure that workers are treated fairly. • Promote Self-Sufficiency: Encouraging migrant workers to become self-sufficient can help to reduce their reliance on government services. This may involve providing education and training to improve their skills and job prospects and | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | providing access to resources such as loans and grants to start businesses. | | | | | | |
| SOC8 | Site clearance and earthworks | Relocation of the football field | Give priority to the re-allocation of the football ground and/or identify a temporary solution | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | for the re-allocation of the football ground outside the proposed market during the construction phase of the project in close cooperation with the Youth representative and Chairman Ward 15. | | | | | | |

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| SOC9 | Construction activities | Workers health and safety due to construction activities | <p>To mitigate the risk of accidents involving vehicles and instruments near the construction sites, it is important to implement proper safety measures and procedures. This can include:</p> <ul style="list-style-type: none"> • A Policy on Contractor Health and Safety for the duration of their work on site, must apply, and be monitored. In addition, a Contractor's Code of Conduct (especially in terms of respecting local by-laws and specific practical community concerns on which agreement may be reached), should be applied for the duration of the construction. In addition, it is vitally important that a formal labour grievance management system be put in place (and should remain throughout the life of the plant). • Proper training: Workers operating heavy vehicles | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |
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| | | <p>should be properly trained in their operation and safety procedures.</p> <ul style="list-style-type: none"> • Traffic management: Traffic Management Plan should be in place to control the flow of traffic around and to construction sites and to ensure that heavy vehicles can operate safely. The plan will assist in scheduling the logistics of abnormal truck loads, thus controlling traffics flows and congestion. • Safety barriers: Physical barriers can be used to separate heavy vehicles from workers and the public, reducing the risk of accidents. • Warning signs: Signage can be used to warn workers and the public of the presence of heavy vehicles and to indicate areas where heavy vehicles are operating. • Regular inspections: Heavy | | | | | |
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| | | | <p>vehicles should be regularly inspected and maintained to ensure that they are in safe working condition.</p> <ul style="list-style-type: none"> • Worker's camp, sanitation, to be aligned to Nepalese labour law and ILO Workers' Housing Recommendation 115 and IFC/EBRD Guidance note on Worker Accommodation (Processes and Standards). Contractor (worker) Code of Conduct (on/ off site) to be developed and implemented. • Worker Code of Conduct is necessary to maintain and monitor labour as well as community social interfaces. A Worker Code of Conduct will be required to stipulate all expected discipline and behaviour from local and non-local labour. Control measures for exiting and entering of labour accommodation site to be included | | | | | |
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| | | | <p>(with consideration of times, contraband goods such as drugs and alcohol, weapons, etc)</p> <ul style="list-style-type: none">• Labour GRM to be implemented. <p>The community GRM must also be active so that feedback is received from various streams, lending to credibility of the information for further investigation.</p> | | | | | | |
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| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| SOC10 | Influx of construction workers | Community relations and inter-relationships | <p>Worker Code of Conduct shall be implemented to maintain and monitor labour – community social interfaces. Behaviour of workers to be set within defined rules and requirements. Control measures for exiting and entering of labour accommodation site to be included (with consideration of times, contraband goods such as drugs and alcohol, weapons, etc)</p> <p>Labour GRM to be implemented. The community GRM must also be active so that feedback is received from various streams, lending to credibility of the information for further</p> | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | <p>investigation.</p> <p>With the potential non-local labour contingent presence, communities may feel threatened and blame any criminal activity on the foreign workers in the area. Worker Code of Conduct shall be implemented to stipulate all expected discipline and behaviour from local and non-local labour.</p> <p>The local police service must be kept abreast of incidents, allowing them to investigate and remediate, or charge perpetrators as necessary. The mitigation measures as listed in the EIA report, section 8 on Law</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------|-------------------------|--------------------------------|---|--|----------------------------|--------------------|------------------------------|-------------------------------|---------------------------|
| | | | <p>and order in the community shall be implemented.</p> <p>The mitigation measures as listed in the EIA report, section 8 on Prioritising the project affected families in recruitment by the project and Social and Gender Inclusion in the project construction practices shall be implemented.</p> | | | | | | |
| SOC11 | Construction activities | Establishment of a worker camp | The labour camp shall be established in line with Nepalese labour law, ILO Workers' Housing Recommendation 115 and the Workers' accommodation: processes and | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | standards, guidance note by IFC and the EBRD, 2009. This guideline provides requirements in terms of how to assess the need and requirements for workers accommodation (e.g., the m2 per type of accommodation, ratio living and recreational space, required services, etc), how to assess impacts of workers' accommodation on communities, standards for workers accommodation, management practices, etc/. and provides useful framework for managing this activity. | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------|-------------------------|--|--|--|-----------------------------------|--------------------|------------------------------|-------------------------------|---------------------------|
| SOC12 | Construction activities | Ground water availability to surrounding communities | <ul style="list-style-type: none"> • Review the water supply strategy based on the results of the (Ground) Water Sourcing Study (conducted during the detailed design). • Reduce water usage: The project should aim to reduce its water usage by implementing water-saving technologies or practices. This could include saving and recycling water where possible. • Increase water supply: In case, the onsite wells do not provide the required water amount, the project must explore alternative sources of water, harvesting rainwater and others, e.g., installing additional low | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>capacity wells in larger area than the site.</p> <ul style="list-style-type: none"> • Develop water management plans: The project could develop and implement a water management plan that outlines how water will be used, conserved, and recycled. The plan should also include procedures for monitoring and reporting on water use and any impacts on local water resources. • Engage with local communities: The project should engage with local communities to understand their water needs and concerns. This could involve consulting with local water users and stakeholders, providing regular updates on water use and conservation | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
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| | | | measures, and collaborating with community groups to identify solutions to water availability challenges. | | | | | | |
| SOC13 | Construction activities | Decreased availability of natural resources (surface and groundwater water, soil) due to pollution caused by the project | <ul style="list-style-type: none"> The project will implement pollution control technologies to minimise emissions and pollution by using filters, or other air and water treatment technologies. The project will monitor air and noise quality to ensure that local communities are | Mitigative | Project area and surrounding area | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>not exposed to harmful levels of pollutants or noise.</p> <ul style="list-style-type: none"> • The project sites will be fenced to prevent the noise level reaching the settlement area in vicinity. • The project will engage with local communities to understand their concerns about air, noise, and pollution. This could involve consulting with local community leaders and representatives, providing regular updates on air and noise quality monitoring, and collaborating with community groups to identify solutions to pollution challenges • Road signage, maintaining speed limits, watering down of the road | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------|-------------------------|---|--|--|----------------------------|--------------------|------------------------------|-------------------------------|---------------------------|
| | | | during dry periods and the acknowledgement of free roaming cattle must be addressed. See also details on Safeguarding health from the improper waste management in SOC6 The above aspects shall be included in the Construction Contractor CHSSMP. | | | | | | |
| SOC14 | Construction activities | Impacts to the structural integrity of the Shiva Temple | Undertake regular inspection of the structural stability of the Shiva temple. | Mitigative | Project site | Construction phase | Included in the project cost | Construction Contractor | MoALD, IFAD |

C. Operation

Table 7: ESMP for the Semlar Agriculture Regional Wholesale Market (Operation phase)

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----------------------------|---|---|--|--|----------------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| Physical Environment | | | | | | | | | |
| PH15 | Operation of the market | Flooding risk affecting the wholesale market and adjoining areas. | Follow the protocol in the flood risk assessment describing what to do when the flood mitigation measures fail (refer to PH1) | Mitigative | Project site and adjoining areas | Operation phase | Included in the project cost | Wholesale Operator Market | Semlar SPIU |
| PH16 | Climate change | Climate change increasing the flooding events | Follow the protocol in the flood risk assessment describing what to do when the flood mitigation measures fail (refer to PH1) | Mitigative | Project site and adjoining areas | Operation phase | Included in the project cost | Wholesale Operator Market | Semlar SPIU |
| PH17 | Abstraction of groundwater during operation | Potential impacts on the groundwater levels due to abstraction | <ul style="list-style-type: none"> - Follow the plans developed in PH2. - Biannually check and repair the water pipes and taps to reduce leakage, if necessary Review the project water demand during the detailed design since the current water demand estimate includes a 30% | Mitigative | Project site | Operation phase | Included in project cost | Wholesale Operator Market | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>contingency post. Undertake a project water balance to improve the accuracy of the water demand. Subsequently, review and adjust the Wastewater Treatment Plant capacity, see section solid waste management below for details.</p> <p>Rainwater harvesting will be installed to capture and store rainwater, which can be used for non-potable purposes like cleaning and toilet flushing (this measure is currently embedded in project design of the storage and processing buildings).</p> | | | | | | |
| | | | <p>Implement water-efficient technologies such as low flow faucets and toilets to reduce water usage.</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|------|---|--|---|--|----------------------------|------------------|---------------------|-------------------------------|---------------------------|
| | | | The storm (rain) water drainage system will also have a soak pit incorporated so that water will have a better chance to recharge the groundwater than simply flow out into the Danab River. | | | | | | |
| PH18 | Emissions to air during operation of the market and related traffic | Deterioration of ambient air quality due to operation related emissions and dust | Calculate the project GHG profile considering the energy mass balance and final equipment selection. Calculate the maximum electricity demand of the wholesale market and size back up diesel generators, considering the operational efficiencies of the generator sets. When more detailed information becomes available, recalculate the maximum water demand of the operation of the wholesale market | Mitigative | Project site | Operation phase | USD 10,000 per year | Wholesale Operator Market | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>and size diesel generator and pump sets, accordingly, taking into account the operational efficiency of the water pump. Generator and pump set could be fitted with a Variable Speed Drives to ensure that the loading of the generator and pump set is more responsive to changes in demand. Ensure connecting the market to the public transportation network which could reduce the number of personal vehicles coming to the market, and hence reduce vehicular exhaust gases.</p> <p>Regular maintenance of the vehicles owned by the market, and set maintenance protocol for transportation vehicles, so that</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|------|---|--|--|--|----------------------------|------------------|------------------------|-------------------------------|---------------------------|
| | | | <p>these vehicles run efficient, thus, minimise emitting excessive pollutants.</p> <p>Ensure that the roads to the market are in good condition and maintain on a regular basis to avoid dust pollution in the surrounding settlements.</p> <p>Consider the lobby for a direct road connection to the highway from the market, allowing suppliers to avoid local entrance roads.</p> | | | | | | |
| PH19 | Operation of the market and related traffic | Increase in ambient noise levels, vibration and light due to operation of the wholesale market | One of the effective ways to reduce noise and light issues is to install barriers, such as walls (up to 2m in height), fences and vegetation that can block the noise and light, as well as absorb sound waves. This will help in keeping the noise and light within the | Mitigative | Project site | Operation phase | Included in costs PH18 | Wholesale Operator Market | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>wholesale market area. Installation of sound walls can also increase the road safety since crossing of the roads will be in dedicated placed only.</p> <p>Identify zones of high and low lighting requirements, focusing on only illuminating areas to the minimum extent possible to allow safe delivery of materials at night and for security surveillance. Utilise security lights that are movement activated rather than permanently switched on. Fit all security lighting with 'blinkers' or specifically designed fixtures, to ensure light is directed downwards while preventing side spill. Eliminate any ground-level spotlights.</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|------|---|--|---|--|----------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| | | | Regular maintenance of machinery and equipment can also help to reduce noise pollution. | | | | | | |
| PH20 | Waste generation during operation of the market | Pollution of direct environment due to improper waste disposal | Solid waste • The segregation of biodegradable, non-degradable, hazardous waste shall be done by using separate waste bins with proper signage. • The waste bins and waste storage yards must be enclosed, have watertight cement floor, and include restricted access to vermin and other wildlife. Storage yards shall be located at least 500 m away from the Danab River. Final disposal of waste shall be done by locally approved waste contractors and sites. • Ensure enough waste bins covering all areas of the market and sufficient staff to | Preventive | Project site | Operation | Included in the project cost | Wholesale Operator Market | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>handle waste and cleaning of the facility. • Market personnel and shop owners must be induced and trained on good housekeeping and environmentally sound storage and disposal of construction related waste. • Collaborate with the local municipality to develop a long-term solid waste management system for the project as well as settlement. • The composting facility can be developed outside the market that can process the biodegradable waste. • The Wholesale Market E&S officer together with the Project Proponent shall undertake a due diligence of the waste contractor and sites used for final disposal of</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | waste on compliance with Nepali regulation and this project requirements. Wholesale Market E&S officer shall be responsible for training on the subject, weekly inspection of waste management system on site. | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p><u>Wastewater</u></p> <ul style="list-style-type: none"> • Review the capacity of the Wastewater treatment Plant during the detailed design, based on the accurate water demand and water balance exercise. • With respect to the Wastewater Treatment Plant (embedded in the design), effluent shall comply with the Nepali effluent standard / IFC World Bank General EHS Guidelines, which weather is more stringent. • Treated effluent (when meeting the above effluent quality) shall be used for site irrigation, wheel washing or discharge to Danab River. • Remaining sludge from WWTP shall be collected and disposed by approved third | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>party, e.g., trough composting.</p> <p><u>Oily water</u></p> <ul style="list-style-type: none"> • All areas of possible oil leakage shall be bunded. • An oily water separator shall be used to treat the contaminated 'stormwater'/service water stream to reduce volume of oil to be cleaned/recycled. • Oil that cannot be recycled can be collected in an oil tank for removal by a waste contractor. • The oily storm (rain) water system must be designed to contain the 1 in 100-year storm event; or | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------------------------------|----------|-----------------------------|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>the buffer capacity (reservoir size) of the possible contaminated storm water sewer must be based on a risk analysis of different release scenarios.</p> <ul style="list-style-type: none"> • The storm (rain) water system of the site must be able to handle all fire protection water, in case of an emergency. There should be sufficient capacity to store the water and not discharge into the environment before conducting chemical analysis. • Oil traps must be included in the design of the storm (rain) water sewer. Oil recovered from oil traps must be recycled or disposed of through a certified waste contractor. | | | | | | |
| Biological Environment | | | | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----|-------------------------|--|--|--|-------------------------------|------------------|-----------------|-------------------------------|---------------------------|
| BI7 | Operation of the market | Terrestrial wildlife and avifauna might be displaced due to habitat modification and interferences in the project area | (1) Conduct a baseline survey to identify the species that are being affected by the market operation and their patterns of movement and habitat use. (2) Install fencing around the market site to prevent wildlife and avifauna from entering the area, and implementing measures to deter wildlife from entering the site, (3) Monitoring program to track the movement of wildlife and avifauna in and around the market site, (4) Conducting awareness and education programs for the market operators, workers, and visitors to promote responsible behaviour around wildlife and avifauna, (5) develop an | Mitigative | Project site and access roads | Operation phase | USD 5,000/year | Wholesale Operator | Market Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----|--------------------------------|--|---|--|----------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| | | | emergency response plan to address any incidents involving wildlife and avifauna on the market site in collaboration of DFO. | | | | | | |
| BI8 | Transportation of the produces | Vermin and sanitary conditions at the wholesale market | (1) Prevent the entry and proliferation of vermin around market, such as regular cleaning and disinfection of the market area, installation of screens on doors and windows, and proper storage and disposal of waste (2) Regular inspection of the market area to identify potential sources of vermin and implementing measures to illuminate them, such as sealing gaps and cracks in walls and floors, and removing standing | Mitigative | Project site | Operation phase | Included in the project cost | Wholesale Operator Market | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-----------------------------------|----------|-----------------------------|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>water and debris, (3) Providing designated waste collection areas and ensuring that all waste is properly disposed of, to reduce the attraction of vermin to the market. (4) provide adequate ventilation and lighting in the market area, to reduce the risk of vermin infestation and improve overall sanitation. (5) conduct regular cleaning and maintenance of processing and storage areas, to ensure that they are free from vermin and other pests, (6) educate market operators, workers, and visitors about the importance of maintaining good sanitary practices.</p> | | | | | | |
| Socio-economic Environment | | | | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|--------|--|--|---|--|-----------------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| SOC1 5 | Operation of wholesale market | Potential impacts to downstream bridge and communities located north of the river due to new wholesale market in a portion of the river floodplain | Implement the results of the update of the Flood Risk Study | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Operator Market | MoALD, IFAD |
| SOC1 6 | Groundwater abstraction during operation | Wholesale market groundwater abstraction affecting the surrounding community well | 1) Reduce water usage: The project should aim to reduce its water usage by implementing water-saving technologies or practices. This could include saving and recycling water where possible.2) Increase water supply: In case, the wells/tube wells are dried out, the project must explore alternative sources of water, harvesting rainwater and others.3) Develop | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Operator Market | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>water management plans: The project could develop and implement a water management plan that outlines how water will be used, conserved, and recycled. The plan should also include procedures for monitoring and reporting on water use and any impacts on local water resources.4)</p> <p>Engage with local communities: The project should engage with local communities to understand their water needs and concerns. This could involve consulting with local water users and stakeholders, providing regular updates on water use and conservation measures, and collaborating with community groups to identify solutions</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------|---|---|---|--|-----------------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| | | | to water availability challenges. | | | | | | |
| SOC17 | Pollution of natural resources during operation | Availability of natural resources to community (surface and groundwater, soil) due to pollution originating from the wholesale market | <ul style="list-style-type: none"> Various HSE (Health, Safety Environment) plans (Hazard/ risk management, driving safety standards, Emergency Response plan) shall be develop by the Construction Contractor. Community Health, Safety and Security Plan (CHSSMP), also showing HSE communication and consultation procedure is necessary. | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Operator Market | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <ul style="list-style-type: none"> • implementing pollution control technologies to minimise emissions. • monitoring air and noise quality. • fencing the premises to prevent the noise reaching the settlement area in vicinity. • engaging with local communities to understand their concerns about air, noise, and pollution. • maintaining road signage, speed limits. • regular maintenance of the road condition. <p>Furthermore, the HSE plans shall reflect the mitigation measures as listed in the EIA in the mitigation measure chapter 8 on, Safeguarding from operational health hazards, Safeguarding health from the improper waste management, measures to reduce</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|--------|-------------------------------------|---|--|--|-----------------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| | | | the risks for community impacts and spreading of diseases. Requirements for the Emergency Response are included in the EIA, chapter 8 and shall be implemented. | | | | | | |
| SOC1 8 | Energy consumption during operation | Required energy consumption of the wholesale market thereby affecting overall energy availability | The wholesale market will be connected to the grid. Power will be supplemented by own solar panels. The energy demand shall be monitored and evaluated if the demand does not impact near-by communities. If an impact occurs this shall be addressed by Wholesale | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Operator Market | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|-------|--------------------------------------|--|--|--|-----------------------------------|------------------|------------------------------|-------------------------------|---------------------------|
| | | | Market Operator and local authorities | | | | | | |
| SOC19 | Transport movements during operation | Traffic nuisance (noise, emissions, community health and safety risks) due to operation of the wholesale market affecting nearby communities | Implement measures listed in SOC 3 | Mitigative | Project area and surrounding area | Operation phase | Included in the project cost | Wholesale Operator Market | Semlar SPIU |
| SOC20 | Infrastructure damage | Deterioration of public roads due to intense use by the wholesale market users | The project assumes that the local municipality will maintain municipal roads. Proper, ongoing maintenance and repair will serve to reduce the dust and noise generated by traffic on poor roads and will positively | Mitigative | Project area and surrounding area | Operation phase | N/A | Government Authority | Government Authority |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|--------|---|--|---|--|----------------------------|------------------|--------------------------|-------------------------------|---------------------------|
| | | | contribute to increasing safety on roads. | | | | | | |
| SOC2 1 | Waste generation during operation of the market | Nuisance, community health and sanitary risks related to wholesale market operation, including improper waste disposal | <ul style="list-style-type: none"> It is important to segregate waste properly into recyclable, biodegradable, and non-biodegradable materials. This helps to reduce the amount of waste that ends up in landfills and decreases the risk of contamination. The wholesale market shall be foreseen with a dedicated area, where waste can be collected, segregated and temporarily stored until collection by third party for final treatment/disposal. The area shall be covered, contained and fenced. Composting is an effective way to reduce the amount | Mitigative | Project site | Operation phase | Included in project cost | Wholesale Operator Market | Semlar SPIU |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>of biodegradable waste that ends up in landfills. It also produces nutrient-rich soil that can be used for gardening and farming. The market shall identify and engage a waste company that can provide composting services for the project (construction phase, but especially for the operation phase of the wholesale market).</p> <ul style="list-style-type: none"> Waste should be collected and transported in a safe and hygienic manner. This includes using covered and leak-proof containers, as well as properly sealed garbage trucks. Waste will be disposed of in designated landfills that meet safety and health standards. These landfills will be | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|----|----------|-----------------------------|--|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | <p>located far away from residential areas to reduce the market shall inspect the waste contractor to ensure the project requirements can be met</p> <ul style="list-style-type: none"> • Educating the public about the importance of proper waste management can help reduce the amount of waste that ends up in landfills. This includes encouraging the use of reusable bags, bottles, and containers. <p>Furthermore, to reduce the community nuisance from the market, the following aspects shall be reflected in the project operational plans: see mitigation measures as listed in chapter 8, reduction</p> | | | | | | |

| SN | Activity | Beneficial / Adverse Impact | Mitigation / Enhancement measure | Categorization of Measures: -Avoidance -Preventive -Mitigative -Compensatory | Location of implementation | Timing of Action | Mitigation Cost | Responsibility Implementation | Responsibility Monitoring |
|--------|-----------------------------------|--|---|--|----------------------------|------------------|-----------------|-------------------------------|---------------------------|
| | | | of community impacts, reduction of risk of spreading of diseases, and prioritising the project affected families in recruitment by the market | | | | | | |
| SOC2 2 | Operation of the wholesale market | Access to and structural integrity of the Shiva Temple | Access to the Shiva temple and the structural integrity of the temple will not be affected by the operational phase activities. | N/A | N/A | N/A | N/A | N/A | N/A |

Annex 5b: Targeted Adaption Assessment (TAA)

1. Overview

1. The International Fund for Agricultural Development (IFAD) Social, Environmental, and Climate Assessment Procedure (SECAP) screening checklist assessed the Resilient High Value Agricultural Programme (R-HVAP) as 'substantial' for climate risk. As per the SECAP guidelines 2021, a Targeted Adaptation Assessment is required. Such an assessment ensures that climate change impacts are carefully considered, and reviews hazards, exposure, and vulnerability in detail and proposes adaptation options. The data and analysis presented in this report is mostly at the national level and provides provincial level information where available.

2. The Targeted Adaptation Assessment is intended to guide the design of the programme interventions, with an understanding that specific assessments may be required during the implementation phase. The Programme Coordination Unit (PCO) hosted by Ministry of Agriculture and Livestock Development (MoALD) and the Provincial Programme Management Units (PPMOs) will revise or update the document as required, drawing on lessons from Local Adaptation Plans for Action (LAPA) developed under ASHA and ensuring alignment with the 5-year Agroecological Cluster Plan developed under R-HVAP.

1.1 Title of the program

3. *Resilient High Value Agricultural Programme (R-HVAP).*

1.2 Area

4. Three western provinces of Nepal: namely, Lumbini, Karnali, and Sudurpashchim, and will operate in nearly 80 municipalities. The provinces have been selected based on the highest incidence of multi-dimensional poverty, climate vulnerability, impacts of COVID-19, and landscape perspective to facilitate the building of an agroecological foodshed.

5. The Semlar regional wholesale market, which will facilitate commodity aggregation and marketing to domestic/export markets — particularly from R-HVAP agricultural clusters, is proposed for construction in the Lumbini Province, Rupandehi District, Butwal Sub-Metropolitan City.

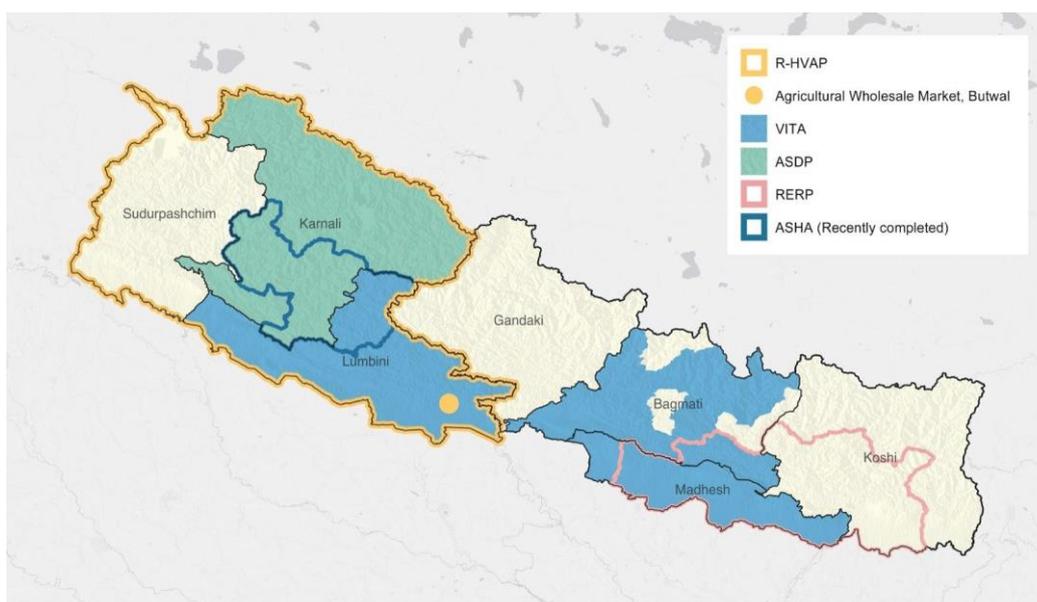


Figure 1 RHVAP's target provinces, including IFAD Nepal's other ongoing programmes/projects

1.3 Executing Entity

6. MoALD is the Programme Lead Agency (PLA). It will coordinate with the federal Ministry of Finance (MoF) and the Ministry of Industry, Commerce and Supplies (MoICS) as well as the provincial Ministry of Land Management, Agriculture, and Cooperatives (MoLMAC), Ministry of Industry, Tourism, Forest, and Environment (MoITFE) and other relevant agencies/stakeholders.

7. A Programme Steering Committee (PSC) at the federal level will be chaired by MoALD with representatives from the concerned line ministries (MoF, MoICS, MoFE). Three Provincial Programme Steering Committees (PPSC) will be established under the chairmanship of MoLMAC, with representatives from the relevant provincial ministries of Lumbini, Karnali, and Sudurpashchim.

8. Management structures will include:

- a) one PCOO at the federal level, hosted by MoALD.
- b) three PPMOs in Lumbini, Karnali, and Sudurpashchim provinces.
- c) three Corridor Offices in strategic locations, which will host the technical staff in the various fields of expertise required (such as agroecology, agronomy and livestock, engineering, social inclusion, business development).

9. Government appointed staff, deputed to the various levels, will play a key role in revising and updating the Targeted Adaptation Assessment as required. Specifically,

- a) the Programme Coordinator at the PCO level and the Programme Manager at the PPMO level will provide oversight, with the support of PMO's gender empowerment, youth and social inclusion (GESI) expert.
- b) the Forestry Technicians at the PPMO level, appointed by the provincial ministry in charge of Forest and Environment (MoITFE or equivalent) and responsible for coordination on interventions related to soil and water protection measures in the agroecological clusters, will undertake the revision and update of Targeted Adaptation Assessment with inputs from technical staff (see 9c).

1.4 Summary of the program

10. Within the programme area, R-HVAP will adopt an agroecological cluster-based approach in selecting wards and *Palikas* (municipalities). An agroecological cluster is a homogenous geographic unit, within or beyond one Palika, that has the production potential for a diversity of high value commodities with market demand. The prioritization and selection of clusters will follow a participatory process using a set of criteria such as (i) poverty incidence; (ii) presence and quality of Producers Organizations (Pos); (iii) proximity to road corridors; and (iv) credible market opportunities, where smallholders can profitably compete. Remoter clusters will be brought into operation once the supply chains adjacent to road corridors are operational.

11. R-HVAP aims at scaling-up agroecological farming systems that generate economic benefits for smallholder farmers, while providing environmental and food system benefits. The programme ambition is to support the smallholder agriculture transition into inclusive, agroecological, resilient, and profitable agri-food systems. The agroecological approach will be promoted at four levels: (i) farm level via agroecological practices; (ii) landscape level via natural resource governance, community joint learning, and adoption of sustainable NRM and nature-based solutions to enhance ecosystem services; (iii) market level via support for value addition and innovations in connecting small-scale producers and consumers around shared values of sustainable and healthy food; and (iv) policy level via instruments and services enabling agroecology and sustainable food systems.

12. Under the agroecology framework, R-HVAP features four complementary and interlinked components: (1) Enhanced capacities for transitioning to market-oriented agroecological production systems; (2) Improved access to climate-resilient productive

infrastructure; (3) Improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets; and (4) Strengthened policies, regulations and institutions for smallholder agroecological production and trade.

13. The first component will focus on i) decentralized planning to mainstream agroecology approach through agroecological cluster delineation and the development of an agroecological cluster plan, ii) disseminate and develop knowledge of farmers on agroecological farming, including through demonstration farms, youth apprenticeships, and participatory research, iii) expand market-oriented agroecological production through Producer Organizations, Multi-stakeholder Platforms (MSPs), and iv) strengthen MSME ecosystem across the value chain from bio-input supply to aggregation to post-harvest processing and transport.

14. The second component, improved access to climate resilient productive infrastructure, will i) establish water-related infrastructure, ii) promote renewable energy technologies.

15. The third, improved wholesale aggregation and distribution of agroecological commodities for domestic and export markets, will focus on wholesale markets at strategic locations, including the establishment of the Semlar regional wholesale market (a co-financed project).

16. The fourth and final component will i) implement policies, plans, and Programs for stimulating smallholder agroecological production, and ii) strengthen capacity of participating institutions to support profitable agroecological production.

1.5 Date of preparation of the vulnerability and adaptation assessment

17. This document was prepared between April and June 2023.

2. Indication of hazard, exposure, sensitivity, and adaptive capacity

18. **General climate:** Nepal has a wide range of climatic conditions (Table 1), with the southern part being tropical (summer temperature exceeds 37 deg C in some areas) and the northern part being alpine (temperate summer and winter temperatures are sub-zero). The variation in altitude over a short distance (Figure 2) creates different geographical regions – from the low elevations of the Gangetic plains in the south to the high Himalaya in the north, which include eight of the world’s top ten highest mountains. Temperature is primarily determined by altitude, while precipitation is mainly influenced by monsoons that move across the country from June to September (70% of rainfall⁸). Nepal experiences mainly dry winters (5% of rainfall), with the Himalaya acting as a barrier to cold winds from Central Asia in the winter.

19. The country’s annual minimum temperature varies from -4°C to 19°C while the maximum temperature ranges from 4°C to 30°C. Most of the low-lying southern districts have the highest annual average maximum temperature above 30°C. While the average annual rainfall is 1,600 millimetres (mm), this varies by north-south and east-west directions – with some central and northern areas of the country receiving more than 3,000 mm, the central and southern plains usually receiving between 1,500 and 2,000 mm, and some high-altitude regions in the north getting 100-150 mm. Total annual rainfall increases with altitude up to approximately 3,000 msl and then diminishes at higher elevations (National Adaptation Plan, 2022). Figure 3a, 3b, and 3c illustrate the precipitation and temperature ranges by physiographic region.

Figure 2 Nepal elevation map

⁸ ICIMOD 2015. The Himalayan Water and Climate Atlas.



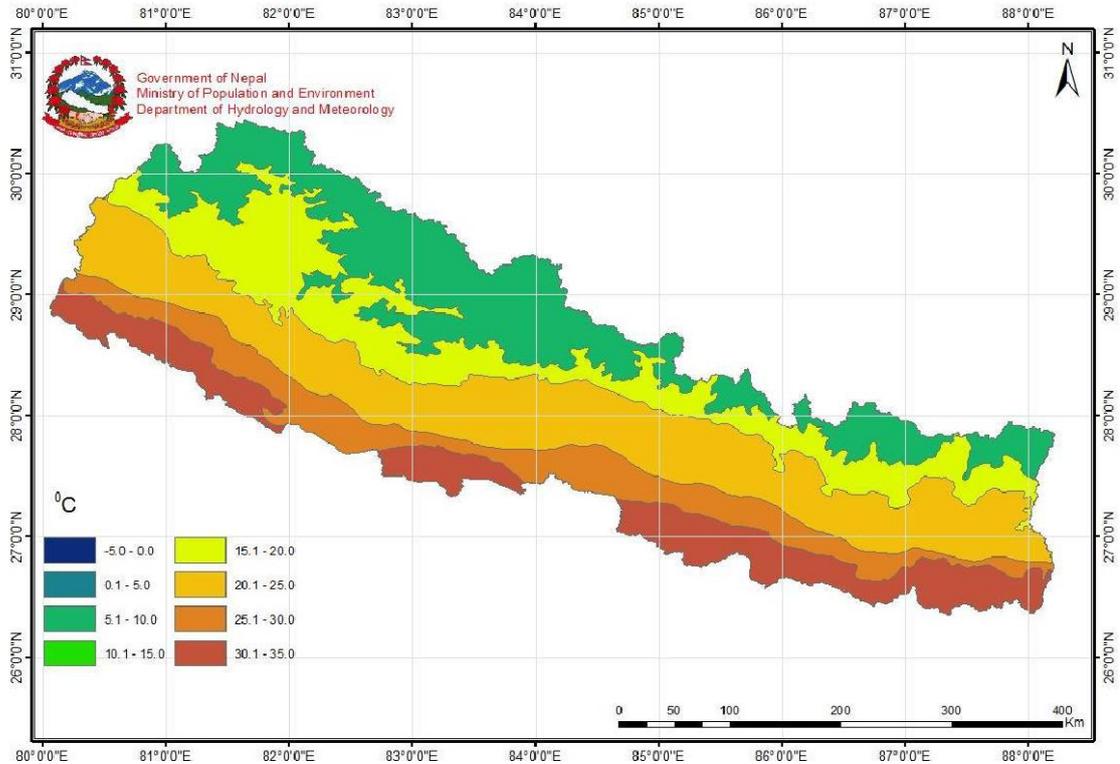
Table 8 Nepal's Climatic Zones. Source: Environment Statistics of Nepal 2019, Central Bureau of Statistics.

| Physiographic regions | Elevation | Climatic zone | Average annual precipitation | Average annual temperature |
|--------------------------|-------------|--------------------------|------------------------------|----------------------------|
| High Himal | Above 5000m | Tundra / arctic | 150-200mm | <3-10 deg C |
| High Mountains | 3000-5000m | Alpine / subalpine | | |
| Middle Mountains | 1000-3000m | Cool to warm temperature | 275-2300mm | 10-20 deg C |
| Siwalik | 500-1000m | Sub-tropical | 1100-3000mm | 20-25 deg C |
| Terai (low-lying plains) | Below 500m | Tropical | | |

Figure 3 Temperature & precipitation, Source: Observed climate trend analysis. MoPE, 2017

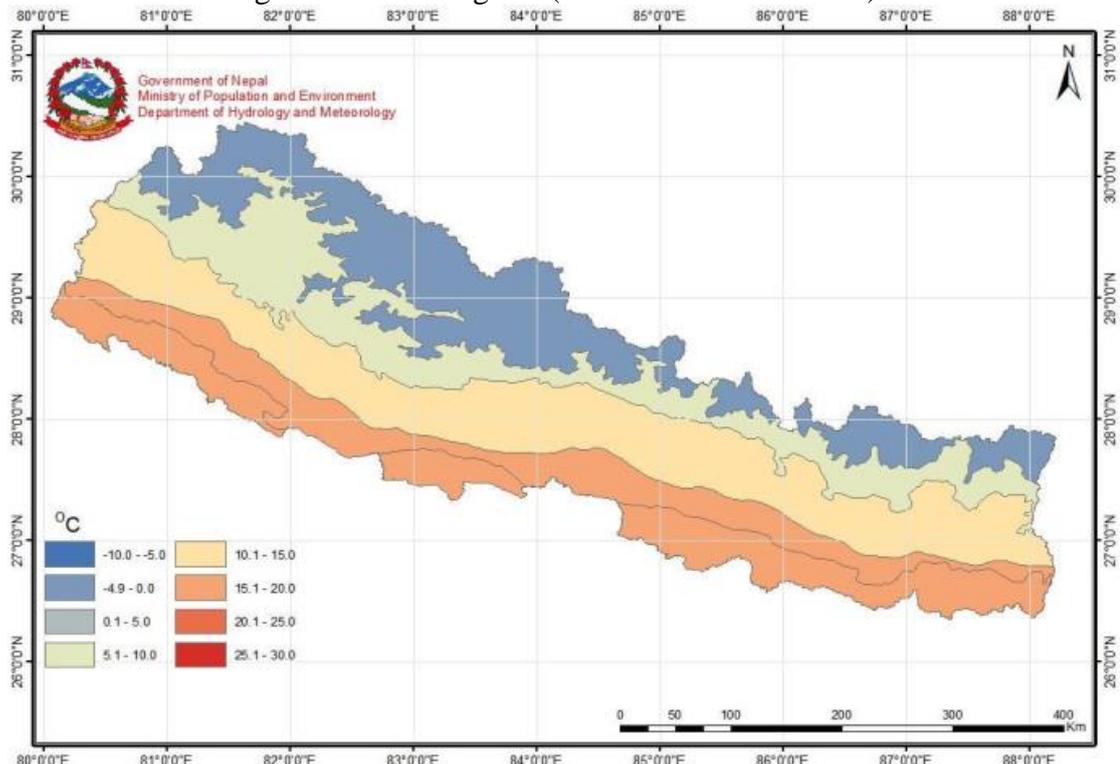
(3a) Annual Maximum Temperature by Physiographic Regions

The High Himalayas has the lowest normal annual maximum temperature (5°C-10°C) whereas the Terai region has the highest normal annual maximum temperature (>30°C)



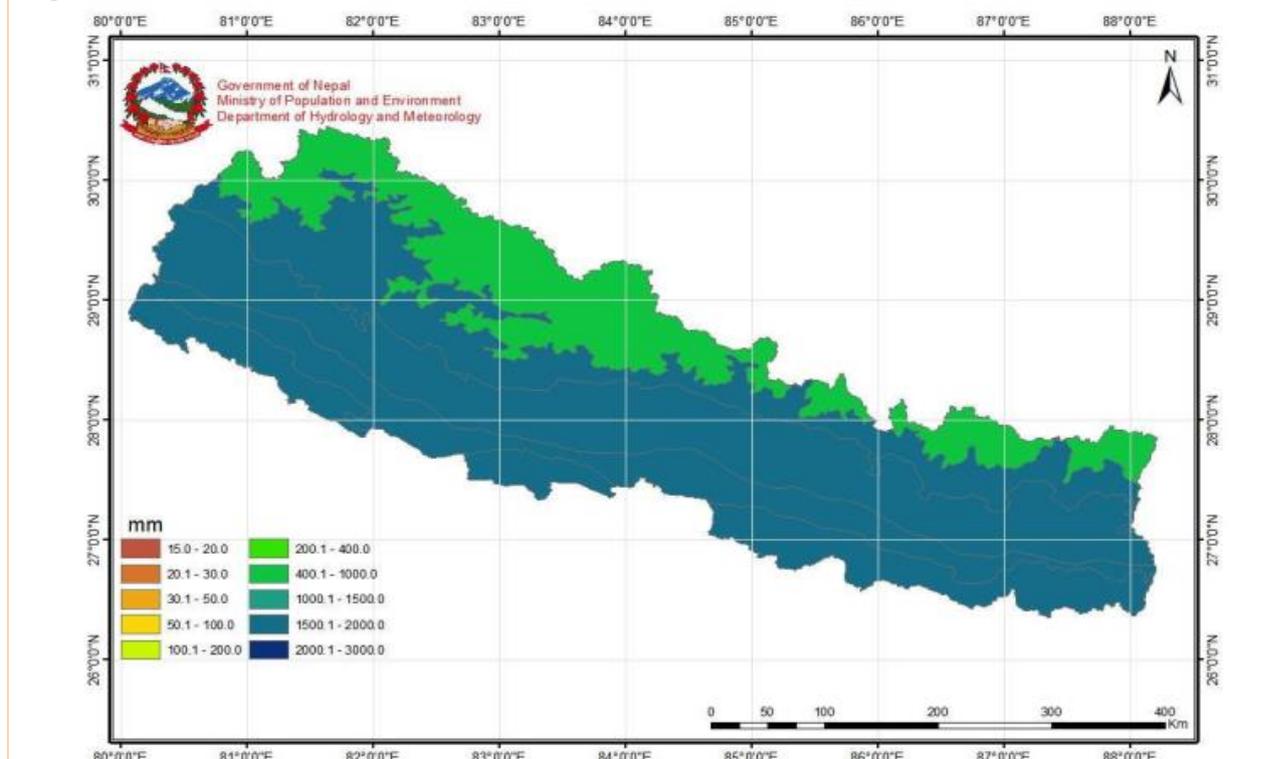
(3b) Annual Minimum Temperature by Physiographic Regions

The High Himalayas has the lowest normal annual minimum temperature (-5°C-0°C) whereas the Siwaliks and the Terai regions have the highest (between 15°C and 20°C).



(3c) Annual precipitation by Physiographic Regions

High Himalayas receives the least amount of rain (400–1000 mm) and remaining regions receive higher rainfall (1500-2000 mm).



2.1 Observed climate trends⁹

2.1.1 Observed temperature trends:

20. The temperature trend for Nepal as a whole indicates a significant increase in both annual maximum and minimum temperatures (e.g., Figure 4a, 4b), with a yearly increase of 0.056°C and 0.002°C, respectively. In Karnali, for instance, both maximum and minimum temperatures are increasing and the increase in the pre-monsoon period is significantly high (0.08°C/year)¹⁰. In general, the highest rates of warming are in the winter months, and the lowest occur in the summer¹¹.

21. At both the district and physiographic levels, the seasonal and annual maximum temperature trends are correlated with altitude, with lower altitude regions showing a negative or small positive trend depending on the season, and higher altitude regions showing a larger positive trend across seasons (Table 2, MoPE 2017). This suggests that maximum temperature is increasing with elevation, with the Terai region having the lowest positive trend (0.036°C/year) and the High Himalayas having the highest positive trend (0.072°C/year) in the monsoon season. The temperature increase in high altitudes has resulted in a retreat of Himalayan glaciers¹². The negative trend in winter maximum temperature for Terai is posited to be due to long episodes of winter fog.

22. Seasonal and annual minimum temperature trends are not significant across seasons (Table 3, MoPE 2017), but there are positive trends in lower elevation areas and negative trends in higher elevation areas. In particular, the winter minimum temperature trend

⁹ Observed Climate trend analysis. Ministry of Population and Environment (then), 2017. Government of Nepal.

¹⁰ MoFE 2019. Climate Change Scenarios for Nepal for National Adaptation Plan. Ministry of Forests and Environment.

¹¹ MoFE 2019.

¹² MoPE 2012. Mountain Environment and Climate Change in Nepal: Country Report for the International Conference of Mountain Countries on Climate Change, 5-6 April Kathmandu, Nepal.

shows a positive trend (0.025°C/year) in the Terai region and a negative trend (-0.056°C/year) in the High Himalayas.

Table 9 Seasonal & annual maximum temperature trends (1971-2014) in the physiographic regions

| Physiographic Regions | Winter | | Pre-monsoon | | Monsoon | | Post- monsoon | | Annual | |
|-----------------------|----------|---------------|-------------|---------------|----------|---------------|---------------|---------------|----------|---------------|
| | α | Trend (°C/yr) | α | Trend (°C/yr) | α | Trend (°C/yr) | α | Trend (°C/yr) | α | Trend (°C/yr) |
| Terai | 0 | -0.004 | 0 | 0.018 | *** | 0.036 | ** | 0.028 | *** | 0.021 |
| Siwaliks | 0 | 0.010 | * | 0.031 | *** | 0.040 | *** | 0.033 | *** | 0.030 |
| Mid Mountain | *** | 0.046 | *** | 0.049 | *** | 0.055 | *** | 0.052 | *** | 0.052 |
| High Mountains | *** | 0.070 | *** | 0.062 | *** | 0.064 | *** | 0.064 | *** | 0.068 |
| High Himalayas | *** | 0.101 | *** | 0.076 | *** | 0.072 | *** | 0.085 | *** | 0.086 |

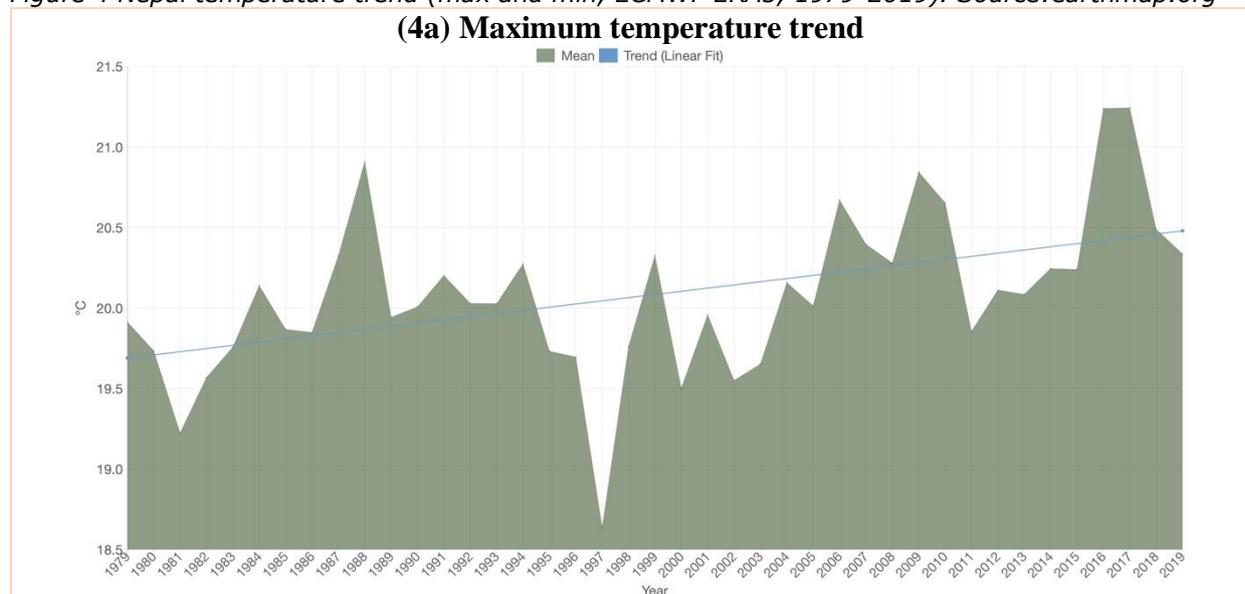
Note: Significant: * 95% confidence level (CL), ** 99% CL, *** 99.9% CL.
Insignificant at 95% CL: +, 0.

Table 10 Seasonal & annual minimum temperature trends (1971-2014) in the physiographic regions

| Physiographic Regions | Winter | | Pre-monsoon | | Monsoon | | Post-monsoon | | Annual | |
|-----------------------|----------|---------------|-------------|---------------|----------|---------------|--------------|---------------|----------|---------------|
| | α | Trend (°C/yr) | α | Trend (°C/yr) | α | Trend (°C/yr) | α | Trend (°C/yr) | α | Trend (°C/yr) |
| Terai | ** | 0.025 | * | 0.015 | *** | 0.015 | 0 | 0.013 | *** | 0.018 |
| Siwaliks | * | 0.016 | * | 0.013 | *** | 0.015 | 0 | 0.013 | *** | 0.016 |
| Mid Mountain | 0 | 0.004 | 0 | 0.004 | ** | 0.014 | 0 | 0.006 | * | 0.010 |
| High Mountains | + | -0.018 | 0 | -0.011 | * | 0.013 | 0 | -0.013 | 0 | -0.005 |
| High Himalayas | ** | -0.056 | + | -0.021 | 0 | 0.013 | + | -0.025 | + | -0.015 |

Note: Significant: * 95% confidence level (CL), ** 99% CL, *** 99.9% CL.
Insignificant at 95% CL: +, 0.

Figure 4 Nepal temperature trend (max and min, ECMWF ERA5, 1979-2019). Source:earthmap.org



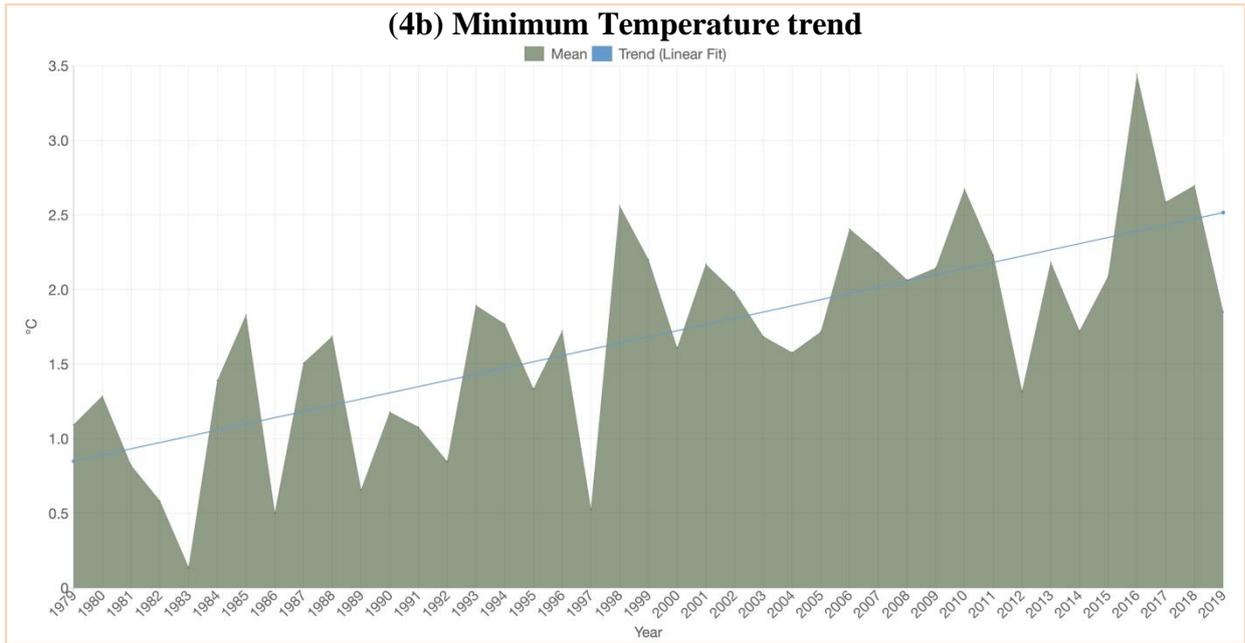


Figure 5 Annual mean temperature 1901-2021; Monthly mean temperature and precipitation, 1991-2020. Source: World Bank Climate Portal

Figure 5a

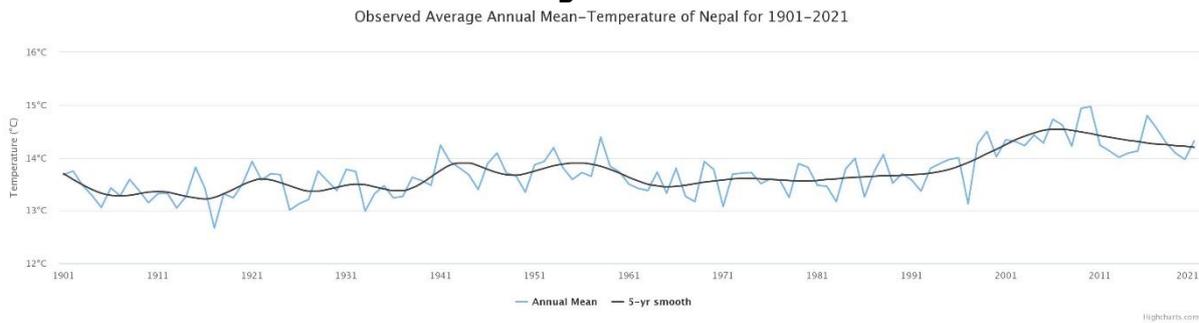
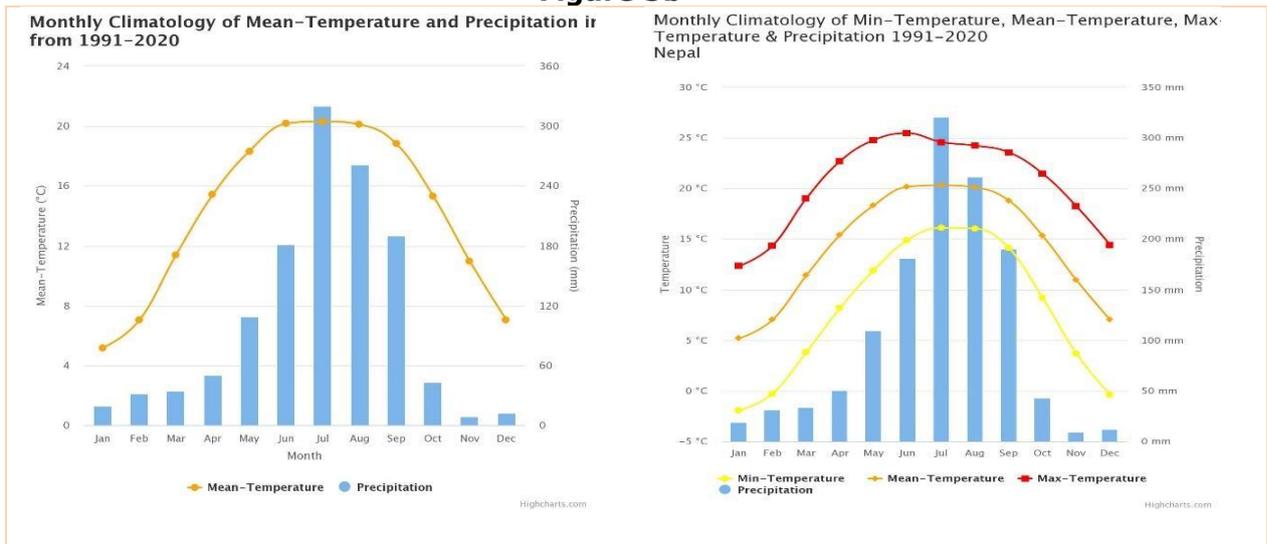


Figure 5b



2.1.2 Observed precipitation trends:

23. In terms of physiographic regions, only the High-Himalayan region shows a significant positive trend in pre-monsoon precipitation, with insignificant trends in other seasons across all physiographic regions (Table 4). Table 4 as well as other analysis (Karki et al.

2017) is indicative of increased pre-monsoonal and monsoonal precipitation in the Terai; there's a decline in post-monsoon precipitation across Nepal¹³.

Table 4 Seasonal and annual precipitation trends (1971-2014) in the physiographic regions

| Physiographic Regions | Winter | | Pre-monsoon | | Monsoon | | Post-monsoon | | Annual | |
|-----------------------|----------|---------------|-------------|---------------|----------|---------------|--------------|---------------|----------|---------------|
| | α | Trend (°C/yr) | α | Trend (°C/yr) | α | Trend (°C/yr) | α | Trend (°C/yr) | α | Trend (°C/yr) |
| Terai | 0 | 0.09 | + | 1.24 | 0 | 0.51 | 0 | -0.26 | 0 | 0.49 |
| Siwaliks | 0 | 0.08 | 0 | 0.75 | 0 | -0.60 | 0 | -0.38 | 0 | -1.48 |
| Mid Mountain | 0 | 0.03 | 0 | 0.03 | 0 | -0.45 | 0 | -0.43 | 0 | -1.58 |
| High Mountains | 0 | -0.06 | 0 | -0.82 | 0 | -1.19 | 0 | -0.50 | + | -3.17 |
| High Himalayas | 0 | -0.03 | * | -0.074 | 0 | -0.21 | 0 | -0.32 | + | -1.46 |

Note: Significant: * 95% confidence level (CL), ** 99% CL, *** 99.9% CL.
Insignificant at 95% CL: +, 0.

24. The number of annual rainy days is increasing in almost all districts, with 12 districts showing a significant positive trend (MoPE 2017). MoPE 2012 also reported an increase in high intensity rain for shorter periods of time resulting in flash floods and landslides. But, the trend of very wet days (and extremely wet days) is decreasing in most districts, with 17 districts showing a significant negative trend, while only two districts indicate a significant increasing trend for very wet days. In general, the number of consecutive dry days is increasing – implying an increase in prolonged dry spells (Karki et al. 2017). There are some deviations from this precipitation pattern for certain regions (Table 5), but what is evident is that intensity and direction of change varies by altitudes. A Drought Risk Assessment for Central Nepal in 2016 showed a downward trend in annual precipitation between 1981 and 2012, and an increasing trend of Winter drought for 90% of stations¹⁴.

25. While most analysis shows that there's a delay in monsoon departure (for instance, analysis for 1968-2010 showed that there's delay in departure of about half a day per year¹⁵), the evidence on monsoon onset is mixed. Panthi et al., 2015 showed no delay in arrival but other analysis shows onset delays (Gautam and Regmi 2013¹⁶, Brunello et al. 2020¹⁷), with some variation east-to-west.

Table 5 Climate Indices for Nepal (1971-2014)

| Extreme Climate Indices | Trends by Regions |
|--|--|
| (1) Number of rainy days ¹⁸ | Increasing significantly, mainly in the northwestern districts & trends are insignificant in other districts |
| (2) Very wet days ¹⁹ | |
| (3) Extremely wet days ²⁰ | Decreasing significantly, mainly in the northern districts & trends are insignificant in other districts |
| (4) Consecutive wet days ²¹ | Increasing significantly in the northern districts of Mid-Western districts, the central part of Western districts and Eastern districts & trends are insignificant in other districts |
| (5) Consecutive dry days ²² | Decreasing significantly mainly in the northwestern districts and trends are insignificant in other districts |
| (6) Warm days ²³ | Increasing significantly in the majority of the districts |

¹³ Karki et al., 2017. Rising precipitation extremes across Nepal. <https://doi.org/10.3390/cli5010004>

¹⁴ Dahal et al., 2016. Drought risk assessment in central Nepal: temporal and spatial analysis. <https://doi.org/10.1007/s11069-015-2055-5>

¹⁵ Panthi et al., 2015. Spatial and Temporal Variability of Rainfall in the Gandaki River Basin of Nepal Himalaya. <https://doi.org/10.3390/cli3010210>

¹⁶ Gautam and Regmi, 2013. Recent Trends in the Onset and Withdrawal of Summer Monsoon over Nepal.

¹⁷ Brunello et al., 2020. Annually Resolved Monsoon Onset and Withdrawal Dates Across the Himalayas Derived From Local Precipitation Statistics. <https://doi.org/10.1029/2020GL088420>

¹⁸ Annual count of days with daily precipitation > 1mm

¹⁹ Annual total precipitation when daily rainfall >95th percentile

²⁰ Annual total precipitation when daily max rainfall >99th percentile

²¹ Maximum number of consecutive days with daily precipitation >1mm

²² Maximum number of consecutive days with daily precipitation <1mm

²³ Percentage of days when maximum temperature >90th percentile

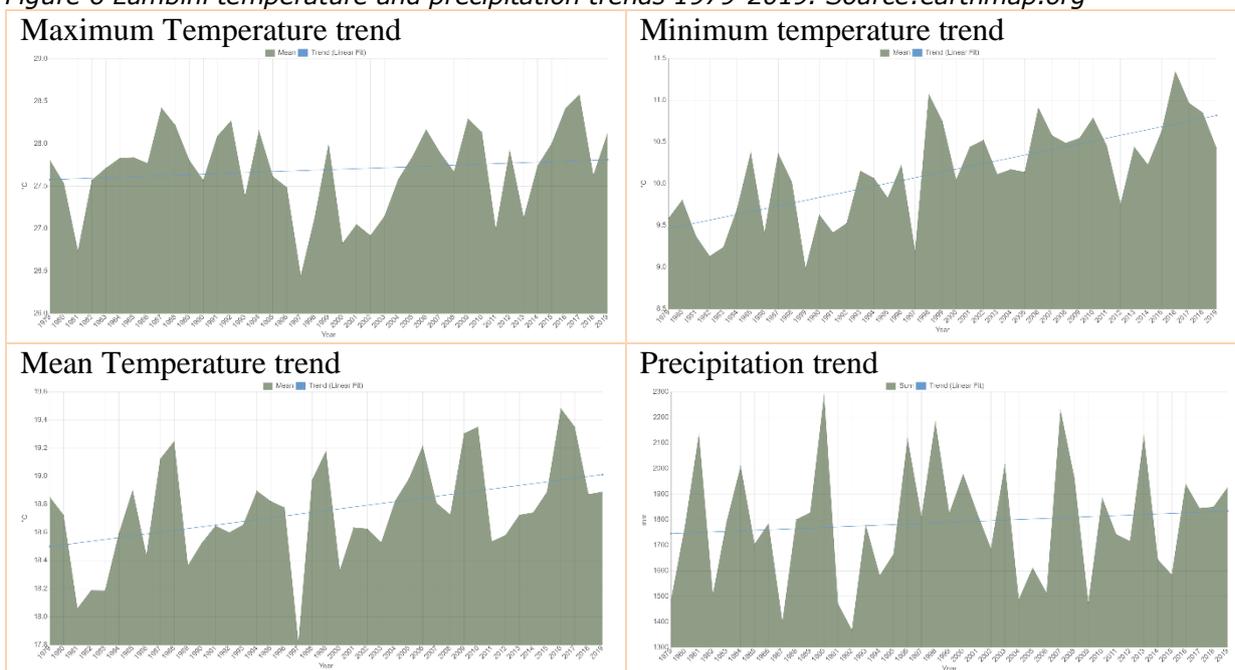
| | |
|--|--|
| (7) Warm nights ²⁴ | Increasing significantly in the majority of the districts |
| (8) Warm spell duration ²⁵ | Increasing in majority of the districts |
| (9) Cool days ²⁶ | Decreasing in majority of the districts |
| (10) Cool nights ²⁷ | Increasing in the northwestern significantly & decreasing in the southeast significantly |
| (11) Cold spell duration ²⁸ | Increasing significantly only in the Far-Western districts and trends are insignificant in other districts |

2.1.3 Climate baseline and observed trends in R-HVAP provinces

2.1.3a Lumbini Province

26. The climate in Lumbini Province is diverse, ranging from the plains of Kapilvastu to the high mountains of Rukum East. The highest recorded maximum temperature was in the Rolpa district (30.8°C) while the lowest was in the Dang district (3.4°C) between 1971 and 2014. Additionally, the district of Nawalparasi West received the highest annual precipitation amount (1953 mm), whereas Banke district received the lowest annual precipitation amount (1211 mm).

Figure 6 Lumbini temperature and precipitation trends 1979-2019. Source:earthmap.org



2.1.3b Karnali Province

27. Karnali Province experiences diverse climatic conditions due to its geographical location, which spans from the plains of Surkhet in the South to the frigid Himalayan peaks in the North. The Dolpa district holds the record for the lowest maximum temperature of -3.3°C, based on data collected from 1971 to 2014. Surkhet district receives the highest annual precipitation of 1392 mm, while Dolpa district has the lowest annual precipitation of 487 mm.

Figure 7 Karnali temperature and precipitation trends 1979-2019. Source:earthmap.org

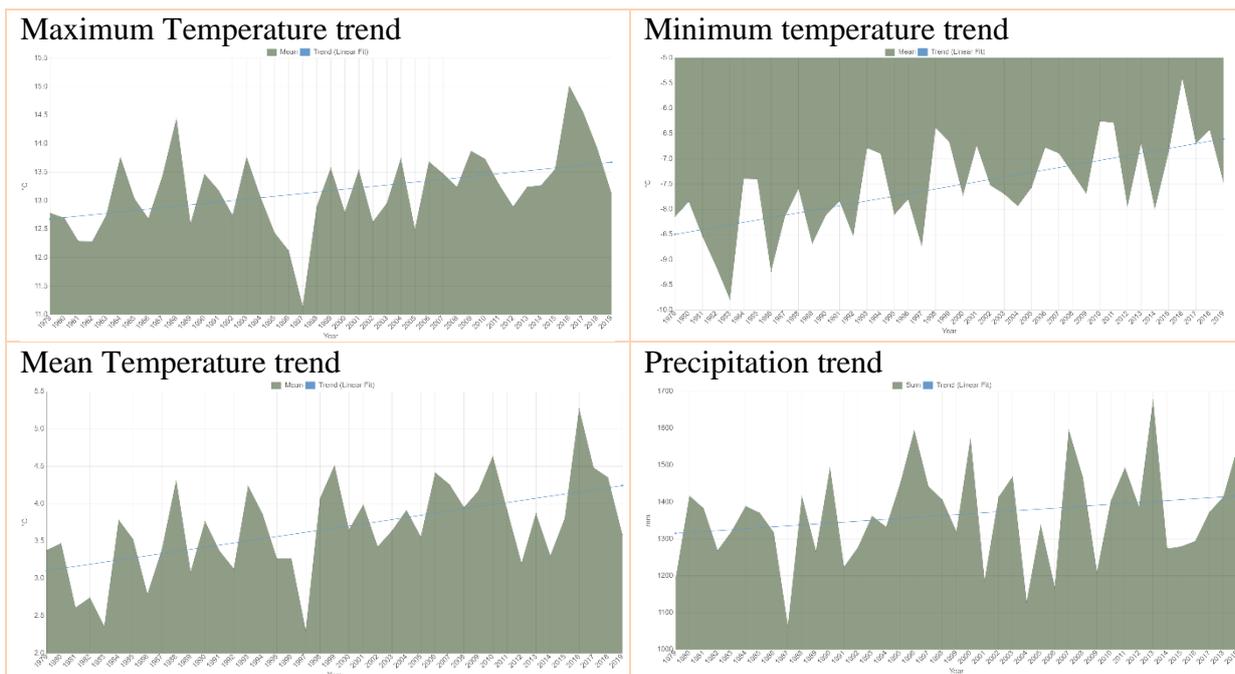
²⁴ Percentage of days when minimum temperature >90th percentile

²⁵ Annual count of days with at least 6 consecutive days when maximum temperature > 90th percentile

²⁶ Percentage of days when maximum temperature <10th percentile

²⁷ Percentage of days when minimum temperature <10th percentile

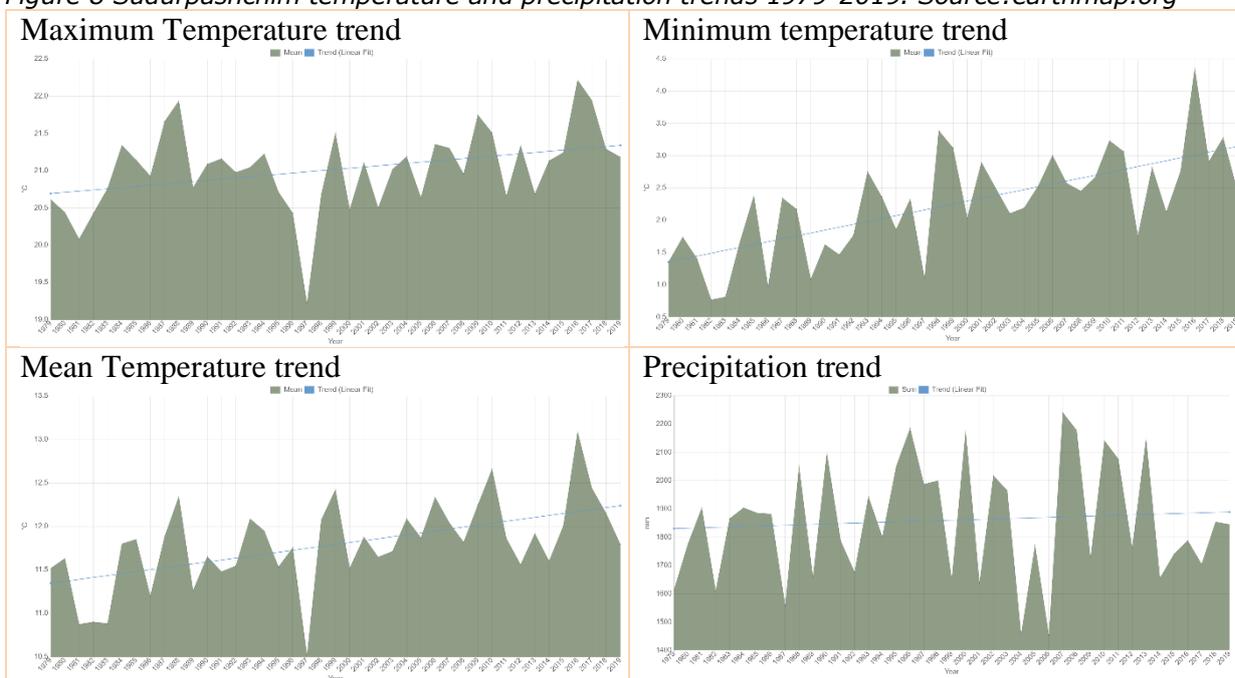
²⁸ Annual count of days with at least 6 consecutive days when minimum temperature < 10th percentile



2.1.3c Sudurpashchim Province

28. Sudurpashchim Province has a varied climate due to its geographical location, with the plains of Kailali and Kanchanpur in the south and the high hills of Bajhang and Bajura in the north. Kailali district received the highest amount of annual precipitation (1719 mm), while Bajura district received the lowest (1024 mm).

Figure 8 Sudurpashchim temperature and precipitation trends 1979-2019. Source:earthmap.org

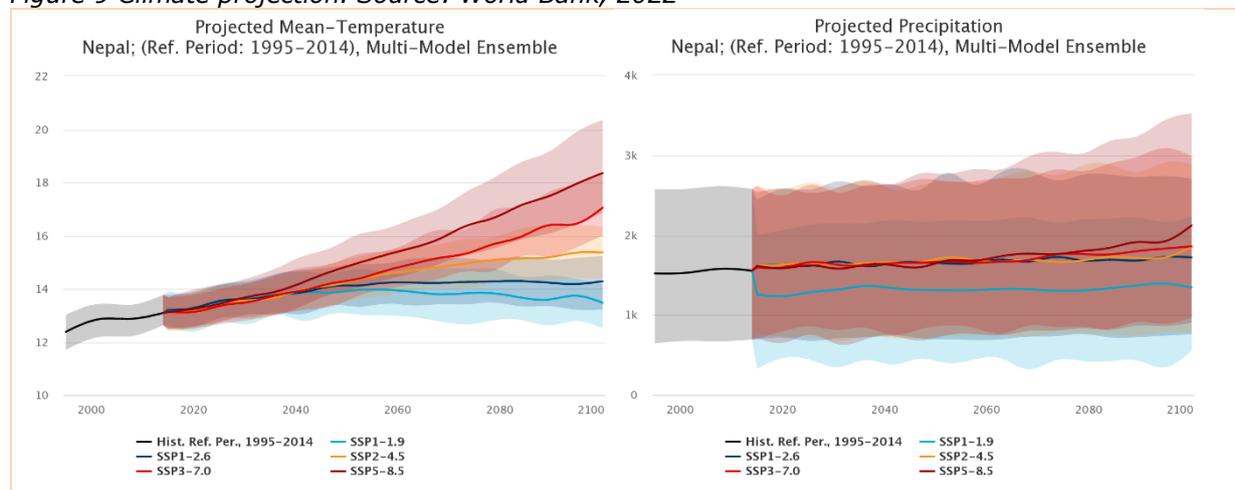


2.2 Climate Projections (Future)

29. Climate model projections for Nepal show that there will be a rise in the average annual temperature over Nepal and that it will vary both spatially and temporally. In the OECD study, General Circulation Models (GCM) run with the SRES B2 scenario show an annual mean temperature increase by an average of 1.2°C by 2030, 1.7°C by 2050 and 3°C by 2100 compared to pre-2000 baseline. In general, several studies show higher

temperature increment projections for winter as compared to the monsoon season. In terms of spatial distribution, a higher temperature increment over western and central Nepal is projected as compared to eastern Nepal. While the impact of climate change on glaciers is harder to project and subject to debate, glacier retreat occurs with increase in temperature and some studies project a 20% loss in glacial mass with 1°C increase in temperature and an elimination of small glaciers (NAP 2021-2050).

Figure 9 Climate projection. Source: World Bank, 2022



30. For precipitation, the trends are less certain, but there is evidence of the increasing occurrence of intense rainfall events and an increase in flood days and generally more variable river flows. The summer monsoon is likely to become more intense with the increasing occurrence of heavy rainfall events; winters are projected to be drier.

31. During the summer months, the projections show an increase in precipitation for the whole country in the range of 15–20%. In terms of spatial distribution, studies show an increase in monsoon rainfall in Eastern and Central Nepal as compared to Western Nepal. In terms of an increasing number of extreme rainfall events, events that now occur every 5 years are projected to occur every 2 years. In terms of winter precipitation, the models project almost no change in Western Nepal and up to a 5–10% increase in precipitation in Eastern Nepal. Table 6 below gives the climate scenarios as per physiographic regions:

Figure 10 Climate projection by regions. Source: Ministry of Forests and Environment, 2019

| Time Period | RCP 4.5 | | | RCP 8.5 | | |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 2016-2045 | 2036-2065 | 2071-2100 | 2016-2045 | 2036-2065 | 2071-2100 |
| Change in precipitation (%) | | | | | | |
| High Mountain | 2.6 | 9.5 | 12.6 | 8.0 | 14.4 | 25.1 |
| Middle Mountain | 1.7 | 7.6 | 10.3 | 6.3 | 12.4 | 21.7 |
| Hill | 2.1 | 7.2 | 9.9 | 5.8 | 11.2 | 22.6 |
| Siwalik | 1.6 | 7.4 | 9.9 | 5.8 | 11.1 | 21.9 |
| Terai | 2.1 | 7.3 | 10.2 | 5.4 | 10.6 | 22.7 |
| Change in temperature (°C) | | | | | | |
| High Mountain | 0.95 | 1.36 | 1.79 | 1.09 | 1.86 | 3.61 |
| Middle Mountain | 0.89 | 1.27 | 1.66 | 1.04 | 1.76 | 3.44 |
| Hill | 0.9 | 1.26 | 1.69 | 1.06 | 1.8 | 3.56 |
| Siwalik | 0.94 | 1.29 | 1.72 | 1.1 | 1.87 | 3.66 |
| Terai | 0.93 | 1.29 | 1.73 | 1.11 | 1.87 | 3.69 |

Table 6 Projected range of mean change in precipitation (%) for different seasons compared to the reference period 1981-2010. Source: MoFE, 2019.

| Seasons | Medium-term 2016-2045 | | Long-term 2036-2065 | | End of the century 2071-2100 | |
|---------|-----------------------|---------|---------------------|---------|------------------------------|---------|
| | RCP 4.5 | RCP 8.5 | RCP 4.5 | RCP 8.5 | RCP 4.5 | RCP 8.5 |
| Annual | 2.1 | 6.4 | 7.9 | 12.1 | 10.7 | 23.0 |

| | | | | | | |
|--------------|------|------|------|------|------|------|
| Winter | -5.8 | 7.2 | 13.6 | 5.0 | 24.4 | 20.9 |
| Pre-monsoon | -5.0 | -4.0 | -7.4 | 4.2 | -7.8 | -3.1 |
| Monsoon | 2.7 | 7.8 | 9.4 | 13.6 | 12.4 | 27.1 |
| Post-monsoon | 18.6 | 6.0 | 20.3 | 19.0 | 16.5 | 22.9 |

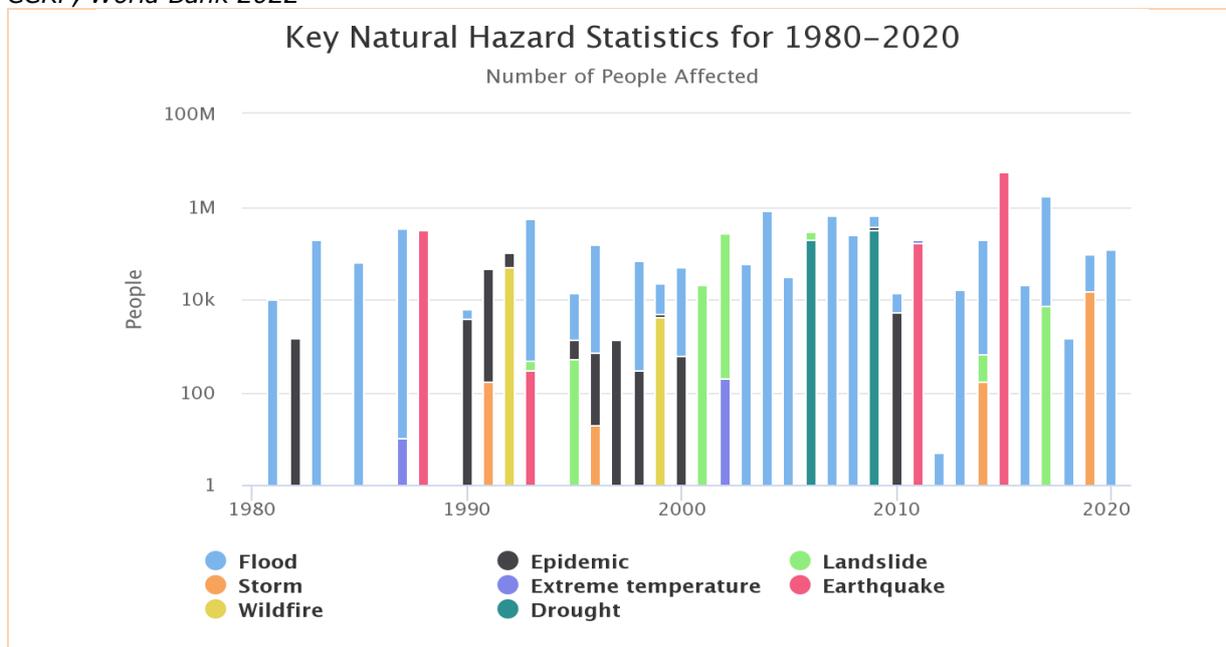
2.3 Climate hazards

32. Nepal already experiences a range of climate hazards: floods, landslides and droughts are considered the principal hazards. More than 80% of property loss due to disasters is attributable to climate hazards, particularly water-related events such as floods, landslides, and glacial lake outburst floods (GLOFs). Water-related disasters claim more than 300 lives a year, displace people, and destroy homes, farmland, and other essential infrastructure. Extreme rainfall in 2020 caused 445 flooding and landslide incidents that claimed about 430 lives and displaced more than 5,000 people (National Adaptation Plan, 2022).

33. As temperatures rise in Nepal, acute climate hazards such as extreme weather events (including heavy rainfall, snowstorms, high winds, hailstorms, and increased lightning), heat waves, cold waves, floods, landslides, and wildfires are expected to increase in frequency and severity; and chronic or slow onset hazards such as drought, changes in precipitation patterns, snow cover changes, glacier retreat, and GLOFs, are expected to intensify. Multiple events may occur simultaneously across regions, which could be catastrophic (National Adaptation Plan, 2022).

34. The Climate Change Knowledge Portal of the World Bank indicates that flood is the most frequent climate hazard and affects the largest number of people, among all other hazards from 1980 to 2020. Also, according to the ThinkHazard tool, the hazard level in Nepal for urban floods, landslides, water scarcity, extreme heat and wildfire is high, and for river floods and earthquake is medium.

Figure 11 Occurrence of the key natural hazards and number of people affected 1980-2020. Source: CCKP, World Bank 2022



2.3.1 Climate hazards R-HVAP provinces

2.3.1a Lumbini Province

35. Lumbini faces several climatic risks, including heatwave, forest fire, flood and landslides. Rolpa and Pyuthan districts are very highly vulnerable to climate change, and Argakhachi, Eastern Rukum, Gulmi, and Palpa are highly vulnerable.

Table 7 Lumbini climate risks and vulnerability²⁹

| Lumbini Province Districts | Flood Hazard | Landslide | Heatwave | Cold wave | Snowstorm | Thunderbolts | Windstorm | Hailstorm | Drought | Fire | Forest Fire | Climate induced disaster | Exposure | Sensitivity | Adaptive Capacity | Vulnerability | Overall baseline climate risk |
|----------------------------|--------------|-----------|----------|-----------|-----------|--------------|-----------|-----------|---------|-------|-------------|--------------------------|----------|-------------|-------------------|---------------|-------------------------------|
| Arghakhanchi | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green | Orange | Green |
| Banke | Green | Green | Red | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green |
| Bardiya | Orange | Green | Orange | Green | Green | Green | Orange | Green | Green | Green | Red | Green | Green | Green | Green | Green | Green |
| Dang | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green | Orange | Orange | Orange | Green | Orange | Green | Orange |
| Eastern Rukum | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green |
| Gulmi | Green | Orange | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Red | Green | Orange | Green |
| Kapilvastu | Green | Green | Orange | Green | Green | Green | Green | Green | Green | Green | Green | Green | Red | Green | Orange | Green | Green |
| Palpa | Green | Orange | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green | Orange | Green |
| Parasi | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green |
| Pyuthan | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Red | Green | Red | Orange |
| Rolpa | Green | Orange | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green | Red | Green |
| Rupandehi | Green | Green | Orange | Green | Green | Green | Green | Green | Green | Green | Green | Green | Red | Green | Green | Green | Green |
| Very High | Red | High | Orange | Moderate | Green | Low | Green | Very Low | Green | | | | | | | | |

2.3.1b Karnali Province

36. Karnali is the most vulnerable province to climate change. Landslides and droughts are the key climate hazards for many districts. Out of the 10 districts, 8 are very highly vulnerable and other two districts are highly vulnerable.

Table 8 Karnali climate risks and vulnerability, MOFE 2021

| Karnali Province Districts | Flood Hazard | Landslide | Heatwave | Cold wave | Snowstorm | Thunderbolts | Windstorm | Hailstorm | Drought | Fire | Forest Fire | Climate induced disaster | Exposure | Sensitivity | Adaptive Capacity | Vulnerability | Overall baseline climate risk |
|----------------------------|--------------|-----------|----------|-----------|-----------|--------------|-----------|-----------|---------|-------|-------------|--------------------------|----------|-------------|-------------------|---------------|-------------------------------|
| Dailekh | Green | Orange | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green | Red | Green |
| Dolpa | Green | Orange | Green | Green | Green | Green | Green | Green | Red | Green | Green | Green | Green | Green | Green | Red | Green |
| Humla | Green | Green | Green | Green | Orange | Green | Green | Green | Red | Green | Green | Green | Green | Red | Green | Red | Green |
| Jajarkot | Green | Orange | Green | Green | Green | Green | Green | Green | Orange | Green | Green | Green | Green | Orange | Green | Red | Green |
| Jumla | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green | Red | Green |
| Kalikot | Green | Orange | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green | Red | Green |
| Mugu | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green | Green | Green | Green | Green | Green | Red | Green |
| Salyan | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Red | Green |
| Surkhet | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green | Orange | Green | Green | Green | Green | Orange | Green |
| Western Rukum | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Green | Orange | Green |
| Very High | Red | High | Orange | Moderate | Green | Low | Green | Very Low | Green | | | | | | | | |

2.3.1c Sudurpashchim Province

37. Among the nine Sudurpashchim districts, seven are highly to very highly vulnerable to climate change. Landslides, drought, and forest fires are the key climate risks.

²⁹ Vulnerability information are taken from Vulnerability and Risk Assessment published by Ministry of Forests and Environment (2021), Government of Nepal

Table 9 Sudurpashchim climate risks and vulnerability, MOFE 2021

| Sudurpashchim Province Districts | Flood Hazard | Landslide | Heatwave | Cold wave | Snowstorm | Thunderbolts | Windstorm | Hailstorm | Drought | Fire | Forest Fire | Climate induced disaster | Exposure | Sensitivity | Adaptive Capacity | Vulnerability | Overall baseline climate risk |
|----------------------------------|--------------|-------------|-------------|-------------|-----------|--------------|-----------|-------------|-------------|-------------|-------------|--------------------------|-------------|-------------|-------------------|---------------|-------------------------------|
| Achham | Green | Light Blue | Green | Light Green | Green | Green | Red | Light Green | Light Blue | Green | Light Green | Light Green | Light Green | Light Green | Light Green | Orange | Light Green |
| Baitadi | Green | Light Blue | Green | Light Green | Green | Green | Green | Light Green | Light Green | Green | Light Green | Light Green | Light Green | Orange | Light Green | Red | Light Green |
| Bajhang | Green | Orange | Green | Light Green | Green | Green | Green | Light Green | Orange | Green | Light Green | Light Green | Light Green | Red | Light Green | Red | Light Green |
| Bajura | Green | Orange | Green | Light Green | Green | Green | Green | Light Green | Light Green | Green | Light Green | Light Green | Light Green | Red | Light Green | Red | Light Green |
| Dadeldhura | Green | Light Green | Green | Light Green | Green | Green | Green | Light Green | Light Green | Green | Light Green | Light Green | Light Green | Light Green | Light Green | Orange | Light Green |
| Darchula | Green | Orange | Green | Light Green | Green | Green | Green | Light Green | Light Green | Green | Light Green | Light Green | Light Green | Orange | Light Green | Red | Light Green |
| Doti | Green | Light Green | Green | Light Green | Green | Green | Green | Light Green | Light Green | Green | Light Green | Red | Light Green | Light Green | Light Green | Orange | Light Green |
| Kailali | Red | Light Green | Light Blue | Light Green | Green | Light Blue | Orange | Light Green | Orange | Light Green | Orange | Red | Red | Orange | Orange | Light Blue | Red |
| Kanchanpur | Light Blue | Green | Light Green | Light Green | Green | Green | Green | Light Green | Light Green | Light Green | Orange | Light Green | Light Blue | Light Green | Orange | Light Green | Light Green |
| Very High | Red | Orange | High | Orange | Moderate | Light Blue | Low | Light Green | Very Low | Light Green | Light Green | Light Green | Light Green | Light Green | Light Green | Light Green | Light Green |

Figure 12 Summary of climate hazards and vulnerability drivers in Nepal. Source: Source, National Adaptation Plan, MoFE 2022

| CLIMATE HAZARDS | KEY FACTORS OF VULNERABILITY |
|--|--|
| <p>Acute Increased frequency and severity of:</p> <ul style="list-style-type: none"> • Extreme weather events • Heat waves • Floods • Landslides • Avalanches • Forest fires <p>Chronic / Slow onset</p> <ul style="list-style-type: none"> • Drought • Changes in precipitation pattern • Snow cover changes • Glacier retreat • GLOFs | <ul style="list-style-type: none"> • 28.6% of the population is multidimensional poor; 18.7% live in absolute poverty • Significant disparities between rural and urban areas • Significant disparities along lines of caste and ethnicity • Low levels of gender equality • Reliance on ecosystem services for subsistence livelihoods • Largely natural resource-dependant agrarian economy • High reliance on natural rainfall and insufficient irrigation systems • Small, fragmented landholdings in rural areas • Poor urban and land use planning – rapid and haphazard urbanization • Large number of informal settlements due to rural-urban migration • Poor health infrastructure • Inadequate access to improved technologies • Inadequate evidence and knowledge base • Illiteracy (in 2018, 32% of the population was not literate) • Inadequate, but improving, governance structures • High dependence on international finance to address adaptation priorities <p>Particularly vulnerable regions</p> <ul style="list-style-type: none"> • High mountain landscapes and ecosystems <p>Particularly vulnerable groups</p> <ul style="list-style-type: none"> • Women, indigenous people, Madheshi, Tharu, Muslim, oppressed groups, backward class, minorities, landless, marginalized farmers, labourers, youth, children, senior citizens, persons with all forms of disability, pregnant women, incapacitated and disadvantaged persons or groups • People in remote communities with small landholdings and/or livelihoods dependent on natural resources • Communities in the mid and far western hills and mountain communities that have attracted the least climate investment and experience the highest levels of poverty |

2.4 Assessment of sub-sector impacts and vulnerability³⁰

38. Nepal is among the most vulnerable countries to climate change. It is at high-risk due to the country's fragile topography, degradation of natural resources, the climate-sensitive and ecosystem-dependent livelihoods of the people, and their limited adaptive capacity.

2.4.a. Agriculture and Livestock

39. Nepal's agriculture sector is highly susceptible to temperature and precipitation changes, extreme weather events (landslides, floods, droughts), and loss of biodiversity or degradation in ecosystem services exacerbated by climate change. The analysis of existing literature indicates that climate change has resulted in a variety of consequences for the agriculture sector and the communities that rely on it. The current economic cost of climate variability in the agricultural sector is equivalent to 1.5% to 2% of Nepal's GDP, and the projected 2-4% annual drop in GDP by 2030 would require USD 2.4 billion for adaptation. Nearly 90% of crop losses in Nepal are attributed to meteorological events, increased temperatures, and associated hazards such as erratic rainfall, droughts, and floods. The negative impacts of climate change also extend to livestock and fisheries, with overall production losses ranging from 10% to 30%. Among these hazards, droughts are the most significant and account for almost 40% of all weather and climate-related losses between 1971 and 2007. Floods rank second and causes recurrent damage in the form of crop loss, land erosion, and loss of livestock. Additionally, insect and disease pests, hailstorms, cold waves, and heat waves also have negative effects on crop yield.

40. The increase in temperature has harmful effects on animals, negatively impacting their weight gain, fertility, feed intake, and conversion efficiency. This also leads to heat stress, morbidity, vector-borne and parasitic diseases, new skin diseases, and ectoparasite infestation. Climate change also causes water loss in ponds and reservoirs, reducing pasture productivity and affecting the fisheries sector.

41. The impacts of climate change extend beyond the economic realm, causing social and cultural implications such as job loss, distress or voluntary migration, changes in gender roles, food insecurity, and poverty. Marginalized communities, including women, Dalits, Janajatis, smallholder farmers, and farmers who rely on rainfed agriculture, are the most vulnerable to and disproportionately by climate change.

Lumbini Province³¹

42. Lumbini Province, situated in the western part of Nepal, shares borders with Karnali Province to the north, Sudurpashchim Province to the west, and the state of Uttar Pradesh in India to the south. It covers an area of 19,698 square kilometres, which makes up approximately 13.3% of Nepal's total area. It comprises 12 districts, four sub-metropolitan cities, 32 municipalities, and 73 rural municipalities with a combined land area of 1,969,776 hectares. Of this total area, 35.40% is cultivable land, which amounts to 697,331 hectares. Currently, 77% of the cultivable land (539,443 ha) is being utilized for cultivation, while 157,888 hectares are left fallow. The province is self-sufficient in terms of agriculture and livestock production to feed its population.

Karnali Province

43. Karnali Province is the most remote and least developed province in the country. It comprises ten districts, including Surkhet, Dailekh, Jajarkot, Humla, Jumla, Mugu, Dolpa, Kalikot, Rukum West, and Salyan, which are further divided into 25 municipalities and 54 rural municipalities. Despite occupying a significant portion of the country's land area, Karnali Province contributes only 4% to Nepal's Gross Domestic Product (GDP). Moreover, the province faces a shortage of food due to its inadequate agriculture production and

³⁰ Reference: Vulnerability and Risk Assessment thematic reports, MoFE 2021

³¹ Provincial general description for all three provinces were taken from LiBIRD's provincial climate investment plans for agricultural sectors. Link: <https://libird.org/publications/>

heavily depends on other provinces for cereals, pulses, fruits, vegetables, and livestock products (excluding milk and eggs). Out of the province's total land area, which is approximately 2,99,339 hectares, 11.85% is cultivable land. Among the cultivable land, 2,16,880 hectares are currently under cultivation, and 82,495 hectares remain unused or fallow, making up around 27.54% of the province's total cultivable land.

Sudurpashchim Province

44. Sudurpashchim Province is located in the far-western region of Nepal, and the majority of its area consists of hills and high hills (75.14%). The province is comprised of nine districts, one sub-metropolitan city (Dhangadi), 33 municipalities, and 54 rural municipalities. Sudurpashchim Province contributes around 7% to the country's GDP. However, it is food-deficient when it comes to agricultural production and depends on other provinces to meet its demands for cereals, pulses, fruits, vegetables, and livestock products. Out of the total area of the province, only 18.39% of the land is cultivable, with around 13.2% of the cultivable land being fallow (51,270 ha), posing a significant challenge for the province's food production and ensuring food security.

45. The table below presents the current major cropping patterns and potential practices as per the agroecological regions.

Table 11 Agroecological regions and crop and livestock production³²

| Eco-region | Land use | Major cropping pattern and suitable | Suitable and potential practices |
|------------------|-------------------|--|--|
| Terai | Irrigated lowland | Paddy-wheat/potato/legumes/oilseed s-maize/vegetables/paddy | Commercial vegetable farming (fresh-road corridor; seed: distant areas); commercial potato, wheat, maize, rice production; Intercropping (Wheat/legumes); Legumes (lentils, kidney bean, mustard...); Fishery, Goat, Poultry, and dairy value chain; Bee Keeping |
| | Rainfed lowland | Paddy-wheat/mustard/legumes-fallow | Commercial wheat, legumes; agroforestry including livestock (goat, dairy); Bee Keeping |
| | Upland | Maize-mustard | Agroforestry; NTFPs; Rice (Ghaiya: Upland rice/spring rice/chaite dhan); Goat; Dairy; Bee keeping |
| Hills | Irrigated lowland | Paddy-wheat/potato/legumes-maize/vegetables/paddy | Vegetable farming; Agroforestry; Goat, Backyard poultry, and dairy value chain; native crops (millet, proso millet, buckwheat), Beans, Amaranth (grains and leafy vegetable); Bee keeping; Home garden |
| | Upland | Maize+millet/paddy/legumes-black gram/vegetables/legumes/potato-fallow | Vegetable farming; Goat, Poultry, and dairy value chain; local and native crops: millet, proso millet, buckwheat, Beans, Amaranth-grains and leafy vegetable etc; Bee keeping; Home gardens |
| Mountains | Irrigated lowland | Paddy-barley/beans-fallow | local and native crops; home garden, Bee keeping; Agroforestry; Seed production; Inter cropping; Mix farming |
| | Upland rainfed | Maize-vegetable/wheat/potato-fallow | Pasture and forage; local and native crops; Livestock (meat: yak, sheep) |

2.4.b. Infrastructure

46. Infrastructure, in particular rural infrastructure (markets, access tracks, roads, agro-processing facilities, etc.), will also face significant challenges in terms of their functioning and sustainability from climate impacts (Nepal Sustainable Transport Strategy (NSTS) 2015). There may be direct impacts that damage the physical integrity of structures owing to high temperature, heavy rainfall, floods, and landslides; indirect impacts may stem from increased electricity demand during heatwaves or storms/lighting that cause power outages, reduced availability of water due to droughts, disruptions in transport of inputs and commodities due to floods/landslides, fall in human productivity due to heat stress, etc.

³² MOAC (2011) agricultural atlas with updates from stakeholder and experts consultation

47. While Nepal's geography makes it more susceptible to natural disasters, a major challenge is also the poor state of existing infrastructure and/or inadequate attention to potential climate risks during construction of roads and other infrastructure. For instance, the current practice of constructing poorly designed roads and usage of excavators has led to increased vulnerability to landslides in many areas. The common practice of cutting and throwing away earth has altered the landscape and caused negative impacts on drainage, slope stability, erosion, and the supply of sediment downstream of many rivers.

2.4.c. Water resources

48. Nepal is a country that is rich in terms of water availability, with a water flow of 225 billion cubic meters. The country is home to over 6,000 rivers and rivulets that originate from both rain and snow – fed by glaciers. These water sources have a total drainage area of 194,471 square kilometres, with 45.7% of it located within Nepal, and can be used for generating hydroelectric power, irrigation, and domestic and industrial use. Nepal has a variety of water sources such as rivers, rivulets, brooks, streams, waterfalls, lakes, and small springs that are distributed throughout the country. From an economic perspective, rivers are the most important water resource for Nepal. Nepal is estimated to have 2.27% of the world's total freshwater resources.

49. The impact of climate change on Nepal's water and energy sectors has been observed to be physical and socio-economic. Changes in temperature and precipitation have affected the water recharge, balance, runoff, and the timing of water availability. The snow and glacier melt pattern has also been affected. The result of these changes includes soil erosion, mass-wasting (movement of rock or soil down slopes), sediment deposition, changes in land cover, land use, and soil pattern, which ultimately impact water availability due to water-induced hazards. Extreme events have also caused damage to the water services sector, hydropower plants, and infrastructure, and resulted in the loss of human life and property. The formation of glacial lakes behind moraine dams on loose and unconsolidated material has resulted in unstable lakes, leading to landslides, dammed outburst floods, and GLOFs to downstream communities, causing damage to infrastructure.

50. Currently, the middle mountain area of Nepal is facing significant water stress, and access to water is limited. The scarcity of water has become an increasingly significant obstacle to the livelihoods of locals and efforts to reduce poverty in many villages in the region. A recent study conducted on the springs in the mountain watershed of western Nepal determined that the springs are in a precarious state due to human activities and climate change. According to the study, around 70% of the springs are experiencing a decreasing trend in discharge, and it is crucial to undertake restoration activities promptly. The 2015 earthquake also had a detrimental impact on the groundwater water table in central Nepal Himalaya as many spring sources dried up after the disaster.

51. In general, the contamination of existing surface water due to various activities such as releasing untreated domestic sewage and sludge, excessive use of agricultural chemicals, disposal of solid waste, and illegal extraction of riverbed materials worsens the water stress by reducing freshwater availability. Moreover, with an increase in population, water demand has also risen, while water supply remains unchanged or decreased at the source. Therefore, some economically active households have migrated to areas where there is an adequate water supply.

2.5 Climate Risk Summary

Table 11 Climate risk summary

| STRESSORS/ TRIGGERS | Nature and Intensity | Agriculture | Livestock | Water Resources |
|--|--|--|--|---|
| Rising temperatures | Temperature is projected to increase in all seasons | <p>Reduced soil moisture and increased surface runoff</p> <p>Irregular phenological development of crops</p> <p>Decreased yield of rain fed crops and crop failure</p> <p>Increase frequency and incidence of pest and diseases</p> <p>Increase in temperature or humidity might damage saplings or harvested produce</p> | <p>Increased rate of development of parasites and pathogens</p> <p>Negatively affects weight gain, reproduction, breeding pattern, feed intake, and conversion efficiency of animals</p> <p>Increases heat stress, morbidity, vector-borne diseases (such as ticks and flies), parasitic diseases (such as liver fluke and nematodes), new skin diseases, and ectoparasite infestation</p> | Reduced water availability, increased pressure on water resulting water source drying |
| Increased variability of rainfall | <p>Increase in nature (intense rainfall for short time, and unpredictable) and frequency.</p> <p>Unseasonal rainfall</p> | <p>Changes to rainfall onset and withdrawal can disrupt growing season.</p> <p>Adverse impact on production (quantity) and quality. Largely impacts rainfed agriculture</p> <p>Increased production cost due to water supply management</p> <p>Adverse impact on post-harvest activities such as drying, threshing</p> | Impact on fodder / feed quality and quantity | Water recharge disrupted due to water runoff or soil erosion due to extreme rainfall events |
| Longer and more intense dry spells. | Increasing in frequency and intensity across the country | Reduced production and quality | Increased rate of livestock loss due to heat and water stress impacting fodder and pastureland quality | Reduced runoff and stream flows |
| Increased frequency of droughts. | Increasing | <p>Increased incidence of pests, diseases</p> <p>Increased input costs especially for water, fertilizers and pesticides</p> <p>Drying up of water sources; crops dying off</p> <p>Increased weed infestation</p> <p>Early maturity leading to poor grain formation</p> <p>Evaporation and evapotranspiration leading to the high amount of water loss</p> <p>Fruit cracking due to heavy rainfall after a long drought</p> | <p>Drying pasture, decreasing grazing potential</p> <p>An increasing number of bugs and mosquitoes affecting livestock</p> <p>New respiratory diseases</p> <p>Drinking water scarcity</p> <p>Low yield of grasslands and fodder</p> | <p>Drying up water resources</p> <p>Over extraction of water</p> <p>Potential impact on soil salinity</p> |

| | | | | |
|------------------------------------|--|---|--|--|
| Flood | Increasing in trend; more high-intensity floods | Submergence of crop land Washing away of crops, lands Waterlogging | Inundation of grazing lands Damage to sheds and housing structures | Damage to water infrastructure Reduced groundwater recharge |
| Hailstorm | Making pockets in certain eco-geography with high intensity and frequency of hailstorm; an untimely occurrence of an event | Crops, vegetables, and fruits are damaged by hailstones thus reducing the yield and quality | Death of livestock when hit by hailstones Damaging sheds Shattering fodder trees and grasses | |
| Cold waves | Increasing in some regions while others are getting better, moving toward low and mid-hills | Winter crops are affected, particularly solanaceous crops such as potato, tomato, chilly due to late blight, aphids and other diseases and insects | Increase livestock mortality due to cold Slow growth of livestock | |
| Pest and Diseases | New insects and diseases are seen triggered by climate change | Changing climate triggers the occurrence, growth, and intensity of insects and diseases Reduced yield of crops due to damages caused by insects and diseases | Increase livestock mortality due to different types of diseases Zoonosis | |
| Changes in snowfall pattern | Change in time, duration, and quantity of snowfall | Depleting ecosystems; altering flowering and fruiting of plants | Dwindling quantity and quality of rangelands impacting fodder productivity for livestock | Reduced runoff and stream flows |

2.5 Adaptive capacity

52. Agriculture is a crucial sector for Nepal's livelihood security and socio-economic development, with a significant proportion of the population deriving income and significant land use. However, the growth and development of the sector are hindered by various socio-economic and political issues, which are further aggravated by climate change. Factors such as subsistence farming practices, small farm sizes, low crop and livestock productivity, and poverty make farming communities highly sensitive to the impacts of climate change. Additionally, farmers' ability to adapt to climate-induced risks is limited due to insufficient skills and knowledge of climate adaptive technologies and practices, and limited access to improved technologies, markets, and finance.

53. In Nepal, women constitute approximately 73% of the agricultural workforce, and the agricultural sector is increasingly becoming feminized due to the outmigration of men. The vulnerability of women to the impacts of climate change is heightened by a combination of factors, including insufficient income, limited ownership of land and property, restricted access to extension services, credit and markets, and a lack of capacity for diversification of livelihoods. Women own or co-own only 10% of the farms in Nepal, and female-headed households are more susceptible to climate-related shocks because they cultivate fewer crop varieties.

54. Climate change has a disproportionate impact on certain groups such as children, women, elderly individuals, and people with disabilities, resulting in increased levels of hunger, illness, and deaths (due to disasters). Indigenous communities like Majhi, Raute, Chepang, and Star are more vulnerable to food insecurity and are at a higher risk of experiencing disasters such as floods, landslides, and fires. The effects of extreme weather conditions, such as heat waves, are felt more acutely by individuals working outside, including those who are poor, women, children, and the elderly. Droughts and floods, which are more frequent due to climate change, can lead to the spread of waterborne illnesses such as typhoid, cholera, and diarrhoea, which disproportionately affect children under the age of 5. Girls and women are more likely to suffer fatalities because of flooding compared to boys and men.

55. Table 7,8, and 9 presents information from Government of Nepal on district level climate adaptation capacity, which is the lowest in Karnali Province, followed by Lumbini and Sudurpashchim.

3. Adaptation assessment

56. Based on the understanding of hazard and vulnerability, adaptation options are identified and evaluated on the basis of their technical feasibility, economic viability, and social acceptability in section 3.1 and 3.2. Technical feasibility evaluates whether proposed engineering/structural and non-engineering/non-structural measures can be implemented with available skills; equipment; and other local factors such as geography, governance, and capacity. The economic analysis involves estimating and comparing the cost and benefits of the project to identify which adaptation option yields the highest net benefit. Social analysis allows stakeholders to weight adaptation options according to social acceptability criteria.

3.1 Identifying adaptation options

57. This section outlines a set of general strategies for adaptation that can provide a framework for generating more specific adaptation options and management actions during implementation based on context-specific assessments (relevance to the impacts, vulnerabilities, or opportunities at hand). The adaptation options are categorized into three interconnected levels: PO and cluster level, Palika level, and federal to national (strategic) level. While some of the options are generic, they will be combined with others in different contexts. Matching the needs of the end farmer at the plot level with the system and national strategies is crucial. Furthermore, system-level adaptation should be responsive to strategic policies at the national level.

58. Communities face significant challenges in adapting to the uncertainty associated with climate variability. Local practices, processes, systems, and infrastructure that have been adjusted to current climate conditions may not be suitable in the near future. Therefore, new adaptation strategies are necessary to address future climatic changes. R-HVAP and its sub-projects must stay up to date with this unpredictability to create appropriate, area-specific, localized coping strategies. The project should ensure that localized climate assessments are developed, or climate-related empirical data is gathered, which can be downscaled to the lowest possible level to inform local action plans.

59. The strategies for adaptation in Table below include the discussion with the farmers and stakeholders in the field, experts' consultation, and the reports like Vulnerability and Risk Assessment, Climate Investment Plan, and National Adaptation Plan.

Step1: Identification of Generic Adaptation Options to Build Resilience for RHVAP.

Table 12 Adaptation options

| Risk | Producer organization and Cluster level | Palika level | Province and federal level |
|--|---|---|---|
| Changing climate conditions and climate variability and seasonality | Promote the adoption of sustainable farming methods such as agroecological farming, bio-pesticides, and bio-manure, Integrated Pest Management, Integrated Nutrient Management | Strengthen the local agriculture groups, social mobilisers and palika human resources and promote climate field school approaches to enhance exchange and knowledge and information among farmers to collectively deal with climate and weather extremities | Support on agroecological training, facilitate to establish commercial bio inputs enterprises, develop and implement agroecological farming policies. Promote the establishment of gene banks, seed banks, nurseries, orchards, research stations, laboratories |
| | Integrated farming, including two or more high value crops and livestock to enhance resilience to climate and economic shocks | Promote diversification of income by adding livestock operations Promote agroforestry and improve agroforestry techniques | Strengthen livestock technical support Facilitate easy access to quality breeds and seeds |
| | Increased inter- and multi-cropping and diversification of varieties or crops to hedge against risk of individual crop failure. | Capacitate extension staff with knowledge on climate change in order to support farmers deal with climate risks Establishment of farmers' support (subsidies, awareness training programs) | Strengthen capacity to generate new forms of empirical knowledge, technologies and agricultural support services that meet emerging climate change and variability challenges. Develop frameworks for sustainable intensification and commercialization of agriculture at different scales across agro-ecological regions. |
| | Introduce stress-tolerant crop varieties (flood-tolerant, drought-tolerant, diseases resistant), agricultural diversification, and shifting agriculture/crop calendar as per the climate changing pattern | Provide technology, inputs (seed, bio-fertilizers) and technical assistance to farmers to increase crop production | Research into seasonal viable production systems for different farmers Develop technology and strategies to promote both indigenous and improved technologies for climate-smart agriculture |
| | Establish a vegetable collection centers and pop-up markets to regulate sales during extreme events | | Establish a cold storage system for storage of farmers products and provide incentives to farmers |
| | Enhance fodder management through plantation and agroforestry practice | Clustering fallow land for the agroforestry and collaborate divisional forest offices for seedling and technical support | Policy on the use of fallow land for agroforestry |
| | Promote post harvesting, processing, packaging, branding and marketing | Encourage agro-enterprises | |
| | Promote non timber forest products including Medicinal and Aromatic Plants | | |

| Risk | Producer organization and Cluster level | Palika level | Province and federal level |
|---|--|---|---|
| | Promote planting of climate-resilient and genetically diverse local crops and varieties, including neglected and underutilized species (NUS) | Promote local breeds, species, improved breeds with desired traits through artificial insemination | Organize capacity developing activities targeting the agriculture sector practitioners, local and provincial governments and cooperatives, and farmers |
| | Consider the effect of new weather patterns on the health and well-being of agricultural workers. | Implementation of climate smart agriculture practices and environmentally sustainable infrastructure (e.g., shade nets) | Expand Agricultural areas to regions with lower climate risk |
| | Identify and target the most vulnerable households, women households, and smallholder farmers in terms of adaptation options. Design specific adaptation packages for these groups to help them to better adopt and cope with climate change impacts | | Introduce and promote improved agriculture land zoning and management practices to address the core issues of fallow land, degradation of agricultural land, land fragmentation, etc. Develop climate change strategy and action plan for the agriculture and food security sector, mostly focused on addressing key climate change impact on crops and livestock sector |
| Increased variability of rainfall and Water Availability | Shifting cropping calendars; when to plant, which varieties to plant and which inputs to use | Improve existing irrigation systems to reduce water losses | Management policy and plan to address the core issues of fallow land |
| | Water recharge pond, conservation pond, small pit around the contour lines | Adopt enhanced water conservation measures (larger storage to cope with drought and water harvesting infrastructure) | |
| | Reduced tillage to lessen water loss, similarly the incorporation of manures and compost, and other land use techniques such as cover cropping increase soil organic matter and hence improve water retention. | Invest and develop an early warning system (better surveillance and information dissemination) | |
| | Introduce micro-irrigation (drip irrigation, sprinkler irrigation) | | |
| | Promote solar-based irrigation system combined with micro-irrigation techniques | | |
| | Promote water tapping and multiple-use water system: grey/wastewater ponds in kitchen gardens, small ponds, maintenance of traditional ponds and water sources, groundwater trenching, rainwater harvest | | |
| | Alter agronomic practices to suit climatic conditions. | | |

| Risk | Producer organization and Cluster level | Palika level | Province and federal level |
|---|--|--|--|
| Increased frequencies and intensity of extreme weather events (extreme heat, droughts, storms, floods, landslides, wildfire events) | Encourage climate smart practices | Agricultural disaster risk reduction and management | Agricultural disaster risk reduction and management. Promote the risk transfer mechanisms guidelines and mechanisms such as crop, livestock, and fisheries insurance covering mostly the marginalized and smallholder farmers |
| | General water conservation measures (described above) | Develop knowledge and decision-support systems including improved monitoring and early warning systems (Climate and weather information advisories) | Strengthen early warning systems on cropping season quality, rangelands conditions, droughts, floods, disease/ pest outbreaks and wildlife movement in order to enhance farmer preparedness. |
| | Ensure the irrigation system for rainfed system, or provide alternative farming options to deal with climate adversities | Invest in small Irrigation system. Promote development of innovations to increase resilience to disasters, engage in the distribution of those innovations, and train farmers to use best agricultural practices. | Strengthen the capacity to identify and promote adoption of indigenous and improved livestock breeds that are tolerant to climate related stresses. |
| | Change farming practice to work with flooding rather than against it e.g. in flood plains for cattle pastures | Strengthen the capacity to reduce risk and improve resilience at the farm level and help farmers adapt to climate change | Strengthen capacity to finance and deliver timely assistance when disasters of medium/low frequency and medium/high severity occur |
| | Use drought resistant varieties. | Support communities affected by disasters through various response and recovery interventions | Develop standards to enable flood proof infrastructure development |
| | Improved drainage, improved soil organic matter content and farm design to avoid soil loss and gullyng. | Promote Innovative risk transfer programs such as agricultural insurance at the group and farmer level are being implemented | Reappraise economic viability of proposed design based on climate projections over lifetime of assets |
| | Provide cooling systems for mid/post-harvest horticulture produce management | | |
| | Pest, weed and diseases, disruption of pollinator ecosystem services | Use expertise in coping with existing pests and diseases, including after harvest. | Invest and develop an early warning system (better surveillance and information dissemination) |
| Maintain healthy soils. | | Develop and implement Integrated Pest Management Plan | Promote agricultural innovation and (phyto)sanitary systems |
| Plant resistant varieties, plant a variety of crops and change crop patterns | | Build on natural regulation and strengthen ecosystem services. | |

| Risk | Producer organization and Cluster level | Palika level | Province and federal level |
|---|---|---|---|
| | Use drip irrigation or flood irrigation to keep plant leaves and stems healthy. | Monitoring and control of crop diseases and pests | |
| Deterioration of soil health and erosion | Reduction of soil erosion, nutrient leaching from soil and minimized wind damage. (Soil erosion control and water holding structures) | Encourage crop diversification | |
| | The use of shade trees and plantation of leguminous varieties for nitrogen fixation | Promote balanced fertilizer application | |
| | Promote use of bio-fertilizer and bio pesticides | | |
| | Promote Conservation Agriculture combined with drip irrigation for vegetable production, linking with markets | | |
| Overall areas | Youth target program to retain them in villages | | |
| | Ease smallholder's access to finance | | |
| | Early Warning and Anticipatory Action / Forecast-based Financing (WFP) | | |
| | | | Support in organizing innovation fairs to document and promote technology and practices, including local knowledge |
| | | | Integrate climate resilience in planning and budgeting process |
| | | | Implement ICT-based agro-advisory services targeting weather-based and impact-based forecasting system |
| | | | Document and promote local knowledge and practices that are successful in helping the farmers cope with and adapt to climate change hazards |
| | Construct farm roads | | |
| | | | Incentivize the private sector for leveraging climate financing and ensure their investment in research and development of adaptation technology and practices; for example, green enterprise promotion |
| | | | Identify and target the most vulnerable households, women households, and smallholder farmers in terms of adaptation options. Design specific adaptation packages for these groups to help them to better adopt and cope with climate change impacts. |
| | | | Promote more effective use of silage urea molasses mineral block, prophylaxis and area-specific mineral block, crop residue treatment, precision feeding, pasture spelling, and rotation |

| Risk | Producer organization and Cluster level | Palika level | Province and federal level |
|------|---|--------------|--|
| | | | Implement ICT-based agro-advisory services targeting weather-based and impact-based forecasting system |

60. R-HVAP aims to promote agroecological production and processing, targeting both domestic and international markets. Based on discussions with stakeholders during the design mission, at present, for the domestic market, the identified target commodities are nutri-cereals, off-season vegetables, fruits, livestock, dairy, poultry, nuts, and mushrooms. Similarly, for the international market, the identified target commodities are organic honey, spices, Medicinal and Aromatic Plants (MAPs), nuts, coffee, vegetables, fruits, and dehydrated mushrooms. Table 13 gives the overview of proposed programme support:

Step 2: Identification of Target Value Chains under RHVAP.

Table 13 Proposed programme support

| | |
|---|---|
| Year-round vegetable production: polytunnels, water-efficient systems, seeds, bio-fertilisers and IPM practices | Self-consumption, commercialisation of surplus in local and regional markets (import substitution) |
| Goat and dairy combined with improved sheds for manure management (compost) and forage/fodder. Native chicken | Main source of income. Commercialisation in local and regional markets (import substitution) |
| Native crops and Neglected and Underutilized species (NUS) such as millet, buckwheat, barley, Karnali beans | Important staple food source. Commercial potential in domestic and export markets |
| Apiculture for commercial honey production with butter (Chiuri) trees (20 hives model), pollination and nutrition (2 hives model) | Multiple benefits: nutrition, income generation, pollination, potential for export |
| Medicinal and Aromatic Plants (MAPS) and Non-Timber Forest Products (NTFPs, such as Indian prickly ash or Timur, soap nuts) | Commercialisation in domestic and export markets |
| Spices (Ginger, turmeric, cardamom) | Proven under-supplied export markets. Shade tolerant species. Potential for homestead production |
| Coffee with shade trees and cover crops understorey | Production of quality certified coffee in Lumbini and Karnali provinces, having export markets |
| Agroforestry systems (apple / walnut / citrus / fodder trees with cover crops) | In conjunction with existing and upcoming orchards (NAFHA project) |
| Potato seeds production | Local inputs supply chain supported by investments in cold storage. Commercialisation on local and regional markets (import substitution) |

61. Due to the unavailability of the targeted commodities mentioned above in the CARD assessment tool, the past production trends and the future projection of those commodities are not presented.

3.2 Assessing and selecting adaptation options

62. Making decisions on adaptation options is a complex process, involving decision makers from multiple sectors and experts from diverse fields who need to contend with high levels of uncertainty. It is critical to choose adaptation options that are both effective at increasing resilience as well as socially, economically and politically viable. A simple qualitative description not based on numerical values but on qualitative descriptions such as low, high, and medium can be used but given the diverse array of potential information

sources and the many stakeholders with different perspectives and priorities, a Multi-criteria analysis (MCA) is necessary to provide a systematic way for decision makers to make sense of the wide range of information that may be relevant to making adaptation choices. MCA enables decision makers to create a structured framework for comparing a set of defined options across several criteria so that they may evaluate adaptation options across a range of priorities or values.

63. A standard feature of MCA is a performance matrix in which each row describes an option and each column describes the performance of each option against each criterion (Table 4). Often the individual performance assessments are numerical in value, with higher scores representing more preferred options. Individual scores can then be combined into a final score for each option based on the weights that have been assigned to each criterion. Such a matrix can be the final product of an MCA analysis.

IFAD Adaptation Options Prioritisation System

64. A database of adaptation options, and system for the assessment and prioritisation of adaptation options have been developed as part of IFAD's Adaptation Framework. The prioritisation comprises two main elements. First, the adaptation options are filtered based on project sector, and the climate risks identified during the climate screening process. A MCA is then carried out on the shortlist of adaptation options to assist in choosing measures to integrate into the project using the following criteria:

1. Technical feasibility
2. Cost-benefit ratio
3. How well the option addresses risks in the project context
4. Complementarity to other IFAD themes
5. Flexibility (i.e. avoids lock-in)
6. Mitigation co-benefits
7. Transformative potential
8. Accessibility for small-holder farmers

65. The Adaptation Options System uses a simple scoring system based on the eight criteria above. The first four criteria require a minimum score of 2; options which score lower than 2 on any of these criteria do not meet the minimum requirements and are not deemed to be suitable. Adaptation options which are scored the highest are most suitable for a project. The results are shown in Table 15.

Table 13 Adaptation scoring criteria

| No. | Theme | Scoring Criteria | | |
|-----|------------------------------|--|---|--|
| | | 1 | 2 | 3 |
| 1 | Technical Feasibility | No experience in implementing solution | Consultants available with suitable skills | Previous IFAD experience with solution |
| 2 | Addresses Climate Risk | Adaptation option is not relevant or may not be effective for the risks identified | Adaptation option effectively addresses at least one of the identified risks | Adaptation option is relevant for all of the major climate risks identified |
| 3 | Accessibility for farmers | Adaptation option is inaccessible for the main project beneficiaries (e.g. unaffordable, requiring regular complex maintenance), or exacerbates existing inequalities. | Adaptation option is accessible for the majority of the project's target beneficiaries. | Adaptation option is accessible to project beneficiaries and specifically benefits women or other marginalised groups. |
| 4 | Flexibility (avoids lock-in) | The adaptation option has a long lifetime (>10 years) and its design does not allow for any adjustment. | The adaptation option being considered has a short lifetime (less than 10 years) | The adaptation option is low or no regrets or is part of an adaptive management approach. |
| 5 | Mitigation Co-benefits | No mitigation co-benefits or adaptation significantly increases greenhouse gas emissions. | Adaptation option leads to emissions reductions, either at present or in the future. | Adaptation option involves reforestation, restoration of carbon sinks, or the substitution of fossil fuels for renewable energy sources. |
| 6 | Transformative potential | Adaptation option is limited to small increases in the resilience of target group, but does not involve changes in wider systems. | Adaptation option operates at scale or enables wider implementation of the option, for | Adaptation option enables change in the system in question which significantly increases opportunities |

| | | | | |
|---|--------------------------------|--------------------|---|---|
| | | | instance with a declining marginal cost | for target beneficiaries to adapt to climate change. |
| 7 | Complementarity to IFAD themes | No complementarity | Complements at least one other cross-cutting theme that is directly relevant to adaptation outcomes | Complements more than one other cross-cutting theme to support systemic resilience. |

3.3 Prioritizing adaptation options

66. The Adaptation Options System uses a simple scoring system based on above mentioned seven criteria. The first four criteria require a minimum score of 2; options which scored lower than 2 on any of these criteria were deemed unsuitable for RHVAP. Adaptation options which were scored the highest are most suitable for a project. The results from the Adaptation Options carried out are shown in Table 15 below. All the options scored more than average and were deemed suitable to a varying degree. Options with high mitigation co-benefits scored generally high whilst those with lower transformative potential scored overall lower.

Table 14 Adaptation options

| No | Adaptation Option | Technical Feasibility | Addresses Climate Risk | Accessibility for farmers | Flexibility | Co-Mitigation benefits | Transformative potential | Complementarity to IFAD themes | Suitability to RHVAP | Total Score |
|----|---|-----------------------|------------------------|---------------------------|-------------|------------------------|--------------------------|--------------------------------|----------------------|-------------|
| 1 | Promote the adoption of sustainable farming methods such as agroecological farming, bio-pesticides, and bio-manure, Integrated Pest Management, Integrated Nutrient Management | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 2 | Support on agroecological training | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 3 | Integrated farming, including two or more high value crops and livestock, to enhance resilience to climate and economic shocks. Encourage crop diversification | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 4 | Promote agroforestry | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 5 | Increased inter and multi cropping and diversification of varieties or crops to hedge against risk of individual crop failure | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 6 | Capacitate extension staff with knowledge on climate change in order to support farmers deal with climate risks | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 7 | Promote planting of climate-resilient and genetically diverse local crops and varieties, including neglected and underutilized species (NUS) | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 8 | Improve existing irrigation systems to reduce water losses | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 9 | Promote organic certification with a view to increase marketability of products to domestic and export markets | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 10 | Reduced tillage to lessen water loss, similarly the incorporation of manures and compost, and other land use techniques such as cover cropping increase soil organic matter and hence improve water retention. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 11 | Build on natural regulation and strengthen ecosystem services | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 12 | Promote chemical inputs phasing out; Promote use of bio-fertilizer and bio pesticides | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 |
| 13 | Facilitate the establishment of commercial bio-inputs enterprises | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 23 |
| 14 | Introduce stress-tolerant crop varieties (flood-tolerant, drought-tolerant, diseases resistant), agricultural diversification, and shifting agriculture/crop calendar as per the climate changing pattern. Shifting cropping calendars; when to plant, which varieties to plant and which inputs to use | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 23 |

| No | Adaptation Option | Technical Feasibility | Addresses Climate Risk | Accessibility for farmers | Flexibility | Co-Mitigation benefits | Transformative potential | Complementarity to IFAD themes | Suitability to RHVAP | Total Score |
|----|--|-----------------------|------------------------|---------------------------|-------------|------------------------|--------------------------|--------------------------------|----------------------|-------------|
| 15 | Research into seasonal viable production systems for different farmers | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 23 |
| 16 | Implementation of climate smart agriculture practices and environmentally sustainable infrastructure (e.g., shade nets) | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 23 |
| 17 | Promote micro-irrigation (drip irrigation, sprinkler irrigation) | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 23 |
| 18 | Water recharge pond, conservation pond, small pit around the contour lines. Promote water tapping and multiple-use water system: grey/wastewater ponds in kitchen gardens, plastic ponds, maintenance of traditional ponds and water sources, groundwater trenching, rainwater harvest | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 23 |
| 19 | Develop and implement Integrated Pest Management Plan | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 23 |
| 20 | Strengthen livestock technical support | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 22 |
| 21 | Facilitate on easy access to quality breed and seeds | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 22 |
| 22 | Develop frameworks for sustainable intensification and commercialization of agriculture at different scales across agro-ecological regions. | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 22 |
| 23 | Organize capacity developing activities targeting the agriculture sector practitioners, local and provincial governments and cooperatives, and farmers | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 22 |
| 24 | Identify and target the most vulnerable households, women households, and smallholder farmers in terms of adaptation options. Design specific adaptation packages for these groups to help them to better adopt and cope with climate change impacts | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 22 |
| 25 | Introduce and promote improved agriculture land zoning and management practices to address the core issues of fallow land, degradation of agricultural land, land fragmentation, etc. | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 22 |
| 26 | Reduction of soil erosion, nutrient leaching from soil and minimized wind damage. (Soil erosion control and water holding structures). Improved drainage, improved soil organic matter content and farm design to avoid soil loss and gullyng. | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 22 |
| 27 | Youth target program to retain them in villages | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 22 |
| 28 | Ease smallholder's access to finance | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 22 |
| 29 | Integrate climate resilience in planning and budgeting process | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 22 |

| No | Adaptation Option | Technical Feasibility | Addresses Climate Risk | Accessibility for farmers | Flexibility | Co-Mitigation benefits | Transformative potential | Complementarity to IFAD themes | Suitability to RHVAP | Total Score |
|----|---|-----------------------|------------------------|---------------------------|-------------|------------------------|--------------------------|--------------------------------|----------------------|-------------|
| 30 | Strengthen the local agriculture groups, social mobilisers and palika human resources and promote climate field school approaches to enhance exchange and knowledge and information among farmers to collectively deal with climate and weather extremities | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 21 |
| 31 | Promote the establishment of gene banks, seed banks, nurseries, orchards, research stations, laboratories | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 21 |
| 32 | Develop technology and strategies to promote both indigenous and improved technologies for climate-smart agriculture | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 21 |
| 33 | Promote post harvesting, processing, packaging, branding and marketing. | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 21 |
| 34 | Encourage agro enterprises | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 21 |
| 35 | Promote non timber forest products including Medicinal and Aromatic Plants, | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 21 |
| 36 | Promote local breeds, species, improved breeds with desired traits through artificial insemination, wallow and bath tolerant (for various hazard risks) / Strengthen the capacity to identify and promote adoption of indigenous and improved livestock breeds that are tolerant to climate related stresses. | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 21 |
| 37 | Expand Agricultural areas to regions with lower climate risk | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 21 |
| 38 | Develop climate change strategy and action plan for the agriculture and food security sector, mostly focused on addressing key climate change impact on crops and livestock sector | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 21 |
| 39 | Promote solar-based irrigation system combined with micro-irrigation techniques | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 21 |
| 40 | Implement ICT-based agro-advisory services targeting weather-based and impact-based forecasting system | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 21 |
| 41 | Promote more effective use of silage urea molasses mineral block, prophylaxis and area-specific mineral block, crop residue treatment, precision feeding, pasture spelling, and rotation | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 21 |
| 42 | Strengthen capacity to generate new forms of empirical knowledge, technologies and agricultural support services that meet emerging climate change and variability challenges. Promote development of innovations to increase resilience to disasters, engage in the distribution of those innovations, and train farmers to use best agricultural practices. | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 20 |
| 43 | Establish a vegetable collection centers and pop up markets to regulate sales during extreme events | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 20 |
| 44 | Clustering fallow land for the agroforestry and collaborate divisional forest offices for seedling and technical support | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 20 |

| No | Adaptation Option | Technical Feasibility | Addresses Climate Risk | Accessibility for farmers | Flexibility | Co-Mitigation benefits | Transformative potential | Complementarity to IFAD themes | Suitability to RHVAP | Total Score |
|----|--|-----------------------|------------------------|---------------------------|-------------|------------------------|--------------------------|--------------------------------|----------------------|-------------|
| 45 | Policy on the use of fallow land for agroforestry | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 20 |
| 46 | Convert agronomic practices to suit climatic conditions. | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 20 |
| 47 | Agricultural disaster risk reduction and management. Support communities affected by disasters through various response and recovery interventions. Strengthen capacity to finance and deliver timely assistance when disasters of medium/low frequency and medium/high severity occur | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 20 |
| 48 | Strengthen the capacity to reduce risk and improve resilience at the farm level and help farmers adapt to climate change | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 20 |
| 49 | Construct farm and access roads | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 1 | 20 |
| 50 | Invest and develop an early warning system (better surveillance and information dissemination). Implement ICT-based agro-advisory services targeting weather-based and impact-based forecasting system | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 20 |
| 51 | Provide technology, inputs (seed, fertilizers) and technical assistance to farmers to increase crop production. | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 19 |
| 52 | Develop standards to enable flood proof infrastructure development | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 19 |
| 53 | Promote agricultural innovation and (phyto)sanitary systems | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 19 |
| 54 | Application of biotechnology to promote better reproduction methods by exploring new techniques in artificial insemination and embryo transfer and more efficient production of fodder and silage. | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 19 |
| 55 | Document and promote local knowledge and practices that are successful in helping the farmers cope with and adapt to climate change hazards. Support in organizing innovation fairs to document and promote technology and practices, including local knowledge | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 19 |
| 56 | Incentivize the private sector for leveraging climate financing and ensure their investment in research and development of adaptation technology and practices; for example, green enterprise promotion | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 19 |
| 57 | Establishment of farmers' support (subsidies, awareness training programs) | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 18 |

3.4 Monitoring adaptation

67. The M&E system developed and managed by the PCO will cover: (i) monitoring of implementation performance, execution of the AWPB, outreach and effectiveness of the targeting strategy, and (ii) periodic measurement of Program results (outputs, outcomes and impact) in relation to agreed targets. All provinces will contribute to a single R-HVAP M&E System and have access to the data generated.

68. Georeferenced Management Information System (MIS): A key focus for the R-HVAP M&E System will be to operate a highly effective Geo-MIS (online and offline, internet and mobile devices) that provides programme managers and teams with timely and reliable information to support adaptive programme management. Adaptive management is necessary to

- a. Track risk and thresholds/trigger levels which require new adaptation actions or modifications
- b. Monitor unintended consequences or mal-adaptive actions
- c. Whether planned outputs and outcomes have been achieved

69. A foundational MIS will be developed for R-HVAP in cooperation with ASDP prior to start-up. The Program will adapt and improve on this foundational MIS using lessons from ASDP, ASHA and RERP. Unique ID will be provided to each programme participant and household, similar to the ASDP and ASHA MIS, to enhance transparency of investments, prevent duplication, and track change over time.

70. Most of the listed adaptation activities are embedded in the program support and it will be further updated and enhanced during the implementation. Data related to adaptation will be collected on a regular basis through regular surveys (baseline, midline, and endline, annual outcome etc), regular data collection forms, and thematic studies. Progress, challenges, and ways forward will be presented in periodic, annual, and thematic reports.

1. Costs and Budgetary Considerations

71. As described in previous sections, adaptation and mitigation measures are blended in program activities. The program cost tab has explicitly provisioned budgets for adaptation and mitigation measures.

72. The Semlar market will have dedicated safeguard experts listed in EIA report. The RHVAP experts ToRs will have dedicated roles and responsibilities to work on adaptation activities.

Annex 1. Basic statistics on R-HVAP target provinces

Table 1 Lumbini demographics

| SN | District | Number of HH | Total Population | Male | Female | Sex Ratio |
|--------------|--------------------------|----------------|------------------|-----------------|-----------------|--------------|
| | Nepal | 6761059 | 29192480 | 14291311 | 14901169 | 95.91 |
| Province | | | | | | |
| Lumbini | Rukum East | 13264 | 57962 | 28226 | 29736 | 94.92 |
| | Rolpa | 52992 | 236226 | 110966 | 125260 | 88.59 |
| | Pyuthan | 56962 | 231848 | 104463 | 127385 | 82.01 |
| | Gulmi | 66725 | 246836 | 112788 | 134048 | 84.14 |
| | Arghakhanchi | 49080 | 177200 | 81013 | 96187 | 84.22 |
| | Palpa | 64318 | 242423 | 111940 | 130483 | 85.79 |
| | Nawalparasi (Susta West) | 83882 | 385515 | 188076 | 197439 | 95.26 |
| | Rupandehi | 241449 | 1118975 | 547545 | 571430 | 95.82 |
| | Kapilvastu | 122715 | 686739 | 337604 | 349135 | 96.7 |
| | Dang | 165761 | 676277 | 321901 | 354376 | 90.84 |
| | Banke | 131927 | 603393 | 295112 | 308281 | 95.73 |
| Bardiya | 106448 | 460831 | 217850 | 242981 | 89.66 | |
| Total | | 1155523 | 5124225 | 2457484 | 2666741 | |

Table 2 Karnali demographics

| SN | District | Number of HH | Total Population | Male | Female | Sex Ratio |
|--------------|--------------|----------------|------------------|-----------------|-----------------|--------------|
| | Nepal | 6761059 | 29192480 | 14291311 | 14901169 | 95.91 |
| Province | | | | | | |
| Karnali | Dolpa | 9429 | 42959 | 21276 | 21683 | 98.12 |
| | Mugu | 12535 | 66658 | 33448 | 33210 | 100.72 |
| | Humla | 11484 | 55496 | 27982 | 27514 | 101.7 |
| | Jumla | 24501 | 119377 | 59836 | 59541 | 100.5 |
| | Kalikot | 26956 | 144917 | 72243 | 72674 | 99.41 |
| | Dailekh | 55708 | 253319 | 121675 | 131644 | 92.43 |
| | Jajarkot | 38054 | 189365 | 93795 | 95570 | 98.14 |
| | Rukum West | 37708 | 166354 | 81063 | 85291 | 95.04 |
| | Salyan | 55400 | 238668 | 114953 | 123715 | 92.92 |
| | Surkhet | 99350 | 417776 | 202036 | 215740 | 93.65 |
| Total | | 371125 | 1694889 | 828307 | 866582 | |

Table 3 Sudurpashchim demographics

| SN | District | Number of HH | Total Population | Male | Female | Sex Ratio |
|---------------|--------------|----------------|------------------|-----------------|-----------------|--------------|
| | Nepal | 6761059 | 29192480 | 14291311 | 14901169 | 95.91 |
| Province | | | | | | |
| Sudurpashchim | Bajura | 28922 | 138998 | 67608 | 71390 | 94.7 |
| | Bajhang | 38369 | 189097 | 88988 | 100109 | 88.89 |
| | Darchula | 29186 | 135056 | 65349 | 69707 | 93.75 |
| | Baitadi | 50472 | 244400 | 115426 | 128974 | 89.5 |
| | Dadeldhura | 31608 | 139420 | 65930 | 73490 | 89.71 |
| | Doti | 46100 | 205683 | 95066 | 110617 | 85.94 |

| | | | | | | |
|--------------|------------|---------------|----------------|----------------|----------------|-------|
| | Achham | 49969 | 229816 | 106240 | 123576 | 85.97 |
| | Kailali | 200528 | 911155 | 439792 | 471363 | 93.3 |
| | Kanchanpur | 111900 | 517645 | 243598 | 274047 | 88.89 |
| Total | | 587054 | 2711270 | 1287997 | 1423273 | |

Annex 5c: Stakeholder Engagement Plan

R-HVAP Stakeholder Engagement Plan

Introduction

Community and stakeholder engagement is key to successful implementation of the program. Stakeholder engagement will be conducted throughout the Program lifecycle. In developing and implementing the program activities, communities and all relevant stakeholders will be consulted to gather their suggestions and feedback on the activities design, implementation arrangements and methods, and endorsed mitigation and risk reduction measures.

The design of R-HVAP had a wider consultation process with concerned various stakeholders from local beneficiaries to the national and international level actors. Four thematic stakeholder consultation workshops with province level multi stakeholders, permaculture leading organizations, national organic suppliers, and bio input producers were organized to collect their suggestions and feedback on overall program designs.

Stakeholders include groups, institutions and individuals that will be directly or indirectly impacted by the R-HVAP, may have interest in the program outcomes, or may have influence (negatively or positively) on the program. In the case of the R-HVAP, these include federal and provincial ministries, municipalities, relevant national governmental actors, producer organization, MSMEs, cooperatives, Indigenous Peoples, marginalized and disadvantaged groups, service providers, and IFAD. Further stakeholders may include affected communities or civil societies and other actors working in the Program areas.

Information disclosure

Disclosure of relevant program information helps program affected people and other stakeholders understand the risks, impacts and opportunities of the program. The R-HVAP will provide the relevant stakeholders with access to relevant information, such as i) purpose, nature, and scale of the program, ii) the duration of the proposed program activities, iii) any potential risk to and impacts on such as communities, as well as mitigation measures, iv) the envisaged stakeholder engagement process, and v) the grievance mechanism.

All relevant documents relating to a proposed investment or subproject will be disclosed as part of stakeholder engagement. Depending on the size and nature of the investment and the significance of the risks and impacts, examples of such documents include sub project proposal, ESCMPs, etc.

Disclosure of relevant information will be continuous throughout the Program, including the planning phase to seek feedback from the stakeholders on the safeguard's issues and measures, disclosure of all assessment prior to and after approval and disclosure during and after conclusion of activities to inform communities of implementation activities, potential impacts, and mitigation measures.

The table 1 below list the identified stakeholders and details their engagement methods into the program cycle.

Table 15: Matrix of the Stakeholder Engagement Plan

| Stakeholder | Concerns | Engagement method | Information to disclose and report back | Most valuable information to obtain | Frequency of engagement | Responsible | Timeline |
|---|---|---|---|--|-------------------------|----------------|---|
| Government | | | | | | | |
| <i>Federal ministries and departments</i> | | | | | | | |
| Ministry of Finance (MoF) | Project and finance agreement | Formal communication (letter), formal bilateral meetings, mission kick off and completion meetings, PSC meetings etc | Financial agreement, Project overall design, Implementation, status, missions, restructure (cancelation, partial cancelation, extension) as needed, regular audit status | Finance related arrangements from the government | Regular basis | PCO, PSC | From concept note stage to Design, implementation, and completion |
| Ministry of Agriculture and Livestock Development (MoALD) | Lead Implementation Agency | Leading the overall implementation of the program. | All about the project design, implementation, monitoring, and reporting. Annual workplan and budget (AWPB), Procurement plan, regular reports including annual progress report and studies. Safe food certification | Overall project implementation | Regular basis | PSC, PCO | From concept note stage to Design, implementation, and completion |
| Ministry of Forest and Environment (MoFE) | Promotion of Agroforestry, Medicinal and Aromatic Plants (MAP), fodder management, seedlings for forestry. Likewise, EIA approval, Supplementary plantation | MoFE will be a part of PSC. It will provide overall guidance to implement and supervise program activities. Regarding Semlar wholesale market, MoFE will approve the Environmental Impact Assessment (EIA) and support to manage compensation plantation of harvested trees from Ratanpur Community Forest. | Forest regulation, provisions of MAPs cultivation, Community Based Forest Management practices and regulations, EIA report | Forest related provisions | Regular Basis | PSC, PCO, PPMO | Implementation |
| Ministry of Industry, Commerce, and Supplies (MoICS) | Commodities trade and export, trade fairs | MoICS will be one of the Program implementing agencies. It will represent | Program overall concept and targeted | Regular provision on trade and export | Regular basis | PSC, PCO, PPMO | Implementation |

| Stakeholder | Concerns | Engagement method | Information to disclose and report back | Most valuable information to obtain | Frequency of engagement | Responsible | Timeline |
|---|--|---|--|---|-------------------------|----------------------------------|---|
| | | the PSC and also deploy related staff at PCO. The ministry will overall support and guide on commodity export. | commodity's export mechanism. Market commodities quality control | | | | |
| Center for Agricultural Infrastructure Development and Mechanisation Promotion (CAIDMP) | Lead on Semlar wholesale market EIA works on the behalf of MoALD Semlar Market Operation and Management | Lead agency to operate and manage Semlar Wholesale Market | Market management policy, provisions, and related information | EIA documents Semlar wholesale market operation and management | Regular basis | PSC, PCO | Implementation and post program completion |
| Department of Urban Development and Building Construction (DUDBC) | Lead on construction of Semlar wholesale market | Lead on the construction and monitoring of the Semlar wholesale market through the SPIU | Construction related information | Progress updates on the construction of the Semlar market, including key indicators indicated in the PDR for monitoring | Regular basis | PSC, PCO, SPIU | Implementation and post program completion |
| Trade and Export Promotion Center (TEPC) | Assist on trade related concerns | Direct consultation from LPA and PSC, regular meetings, inviting them in PSC as required, support to strengthen quarantine and laboratories | Quality control procedures, services related to insurance, transport, and export; related directives and guidelines, potential market identification | Relevant policy, provisions, and government capacity | Regular basis | PSC, PCO | Implementation and post program completion |
| Office of the Auditor General (OAC) | Financial audit and Government account persons deploy | Finance person management and regular audits | Audit report and financial transparency | Financial transparency | Regular basis | PSC, PCO, PPMO, Corridor offices | Implementation to closing |
| Nepal Agricultural Research Council (NARC) | Agriculture based research | Collaboration on research activities | Research reports | Research findings | As required | PCO, PPMO, Corridor offices | Implementation |
| Alternative Energy Promotion Centre (AEPC) | Renewable Energy technology | Quality assurance and sustainability of RETs | AEPC listed companies in local level, subsidy provisions, technical support, capacity building, operation maintenance and sustainability | AEPC policy, priorities, ongoing projects, subsidy provisions, technical support | For RET related works | PCO, PPMO, Corridor offices | Implementation |
| Provincial ministry and departments | | | | | | | |
| Ministry of Land Management, Agriculture, and | Provincial implementation | Provincial implementation arrangements, lead on | AWPB, Procurement plans, coordination arrangements, periodic reports | Activities, implementation arrangements, periodic reports | Regular basis | PSC, PCO | Design, Implementation, completion, and post completion |

| Stakeholder | Concerns | Engagement method | Information to disclose and report back | Most valuable information to obtain | Frequency of engagement | Responsible | Timeline |
|---|---|--|---|--|-------------------------|--|---|
| Cooperatives (MoLMAC) | | provincial level coordination | | | | | |
| Ministry of Industry, Tourism, Forest, and Environment (MoITFE) | Export and market related activities at province level | Provincial level arrangement on market and export sector | Market provisions, arrangements, quality provisions | Activities, market regulations | Regular Basis | PSC, PCO, PPMO, Semlar market management | Implementation |
| Provincial directorate | Activities planning and implementation at provincial level | Implementation arrangement of related field | Provincial implementation arrangement and provisions at directorate level | Provincial provisions on different themes, divisions; their activities plan and implementation arrangement | Regular basis | PPMO | Implementation |
| NARC provincial offices | Agricultural research at local level | Research activities | Program related researches | Ongoing and future research activities at province or local level | Research need basis | PCO, PPMO | Implementation |
| Local governments | | | | | | | |
| Municipality and Rural Municipality | Planning, implementation, supervision, operation, and maintenance | Leading on Agroecological Corridor Plans (PAP), integrating PAPs into the local government's planning process, coordination and collaboration on implementation, lead on supervision, operation, and maintenance ensuring sustainability | Planning and implementation arrangements, process | Planning process and program activities integration | Regular basis | PPMO and Corridor offices | Implementation, completion, and post completion |
| Development Partners | | | | | | | |
| USAID, ADB, FAO, WFP, UNDP, EU, Other UN agencies, International Trade Center (ITC) etc | Learning and knowledge exchange | Coordination and collaboration on activities implementation | Ongoing projects and their activities, past projects and their learning, plans for upcoming projects and programs | Potential collaboration on activities implementation, upscaling, and creating joint efforts | Need basis | PSC, PCO | Implementation |
| Ongoing IFAD projects | | | | | | | |
| ASDP VITA RERP | Learning and knowledge exchange, thematic capacity building | IFAD Nepal's ongoing thematic community of practice (COP), regular cross learning sessions, thematic capacity building events | Project's working area, activities, implementation arrangements and modality, areas of collaboration | AWPB, annual and progress reports, thematic and research reports | Periodic | PSC, PCO, PPMO | Implementation |
| Organizations | | | | | | | |

| Stakeholder | Concerns | Engagement method | Information to disclose and report back | Most valuable information to obtain | Frequency of engagement | Responsible | Timeline |
|---|--|--|--|--|-------------------------|----------------------------------|--------------------------|
| LiBIRD | Agroecological practices promotion | Learning exchange, possibility of technical assistance | Long learning and research experience on climate smart agriculture and | Technical assistance | Need basis or regular | PSC | Implementation |
| SNV | Producer organization capacity building, technical assistance | Learning exchange, possibility of technical assistance | Long learning and research experience on POs formation and graduation | Technical assistance | Need basis or regular | PSC | Implementation |
| HEIFER | Livestock value chains, especially learning from VITA implementation | Learning exchange | Extensive livestock projects implementation experience | Knowledge sharing | Need basis or regular | PSC, PCO, PPMO | Implementation |
| Permaculture organizations | Agroecological practices promotion, capacity building, farmer field school | Learning exchange, possibility of technical assistance | Long learning and research experience on climate smart agriculture and | Learning sharing and technical assistance | Need basis or regular | PSC, PCO, PPMO | Implementation |
| Organic exporters | Safe food market | Multi stakeholder platforms (MSP), wholesale and satellite market management | Market demand, price, and opportunities | Market stakeholders, issues, challenges, and opportunities | Regular basis | PSC, PCO, PPMO | Implementation |
| Bio input producers | Ensuring bio inputs to the program areas | MSP, enterprises support and promotion | Bio input demand, supply, and quality status, potential production opportunities | Bio input demand, supply, and quality status, potential production opportunities | Regular | PSC, PCO, PPMO, Corridor offices | Implementation |
| Service Providers | Studies, research, technical assistance, and other | Through procurement | Status and opportunities | Status and opportunities | Need basis | PSC, PCO, PPMO, Corridor offices | Implementation |
| Federations | | | | | | | |
| Federation of Nepal Chambers of Commerce and Industries (FNCCI): Central, provincial, and district chapters | Engagement with commercial stakeholder | MSP, PAP process, implementation support, joint monitoring | Commerce and industry related information | Commerce and industry related information | Regular | PSC, PCO, PPMO, Corridor offices | Planning, Implementation |
| IPs | Participatory engagement: planning, implementation, and monitoring | Central, provincial, to Corridor level planning, implementation, and monitoring events | IPs status, priorities, needs, and provisions | IPs status, priorities, needs, and provisions | Regular | PSC, PCO, PPMO, Corridor offices | Planning, Implementation |
| Youth | Participatory engagement: planning, implementation, and | Central, provincial, to Corridor level planning, implementation, and monitoring events | IPs status, priorities, needs, and provisions | IPs status, priorities, needs, and provisions | Regular | PSC, PCO, PPMO, Corridor offices | Planning, Implementation |

| Stakeholder | Concerns | Engagement method | Information to disclose and report back | Most valuable information to obtain | Frequency of engagement | Responsible | Timeline |
|---|---|--|--|--|------------------------------------|----------------------------------|----------------------------------|
| | monitoring, ICTs, internships, lead farmers | | | | | | |
| Women | Participatory engagement: planning, implementation, and monitoring, Drudgery reduction, lead farmers | Central, provincial, to Corridor level planning, implementation, and monitoring events | IPs status, priorities, needs, and provisions | IPs status, priorities, needs, and provisions | Regular | PSC, PCO, PPMO, Corridor offices | Planning, Implementation |
| Dalit | Participatory engagement: planning, implementation, and monitoring | Central, provincial, to Corridor level planning, implementation, and monitoring events | IPs status, priorities, needs, and provisions | IPs status, priorities, needs, and provisions | Regular | PSC, PCO, PPMO, Corridor offices | Planning, Implementation |
| Organic producers | | | | | | | |
| Community and community organizations | | | | | | | |
| Cooperatives | Planning, participation on production, institutionalization of producer organization, micro finance, input supply | MSP, PAP process, regular meeting, activities implementation | PAP, capacity, need, activities | PAP, capacity, need, activities | Regular | PSC, PCO, PPMO, Corridor offices | Planning, Implementation |
| Producer organization, farmer groups, including organic producers | Planning, participation on production | MSP, PAP process, regular meeting, activities implementation | PAP, capacity, need, activities | PAP, capacity, need, activities | Regular | PSC, PCO, PPMO, Corridor offices | Planning, Implementation |
| Forest user groups (community forest, leasehold forests) | Planning, participation on production | MSP, PAP process, regular meeting, activities implementation | PAP, capacity, need, activities | PAP, capacity, need, activities | Regular | PSC, PCO, PPMO, Corridor offices | Planning, Implementation |
| Ratanpur Community Forest User Groups | Consent to use community forest area for wholesale market (mutual agreement has been done, documented and circulated to relevant parties) | Awareness on the Semlar Wholesale Market, Inclusive meaningful and participatory community consultations | Community Forestry constitution, operation plan, forest provisions | Consent to use community forestry land for wholesale market construction | Mostly at design stage and regular | MoALD, MoFE, PSC | Design and implementation |
| Indigenous Peoples (IPs) | Meaningful inclusive participation on the program; create employment and | <u>Program Design:</u> Wider consultation with IP communities at the program target areas. | Overall program design and planned activities, Social inclusion and IP | Activities related to the beneficiaries | Regular | PCO, PPMO, and Corridor offices | Design, planning, implementation |

| Stakeholder | Concerns | Engagement method | Information to disclose and report back | Most valuable information to obtain | Frequency of engagement | Responsible | Timeline |
|----------------------------------|---|---|--|---|-------------------------|---------------------------------|----------------------------------|
| | diversified livelihood opportunities; no negative impacts on IPs' land access and use, traditional and cultural rights | Brief about the program overall goal, implementation arrangements and modality, potential list of activities, ways of collaboration and benefit to IP communities. <u>Planning:</u> Ensure the inclusive and meaningful participation of IPs at Agroecological Cluster Plan (PAP) planning process. Organize a separate IP focus group discussion where relevant. Intensively discuss IPs status and their actual need and address them on planning process. Include IPs representative in MSPs. <u>Implementation:</u> Focus on IPs need and demands. Take IPs on leading front on the implementation. <u>Monitoring and supervision:</u> As a common Nepal project's practice, involve IPs representatives, where relevant, on joint monitoring and supervision | targeting policies, provisions related to IPs | | | | |
| Dalit and marginalized community | Meaningful inclusive participation on the Program; ensure equitable benefit sharing, proactive targeting, improve nutrition status. | Similar as IPs | Overall program design and planned activities, Social inclusion targeting policies, provisions related to Dalit and marginalized community | Activities related to the beneficiaries | Regular | PCO, PPMO, and Corridor offices | Design, planning, implementation |

| Stakeholder | Concerns | Engagement method | Information to disclose and report back | Most valuable information to obtain | Frequency of engagement | Responsible | Timeline |
|---------------------------------|---|---|---|---|-------------------------|---------------------------------|----------------------------------|
| Women and girls | Inclusive and meaningful participation; enhance decision making capacity; access to land, finance, and diversified livelihood opportunities; Drudgery reduction; improve communication technologies | Similar as IPs | Overall program design and planned activities, Social inclusion targeting policies, provisions related to women and girls | Activities related to the beneficiaries | Regular | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| Youth | Inclusive and meaningful participation; mainstream into the agriculture; improve access to land, finance, and diversified livelihood opportunities; create employment; improve communication technologies, provide internship opportunity | Similar as IPs | Overall program design and planned activities, Social inclusion targeting policies, provisions related to youth | Activities related to the beneficiaries | Regular | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| Direct and indirect beneficiary | Reduce poverty and transition their agriculture practice to agroecological system | Same as IPs | Overall program design and planned activities, Social inclusion targeting policies | Activities related to the beneficiaries | Regular | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| Lead farmers | Establish Agroecology demo farms, host youth interns to capacitate them, act as agroecology extension agent and barefoot consultant, provide onsite support to the smallholders | Provide ToTs for agroecology system, Support on Demo farm establishment | | | | | |

| Stakeholder | Concerns | Engagement method | Information to disclose and report back | Most valuable information to obtain | Frequency of engagement | Responsible | Timeline |
|--|--|--|---|---|-------------------------|---------------------------------|---|
| Traders and buyers | | | | | | | |
| Business entities | Trade and related capacity building and quality control, Export market linkages | Multistakeholder platforms, Semlar wholesale market operation and management | Potential market and commodities | Potential market and commodities | Need basis | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| MSME | Bio input supply, trade fairs, enterprise development, business to business service, business and suppliers service, market management, capacity building, post-harvest support | MSP, B2B, B2S, direct benefit from program activities | Market potential, suitable commodities, input supply demand and supply status | Market potential, suitable commodities, input supply demand and supply status | Regular | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| Financial institutions | | | | | | | |
| Agricultural Development Bank (ADB) | Improve access to finance, link VITA to R-HVAP activities | Access to credit and finance packages | Credit and finance facilities | VITA's financing provisions, ADB's overall credit and finance package | Regular | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| Government and Private Banks | Improve access to finance | Access to credit and finance packages | Credit and finance facilities | Overall credit and finance package | Regular | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| Insurance companies | Improve insurance provision | Awareness on Insurance provisions and methods | Insurance facility, package, and benefits | Insurance facility, package, and benefits | Need basis | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| Non-Governmental Organizations | | | | | | | |
| Local to national level NGOs | Capacity building | Awareness, capacity building | Governance, transparency, technical assistance | Governance, transparency, technical assistance | Need basis | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| Capacity building institutions | | | | | | | |
| Technical and Vocational Education and Training (TVET) | Trainings for JTA and social mobilizers, Youth internship | Training programs | Training programs | Training programs | Need basis | PCO, PPMO, and Corridor offices | Design, planning, implementation |
| IFAD | | | | | | | |
| IFAD offices | Program design, missions (kick off, supervision, implementation support, mid-term review, and program completion), No objection as per provisions, regular capacity building and | Formal communication | PDR, IFAD policies and provisions | PDR, IFAD policies and provisions | Regular basis | PCO | Design, planning, implementation, completion, and post completion |

| Stakeholder | Concerns | Engagement method | Information to disclose and report back | Most valuable information to obtain | Frequency of engagement | Responsible | Timeline |
|-------------|--------------------------------|-------------------|---|-------------------------------------|-------------------------|-------------|----------|
| | technical assistance as needed | | | | | | |

Annex 5d: Grievance Redress Mechanism (GRM)

R-HVAP grievance redress mechanism

Introduction

The efforts will be made from the corridor level to solve the grievance in a participatory way. The program will ensure a focal person for feedback record and grievance handle and ensure that properly documented and included into the reporting framework. There will be five levels of grievance redress mechanisms in the Program. Anyone submitting a grievance may wish to raise a concern in confidence. If the complainant asks to protect identity, it should not be disclosed without his/her/their consent.

The Program will provide a template to write grievances (sample is below). In cases where applicant does not have the writing skills or are unable to express their grievances verbally, the project will facilitate to find a common person to write on behalf of them. The applicant will be allowed to have access to the Program focal person to ensure that all the details have been recorded accurately enabling all parties to be treated fairly. Throughout the grievance redress process, the focal person or authorised person will ensure that the concerned applicant is provided with copies of complaints and decisions or resolutions reached.

Figure 3: Grievance redress Mechanism (GRM) stages

| | |
|--|---|
| <p>Stage 1 Community or Producer Organization Level</p> | <p>There will be a proper mechanism to collect grievance at the community level. The RHVAP will appoint a focal person to collect grievance, document, communicate, and report. The community or PO level discussion should solve the issue and inform concerned person/group/organization by 7 days* of application. The concerned program team should forward application along with decision, decision process to corridor office if applicant is not satisfied.</p> |
| <p>Stage 2 Corridor level</p> | <p>The corridor office has to solve the issue in a participatory manner and inform to concerned applicants within 7 days*. If applicant is not satisfied, all related documents should be forward to program management office at provincial level.</p> |
| <p>Stage 3 Province or PPMO level</p> | <p>The provincial team may take up to 7 days* to solve the problem in close coordination with the applicant. If applicant is not satisfied, all related documents should be forward to PCO secretariat.</p> <p>In case of Semlar market, the Semlar SPIU will have provision to collect and handle grievances. The PIU will solve the issue within 7 days* and inform the concerned applicant. If applicant is not satisfied, the PIU will forward all the related document to the PCO.</p> |
| <p>Stage 4 PCO level</p> | <p>The PCO team consults with concerned parties and solve within 7 days* of application receipt and formally communicate to the applicant. If applicant is not satisfied, the complaint will be taken to the PSC and ministry level.</p> |
| <p>Stage 5 PSC and ministry level</p> | <p>The PSC will consult with concerned parties and solve within 7 days* of application receipt. If not solved by the PSC, the complaint will be forwarded to the concerned ministry for the action. The PCO focal person needs to facilitate the process and inform the applicant.</p> |

During the process or If not solved

Option A: Write to IFAD country office

Applicant can directly approach to the IFAD country office in issues including sexual harassment, child and forced labour, community and workers health and safety, governance and transparency, serious environmental impacts, social inclusion, impacts to IPs, women and girls etc.

IFAD country office for the communication:

Email: IFAD_Nepal@ifad.org

Postal address:

International Fund for Agricultural Development

WFP Complex, Patan Dhoka Road, Lalitpur Nepal

Telephone:

+977-1-5260693; 5260105 (Extension: 4144)

Option B: Apply to judicial level

Applicant can approach the judiciary process for the Grievance redress anytime.

**The program may revisit the number of days in a practical basis.*

Grievance follow up: The relevant corridor offices will contact the applicant at a later stage to ensure that the activities do not trigger any further issues. If the problem persists, it will be treated as a new grievance and re-enter the process.

IFAD Complaints Procedure

Objective

To ensure that appropriate mechanisms are in place to allow individuals and communities to contact IFAD directly and file a complaint if they believe they are or might be adversely affected by an IFAD-funded project/programme not complying with IFAD's Social and Environmental Policies and mandatory aspects of SECAP.

Eligibility criteria

To file a complaint for alleged non-compliance with IFAD's social and environmental policies and mandatory aspects of its SECAP, IFAD will consider only complaints meeting the following criteria:

- The complainants claim that IFAD has failed to apply its social and environmental policies and/or the mandatory provisions set out in SECAP.
- The complainants claim that they have been or will be adversely affected by IFAD's failure to apply these policies.
- Complaints must be put forward by at least two people who are both nationals of the country concerned and/or living in the project area. Complaints from foreign locations or anonymous complaints will not be taken into account.
- Complaints must concern projects/programmes currently under design or implementation. Complaints concerning closed projects, or those that are more than 95 per cent disbursed, will not be considered.

The process

The complainants should first bring the matter to the attention of the government or non-governmental organisation responsible for planning or executing the project or programme (the Lead Agency), or to any governmental body with the responsibility for overseeing the Lead Agency. If the Lead Agency does not adequately respond, then the matter may be brought to the attention of IFAD. The issue may be brought straight to IFAD if the complainants feel they might be subject to retaliation if they went to the Lead Agency directly.

The Regional Division will examine the complaint and, if necessary, will contact the Lead Agency, or the governmental body with the responsibility for overseeing the Lead Agency, to decide if the complaints are justified. If the complainants request that their identities be protected, IFAD will not disclose this information to the Lead Agency or anyone else in government.

If the complaint is not justified, the Regional Division will inform the complainants in writing.

If the Regional Division finds the complaint is justified and there is proof of actual or likely harm through IFAD's failure to follow its policies and procedures, IFAD will take action. This may consist of making changes to the project/programme, or requiring that the government observes its obligations under the Financing Agreement. IFAD's response will focus bringing the project/programme into compliance and no monetary damages will be available or paid in response to such complaints. The complainants will be informed of the outcome of the issue by the Regional Division.

In all cases, if the complainants disagree with IFAD's response, they may submit a request to SECAPcomplaints@ifad.org and request that an impartial review be carried out by the Office of the Vice-President.

The Office of the Vice-President will decide on the steps to be taken to examine such complaints, including, if necessary, contracting external experts to review the matter. The complainants will be informed of the results of the review.

How to submit a complaint

A complaint relating to non-compliance with IFAD's Social and Environmental Policies and mandatory aspects of its SECAP can be submitted in any of the following ways:

mandatory aspects of its SECAP can be submitted in any of the following ways:

- Download word file complain form: [Here](#)
- Send an email to SECAPcomplaints@ifad.org

If you email or mail your complaint, please include the following information:

- Name, address, telephone number and other contact information
- Whether the complainants wish to keep their identity confidential, and if so, why
- Name, location, and nature of the IFAD project/programme (if known)
- How the Complainants believe they have been, or are likely to be, adversely affected by the IFAD-supported project or programme

Complaints sent by mail should be addressed to:

IFAD

SECAP Compliant (PMD)

Via Paolo di Dono 44

00142 Rome, Italy

Figure 4: Model of complaint form (GRM)

(Model of complaint form)

Date:.....

To; Mr./Ms.....

I am/We would like to submit the complaint form relating to the.....sub-project funded by RHVAP.

We believe that it will be impacted and can be impacted due to the sub-project in the following sections (please describes the impacting sections). We have raised our concerns to.....in order to address it that is reasonable and acceptable for us.

Table 16: Feedback/complaint handling format (GRM).

| S N. | Name of person receiving complaint | SM, Letter, Call/SMS/email etc. | Date of complaint received (MM-DD-YYYY) | Time (00:00 AM or PM) | Province | District | Commune | Complaint details | Name of the complaining person | complaint registration number | Contact number of complainers | Subject of complaint | Problem/Question/Issue/Complaint | Address Mechanism for the complaint | Responsible person to lead the issue | Finding of the complaint | Reporting about the finding to all (Yes/No) | Action taken on the recommendation | Remarks |
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