IFAD
Investing in rural people

India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

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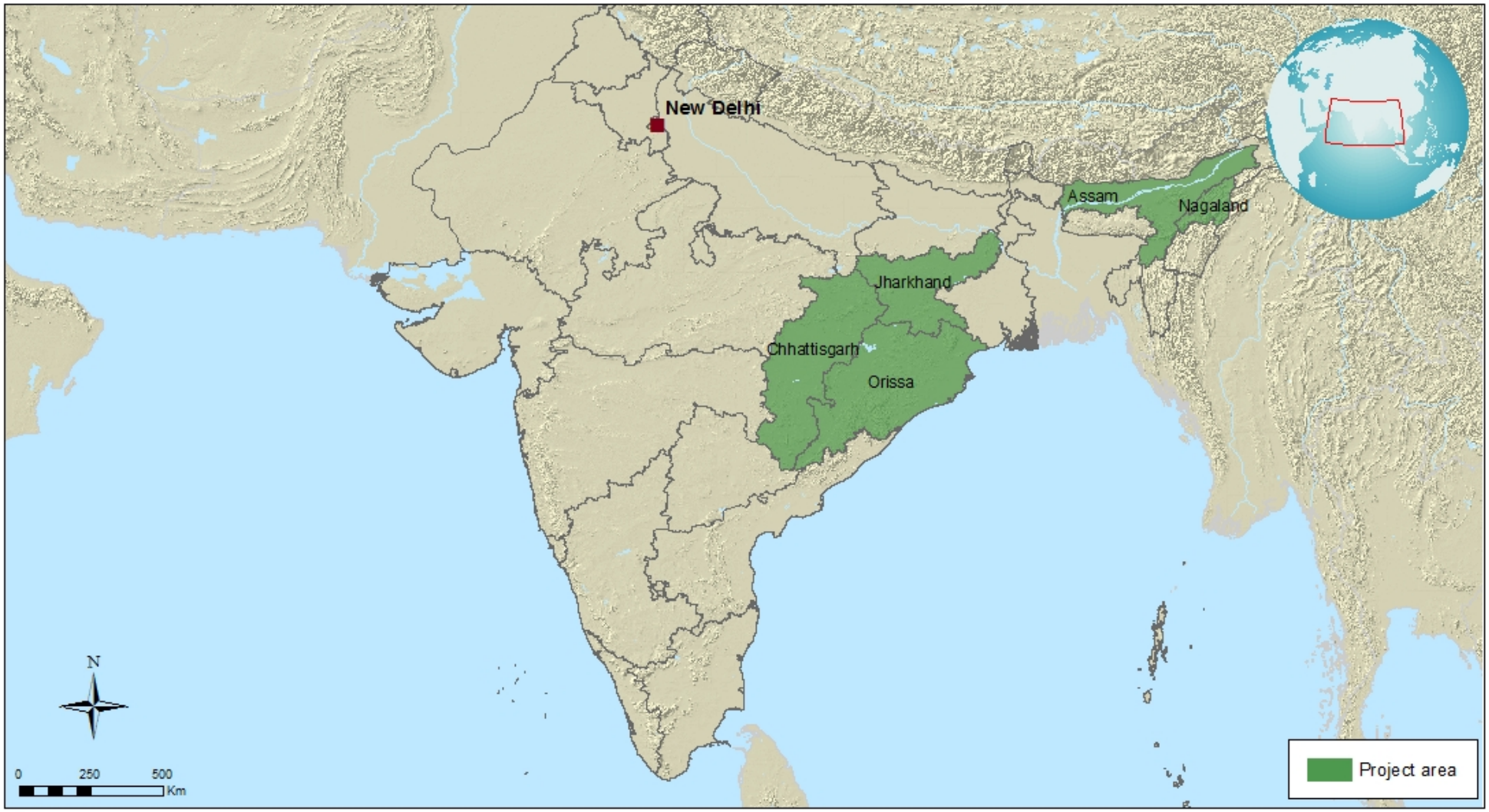
Map of the Project Area



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Map compiled by IFAD | 11-02-2019

Abbreviations and Acronyms

ADG	Assistant Director General
AE	Agricultural Engineering
AED	Agriculture Engineering DivisionA
AICRPs	All India Coordinated Research Projects
AMMA	Agricultural Machinery Manufacturers Association
APD	Additional Project Director
AOSs	Annual Outcome Surveys
ATARI	Agriculture Technology Application Research Institute
ATBs	Agriculture Tool Banks
AWP & B	Annual Work Plan & Budget
BCR	Benefit cost ratio
C & AG	Comptroller and Auditor General of India
CAIM	Convergence of Agricultural Interventions in Maharashtra
CAUs	Central Agricultural Universities
CFCs	Common Facility Centres
CGIAR	Consortium of International Agriculture Research Centres
CI	Community institutions
CLFs	Cluster Level Federations
COSOP	Country Strategic Opportunities Programme
CSISA	Cereal Systems Initiative for South Asia
CVO	Chief Vigilance Officer
DARE	Department of Agriculture Research and Education
DDG	Deputy Director General
DG	Director General
DoAC&FW	Department of Agriculture, Cooperatives and Farmers' Welfare
DPCC	District Project Coordination Committee
DST	Department of Science and Technology
EFA	Economic and Financial Analysis
EFC	Expenditure Finance Committee
ERP	Enterprise Resource Planning
FMT&TIs	Farm Machinery Testing and Training Institutes
FMUs	Farm Mechanization Units
FPIC	Free Prior Informed Consent
FOCUS Nagaland	Fostering Climate Resilient Upland Farming Systems in the Northeast in Nagaland (IFAD supported project)
FPOs	Farmer Producer Organizations
GCF	Gross Capital Formation
GDP	Gross Domestic Product
GHG	Green House Gas
GIS	Geographic Information System
GoI	Government of India

HofF	Head of Finance
ICAI	Institute of Chartered Accountants of India
ICAR	Indian Council of Agricultural Research
IFAD	International Fund for Agricultural Development
IIT	Indian Institute of Technology
IMF	International Monetary Fund
INR	Indian Rupee
IPSAS	International Public Sector Accounting Standards
IRR	Internal rate of return
JRMCs	Jhum Resource Management Centres
JTELP	Jharkhand Tribal Empowerment and Livelihoods Project (IFAD supported project)
KM	Knowledge Management
KVKs	Krishi Vigyan Kendras
KWh	Kilowatt Hours
M & E	Monitoring & Evaluation
MIS	Management Information System
MoA&FW	Ministry of Agriculture and Farmers Welfare
MoRD	Ministry of Rural Development
MoU	Memorandum of Understanding
MTR	Mid Term Review
NAHEP	National Agriculture Higher Education Project (World Bank funded project)
NAV	Net Asset Value
NICRA	National Initiative on Climate Resilient Agriculture
NPV	Net Present Value
NRLM	National Rural livelihood Mission
NTFPs	Non Timber Forest Products
OCC	Opportunity Cost of Capital
OPELIP	Odisha PVTG Empowerment and Livelihoods Improvement Programme (IFAD funded project)
PD	Project Director
PFMS	Public Financial Management System
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PSC	Project Steering Committee
R & D	Research & Development
RBI	Reserve Bank of India
SAUs	State Agricultural Universities
SC	Scheduled Castes
SCATE	Scaling up Agricultural Technologies for Smallholder Farmers
SDA	State Department of Agriculture
SDGs	State Gross Domestic Project
SHG	Self Help Groups
SIA	Standards on Internal Audit

SMAM	Sub-mission on Agricultural Mechanization
SPCC	State Project Coordination Committee
SPMU	State Project Management Unit
SRLM	State Rural Livelihood Mission
STs	Scheduled Tribes
USD	United States Dollar
VO	Village Organizations
WB	World Bank
WSCs	Watershed Committee
WSM	Watershed Missions

Executive Summary

1. **Context and rationale**: India, despite being the third largest economy in purchasing power parity terms, remains dependent on agriculture. The current focus of the government is to double farmers' income by 2022, and promoting agriculture mechanization is one of the important interventions to achieve this goal. Agriculture mechanization is being expanded through the Sub-Mission on Agricultural Mechanization (SMAM). The main focus of SMAM has been largely on prime movers (tractors, power tillers, combine harvesters). Given that 85% are small and marginal farmers (with landholdings of less than 2 Ha), that 75% of the agricultural work is carried out by women, and that labour represents 60% of production costs, there is a need to refocus agricultural engineering (AE) technology, beyond tractorization, on the needs of small and marginal farmers. To do so, AE technology needs to be: (i) more location specific; (ii) more oriented to build farmers' capacity to adapt to climate change; (iii) more responsive to women's needs and to energy efficiency concerns; (iv) create enterprise opportunities for youth. In order to achieve this, the project promotes participatory development of agri-engineering technology, in-field demonstration and scaling up of adapted and affordable technologies.

2. **Special aspects relating to IFAD's corporate mainstreaming priorities** This project will address issues related to feminization of agriculture and youth alienation from farming and the growing impact of climate change on agriculture. Accordingly, this project will leverage the existing women led community institutions comprising largely below poverty line households, to expand their access to agricultural engineering (AE) technologies in consonance with the Strategic Objective of IFAD's Policy on Gender Equality and Women's Empowerment. Mechanization and the options for employment this brings with it, will also address the issue of youth moving away from agriculture. The project has designed youth specific interventions such as research fellowships, mechanics training and support to establish agri-service centres. This project is not classified as nutrition sensitive; however, it is expected that the target beneficiaries would be able improve their nutritional status by achieving increased productivity and income levels.

3. **Rationale for IFAD involvement**: The rationale for IFAD involvement includes: (i) the poverty, women and youth focus and adaptation to climate change specificity of this project is in sync with the main corporate mainstreaming priorities of IFAD; (ii) the Indian Council of Agricultural Research's (ICAR's) orientation in this project on pro-poor technology and maximising rural outreach coincides with IFAD's mandate of contributing to rural poverty reduction; (iii) the focus of the IFAD portfolio in India on improved agriculture productivity and incomes in economically weaker areas is in perfect synergy with the objectives of this project; and (iv) alignment to IFAD's Country Strategic Opportunities Programme (COSOP)- 2018-24 which outlines IFAD's commitment to work towards smallholder food and agricultural production systems becoming remunerative, sustainable and resilient.

4. **Project goal and objectives**: The goal of the project is to enable poor rural households to increase farm income through use of affordable and efficient AE technologies[1]. The goal will be achieved through the development objective of Increased labour and farm productivity through adoption of AE technologies[2].

5. **Geographic areas of intervention:** The project would be implemented in two states of the north-eastern region (Assam and Nagaland) and three eastern states (Chhattisgarh, Odisha and Jharkhand) with high poverty levels, rain-fed agriculture systems, low levels of farm power availability, limited availability of appropriate technology suitable for hill/tribal farmers and ability to adapt to climate change events. The project will be implemented in 31 selected districts in these five states; covering aspirational districts and districts with higher incidence of women owned and managed community institutions.

6. **Targeting and target groups:** The project would adopt: (i) geographic targeting to select states and districts based on high levels of poverty, low availability of farm power and low level of AE technology diffusion and adoption; (ii) direct targeting to address the needs of women in small and marginal farmer households, and of hill farmers, especially the tribal households among them; and (iii) self-targeting for demonstration and promotion of technology. The project area has 40% below poverty households (twice the national average), and 50% presence of scheduled tribes, with small and marginal land holding comprising more than 75% of farmers and cultivating 32% of the landholding area. Technology promotion and adoption will be undertaken through existing community institutions (namely self-help groups, village organizations, producers' groups) comprising socio-economically disadvantaged households, largely below the poverty line. This targeting approach has dual benefit: (i) the poor households are primary beneficiaries of the development and diffusion of AE technologies; (ii) women become the agents of change for improved labour and farm productivity and adaptation to climate change in their household.

7. **Project Components/Outcomes:** The project will have two components: (i) Participatory technology development; and (ii) Business models for scaling up of appropriate AE technologies. Under the Participatory Technology Development component, the project will develop an inventory of location specific AE technologies, build capacity of ICAR to create AE research interest amongst youth through awards and fellowships, develop national technology forums, protocols and training manuals, and train scientists/engineers/economists to undertake techno-economic assessments of technologies and demonstrations. The project will establish an innovation platform to promote: (i) new technology development from concepts to prototypes; (ii) adaptation/ customization of existing technologies; and (iii) existing prototypes to move into commercial production. Eligibility to the innovation platform will be open to public and private research institutions. Proposals received from the innovation platform will be evaluated from a smallholder , women drudgery and climate change adaptation perspective and selected proposals will be funded. These activities will contribute to reduce the mismatch between needs and availability of smallholder centric AE technology (hill farmer, women, energy efficient and conservation agriculture centric).

8. Under the component of Business models for scaling up of appropriate AE technologies, the project will support training of lead farmers and organization of lead farmer led field days. The training will be organized by Krishi Vigyan Kendras (KVKs, which are agricultural extension centres). The project will support service and after sales centres through State Agro Corporations, existing agriculture machinery centres and agriculture input centres. In addition, local youth will be selected, trained and supported to establish after-sales service centres. The project will develop partnerships with SRLMs, State Watershed Missions (WSMs), State Departments of Agriculture (SDAs) and other agencies to support existing Self Help Groups (SHGs), Village Organizations (VOs) and other community institutions (CIs) for establishing Farm Mechanization Units (FMUs), Common Facility Centres for processing (CFCs) and Agriculture Tool Banks (ATBs). The project will also support individual ownership of AE machinery equipment (other than prime movers) by smallholders. The project will also seek to develop partnerships for scaling up with agribusinesses involved in machinery hire services along the Uber model. The project will provide community institutions with technology incentives for AE machinery acquisition and also an innovative user expansion support.

9. **Project costs and financing**: The project costs of USD 124.27 million will be financed by : IFAD loan of USD 66.1 million; IFAD grant of USD 1.0 million; GOI participation equivalent to USD 18.32 million including domestic taxes equivalent to USD 16.28 million; ICAR contribution of USD 13.82 million equivalent in the form of staff salary and other operational costs; bank financing of USD 5.73 million equivalent; convergence through SMAM equivalent to USD 9.4 million; and the beneficiaries' contribution of USD 9.9 million equivalent. The IFAD loan will be on ordinary terms .

10. **Benefits and beneficiaries**: The Project will reach out to 400,000 households. It is expected that direct beneficiaries, adopting the AE technologies scaled up by the project, would be 318,600 households. The immediate benefits from the project are significant reduction in

agricultural production costs by 31 percent, incremental production ranging between 11-15 percent and improved access of the small and marginal farmers to the farm mechanisation services and agri-based primary processing.

11. **Economic Rate of Return and Sensitivity Analysis:**Cost-benefit analysis yields an overall IRR of 18 percent. The estimated NPV for a 7.5 percent discount rate is INR 3,389 million and the BCR is 1.26. A positive NPV under the current opportunity cost of capital (OCC) of 7.5 percent indicates that the project investments are sound and robust. Under a scenario of costs increase by 10 percent and benefits decline by 10 percent over the base-case, IRR reaches 9 percent and the NPV is 417 million INR and this confirms the robustness and soundness of the project investments. The switching value analysis indicates that the project is capable of sustaining a 26 percent increase in costs and 20 percent decline in benefits.

12. **Exit strategy*:*** The exit strategy of this project is linked to institutionalization of technology development, demonstration and scaling up efforts into the regular programme of AED-ICAR, KVKs and SDAs respectively by building on their strengths and core areas of work for continuation beyond project life. AED-ICAR will fund all activities related to participatory technology development from the sixth year of the project. The project has put in place a new state level collaborative framework between ICAR institutions and the SDAs to integrate project support with farm mechanization efforts of the government. The project's strategy of leveraging on the capacity of existing CIs supported by SRLMs and other partner agencies will also facilitate a seamless exit.

13. **Sustainability:** The farm mechanization units established by the CIs will have to be profitable to achieve sustainability. This requires establishment of a sound management system, availability of adequate after-sales service and also accelerated pace of AE technology adoption. The project has built in measures to address these sustainability challenges.

14. **Project Risks:** The overall project risk is rated low to medium (L-M). The political and governance risk, macroeconomic risk and sector strategies and policies related risk are low and no mitigation measures are required to address these risks. The risks related to technical design of the project is also low. The risks related to institutional capacity for implementation and sustainability are considered medium. Financial Management and procurement risks are considered high which will decline to medium with the mitigation measures proposed. The project is classified as Environment and Social Category B and high climate risk.

15. **Organisational Framework**: At the central level, Ministry of Agriculture and Farmer Welfare (MoA&FW) would be the nodal agency. ICAR, which is under the Department of Agriculture Research and Education (DARE) of the MoA&FW will be the lead implementing agency. The Project Implementation Unit (PIU) will be housed within the AED-ICAR. Deputy Director General (DDG) of AED will be the Project Director (PD). ICAR will depute senior staff and engage contract staff from the market for project management and implementation. The project will establish a State level Project Management Unit (SPMU) in each project state within the SDAs. The Directors of SDAs in the project states will be the State Project Directors. Demonstration activities will be conducted by KVKs and scaling up activities will be undertaken by the SRLMs and other partner agencies identified by the state government. The project will establish a two tier coordination structure at the central level and two stage coordination structure at the state level.

16. **Financial Management (FM), Procurement and Governance:**The overall country inherent FM risk is assessed as medium. PIU within AED of ICAR will be responsible for financial management. The initial FM risk assessment of this project is assessed as high but mitigating measures bring down this risk to medium. Competent staffing comprising ICAR permanent staff and contract staff will be engaged. IFAD loan and grant account shall be designated in USD. An allocation of USD 1.0 million will be made for r**etroactive financing and a start-up advance will also be permissible.** The project will establish internal and external audit by independent Chartered Accountant firms in accordance with IFAD's General Conditions and the IFAD Handbook for Financial Reporting and Auditing of IFAD-financed projects. The loan will be on ordinary terms, denominated in USD, with a variable spread, 18 year maturity with a three year grace period and this is proposed in line with recent loans for agriculture development GoI borrowed from the World Bank. The project will undertake all procurement in line with IFAD procurement guidelines. The independent and competent authority responsible for receiving, reviewing and investigating allegations of fraud and corruption will be the Chief Vigilance Officer of ICAR, who reports directly to the Director-General, ICAR.

17. **Planning, M&E, Knowledge management and Communication**: PIU will be responsible for the preparation of annual work plan and budget (AWP&B) including the plans and budgets of all partners. The project will establish a Management Information System (MIS) to monitor physical and financial progress, achievement towards output targets. Annual outcome surveys (AOSs) will be conducted to assess achievement of outcome targets. The project will also conduct a baseline, impact assessment at mid-term and completion, and thematic studies. The project will generate and disseminate knowledge through regular knowledge products, and creation of a website for uploading knowledge generated.

18. **Implementation plans:** AED-ICAR is working on the readiness requirements of GoI and IFAD. A national start-up workshop and state level start-up workshops will be conducted. This project will be directly supervised by IFAD through annual Supervision Missions. A **Mid Term Review** (MTR) will be conducted by the end of the third year to review project achievements and implementation constraints. PIU will prepare and submit a Project Completion Report by the end of project completion date. IFAD and GoI will then carry out a Project Completion Review based on the information provided in the Project Completion Report and other data.

1. Context

A. National context and rationale for IFAD involvement

a. National Context

1. With a population of more than 1.25 billion, India is the world's largest democracy, second most populous country and the third largest economy in purchasing power parity terms. It is expected to grow at well over 7 percent per year and long-term Gross Domestic Product (GDP) growth is expected to become more stable, diversified, and resilient.[1] Agriculture continues to be the primary source of livelihood for nearly 50 percent of the Indian population although its contribution to GDP remains low at 12 percent, a challenge that needs to be addressed. The extreme poverty in India has dropped from 46 percent to an estimated 13.4 percent over the past two decades, yet the country is still home to 176 million poor people. India's economic performance has been strong with the gains of economic progress and access to opportunities differing between population groups and geographic areas. India's success will be central to the world's collective ambition of ending extreme poverty, promoting shared prosperity, and achieving the 2030 Sustainable Development Goals (SDGs) [2].

2. ***Poverty (SDG 1), food security and nutrition (SDG 2), and smallholder agricultural and rural development context: The*** incidence of multidimensional poverty was almost halved between 2005-06 and 2015-16 in India. The number of poor people in India during the last ten years fell by more than 271 million – a truly massive gain. However, poverty levels are not uniform across the states. Poverty levels in some states are less than 30 per cent, whereas in some other states they are 30-50 per cent.[3] India has made rapid strides in lowering the incidence of undernutrition. Owing to concerted efforts at all levels, stunting in children below five years declined from 48 to 38 percent between 2006 and 2016.[4] However, India continues to have one of the world's highest child under-nutrition rates. To address this, the Government of India is working on a Mission mode towards the vision of "Kuposhan Mukt Bharat" or Malnutrition free India.[5]

3. Over the past six decades, India has come a long way from being a famine-prone country to comfortably producing food for 1.25 billion people from finite arable land. Yet productivity remains a key challenge. Although most crop yields have at least tripled, they are still relatively low by global and even regional standards. Farm sizes are typically small: average size has fallen from 2.28 hectares (ha) in 1970-71 to 1.15 ha in 2011-12, and 85 percent of holdings are now under 2 ha. The absence of mechanized agriculture system coupled with land fragmentation has resulted in pre-dominance of less than 0.5 ha of landholdings.[6] A study in Jharkhand showed that less than a third of the total land under cultivation by the smallholders/tribal was fertile or arable and irrigation remains scarce with only about a quarter of the land owning households having some amount of irrigation for their crops.[7] Further, dependence on Non-timber Forest Products (NTFPs) as a mainstay for livelihood faces barriers related to unavailability of processing facilities which constrains the potential of transforming the livelihood system of tribal communities.[8]

4. The growth rates of agriculture and allied sectors have been fluctuating and uncertainties in agricultural growth are explained by the fact that more than 50 percent of agriculture in India is rain-fed, which aggravates the production risks and vulnerability to climate change. The agricultural sector in India has long depended on cheap and surplus labour, a situation that is changing with more opportunities in factories and services as well as the Government's rural employment guarantee program. This, coupled with drudgery in use of animal power has made mechanisation a necessity for farmers. NITI Aayog (National Institution for Transforming India serves as the premier policy think tank of GoI) in its vision document - Strategy for New India @75 - outlines how India has not caught up to the rest of the world in terms of technology, which has led to the dominance of inefficient production practices, thus arguing for the need for farm mechanisation as one of the strategies for Doubling Farmers' Income.[9]

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

5. India's agricultural policy reflects the government's priority focus on farmers' welfare and sustainable agriculture. Accordingly, in 2015, GoI renamed Ministry of Agriculture as Ministry of Agriculture and Farmers' Welfare (MoA&FW), and shifted its focus from enhanced productivity, to *doubling farmers' incomes* in real terms, by 2022. The reoriented strategy provided greater flexibility to state governments in allocating resources for prioritising agricultural development.[10] Mechanization of agricultural operations has been identified as one of the key interventions which directly contributes to the reduction in costs of production[11] and post-harvest losses, higher recovery of produce[12] during post-harvest as well as increase in farm productivity[13], resulting in increased farm income[14]. It is projected that 3 kW/ha farm power availability by 2022 is required to achieve the objective of doubling farmers' incomes in real terms by 2022, up from the current national average of 2.02 kW/ha in 2016–17.[9]

6. GoI is supporting a number of schemes for the promotion of agricultural mechanization. The ***Sub-Mission on Agricultural Mechanization (SMAM),*** under the MoA&FW, aims to increase farmers' reach to farm mechanization by providing 50-80 percent subsidies on machinery albeit with focus largely on the prime movers. ***The State Rural Livelihood Missions (SRLMs) under the National Rural Livelihood Mission (NRLM) of*** the Ministry of Rural Development (MoRD), IFAD funded projects in Jharkhand, Nagaland and Odisha, and Watershed missions in all states are creating efficient and effective community institutions (CIs) for social and economic empowerment. The CIs can become key actors in scaling up the adoption of AE technologies, as proposed in this project.

7. India is implementing a number of outcome based and well-targeted programmes and schemes to end poverty and a new initiative to address the agenda of "leaving no one behind" is to use data from the Socio economic and Caste Census, 2011 - which measures different forms of deprivation - for identifying beneficiaries for various development programmes.[15]

8. **Key actors and institutional arrangements**. The key actors in the process of agricultural mechanization are: (i) SMAM of the MoA&FW; (ii) Agriculture Engineering Division (AED) of Indian Council of Agricultural Research (ICAR) with its network of Agriculture Engineering and Technology Institutes, Farm Machinery Testing and Training Institutes (FMT&TIs) and All India Coordinated Research Project on agricultural machinery technologies (AICRPs); (iii) State Agricultural Universities (SAUs) and the Central Agricultural Universities; (iv) Krishi Vigyan Kendras (KVKs, district level agri-extension centres that link ICAR and farmers, aim to apply research to localized settings, and serve to train farmers on new practices); (v) Agriculture Machinery Manufacturers Association (AMMA); (vi) the State Departments of Agriculture (SDAs); and (vii) farmers & their organisations.

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

9. **Gender balanced for sustainable rural transformation:** India ranks 127 out of 189 countries on the gender inequality index (GII=0.524 in 2018)[16] and ranks 108 in Gender Gap Index[17] In order to bridge the gender gap, GoI is giving priority to women's social and economic empowerment by promoting women centric programmes including self-help groups under the nationwide NRLM/SRLM initiative. Recognizing that in rural areas, 75 percent of female workers are engaged in agriculture with limited access to productive resources, GoI has developed a gender mainstreaming strategy for its agricultural programmes.[18] This project design largely builds on the existing women led community institutions mobilized by SRLMs to empower women and to bring about financial inclusion. This project will identify existing community institutions and facilitate them to acquire agriculture engineering (AE) technologies which will increase the control of women over productive assets, reduce workload and

drudgery. These interventions are aligned with all the three Strategic Objectives enshrined in the IFAD's Policy on Gender Equality and Women's Empowerment.

10. **Youth Inclusive:** The project design also addresses the needs of youth who are increasingly moving away from agriculture due to hard labour requirements and low returns owing amongst other things, to low levels of mechanization. This will be addressed through development and promotion of appropriate AE technology. The project has also designed youth specific interventions such as research fellowships and awards for postgraduate students. In addition, youth will be given priority while selecting persons for training as mechanics to service AE machinery, and to establish service centres. The project will also target youth while selecting lead farmers for training in the use of AE technology and to conduct farmer field days. Participatory processes will be mainstreamed in demonstration and also in technology development with the involvement of smallholder in general and women and youth in particular.

11. **Climate focussed**: The project will contribute in two ways to enable smallholders to adapt to climate change related impacts and reduced greenhouse gas (GHG) emissions. Firstly, from the climate change adaptation perspective, mechanization will address those operations that are most affected by climate change such as : soil moisture conservation through zero tillage and mulch spreading; crop establishment through dry rice seeders, and rice transplanters, seed-cum-fertilizer drills; harvest through motorized reapers; and post-harvest through pedalled and motorized threshers. Secondly, although farm mechanization will contribute to GHG emissions due to use of fossil fuels for the prime movers, this impact will be offset by the reduction in number of draft animals, efficient use of chemical fertilizer and pesticides, and use of renewable energy for processing.

12. **Nutrition enabled:** This project focuses on AE technologies to increase the income of smallholders. The focus of this project is not on nutrition sensitive agriculture and hence no direct measure for nutrition improvement has been incorporated. This project will, however, enable the target beneficiaries to improve their nutritional status, indirectly, as AE technologies increase productivity by enabling them to introduce a second or third legume / oil seed / vegetable crop after rainy season rice. The resulting income increase along with diversification of the cropping system would indirectly contribute to improved diets of the households.[19]

c. Rationale for IFAD involvement

13. India has a diverse agro-ecology and its current farm mechanization strategies largely focus on tilling and irrigation technologies as the market for these technologies is enormous. The focus of the SMAM has been largely on tractors and to a limited extent on power tillers, combine harvesters and water lifting devices. A recent impact evaluation of the SMAM[20] programme points towards the need for promoting technology for rainfed areas, support for farm production and processing machinery other than prime movers, greater investment in demonstration, focus on location and crop specific machinery/technology; greater outreach and awareness about mechanisation; transfer of new design or technology.

14. On the research side, AED-ICAR has done pioneering work in agricultural mechanization and has developed 300 AE technologies through its network institutions and projects. The technologies developed by ICAR are categorized into production/cultivation, harvest, post-harvest/processing and agri-residue management that depend on a variety of power source including diesel/petrol, electricity, solar and biomass. In preparation for the design of this project, IFAD and AED-ICAR screened more than 120 technologies in terms of energy efficiency, savings in labour and energy, and affordability to smallholders, using standard cost benefit and environmental analyses. A majority of these technologies were for processing. The exercise revealed that there are no benchmarks for assessment of adequacy of AE technologies for smallholders, and that many of these technologies remained at proof of concept stage, or had limited market penetration.

15. The present project aims to better align AE research and requirements of smallholder farmers; as well as scaling up of AE technologies that have been successfully demonstrated with smallholder farmers, particularly women who carry out 75% of agricultural labour. IFAD would support GoI in this endeavour, by developing an effective mechanism for transferring AE technologies from the lab to the field, and expanding last mile delivery of mechanization services for agriculture and allied activities. IFAD supported programme in India presents a solid track record in developing such last mile delivery mechanisms.

16. The project is also fully aligned to IFAD's COSOP (2018-24) which outlines IFAD's commitment to work towards Smallholder food and agricultural production systems becoming remunerative, sustainable and resilient. The project will leverage the on-going IFAD supported operations in Jharkhand, Odisha and Nagaland to facilitate scale up and outreach where appropriate.

B. Lessons learned

17. This project design draws on lessons from the evaluation of the Government's mechanization scheme, the Cereal Systems Initiative for South Asia (CSISA), the NRLM/SRLM promotion of community institutions, and IFAD co-funded projects in India.

18. **Technology adoption is enabled by availability of relevant technology, quality demonstration and incentives for adoption.** The performance assessment of agricultural technologies in Odisha conducted by CSISA concludes that five actions are necessary to promote the uptake of new technologies: training, demonstrations, seasonal learning exercises, large scale extension and awareness creation. Women were found to prioritize the following features in new technologies: time and cost-saving, reduced drudgery, and improved crop establishment and yield.[21] CSISA experience also indicates that providing subsidies on purchase of machinery is not adequate for enhancing adoption of AE technologies ; instead, the subsidies on machinery acquisition should be combined with an incentive for user expansion to drive adoption of new machinery and ensure that the farm machinery is fully utilized.

19. **Free demonstrations do not lead to large uptake**. IFAD-supported Convergence of Agricultural Interventions in Maharashtra (CAIM) initially funded 100 percent cost of machinery to farmers as demonstrations. This led to increased expectation and all the farmers started expecting 100 percent grant for technology uptake. This modality was eventually replaced by demonstration and incentivizing all the interested farmer groups for technology uptake. The revised approach led to substantial uptake of technology.[22] This experience points to the need of: (i) adequate facilitation with local communities (introduction of and sensitization about the usefulness of the technology) before initiating demonstrations; (ii) well-structured demonstrations with requisite attention to field level demonstration and farmers' training; (iii) emphasizing beneficiary contribution in financing technology acquisition.

20. **Community Institutions are effective platforms to reach rural poor**. There are experiences from two large programmes: the GoI's National and State Rural Livelihood Missions and the IFAD supported Tejaswini project in Maharashtra. NRLM/SRLMs have developed a nationwide two tier CI structure comprising SHGs and VOs. NRLM/SRLMs follow a saturation approach and as a result all poor households within a village become a part of the SHGs. These SHGs are federated at the village level to form VOs. The experience in Tejaswini-Maharashtra indicates that the capacity building efforts, governance systems, financial management systems and the incentives available from the government for livelihood activities transform these CIs as the organizations for the delivery of last mile services, catering to both social and economic needs of the women members.[23] These capabilities can be harnessed to enhance access of smallholders to AE technologies.

21. **Community owned and managed Custom Hire Centres (CHCs) and common facility centres (CFCs) have strong social returns but**

require Government subsidies: The experience from community-managed CHCs and CFCs indicates higher level of capacity utilization, no surge pricing during peak season and improved access to smallholders. AE technologies with the exception of tractors, are not optimally profitable given the high opportunity cost of capital for the poor households. Five key lessons with reference to community-managed CHCs and processing enterprises drawn from the experience of CAIM and Tejaswini-Maharashtra include: (i) preference should be given to implements that are power operated and have round the year requirement; (ii) equipment should be –easy to use by women; (iii) training and mentorship are required in managing CHCs and CFCs as enterprise; (iv) skill training should be provided to local youth to operate and repair the machineries; (v) higher level of subsidies are required to enable CIs to acquire and operate AE technologies compared to individually owned CHCs.

22. **Leveraging Government field capacity is key to promote mechanization.** GoI implements a major farm mechanization project through SMAM, which focusses largely on tractors and power tillers, and is implemented by the SDAs. This sub-mission's impact assessment was conducted and the major policy recommendations from this include: (i) bring all farm mechanization schemes under the umbrella of SMAM and rename it as the National Farm Mechanization Mission under the Department of Agriculture, Cooperatives and Farmers' Welfare (DoAC&FW); (ii) provide support for farm machinery manufacturing facility; (iii) establish new FMT&TIs in 21 locations across 17 states; (iv) establish Kissan Seva Kendra in each FMT&TI to assist farmers and users of farm machinery; and (v) organize 'Mechanization Mela' at the district level, at least once/twice in a year for popularization of newly developed agricultural machinery and technology.[24] Some of these recommendations have been incorporated into this design.

2. Project Description

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

23. The goal of the project is to enable poor rural households to increase farm income through the use of affordable and efficient agricultural engineering technologies[25]. The goal will be achieved through the development objective of increased labour and farm productivity through adoption of AE technologies[26]. The project will contribute to AED-ICAR's capacity to collaborate with public and private sector research institutions; to develop, acquire, and support the scaling up of AE technologies. Special features of the AE technologies promoted by the project are : they reduce women drudgery; they are adapted to the needs of hill farmers; they contribute to build the capacity of small and marginal farmers to adapt to climate change.

24. Key indicators at the goal level will include: (i) 70% of households reporting more than 25% increase in incomes. Development objective level indicators to be measured include: (i) 20 percent increase in farm power use; (ii) 50 percent reduction in labour costs for households adopting mechanization; (iii) 15 percent increase in farm productivity; (iv) 40 percent of women reporting decrease in drudgery related workload; (v) women empowerment enhanced; (vi) number tons of CO_2 sequestered. It is expected that by the end of the project, 318,600 households would report reduction in labour costs of 50% and increase in farm productivity of 15% (see logframe in annex 1).

25. **Geographic areas of intervention:** This project will be implemented in the states with relatively higher levels of poverty, low levels of farm power availability and low levels of appropriate technology development and diffusion. Based on these parameters, two states in the north-eastern region (Assam and Nagaland) and three eastern states (Chhattisgarh, Odisha and Jharkhand) have been selected. Of these five states, Chhattisgarh, Jharkhand, Assam and Odisha are amongst the top 10 poorest states in India.[27] Assam and Nagaland are Category IV states with less than 1.00 KW/ha farm power and Odisha, Jharkhand and Chhattisgarh are Category II states with farm power of 1.726 to 1.000 Kilowatt/ha $(KW/ha)^2$. Nagaland, Jharkhand and Chhattisgarh states have a large area under hill agriculture, with low levels of appropriate technology diffusion and adoption.[28] All the states have significant tribal population where exposure to and adoption of technology is even less than national average.

26. The project would be implemented in 31selected districts in these five states. The criteria used for district selection include: (i) districts with well performing KVKs; (ii) aspirational districts (refers to 115 districts identified by the GOI as lagging against human and economic development indicators) within varying agro-climatic zone[29]; (iii) availability of community institutions (SHGs, VOs, FPOs, Watershed committees (WSCs), Jhum resource management committees (JRMCs), etc.) with higher levels of organizational maturity; (iv) districts with intensive blocks of SRLM where SRLM covers all poor households in all villages of the block, and the interventions on financial inclusion for women are combined with livelihood development, agriculture extension in crop and livestock, and set up of enterprises around input supply, output aggregation and value addition, marketing; and (v) contiguity of districts for ease of operation.[30] About 50% of the districts selected are aspirational districts; and 55% of the districts have on-going IFAD supported projects (FOCUS Nagaland, JTELP, OPELIP). The project would be implemented in about 4 blocks in each selected district covering about 30-35 villages per block. In total, the project would cover 135 blocks comprising 4,000 villages. The criteria for selection of project villages include: (i) high potential for agriculture mechanization based on a consultation between SDAs and SRLMs; (ii) availability of community institutions (SHGs, VOs, Cluster level Federations (CLF), Watershed Committees, FPOs) that are in operation for at least 2 years; (iii) contiguity of villages for ease of management; (iv) not part of the ecologically sensitive area nor of the protected area/wildlife sanctuaries and buffer zone under GoI Forest Classification Mapping; and (v) villages from the similar agro-ecology within the district.

27. In respect of all villages including those with tribal population, this project intends to work with the existing affinity based CIs. These are built by various agencies, through participatory and consultative approaches requiring active and voluntary participation of the communities, to empower them socially and economically. Community consultations, full orientation, feedback from the community and other participatory approaches will be the guiding elements in technology testing, demonstration and scaling up. The project will provide demand driven support to the CIs with no imposition from any technology provider. This project's activities do not envisage changes to either land ownership or land use. Hence, no separate free prior informed consent (FPIC) process is being proposed.

28. The districts selected include: (i) Baksa, Nalbari, Golaghat, Morigaon, Barpeta and Sonitpur in Assam; (ii) Raipur, Rajnandgaon, Kanker, Jagdalpur and Gariaband in Chhattisgarh; (iii) Ranchi, Khunti, Latehar, West Singhbhum, Hazaribagh and Gumla in Jharkhand; (iv) Bolangir, Kandhamal, Dhenkanal, Gajapati, Sundargarh and Mayurbhanj in Odisha; and (v) Mon, Longleng, Zunheboto, Wokha, Kiphire, Phek, Mokokchung and Kohima in Nagaland. The project will sign a Memorandum of Understanding (MoU) with each participating state government to formalize the district selection.

29. **Target groups:** The project target group includes: small and marginal farmers whose landholding is less than 2 Ha and who represent more than 75 percent of the farming population; women members of self-help groups and producer groups; and youth. Despite the agro-ecological differences in the project area, the livelihood systems of the rural poor are very similar and characterized as follows: (i) subsistence based rice production systems which generate limited surplus, and which rely on kharif cultivation as the main crop. Main crops are rice, maize, millets and pulses; (ii) livestock holding of less than 5 heads of small ruminants, mainly goats, pigs and poultry; and (iii) for tribal households among the small and marginal farmers, reliance on NTFP is high as a source of livelihoods (examples of NTFP include mahua, sal leaves, chironji, tamarind). Income derived from agriculture and allied sectors represents about 50-70 percent of the total household income and 30-50% of the income would

be derived from wage labour opportunities. The estimated average income for the target group is about 60,000 INR/year which is below the poverty line (estimated at 44 INR/person/day in 2017-18). The project's main focus will be on SHGs/VOs/CIs promoted by the SRLMs whose membership is restricted to only women. The social composition of SHGs indicate that 54.85 percent of the members belong to Scheduled caste/Scheduled Tribe (SC/ST) groups and 90 percent of the members are categorised as poor.[31] The targeting strategy through Self-Help Groups and Village Organizations will have dual benefits: (i) the poor households are primary beneficiaries of the development and diffusion of AE technologies; (ii) women become the agents of change for improved agriculture productivity and adaptation to climate change in their household. With regards youth comprising both women and men in the age group 15-29 years, the project would provide direct support as lead farmers, innovators and persons to be trained as mechanics to establish service centres. In addition, some of the youth will be engaged as managers of FMUs/CFCs/ATBs and as drivers of prime movers. This is expected to attract youth to employment in agriculture.

D. Components/outcomes and activities

30. AED-ICAR's current efforts of AE technology development are largely focussed on its in-house development, and the dissemination through KVKs.[32] In order for AED-ICAR to enlarge its role in setting the AE research agenda, it needs to draw on research from a wide spectrum of stakeholders, both in the public and private sector realm and be at the forefront as the technology contributor to the government's mechanization scaling up efforts. In line with this strategy, the project would strengthen the capacity of AED-ICAR to: (i) develop and promote AE technologies (including agriculture, horticulture, animal husbandry and allied activities) with focus on smallholders (women and hill/tribal farmers) with geographic and climate change adaptation specificity; and (ii) test new institutional and incentive models for the expansion of mechanization to enable farmers to increase overall income from farming.

31. The 2 major outcomes will include: (i) reduced mismatch between the needs and availability of smallholder centric AE technologies; and (ii) increased access and adoption of AE technologies for farm production and post-harvest processing. The project will have two components: (i) Participatory technology development; and (ii) Business models for scaling up of appropriate AE technologies.

Component 1: Participatory Technology Development

32. This component will have two sub-components: (i) Assessment and capacity building; and (ii) Innovation platform. The total budget allocated to this component is USD 16.32 million.

Sub-component 1.1: Assessment and capacity building

33. **Needs Assessment:** Efforts by the government for promotion of AE technologies for tillage operations have yielded substantial results but remain limited in respect of other aspects of farming and post-harvest. A directory of such technologies are required to document the geography and climate change adaptation specific technologies: (i) new AE technology development requirements; (ii) adaptation/customization required for the existing technology; (iii) prototypes that are ready for commercialization; and (iv) existing commercialized technologies with low levels of diffusion. In addition, state specific lists of needed technologies will be prepared and updated every year based on technology assessments conducted in a participatory manner with the users. An initial list, containing prioritized technologies relevant to smallholders (hill/tribal farmers and women) with low diffusion and for starting demonstration related activities, was identified. The list includes: (i) rice direct Seeders / row planters; (ii) pulses and oil seed row seeders; (iii) rice transplanters; (iv) rice field mechanical weeders; (v) reapers (motorized); (vi) motorized mechanical threshers; (vii) grain dryers; (viii) small rice mill with rubber boots; (ix) mills for pulses; (x) oil extractors for oilseeds; (xi) tamarind brick maker; (xii) mahua flower processor; and (xii) mahua kernel processors. Details are provided in Project Implementation Manual (PIM) in annex 8.

34. **Capacity building:** ICAR will use this project to build its capacity as an umbrella organization for AE technology development for marginal and smallholders with focus on hill and tribal farmers, rural women and on adaptation to climate change. This will enable AED-ICAR to set the AE research agenda across both, the public and private sector research agencies, develop knowledge sharing platforms, avoid duplication in research and development (R&D), and disseminate lessons from R&D and scaling up models to the policy makers.

35. The project will support establishment of national technology forums, technology import and export (including machinery and equipment), licencing and IPR protection, and participation in agri-expos. The project will create AE research interest in the young professionals through fellowships and awards for best AE research.

36. The IFAD grant financing the project will be used for enhancing the capacity of ICAR and its institutions on: (i) techno-economic assessment protocols for AE technologies; and (ii) target specific technology manuals for conducting demonstrations on AE technologies and related package of practices. ICAR will engage with Consultative Group for International Agricultural Research (CGIAR) and/or other internationally renowned institutions to implement these activities. In addition, the project will support: (i) international and national exposure visits for staff from SAUs and SDAs to centres of excellence for AE research and development of new technologies; (ii) environment and climate related studies, recommended by the Environmental and Social Management Plan (ESMP). Since GoI intends to deploy loan resources largely for technology development and scaling up activities with tangible benefits to the smallholders, the ICAR capacity building efforts with longer term benefits will be funded through IFAD grant.

Sub-component 1.2: Innovation Platform

37. Several institutions in India are involved in the development of AE technologies. These institutions include ICAR and organizations under its fold, institutions of Department of Science and Technology (DST), Indian Institutes of Technology (IITs), State Agriculture Universities (SAUs) as well as the private sector. The project will establish an innovation platform to promote: (i) new technology development from concepts to prototypes; (ii) adaptations/ customization of existing technologies; and (iii) existing prototypes to move into commercial production.

38. The project will call for proposals from all interested research institutions for: (i) development of new technologies; and (ii) adaptations/customization of existing technologies. Applicants would include public research organizations, private sector R&D, as well as joint submission by public and private research entities. These proposals will be evaluated from smallholder and climate change adaptation perspective and the project will support selected proposals. The project will also conduct technology challenges[33], both at the state and central level, to showcase AE technology prototypes that need to be fine-tuned to take them to the stage of commercial development. Selected prototypes will be supported for demonstration in the project area to seek farmers' feedback. Such demonstrations will also involve machine manufacturers in the development of design blue prints. The project will establish a third party assessment to concurrently evaluate the performance of activities under the innovation platform and make recommendations for improvement.

Component 2: Business models for scaling up of appropriate AE technologies

39. This component will have two sub-components: (i) Demonstrations and support service development; and (ii) Scaling up partnerships. The total budget allocated to this component is USD 97.01 million.

Sub-component 2.1: Demonstrations and support service development

40. **Demonstrations:** Demonstrations serve as an effective instrument for rapid dissemination of technology, especially when they are combined with field days. In line with this strategy, the project will mainly support KVKs to develop a two stage demonstration model comprising: (i) training of lead farmers; and (ii) lead farmer led training of farmers through field days. The project will provide AE machinery and equipment to KVKs to conduct lead farmer training within their campus or on their existing demonstration fields. KVKs will create 3-4 hubs in collaboration with SHGs/VOs/CIs at the block level to manage the AE machinery and equipment (excluding prime mover). The lead farmers selected in consultation with SHG/VOs/CIs will be trained using the technology manuals prepared by the project and after training, will be allowed to borrow machinery from the KVKs and/or rent prime mover (tractor/tiller) if required, and conduct village field days. The lead farmers will be incentivised to conduct the field days and a third party verification through SHG/VOs/CIs will be set up to ensure that the field days have been conducted with required participation. In total 4,000 lead farmers will be trained and each lead farmer will conduct 10 field days covering 100 farmers. Total number of field days will be split into 3-4 events covering different aspects of farming. The project will also support training and exposure visits particularly for promoting appropriate processing technologies.

41. **Support service development:** One of the main reasons for limited diffusion of the smallholder AE technology is the inability of the small scale manufacturers to develop sales and service centres which are essential to raise confidence level of farmers to procure AE machinery. It is also not a viable proposition to establish separate service centres for these machineries individually, and therefore, they need to be linked up to the existing state agro-corporations and to existing agriculture machinery service centres of the prime movers (tractors and tillers). The project will create platforms for consultation between manufacturers and local area dealers involved in sales and services. The project will support: (i) the State Agro Corporations to include the identified AE machinery and equipment in their existing sales and service centres, or establish new sales and service centres; (ii) existing Agriculture Machinery Service Centres, and Agriculture Input Centres; and (iii) train youth in after–sales service of the AE machinery and support them to set up repair and maintenance units. These service centres can also graduate to become FMUs and CFCs with support from scaling up partnerships. SDAs will be the main partner for implementing this activity.

Sub-component 2.2: Scaling up partnerships

42. Scaling up of AE technologies is currently driven by high level of incentives by the government which has resulted in increased ownership of prime movers, essentially tractors and power tillers. Experience of International Rice Research Institute (IRRI) in promoting AE technologies for paddy cultivation in Assam indicates skewed relationship between availability and actual use of AE technologies as the owners use them only for their personal use, instead of optimally using them for both own use and renting to other farmers. This project proposed a community managed model for machinery services.

43. The project will develop partnerships with SRLMs, WSMs, SDAs and other agencies to support the SHG/VOs/CIs for establishing FMUs, CFCs and Agricultural Tool Banks (ATBs) on a collective ownership basis. In addition, the project will also support individual ownership of AE machinery (other than prime movers) by smallholders. The project will implement: (i) a differential technology incentive modality with higher levels of technology incentives for auxiliary AE technologies, renewable energy powered machinery, support for CFCs, ATBs; and (ii) an innovative user expansion support to incentivize users so that the existing AE machines and equipment are used optimally by triggering demand. Details are provided in PIM (annex 8).

44. The incentives for technology acquisition will be shared between the project, convergence with SMAM and beneficiary contribution. In case of individually owned AE machinery, beneficiaries will be required to mobilize about 50 percent of the total cost, which may require support from banks. The project will also facilitate access to finance for the smallholders to acquire AE machineries and equipment by establishing Finance Facilitation Platforms at the block level and district level where bankers, beneficiaries and project's scaling-up partners will be members.

45. It is worth mentioning that the project is open to establishing scaling up partnerships with the agribusinesses involved in machinery hiring services along the Uber model. Provisions in the project budget have been made accordingly to allow such enterprises to expand their business in the project area, in case they find an effective demand for their services. With regards the CI managed FMUs, the option of the CI leasing the machines to an individual entrepreneur can be considered during project implementation. The lessee would take responsibility for the operation and maintenance of the machine and pay a rent to the CI.

E. Theory of Change

46. The growth rate of agriculture & allied sectors has been low and fluctuating. The Gross Capital Formation (GCF) in agriculture and allied sectors as a proportion to the total GCF showed a decline from 8.3 percent in 2014- 2015 to 7.8 percent in 2015-16.[34] The major challenge to enhance agriculture growth is the declining profitability of farming operations mainly due to: (i) increase in farm labour costs contributed by labour shortage as a result of shift of farm labour to other better paying sectors and also disinterest of youth in farming because of the hard labour requirement and drudgery; (ii) inability to respond to climate change events, such as heavy precipitation and intermittent droughts which require an accelerated pace to complete farming operations on time and during confined periods which impose stress on farm labour availability; (iii) inability to increase cropping area and cropping intensity due to labour shortage; (iv) reduction in the recovery of produce due to longer period required to harvest and vacate the field; and (vi) inability to use the available moisture remaining after the *kharif* season for growing a second crop due to delays in harvesting and evacuating harvest from the fields.

47. These challenges can be addressed through farm mechanization. GoI is actively pursuing farm mechanization with an ambitious plan of increasing the farm power availability to 3 KW/ha to achieve the overall objective of doubling farmers' income by 2022. However, the main focus has been on tractors and power tillers. There is mismatch between location specific needs and availability of smallholder centric technology, a limited focus on required technologies relevant to women and hill/tribal farmers, and technologies that enhance ability of farmers to adapt to climate change events.

48. In order to address these challenges, the project's strategies include: (i) building capacity of ICAR as a broader umbrella organization in AE research and development; (ii) developing and promoting new AE technologies, adaptations/modifications in existing technologies, and commercialization of prototypes relevant to smallholders with specific focus on women and hill/tribal farmers centric technologies, and on technologies that facilitate farmers to adapt to climate change events; (iii) increasing awareness of smallholders to appropriate AE technologies with appropriate diffusion strategies; and (iv) developing and operationalizing models for scaling up existing and new AE technologies (production and post-harvest processing).

49. In line with these strategies, the project's interventions include: (i) ICAR's capacity building in smallholder focussed AE research and development; (ii) KVKs' capacity building to conduct demonstrations and field days; (iii) an innovation framework to support development of new AE technologies from concept stage to prototypes, adaptations and modification of existing technologies and commercialization of existing prototypes; (iv) support demonstrations and field days for selected geography and crop specific AE technologies; (v) support service development to promote after sales service; and (vi) support scaling up models to enhance access of smallholders to AE technologies.

50. These interventions are expected to generate outcomes, which include increase in farm power, reduction in labour costs, increased farm productivity, higher produce recovery, reduced drudgery, increased adaptability to climate change events, and increased development of small holder centric technologies and access of smallholders to mechanized solutions. The outcomes will contribute to profitable operations of sales and services of AE technologies, thereby reducing costs of labour and increasing farm income of smallholders. Annex 2 presents ToC diagram.

F. Alignment, ownership and partnerships

51. **Alignment with SDGs**. The project through appropriate AE technologies intends to increase the farm income of rural households by reducing labour costs, increasing farm productivity and reducing farm drudgery. Primary focus of AE technology development and promotion will be on women and hill/tribal farmers and also on climate change adaptation, renewable energy and energy efficient technologies. The project intends to work largely with CIs built under the SRLMs to reach women in general and poor and socially disadvantaged in particular. These strategies of the project will contribute significantly to the achievement of SDG 1 - end poverty; SDG 2 - zero hunger; SDG 5 - gender equality; SDG 7 - access to affordable and clean energy; and SDG 13 - combat climate change and its impacts.

52. **Alignment with IFAD policies and corporate priorities**. At corporate level, the project is aligned with IFAD policies for mainstreaming gender, youth and climate. The project places substantial emphasis on addressing the gender concerns particularly in the realm of drudgery reduction through development and promotion of women friendly AE technologies taking into account their substantial and increasing role. In addition, the project will enhance women's access to resources through promotion of FMUs, CFCs and ATBs. The project is therefore, well aligned with IFAD's Gender Action Plan (2019-2021). Finally, the project contributes to the Youth Action Plan by increasing the opportunities for business development and rural employment tapping into the roles that young people can play in terms of technology uptake and delivery of mechanized farm services as well as in service sector for the maintenance and repair. At country level, the project is aligned with the RB-COSOP 2018-2024, namely promoting remunerative and resilient agriculture.

53. **Ownership.** ICAR is the implementing agency for the project and through the Project Steering Committee (PSC) and Project Management Committee (PMC), the projects' ownership will be expanded to include the DARE, DoAC&FW and MoRD. Similarly at the state level, project ownership will be vested with the State Project Coordination Committee (SPCC) with the involvement of SDAs, SRLMs and other state level partners. ICAR as the lead implementing agency will be vested with the responsibility of project management and has undertaken all the preparatory activities related to project design by organizing a series of consultation on the project concept and implementation modalities, and embarking on meeting the conditions for implementation readiness as required by the Department of Economic Affairs, Ministry of Finance, GoI.

54. **Partnerships.** The project will partner with the KVKs for conducting demonstrations of AE technologies, lead farmer training and lead farmer led farmers' field days. The project will also partner with the SRLMs, SDAs, SWMs and other agencies at the state level involved in grassroots institution building efforts. Through collaboration with SMAM, the project will support the acquisition by the CIs, of the AE technologies that were successfully demonstrated.

G. Benefits, costs and financing

a. Project costs

55. The cost estimates for the SCATE project are prepared using the following key assumptions: (i) the six year project commences implementation in the fiscal year 2019-20; (ii) all unit costs are input in INR currency; (iii) average exchange rate of INR 70 per USD, price contingencies of 5percent; (iv) investment and recurrent costs are categorised in accordance with IFAD circular of 29 August 2013 and (v) taxes excluded from IFAD financing. Total estimated project cost is USD 124.27 million including IFAD loan of USD 66.1 million and Grant of USD 1.0 million, co-financing by the government mostly in the form of taxes, contribution by ICAR in the form of staff salary, facilities etc, convergence support from the ongoing GOI programme of SMAM, beneficiary contributions in cash, and the banks. Project costs by components and financiers are presented in Table 1 below.

Table 1: Project components and financiers in (US$ '000)

Components/Sub-componnet	IFAD loan		IFAD Grant		Banks		Convergence		ICAR		Govt		Benef		Total
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount
A. Component 1: Participatory technology development															
1. Need assessment	423.0	90.0	-	-	-	-	-	-	-	-	47.0	10.0	-	-	470.0
2. ICAR capacity building	4 271.8	70.3	1 005.6	16.6	-	-	-	-	111.7	1.8	683.7	11.3	-	-	6 072.8
3. Innovation platform	5 888.6	60.2	-	-	-	-	-	-	2 914.6	29.8	978.1	10.0	-	-	9 781.4
Subtotal	10 583.4	64.8	1 005.6	6.2	-	-	-	-	3 026.3	18.5	1 708.8	10.5	-	-	16 324.2
B. Component 2: Demonstrations and Scaling up AE Technologies															
1. Demonstrations of AE technologies	13 804.2	53.9	-	-	-	-	702.9	2.7	8 274.7	32.3	2 840.0	11.1	-	-	25 621.7
2. Support service development	3 151.0	80.9	-	-	-	-	-	-	-	-	431.3	11.1	313.0	8.0	3 895.3
3. Scaling up AE technologies	31 935.9	47.3	-	-	5 726.0	8.5	8 700.4	12.9	-	-	11 537.2	17.1	9 589.8	14.2	67 489.3
Subtotal	48 891.0	50.4	-	-	5 726.0	5.9	9 403.2	9.7	8 274.7	8.5	14 808.5	15.3	9 902.8	10.2	97 006.3
C. Component 3: Project Management															

1. PIU and SPMUs	5 720.9	57.8	-	-	-	-	-	-	2 520.4	25.5	1 656.3	16.7	-	-	9 897.5
2. Project M&E and knowledge management	891.5	85.4	-	-	-	-	-	-	-	-	152.3	14.6	-	-	1 043.8
Subtotal	6 612.4	60.4	-	-	-	-	-	-	2 520.4	23.0	1 808.6	16.5	-	-	10 941.4
Total PROJECT COSTS	66 086.9	53.2	1 005.6	0.8	5 726.0	4.6	9 403.2	7.6	13 821.4	11.1	18 325.9	14.7	9 902.8	8.0	124 271.9

56. The IFAD total climate finance for this project is 64.1 million USD or 96% of the total IFAD financing. The share of finance for climate change mitigation represents 81% of the IFAD total climate finance.

57. There are several expenditure categories under this project and these are set in accordance with the IFAD procedures as presented in Table 2 below.

Table 2: Project cost by expenditure categories in (US$ '000)

Components/SubCom-ponents	IFAD loan		IFAD Grant		Banks		Convergence		ICAR		Govt		Benef		Total
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount
I. Investment Costs															
A. Technical assistance /a	18 811.8	73.9	1 005.6	4.0	-	-	-	-	3 026.3	11.9	2 605.4	10.2	-	-	25 449.1
B. Equipment & materials /b	24 445.9	41.0	-	-	5 726.0	9.6	9 403.2	15.8	-	-	10 620.6	17.8	9 400.7	15.8	59 596.4
C. Training and workshop	13 981.4	80.5	-	-	-	-	-	-	-	-	3 393.6	19.5	-	-	17 375.0
D. Grants and subsidies	4 518.8	84.2	-	-	-	-	-	-	-	-	347.7	6.5	502.1	9.4	5 368.6
E. Goods, services and inputs	726.9	90.0	-	-	-	-	-	-	-	-	80.8	10.0	-	-	807.7
Total Investment Costs	62 484.8	57.5	1 005.6	0.9	5 726.0	5.3	9 403.2	8.7	3 026.3	2.8	17 048.0	15.7	9 902.8	9.1	108 596.8
II. Recurrent Costs															
A. Salaries and allowances	-	-	-	-	-	-	-	-	8 274.7	100.0	-	-	-	-	8 274.7
B. Incremental operating costs	3 602.1	48.7	-	-	-	-	-	-	2 520.4	34.1	1 277.9	17.3	-	-	7 400.3
Total Recurrent Costs	3 602.1	23.0	-	-	-	-	-	-	10 795.1	68.9	1 277.9	8.2	-	-	15 675.1
Total PROJECT COSTS	66 086.9	53.2	1 005.6	0.8	5 726.0	4.6	9 403.2	7.6	13 821.4	11.1	18 325.9	14.7	9 902.8	8.0	124 271.9

58. The project costs by component and year are given in Table 3 below.

Table 3: Project costs by component by year in (US$ '000)

Components/SubCom-ponents	2020	2021	2022	2023	2024	2025	Total
A. Component 1: Participatory technology development							
1. Need assessment	107.6	85.3	83.1	87.3	91.7	15.0	470.0
2. ICAR capacity building	51.4	1 187.1	1 363.5	1 351.8	1 259.2	859.7	6 072.8
3. Innovation platform	112.0	1 720.5	1 818.6	1 805.3	1 895.5	2 429.5	9 781.4
Subtotal	271.1	2 992.9	3 265.2	3 244.4	3 246.4	3 304.1	16 324.2
B. Component 2: Demonstrations and Scaling up AE Technologies							
1. Demonstrations of AE technologies	5 975.3	8 089.4	3 828.3	3 485.8	2 574.4	1 668.5	25 621.7
2. Support service development	146.4	822.6	1 251.1	1 203.5	471.7	-	3 895.3
3. Scaling up AE technologies	386.6	10 980.8	19 857.5	18 545.0	17 151.3	568.1	67 489.3
Subtotal	6 508.3	19 892.8	24 936.9	23 234.3	20 197.4	2 236.6	97 006.3
C. Component 3: Project Management							
1. PIU and SPMUs	1 504.1	1 812.4	1 886.9	1 518.5	1 555.9	1 619.7	9 897.5
2. Project M&E and knowledge management	190.9	191.7	196.3	142.7	132.1	190.1	1 043.8
Subtotal	1 695.1	2 004.1	2 083.2	1 661.2	1 688.0	1 809.8	10 941.4
Total PROJECT COSTS	8 474.5	24 889.8	30 285.3	28 139.9	25 131.8	7 350.5	124 271.9

b. Project financing/co-financing strategy and plan

59. The project costs will be financed by IFAD loan of USD 66.1 million and IFAD grant of USD 1.0 million; GOI participation equivalent to USD 18.32 million including domestic taxes equivalent to USD 16.28 million; ICAR contribution of USD 13.82 million equivalents in the form of staff salary; bank financing of USD 5.73 million equivalent; convergence through SMAM equivalent to USD 9.4 million; and the beneficiaries' contribution of USD 9.9 million equivalent. The IFAD loan will be on ordinary terms. IFAD grant will finance the capacity building of the ICAR staff who are involved in the implementation of the project. Both IFAD loan and grant will not finance taxes. Broad financing rules for some of the major categories and activities are provided in Table 4 below:

Table 4: Project cost by disbursement category

Financing rule by disbursement category					
Expenditure category	**IFAD**	**ICAR**	**SMAM**	**Beneficiaries** **Banks**	**Taxes**
Equipment and materials	80%				20%
Farm machinery	40%		40%	20%	20%
Training and workshop	80%				20%
Grants and subsidy	90%			10%	10%
Technical assistance	90%				10%
Goods, services and inputs	90%				10%
Incremental operating costs	90%				10%
Staff salary	0%	100%			

c. Disbursement

60. IFAD loan and grant resources will be allocated to two expenditure categories in Schedule 2 of the Financing Agreement: "investment costs" (a consolidation of technical assistance, equipment and materials, grant and subsidies, training and workshops, and goods, services and inputs); and "incremental operating costs". SCATE will not be on "report-based disbursement", rather IFAD loan and grant resources will be disbursed in accordance with the agreed terms and conditions set forth in the Financing Agreement, the Loan Disbursement Handbook and the Letter to the Borrower. These will require the submission of withdrawal applications listing the incurred eligible expenditures.

d. Summary of benefits and economic analysis

61. Benefits and Beneficiaries: The Project will reach a total of about 400,000 households equivalent to 2.0 million individuals. These beneficiary households will include smallholder farmers and member-farmers of the VOs, SHGs, FPOs, watershed committees, Tribal farmers and other disadvantaged households. Women-headed and poor households will be especially targeted under the project. Average investment of IFAD sources of funds per household is estimated as USD 168. Table 5 below gives an estimate of the cumulative number of beneficiaries by year.

Table 5: Number of Benefitted Households						
Beneficiary categories	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Farm mechanisation units hh a/	0	25,000	65,000	100,000	130,000	130,000

CFC processing unit hh b/	0	22,000	51,000	81,000	110,000	110,000
Agri tool bank unit hh c/	0	5,000	15,000	22,500	22,500	22,500
Support to existing CHC d/	0	12,500	32,500	50,000	65,000	65,000
Individual farmers hh	0	100	2,100	4,100	6,100	6,100
Total direct beneficiaries	0	64,600	184,500	257,600	336,000	336,000
User expansion services hh e/	200,000	200,000				
Total beneficiaries	200,000	264,600	184,500	257,600	336,000	336,000

a/ VO members participating in technology demonstrations and use of farm machinery units

b/ direct beneficiaries of some 950 CFC and post-harvest technology demonstrations and participation

c/ direct beneficiaries of some 225 units of agricultural tools bank

d/ direct beneficiaries of support to existing CHC units

e/ direct beneficiaries of user expansion services for 4,000 village organisations, village councils, producer organisations, watershed committees and other CBOs

62. The immediate benefits from the project are significant reduction in production costs by 31 percent, incremental production ranging between 11-15 percent, access of smallholders and other farmers to the farm mechanisation services, agri-based primary processing of pulses, spices, millets and also opportunities for availing many diversified interventions that are aimed at increasing farmers' incomes. On an average, a household's production benefits increase by a modest estimate of 316 kg/ha due to improved cultivation and farming practices as a result of adoption of AE technologies.

63. *Project Performance Indicators*: Cost-benefit analysis yields an overall Internal Rate of Return (IRR) of 18 percent. The estimated NPV for a 7.5 percent discount rate is INR 3,389 million and the Benefit cost ratio (BCR) of 1.26. A positive Net Present Value (NPV) under the current opportunity cost of capital (OCC) of 7.5 percent indicated that the project investments are sound and robust. A sensitivity analysis of the project is presented in Table 6 below.

Table 6: Project performance Indicators

Project performance indicators					
Indicator	scenario				
	Base Case	Costs Increase by		Benefits down by	
		15%	20%	15%	20%
IRR	18%	12%	10%	11%	8%
NPV on discounted cash flows (million INR)	3,389	1408	754	902	80
BCR on discounted cash-flow	1.26	1.09	1.05	1.07	0.94

64. *Sensitivity analysis* was undertaken to assess how varying assumptions changed the economic parameters. If benefits delayed by two years (in effect, if the project's future production activities take longer to become fully developed or established) then the IRR declines to 12 percent. Under a scenario of costs increases by 10 percent and benefits decline by 10 percent over the base-case, a 9 percent IRR with a 417 million INR of NPV confirming the robustness and soundness of the project investments. *The switching value analysis indicated that the project is capable of sustaining a 26 percent increase in costs and 20 percent decline in benefits.*

e. Exit Strategy and Sustainability

65. **Exit strategy***:* The exit strategy of this project is linked to institutionalization of technology development and scaling up efforts into the regular programme of AED-ICAR and the partner agencies. AED-ICAR will fund all activities related to participatory technology development which involves support to all institutions involved in AE research and development from sixth year of the project.

66. The project also partners with the SDAs, and this partnership will enable smallholders to continue accessing support from SMAM for acquiring new AE machinery and equipment post project closure.

67. Results from the lead farmer training and lead farmer led field demonstrations and locating demonstration units in CIs, will provide valuable lessons at the end of project life to KVKs for expansion of their core business, both in terms of area expansion and quality enhancement.

68. The project plans to collaborate with SRLMs and other partner agencies for supporting community institutions to take up establishment of FMUs, CFCs and ATBs. SRLM being an entity of the State Government will continue to function beyond the project life, and will continue to provide support to the CIs making it easy for project exit.

69. **Sustainability:** The project supports two levels of activities which need to sustain beyond the project life. First, the project intends to support FMUs, CFCs, ATBs, existing CHCs and individual AE machinery and equipment. These machineries will be rented out and the rental income is expected to be adequate to make this enterprise operate profitably. The farm models prepared for this purpose indicate a positive rate of return. However, this hinges on the availability of adequate after sales services for the procured AE machinery and equipment. The project has built adequate support for establishment of sales and services network.

70. Second, sustainability of the project interventions depends on the adoption of AE technologies by the smallholders. The project has built a three-pronged approach to enhance adoption. They include: (i) lead farmer training and lead farmer led field level demonstration with third party verification by community institutions; (ii) technology incentive support for acquiring AE technology of farmers' choice as a part of scaling up support; and (iii) user expansion support to CIs to fund their members to take the AE machinery on rent.

IFAD loan and Grant resources will be allocated to two expenditure categories in Schedule 2 of the Financing Agreement: "investment costs" (a consolidation of technical assistance, equipment and materials, grant and subsidies, training and workshops, and goods, services and inputs); and "incremental operating costs". SCATE will not be on "report-based disbursement", rather IFAD loan and grant resources will be disbursed in accordance with the agreed terms and conditions set forth in the Financing Agreement, the Loan Disbursement Handbook and the Letter to the Borrower. These will require the submission of withdrawal applications listing the incurred eligible expenditures.

3. Risks

71. The overall project risk is rated low to medium (L- M) with the implementation of mitigation measures as detailed in Annex 9 with the implementation of mitigation measures. The political and governance risk, macroeconomic risk and sector strategy and policies related risk are low and no mitigation measures are required to address these risks. The risks related to technical design of the project is also low. The project has only two components and with clear demarcation of activities between the implementing partners. The project focuses on three major sets of activities: (i) participatory technology development building on the strengths of AED-ICAR; (ii) demonstrations leveraging the experience and competence of KVKs; and (iii) scaling up activities synergising with CIs promoted by the state level partners.

72. The risks related to institutional capacity for implementation and sustainability are considered medium. Ability of ICAR's technology development efforts to address the needs of smallholders to adapt to climate change events and also the ability of KVKs to reach a large number of households through demonstrations are considered medium risks. This project's scaling up efforts require coordination between several agencies at the state level. ICAR's limited experience to scale up AE technologies from KVKs to a large number of farmers using state level line departments is also considered a medium risk.

73. The mitigation measures put in place to address the institutional capacity for implementation and sustainability risks are: (i) preparation of an inventory of technologies with geographic specificity to address the needs of smallholders with focus on women and hill/tribal farmers to adapt to climate change events; (ii) introduction of a participatory mode of technology development with in-built consultation with the farmers, demonstrations in farmers' fields and fine tuning of technology in consultation with the farmers; (iii) capacity building of KVK staff with preparation of technology manuals and package of practices to effectively demonstrate technologies; (iv) engagement with state level line department for scaling up by leveraging on the CIs promoted by them; and (v) establishment of coordination mechanisms at both central, state and district level to ensure inter-departmental coordination.

74. The financial management risks include challenges related to fund flow, reporting, audit and eligibility of expenditures due to dispersed nature of the project. The World Bank has been working with ICAR for many years and IFAD has direct experience of working with the four of the five project states. The mitigation strategies include: (i) detailing financial management procedures; (ii) building on existing ICAR systems; (iii) external and internal audit; (iv) hiring of qualified staff; and (v) centralising processes within PIU where feasible.

75. Overall weak procurement capacity in procurement planning, processes, standard documents for bidding and contracts and complaint redressal mechanism are the main procurement risks. These are mitigated by: (i) preparation of annual procurement plan with flexibility to review and revise as per requirement/ implementation; (ii) use of Standard Bidding Documents including contract templates embedding the bid process, clarifications, evaluation and complaint handling mechanism and policy on preventing fraud and corruption and dispute resolution; (iii) direct reporting of Procurement Specialist to APD; and (iv) preparation and adoption of procurement manual. Both financial management and procurement risks are considered high but would reduce to medium with implementation of mitigation measures.

I. Environment and Social category

76. The project states comprising three eastern states (Chhattisgarh, Jharkhand and Odisha) and two north-eastern states (Assam and Nagaland) have higher resource endowments. They are biologically diverse and the ecosystem is preserved due to lower anthropogenic pressure. Among the five states, environmental sustainability of Nagaland is higher, when compared to states like Chhattisgarh and Jharkhand, which are likely to face challenges in maintaining their environment. Assam and Odisha have higher potential to maintain their environmental sustainability.[35] The main environmental and social risks pertinent to the project activities include : (i) steep topographical feature implying cultivation of upland with varying slopes and exposure to soil erosion; (ii) risks of floods, landslide, cloudburst, increasing livelihood vulnerability; (iii) proximity to protected areas/wild life sanctuaries which may lead to man-animal conflicts; (iv) dense forest covers which impose restrictions on expansion of cultivated area; (v)

labour migration from farm to other service sectors leading to feminization of agriculture and associated increase in workload and drudgery for women; (vi) high levels of poverty in the project area with a poverty incidence rate of 40% in the project area, double the national average.

77. The risk mitigation measures included in the project design are: (i) facilitating the small and marginal holders to try out machinery for conservation agriculture; (ii) excluding districts/blocks/villages with ecologically sensitive and forest buffer zones areas from the project area; (iii) adaptation of machinery for ease of use by women and better ergonomics; (iv) scaling-up of affordable technologies and delivery of machinery services through custom hiring/ rental services. Introduction of fossil fuel driven AE technologies is expected to increase GHG emission but the Ex-ACT analysis conducted indicates negative carbon balance on account of other climate positive changes, such as replacement of draft animals. As a result of the above, the project is not likely to have any adverse environmental impacts on the project area and consequently, the project is classified as Category B in the environmental and social category.

J. Climate Risk classification

78. The National Initiative on Climate Resilient Agriculture (NICRA) project of ICAR has ranked all the districts in India using a vulnerability index, which is based on the internationally accepted vulnerability assessment criteria.[36] According to the analysis, only 7 out of 31 project districts, (from Assam, Chhattisgarh, Jharkhand and Odisha) are classified as highly vulnerable districts falling within the top 50 percentile districts (largely very high and high vulnerability). The remaining 24 districts are the bottom 50 percentile districts (medium, low and very low vulnerability) and of this, 8 districts in Nagaland are least vulnerable to climate change with their vulnerability rankings falling in the bottom 20 percentile.

79. In addition to the above, the CORDEX South Asia simulations were used to project the mid-century climate scenario in the 5 districts. The future climate scenario projects an all round warming in all 5 states with an increase of 1 to 1.5^{0}C in maximum and minimum temperatures. Marginal to moderate increase in rainfall (the latter in Nagaland where rainfall increase is predicted up to 17%) is expected, and this will be accompanied by an increase in warm spell duration indicator, consecutive dry days and wet days. In agricultural terms, this means uncertain rainfall in terms of onset of the monsoon and distribution over crop cycle; high likelihood of increased incidence of pests and diseases for crop/livestock/forests, etc; health risks for farmers, namely women, working in the fields under harsh conditions. As a result of this analysis, climate risk is classified as high. Mitigation measures include (i) develop packages of practices in conjunction with the demonstration and scaling up of AE technologies to address the climate scenario especially for land preparation, crop establishment, disease surveillance, crop harvesting. Farmer training should be conducted accordingly; (ii) converge project implementation with those SHGs/VOs/CIs involved in the development of irrigation through watershed development, water harvesting, aquifer recharge, lift irrigation; (iii) promote conservation agriculture; (iv) extending IT based advisory services to the project target group with special focus on building a cadre of women who are able to deliver these services in their communities. Such a service can well be integrated to the FMUs, Agriculture Tool Banks, and Common Facility Centres to provide an integrated service to farmers. Annex 5 presents the full SECAP review note.

4. Implementation

K. Organizational Framework

a. Project management and coordination

Project management

80. The proposed management structure is built around two key considerations: (i) using existing organizations and building on their core competence rather than creating new institutions for the specific purpose of project delivery; and (ii) building a management structure, which will integrate into the regular structure of the identified organizations, leading to seamless exit at project closure. The total cost allocated for project management is USD 10.94 million.

81. At the central level, MoA&FW would be the nodal agency. ICAR, which is administratively under the DARE of the MoA&FW will be the lead implementing agency. The Project Implementation Unit (PIU) will be housed within AED-ICAR to manage and coordinate project implementation. The management structure and implementation arrangements are provided in the PIM (annex 8). PIU would be headed by the Deputy Director General (DDG) of AED, who will be the Project Director (PD). The PD will be supported by an Additional Project Director (APD), an Assistant Director General (ADG) level officer and a Head of Finance (HofF), assigned by ICAR. ICAR will assign five professionals in the rank of Principal Scientist to manage the project components related to technology development, and partnerships with the state agencies.

82. In addition, ICAR will engage the following staff on contractual basis : five Assistant Coordinators, a Finance and Accounts Manager, a Procurement Specialist, a Planning, Monitoring & Evaluation Specialist, a Manager-Knowledge Management, four Project Executives, a MIS Assistant, a Finance Assistant and two support staff. These staff appointments would be on fixed term contracts of at least two years and the candidates would be recruited from the open-market, based on their professional competence and experience. ICAR, while recruiting staff for the project, will give preference to women candidates, subject to other things being equal. The functions of PIU are detailed in the PIM.

83. **State Project Management Units (SPMU): The** project would establish a SPMU within SDA of each state under the overall supervision of the Agriculture Production Commissioner / Principal Secretary – Agriculture. The Director of SDA would be nominated as the State Project Director, and an officer responsible for implementing SMAM at the state level would be nominated as the State Nodal Officer. Each SPMU will be provided with a four member team, comprising a State Project Manager, a Finance Officer, an M&E officer, and an Agriculture Officer. The State Project Manager will have two lines of reporting: (i) to the State Project Director through the State Nodal Officer; and (ii) to the Additional Project Director, PIU through the respective National Coordinators of PIU. The functions of SPMU are detailed in PIM.

Project coordination

84. **Project Steering Committee** (PSC) would function as the apex Governing body. The Secretary, DARE, who is also the Director General (DG) of ICAR, would be the Chairperson of the PSC and the members proposed are: the Additional Secretary, DARE; the Financial Advisor, DARE; DDG Extension, ICAR; Joint Secretary – SMAM, Joint Secretary MORD/ Mission Director-NRLM. The PD would be the member-secretary of the PSC. Technical Experts of repute may be invited to participate in the PSC meetings. The functions of PSC are detailed in the PIM

85. **Project Management Committee** (PMC) would be the main body to deal with relationships with state level agencies and also procurement. This committee will be headed by the Additional Secretary, DARE (Secretary of ICAR), which would comprise the Additional Project Director, the Financial Adviser of DARE/ICAR and the Head of Finance of the project. The PD would be the Secretary of the PMC. PMC would invite the

Chairpersons of **State Project Coordination Committees (SPCC) on a rotation basis or as needed to address the implementation challenges.** PMC would meet on a quarterly basis and would be largely responsible for resolving state level implementation issues with SPMUs, interdepartmental coordination, and reviewing project implementation performance of the project states and partners. The PD is authorised to increase the frequency of PMC meeting.

86. **State Project Co-ordination Committee** (SPCC): A SPCC will be established in each project state and will be headed by the Agricultural Production Commissioner/Principal Secretary-Agriculture. Secretary-Agriculture and Principal Secretary/Secretary of Rural Development Department, District Collectors/Deputy Commissioners of the project districts, Chief Executive Officer and State Mission Director-SRLM and the Director, Agriculture Technology Application Research Institute (ATARI) will be the members of the SPCC. The Director-Agriculture (State Project Director) will be the Secretary of SPCC. The Chairperson of SPCC will have the right to appoint new members into this committee. SPCC will meet quarterly and the functions of SPCC are detailed in the PIM

87. **District Project Co-ordination Committee** (DPCC) will be established in each project district and will be headed by the District Collector/Deputy Commissioner of the district. DPCC will have the following members: the Senior Scientist and Head–KVK and the District Project Manager-NRLM. The District Agriculture Officer will be the Secretary of the DPCC. The Chairperson of DPCC will have the right to appoint new members on the DPCC. The DPCC will meet quarterly the functions of DPCC are detailed in the PIM.

88. Country Context: The overall country inherent financial management (FM) risk is assessed as medium based on the 2018 TI Corruption Perception Index score of 41 and the 2018 Rural Sector Performance Score (RSP) score of 4.40. The last disclosed Public Expenditure and Financial Accountability (PEFA) assessment dates back to 2010. The August 2018 IMF Article IV consultation in India noted that there is limited fiscal space. India's debt is high with a debt-to-GDP ratio at around 70 percent, but the debt path is sustainable.

89. Financial Management: PIU within AED of ICAR will be responsible to DARE and IFAD. The initial financial management risk assessment of this project is assessed as high, due to multiplicity of implementing agencies with varying financial management capacities (5 States, 31 Districts, 200 KVKs and 4,000 villages). However, the implementation of mitigating measures is expected to soon reduce this risk to medium. In particular, the World Bank has been working with ICAR for many years with reliance on their FM systems and many expenditures of this project can be centralised. The SPMUs will be sub-units of the PIU rather than embedded in the SDAs. Further indirect FM assurance can be gained from the performance assessment (not performed by the external auditor) on the Innovation Framework.

90. Finance unit organization: PIU shall have a Head of Finance from ICAR system and a Finance and Accounts Manager on contract basis. The Project Director and all other key Project personnel (including HofF) shall be subject to IFAD No Objection.

91. Budgeting: PIU will prepare the AWP&B, incorporating the budget of the central and state level implementing and partner agencies with the budget of activities to be implemented by PIU. The budget will be presented by components, category of expenditures and financiers. After PSC approval the AWP&B will be submitted to IFAD for no objection before 31 January of each year. ICAR will also submit AWP&B of the project to DARE and get the same included into GoI's budget by creating a separate budget line. PIU will monitor the status of fund utilization of each implementing agencies on a quarterly basis, based on fund utilization certificates.

92. Disbursement arrangements and flow of funds: GoI shall open a Designated Account for each of the loan and the grant at Reserve Bank of India (RBI) in USD to which IFAD will disburse initial advance and thereafter reimburse eligible expenditures on request. The PIU and SPMUs will be obliged through a Financing Agreement covenant to open a separate bank account for the purposes of the Project in a bank acceptable to ICAR. SRLMs and KVKs will only be receiving limited costs for incremental operating costs and do not need to open separate bank accounts as long as the project funds can be specifically identified in their accounting system. The counterpart funds for expenses to be incurred by the implementing agencies and PIU, except salaries of the staff to be paid directly by the implementing agencies and government, will also be released. All expenditure will be pre-financed from the budget released by ICAR to the project and reimbursed by IFAD based on submission of claims. No direct payment from by IFAD to third parties is expected. The disbursement arrangements and budget release process are detailed in the PIM. The use of regular banking channels will be mandatory. Government will monitor cash-flows between Central, State Governments and their agencies through the Public Financial Management System (PFMS). ICAR will release funds quarterly to the implementing agencies.

93. Retroactive Financing: The IFAD Executive Board will be requested to approve retroactive financing of project expenditures incurred between 1 August 2019 and the date of Financing Agreement signature ("Entry into Force") up to USD 1 million equivalents.

94. Start-up Advance: An advance for suitably approved start-up activities is permissible as soon as the project has entered into force. This will provide liquidity if required until the conditions precedent to first withdrawal have been met. This will cover technical assistance, training, equipment other than vehicles and the initial operating costs.

95. Accounting systems, policies, procedures and financial reporting: PIU and SPMUs will maintain accounts of the project separately, following double entry accounting system. Accounting shall record transactions by category, component, funding source and activity, identifiable as pertaining to the Project. As per the World Bank funded National Agriculture Higher Education Project, the FM systems of SCATE would largely be aligned with the systems already established within ICAR, however, a recognized off-the-shelf accounting software such as Tally will be implemented for the Project until the ICAR Enterprise Resource Planning system is able to produce the required reports. ICAR follows national financial reporting templates for autonomous organisations (2002/3) that are satisfactory to the Comptroller and Auditor General (C&AG). ICAR works on an accruals basis other than for the receipt and utilisation of Government grants which are cash basis. These practices are acceptable to IFAD. The contribution made in cash by the implementing agencies, beneficiaries and participating organizations shall be recorded as expenditure as incurred. In-kind contributions will not be quantified. The implementing and partner agencies shall submit to PIU, monthly financial statements which PIU shall consolidate and prepare quarterly interim financial reports for submission to IFAD within 45 days of the end of each quarter. PIU will prepare annual Project financial statements within four months of the end of each financial year.

96. The contribution made in cash by the implementing agencies, beneficiaries and participating organizations shall be recorded as expenditure as incurred. In-kind contributions will not be quantified.

97. The implementing and partner agencies shall submit to PIU, monthly financial statements which PIU shall consolidate and prepare quarterly interim financial reports for submission to IFAD within 45 days of the end of each quarter. PIU will prepare annual Project financial statements within four months of the end of each financial year.

98. Internal Audit: PIU and SPMUs will engage a firm of Chartered Accountants to conduct internal audit in accordance with the Standards on Internal Audit (SIA) prescribed by the Institute of Chartered Accountants of India (ICAI). Six-monthly internal audit reports are to be submitted to the PD of PIU and Chairperson SPCC with a copy to the HofF. Steps taken to resolve issues identified and compliance to audit observations will be placed before PMC and made available to IFAD.

99. External Financial Audit: The office of C&AG shall conduct transaction audit of the Project financial statements. In order to meet the deadline

for submission of the audit reports (within six months of the closing of fiscal year) the project shall also hire a chartered accountant firm empanelled with C&AG to carry out the audit in accordance with IFAD's General Conditions and the IFAD Handbook for Financial Reporting and Auditing of IFAD-financed projects, which, inter alia, requires public disclosure. The audit of the Designated Account shall be conducted by Office of C&AG. The project will explore with office of C&AG to conduct performance audit at the stage of the mid-term review.

100. Financing Terms: The loan will be on ordinary terms, denominated in USD, with a variable spread, 18 year maturity with a three year grace period (average maturity in the 10-12 year bracket). There is no front-end fee or commitment charge. An in-loan grant will be provided which is non-returnable.

101. Procurement: Procurement of goods, works and services under the project financed from resources provided or administered by IFAD will be undertaken in accordance with IFAD's Procurement Guidelines and Handbook (dated September 2010) and as amended from time to time, both at the central level and at the decentralised level by all implementing entities. ICAR has prior experience of implementing three World Bank financed projects, however, the procedures and processes adopted for these have not been made applicable for the entire organization. These were and remain specific to the WB projects.

102. Procurement Risk Matrix assessment was carried out for the ICAR only as the SPMUs in 5 states are not separate legal entities and only the coordination/management units which will be setup de novo. Using the tool, the inherent risk rating is 1.99 (High risk) and if the risk mitigation measures recommended are fully adopted and complied, the Net Risk Rating becomes 2.85 (medium risk). The major risk mitigation measures recommended are adoption of (i) annual procurement plan with flexibility to review and revise as per requirement/implementation; (ii) Standard Bidding Documents including contract templates embedding the bid process, clarifications, evaluation and complaint handling mechanism and policy on preventing fraud and corruption and dispute resolution; (iii) Procurement Specialist report directly to APD; and, (iv) preparation and adoption of procurement manual. The procurement thresholds, in line with Procurement Risk Matrix, will be decided by IFAD and incorporated in the Loan documents and the Letter to the Borrower.

103. Implementation arrangements for procurement: (i) Office equipment (PIU and SPMU): These will be aggregated at PIU and SPMU level and included in the procurement plan. Any procurement which comes under local shopping thresholds, will be procured using Government E-market Portal or advertised quotations. (ii) Demonstration equipment/machineries: Items which are in the SMAM portal, will be procured by selecting any of the manufacturers willing to supply to the location of KVK and the PIU will directly pay after the contract formalities. In case the demonstration requires machineries/equipment which are not in SMAM portal, the KVKs will identify the requirements, typology, sources of supply, etc. and PIU will enter into a state specific rate contract with the manufacturers/fabricators and KVKs may order the items as per need. These rate contracts will also be extended in duration to allow community organizations willing to scale up to take advantage of the rate contract. For scaling up, the project will not procure any machinery, but only provide incentives jointly with SMAM; (iii) Consultancy services and Technical Assistance: These will be competitively procured and following IFAD prior review thresholds. It is recommended that Quality-cum-Cost Based Selection will be the default method and any other method proposed will have IFAD concurrence; and (iv) Grants and Awards: All Grants and Awards to entities other than implementation partners will be competitively announced and evaluated by a Technical Evaluation Committee resulting in a Grant/Award agreement.

104. IFAD Prior Review of Procurement All procurement requiring IFAD prior review will be uploaded in IFAD No Objection Tracking and Utilities System (NOTUS) portal. The prior review thresholds for different categories will be indicated in the Letter to the Borrower.

105. Investigative Authority: Under IFAD's Policy on Preventing Fraud and Corruption[1], the independent and competent authority responsible for receiving, reviewing and investigating allegations of fraud and corruption will be the ICAR Chief Vigilance Officer, who reports directly to the Director-General.

L. Planning, M&E, Learning, KM and Communications Plans

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

106. **Planning**: The AWP&B is the key planning document for the project, and it will serve as the instrument for identifying specific targets and activities and in relating to project outcomes and objectives. The format and the process for bottom-up preparation of the AWPB and subsequent review and endorsement at state, central and IFAD levels are described in the PIM (annex 8).

107. **Monitoring**: The monitoring system will report on project outputs and outcomes, as well as the progress in the implementation of the project's AWP&B. The project will equip field functionaries with the android phone based monitoring and evaluation (M&E) applications. The monitoring processes, including reporting on project outputs and outcomes, are described in the PIM (annex 8).

108. **Management Information System** (MIS): The project will establish a computerized, web-based MIS that will be accessible for data input, analysis and reporting by project implementing partners as well as for data browsing by parties external to the project. The MIS will include Geographic Information System (GIS) data on the locations of the demonstrations, FMUs, CFCs, ATBs and sales and service centres. All the project M&E data will be uploaded on the ICAR website.

109. **Evaluation**: The evaluation system of the project will consist of: (i) a baseline survey; and (ii) impact assessment studies, carried out at mid-term and completion of the project to assess the higher order results, such as agricultural incomes, levels of farm mechanization, labour costs, women drudgery, and post-harvest losses; (iii) detailed cost benefit analysis of the FMUs, CFCs and ATBs as well as of other ancillary AE enterprises supported by the project; and (iv) thematic study of innovation framework, demonstration and scaling up models.

110. **Knowledge Management:** This project aims to generate and share knowledge regarding the following issues: (i) technology needs of the smallholder with women and hill farmer focus to enable them to adapt to climate change events; (ii) factors that drive adoption of AE technology by the smallholders; (iii) factors that drive adoption of energy efficient AE technologies; (iv) efficiency of the FMU, CFC and ATB business models to enhance adoption of AE technology by smallholders; (v) relative importance of technology incentives in determining uptake of technology by smallholders; and (vi) factors that skew the relationship between availability and actual use of AE technology. The project will allocate financial resources for these studies and invite technical proposals from the SAUs, or other qualified institutions for generating this knowledge. All the studies conducted for this purpose will have to incorporate a strong element of gender perspective given women's predominant role in agriculture, and will also draw on the project monitoring data. The project's KM strategy will spell out the modalities of information dissemination apart from the standard dissemination modalities of publishing the results in ICAR's own and other development journals. The knowledge products generated by the project are described in the PIM (annex 8).

b. Innovation and scaling up

111. The project design incorporates three innovations :

- The project will focus on technology development and dissemination to address the needs of smallholders with focus on women, hill/tribal farmers and climate change adaptation centric technologies. This will be achieved through the National Technology Forums, awards for best AE research, fellowships for conducting AE research in key identified areas, and funding of AE research through a competitive grant making facility including technology challenges to showcase prototypes. All these activities will bring together public and private research entities.
- The project will build a two stage demonstration process involving training of lead farmers by KVKs and other training institutions, and lead farmer led field days to demonstrate the technologies. This will be coupled with the third party verification of the field days.
- The project will test a dual incentive modality, comprising a technology incentive and a user expansion incentive to not only increase ownership of AE machinery, but also to improve their capacity utilization.

M. Implementation plans

a. Implementation readiness and start-up plans.

112. **Implementation readiness:** The activities required to be completed to comply with the readiness requirements of GoI and IFAD include:

- Submit the report for approval of the project to the Expenditure Finance Committee (EFC).
- Finalize the draft agreement with SMAM (to be signed post Executive Board approval of the project).
- Finalize the draft MoU between ICAR and the 5 five SDAs and partner agencies (SRLM and others) for scaling up.

113. **Start-up Plans:** IFAD will support AED-ICAR to organize a national start-up workshop and also state level start-up workshops. This opportunity will be used to provide training to the staff of PIU, SPMUs and partner agencies on project implementation modalities, IFAD's financial management and procurement procedures, AWP&B and M&E. IFAD will provide backstopping to the PIU during the first 18 months on project implementation through required technical assistance, comprising experts in farm mechanization, crop production and community institution development in order to streamline implementation modalities. Special attention will be provided to establish a robust financial management, procurement system, and planning and M&E system.

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

114. **Supervision**: The project will be directly supervised by IFAD. Annual Supervision Missions will be conducted, in which it is envisaged that the first supervision mission will take place towards the end of the first year from entry into force of the project. It will include specialists in agricultural technology development, community institution, financial management and procurement.

115. **Mid Term Review** (MTR): IFAD in cooperation with GoI will undertake a mid-term review (MTR) by the end of the third year of the project to review project achievements and implementation constraints. The scope of work of the MTR is described in PIM (annex 8).

116. **Project Completion Review:** As the project reaches completion point, the PIU will be required to prepare a draft Project Completion Report. IFAD and GoI will then carry out a Project Completion Review based on the information provided in the Project Completion Report and other data.

Footnotes

Executive summary

[1] Which will include capitalising on climate adaptation and mitigation practices and synergies

[2] See footnote 1.

Main Text

[1] Source: India home page, The World Bank, updated on 2 April 2019

[2] Source: India home page, The World Bank, updated on 2 April 2019

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[21] Conversely, demonstration of technologies that have high start-up costs coupled and insufficient return on investment, lead to demonstration fatigue.

[22] CAIM Supervision mission reports of 2015, 2016 and 2017.

[23] Project Completion Report, 2018, Tejaswini Maharashtra Rural Women's Empowerment Project

[24] The Impact Assessment report of Sub-Mission on Agricultural Mechanization, WAPCOS, 2018

[25] Which will include capitalising on climate adaptation and mitigation practices and synergies

[26] Which will include capitalising on climate adaptation and mitigation practices and synergies

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[30] based on a Composite Index developed by examining the published sources of district-wise data available in the core sectors of poverty, health & nutrition, education and basic infrastructure: Aspiration districts – Unlocking potentials, Chapter IV- Selection of districts, Niti Ayog, 2018

[31] https://nrlm.gov.in/shgReport.do?methodName=showMojorityStateWise, last accessed: 120619

[32] KVKs are under the administrative control of ICAR-ATARI however hosted and managed by ICAR institutions, SAUs and Civil Society Organizations.

[33] This will be a public display of prototypes from various innovators wherein the public comprising manufacturers and users are able to understand and appreciate the technology. This will be a competitive and transparent platform for selection of prototypes for project support and also to pursue manufacturers' interest in collaboration with the innovators.

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Investing in rural people

India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

Annex 1: Logframe

Document Date:	25/07/2019
Project No.	2000001941

Asia and the Pacific Division
Programme Management Department

Scaling Up Agricultural Technologies For Smallholder Farmers

Logical Framework

Results Hierarchy	Indicators				Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Source	Frequency	Responsibility	
Outreach Number of household reached	1.b Estimated corresponding total number of households members				Project monitoring	Semi-annually	PIU	
	Household members		1000000	2000000				
	1.a Corresponding number of households reached				Project monitoring	Semi-annually	PIU	
	Households		200000	400000				
	1 Persons receiving services promoted or supported by the project				Project monitoring	Semi-annually	PIU	
	Females		150000	300000				
	Males		50000	100000				
	Indigenous people		100000	200000				
	Total number of persons receiving services		200000	400000				
Project Goal Enable the smallholders increase farm income through use of appropriate AE technologies	Percentage of households reporting more than 25% increase in incomes				Impact assessment	At baseline, mid-term and completion	PIU	Sustained Govt policies in favour of farmers' incomes and welfare
	Households		25	70				

Results Hierarchy	Indicators				Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Source	Frequency	Responsibility	
Development Objective Increased labour and farm productivity through adoption of AE technologies.	Percentage increase in farm power (KW/Ha)				Impact assessment	At baseline, mid-term and completion	PIU	Government's farm mechanization expansion policies continue and converge and SCATE successfully converges with the related programs and schemes. Women organizations take lead role in management of hire, operation and repair of AE technologies. Climate Change adaptation is an important criteria in selection of technologies for research/demo/scaling up.
	Percentage over baseline		7	20				
	No. of HH reporting reduction in labour costs of 50% and increase in farm productivity of 15%				Annual outcome survey	annual	PIU	
	Households		159500	318600				
	Indigenous HH		79750	159300				
	Percentage of women reporting decrease In drudgery related workload.				Annual outcome survey	Annual	PIU	
	Percentage		25	40				
	Women empowerment enhanced				Annual outcome survey	Annual	PIU	
	Women Empowerment in Agriculture (WEIA) Index							
	Number of tons of greenhouse gas emissions (CO2) avoided and/or sequestered				Impact assessment	at baseline, mid-term and completion	PIU	
	tCO2eq/year			46522				
Outcome Outcome 1: Reduced mismatch between needs and availability of smallholder centric AE technology (hill farmer, women, energy efficient and conservation agriculture centric)	Percentage of technologies developed to address the needs of smallholder, hill farmers, women, Energy Efficiency (EE) and CA				Project monitoring	Semi-annually	PIU	
	Percentage		30	50				
Output Output 1.1. Region specific list of existing AE technologies with low diffusion	No. of region specific list of existing AE technologies with low diffusion				Project monitoring	Quarterly	PIU	
	Number of regions		15	30				
	No. of fellowships to young innovators				Project monitoring	Quarterly	PIU	
	Young		10	50				

Results Hierarchy	Indicators				Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Source	Frequency	Responsibility	
	Males		5	25				
	Females		5	25				
Output Output 1.2. Innovation platform established and operational	No. of concept to prototype technology supported				Project monitoring	Quarterly	PIU	
	Number		7	35				
	No. of machinery customizations supported				Project monitoring	Quarterly	PIU	
	Number		15	75				
	No of prototypes supported for commercial development				Project monitoring	Quarterly	PIU	
	Number		7	35				
Outcome Outcome 2 : Increased access and adoption of AE technologies for farm production and post-harvest processing	3.2.2 Households reporting adoption of environmentally sustainable and climate-resilient technologies and practices				Annual outcome survey	Annual	PIU	(1) Effective coordination between implementing agencies for scaling up with community institutions; (2) Community organizations manage effectively rental and use of AET
	Households		30	70				
	2.2.4 Supported rural producers' organizations members reporting new or improved services provided by their organization				Annual outcome survey	Annual	PIU	
	Percentage of POs members		40	80				
Output Output 2.1. Demonstration and Support service development implemented	1.1.4 Persons trained in production practices and/or technologies				Project monitoring	Quarterly	PIU	Effective convergence with Government schemes promoting good agronomic practices for climate resilient agriculture
	Males		1000	2000				
	Females		1000	2000				
	3.1.3 Persons accessing technologies that sequester carbon or reduce greenhouse gas emissions				Project monitoring	Quarterly	PIU	
	Males		30000	60000				
	Females		90000	180000				
	Indigenous people		60000	120000				

Results Hierarchy	Indicators				Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Source	Frequency	Responsibility	
	No. of youth trained in repair and maintenance				Project monitoring	Quarterly	PIU	
	Males		50	85				
	Females		50	85				
	No. of Agri Tool Banks established				Project monitoring	Quarterly	PIU	
	Number		400	1300				
	No. of existing Custom Hiring Centres supported				Project monitoring	Quatrerly	PIU	
	Number		125	650				
	No. of post harvest processing units established				Project monitoring	Quarterly	PIU	
	Number		200	900				

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Scaling Up Agricultural Technologies For Smallholder Farmers

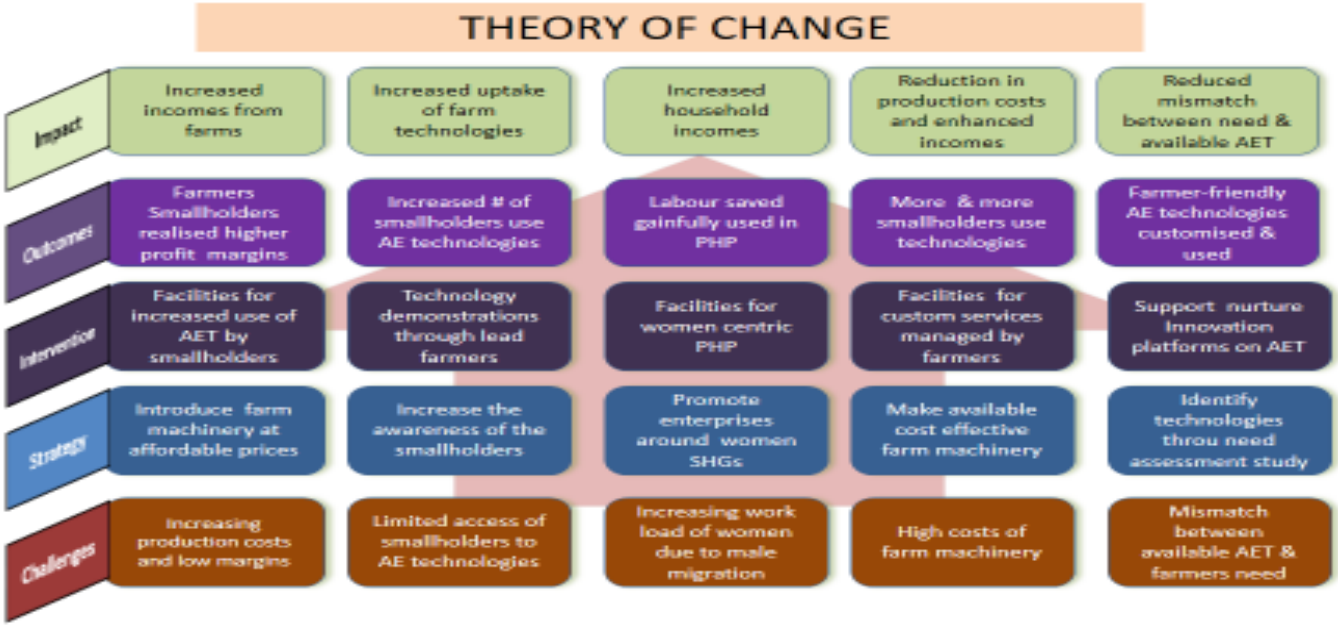
Project Design Report

Annex 2: Theory of change

Document Date:	25/07/2019
Project No.	2000001941

Asia and the Pacific Division
Programme Management Department

Annex 2: Theory of change



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India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

Annex 3: Project cost and financing: Detailed costs tables

Document Date: 25/07/2019

Project No. 2000001941

Asia and the Pacific Division
Programme Management Department

Annex 3 – Project cost and financing - Detailed cost tables (tab file: "scate7.tab")

Summary tables

Disbursement Accounts by Financiers

India
SCATE

(US$ '000)

Disbursement Accounts by Financiers	Govt		ICAR		IFAD		IFAD Grant		Banks		Convergence		Beneficiaries		Total		Duties & Taxes
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	
A. Investment costs																	
1. Technical assistance	2,605.4	10.2	3,026.3	11.9	18,811.8	73.9	1,005.6	4.0	-	-	-	-	-	-	25,449.1	20.5	2,205.3
2. Equipment & materials /a	10,620.6	17.8	-	-	24,445.9	41.0	-	-	5,726.0	9.6	9,403.2	15.8	9,400.7	15.8	59,596.4	48.0	10,474.3
3. Grants and subsidies	347.7	6.5	-	-	4,518.8	84.2	-	-	-	-	-	-	502.1	9.4	5,368.6	4.3	347.7
4. Training and workshop	3,393.6	19.5	-	-	13,981.4	80.5	-	-	-	-	-	-	-	-	17,375.0	14.0	2,432.2
5. Goods, services and inputs	80.8	10.0	-	-	726.9	90.0	-	-	-	-	-	-	-	-	807.7	0.6	80.8
Subtotal	17,048.0	15.7	3,026.3	2.8	62,484.8	57.5	1,005.6	0.9	5,726.0	5.3	9,403.2	8.7	9,902.8	9.1	1,08,596.8	87.4	15,540.3
B. Recurrent costs																	
1. Salary and allowances	-	-	8,274.7	100.0	-	-	-	-	-	-	-	-	-	-	8,274.7	6.7	-
2. Incremental operating costs	1,277.9	17.3	2,520.4	34.1	3,602.1	48.7	-	-	-	-	-	-	-	-	7,400.3	6.0	740.0
Subtotal	1,277.9	8.2	10,795.1	68.9	3,602.1	23.0	-	-	-	-	-	-	-	-	15,675.1	12.6	740.0
Total PROJECT COSTS	18,325.9	14.7	13,821.4	11.1	66,086.9	53.2	1,005.6	0.8	5,726.0	4.6	9,403.2	7.6	9,902.8	8.0	1,24,271.9	100.0	16,280.4

\a Farm and processing mechinery for demo plus office equipment

Components by Financiers

India
SCATE

(US$ '000)

Components by Financiers	Govt		ICAR		IFAD		IFAD Grant		Banks		Convergence		Beneficiaries		Total		Duties & Taxes
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	
A. Component 1: Participatory technology development																	
1. Need assessment	47.0	10.0	-	-	423.0	90.0	-	-	-	-	-	-	-	-	470.0	0.4	47.0
2. ICAR capacity building	683.7	11.3	111.7	1.8	4,271.8	70.3	1,005.6	16.6	-	-	-	-	-	-	6,072.8	4.9	469.6
3. Innovation platform	978.1	10.0	2,914.6	29.8	5,888.6	60.2	-	-	-	-	-	-	-	-	9,781.4	7.9	978.1
Subtotal	1,708.8	10.5	3,026.3	18.5	10,583.4	64.8	1,005.6	6.2	-	-	-	-	-	-	16,324.2	13.1	1,494.8
B. Component 2: Demonstrations and Scaling up AE Technologies																	
1. Demonstrations of AE technologies	2,840.0	11.1	8,274.7	32.3	13,804.2	53.9	-	-	-	-	702.9	2.7	-	-	25,621.7	20.6	1,878.0
2. Support service development	431.3	11.1	-	-	3,151.0	80.9	-	-	-	-	-	-	313.0	8.0	3,895.3	3.1	389.5
3. Scaling up AE technologies	11,537.2	17.1	-	-	31,935.9	47.3	-	-	5,726.0	8.5	8,700.4	12.9	9,589.8	14.2	67,489.3	54.3	11,424.9
Subtotal	14,808.5	15.3	8,274.7	8.5	48,891.0	50.4	-	-	5,726.0	5.9	9,403.2	9.7	9,902.8	10.2	97,006.3	78.1	13,692.4
C. Component 3: Project Management																	
1. PIU and SPMUs	1,656.3	16.7	2,520.4	25.5	5,720.9	57.8	-	-	-	-	-	-	-	-	9,897.5	8.0	990.7
2. Project M&E and knowledge management	152.3	14.6	-	-	891.5	85.4	-	-	-	-	-	-	-	-	1,043.8	0.8	102.5
Subtotal	1,808.6	16.5	2,520.4	23.0	6,612.4	60.4	-	-	-	-	-	-	-	-	10,941.4	8.8	1,093.2
Total PROJECT COSTS	18,325.9	14.7	13,821.4	11.1	66,086.9	53.2	1,005.6	0.8	5,726.0	4.6	9,403.2	7.6	9,902.8	8.0	1,24,271.9	100.0	16,280.4

Expenditure accounts by financiers

India
SCATE

Expenditure Accounts by Financiers	Govt		ICAR		IFAD		IFAD Grant		Banks		Convergence		Beneficiaries		Total		Duties & Taxes
	(US$ '000)																
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	
I. Investment Costs																	
A. Technical assistance /a	2,605.4	10.2	3,026.3	11.9	18,811.8	73.9	1,005.6	4.0	-	-	-	-	-	-	25,449.1	20.5	2,205.3
B. Equipment & materials /b	10,620.6	17.8	-	-	24,445.9	41.0	-	-	5,726.0	9.6	9,403.2	15.8	9,400.7	15.8	59,596.4	48.0	10,474.3
C. Training and workshop	3,393.6	19.5	-	-	13,981.4	80.5	-	-	-	-	-	-	-	-	17,375.0	14.0	2,432.2
D. Grants and subsidies	347.7	6.5	-	-	4,518.8	84.2	-	-	-	-	-	-	502.1	9.4	5,368.6	4.3	347.7
E. Goods, services and inputs	80.8	10.0	-	-	726.9	90.0	-	-	-	-	-	-	-	-	807.7	0.6	80.8
Total Investment Costs	17,048.0	15.7	3,026.3	2.8	62,484.8	57.5	1,005.6	0.9	5,726.0	5.3	9,403.2	8.7	9,902.8	9.1	1,08,596.8	87.4	15,540.3
II. Recurrent Costs																	
A. Salaries and allowances	-	-	8,274.7	100.0	-	-	-	-	-	-	-	-	-	-	8,274.7	6.7	-
B. Incremental operating costs	1,277.9	17.3	2,520.4	34.1	3,602.1	48.7	-	-	-	-	-	-	-	-	7,400.3	6.0	740.0
Total Recurrent Costs	1,277.9	8.2	10,795.1	68.9	3,602.1	23.0	-	-	-	-	-	-	-	-	15,675.1	12.6	740.0
Total PROJECT COSTS	18,325.9	14.7	13,821.4	11.1	66,086.9	53.2	1,005.6	0.8	5,726.0	4.6	9,403.2	7.6	9,902.8	8.0	1,24,271.9	100.0	16,280.4

\a includes studies etc
\b Farm and processing equipment plus office equipment

Project cost summary

India
SCATE

Components Project Cost Summary	(INR '000) Total	(US$ '000) Total	% Total Base Costs
A. Component 1: Participatory technology development			
1. Need assessment	29,150.0	416.4	-
2. ICAR capacity building	3,61,683.5	5,166.9	5
3. Innovation platform	5,75,200.0	8,217.1	8
Subtotal	9,66,033.5	13,800.5	13
B. Component 2: Demonstrations and Scaling up AE Technologies			
1. Demonstrations of AE technologies	16,10,910.0	23,013.0	21
2. Support service development	2,38,500.0	3,407.1	3
3. Scaling up AE technologies	40,58,720.0	57,981.7	54
Subtotal	59,08,130.0	84,401.9	78
C. Component 3: Project Management			
1. PIU and SPMUs	6,01,150.0	8,587.9	8
2. Project M&E and knowledge management	63,680.0	909.7	1
Subtotal	6,64,830.0	9,497.6	9
Total BASELINE COSTS	75,38,993.5	1,07,699.9	100
Physical Contingencies	-	-	-
Price Contingencies	11,60,038.3	16,572.0	15
Total PROJECT COSTS	86,99,031.8	1,24,271.9	115

Expenditure accounts project cost summary

India
SCATE

Expenditure Accounts Project Cost Summa	(INR '000)			(US$ '000)			% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total	
I. Investment Costs							
A. Technical assistance /a	15,22,933.5	-	15,22,933.5	21,756.2	-	21,756.2	20
B. Equipment & materials /b	35,86,860.0	-	35,86,860.0	51,240.9	-	51,240.9	48
C. Training and workshop	11,03,350.0	-	11,03,350.0	15,762.1	-	15,762.1	15
D. Grants and subsidies	3,33,000.0	-	3,33,000.0	4,757.1	-	4,757.1	4
E. Goods, services and inputs	48,750.0	-	48,750.0	696.4	-	696.4	1
Total Investment Costs	65,94,893.5	-	65,94,893.5	94,212.8	-	94,212.8	87
II. Recurrent Costs							
A. Salaries and allowances	4,98,480.0	-	4,98,480.0	7,121.1	-	7,121.1	7
B. Incremental operating costs	4,45,620.0	-	4,45,620.0	6,366.0	-	6,366.0	6
Total Recurrent Costs	9,44,100.0	-	9,44,100.0	13,487.1	-	13,487.1	13
Total BASELINE COSTS	75,38,993.5	-	75,38,993.5	1,07,699.9	-	1,07,699.9	100
Physical Contingencies	-	-	-	-	-	-	-
Price Contingencies	11,60,038.3	-	11,60,038.3	16,572.0	-	16,572.0	15
Total PROJECT COSTS	86,99,031.8	-	86,99,031.8	1,24,271.9	-	1,24,271.9	115

\a includes studies etc
\b Farm and processing equipment plus office equipment

Project cost summary: IFAD financing %

India
SCATE

Project Cost Summary (US$ '000)	**Cost Including Contingencies**	**% of Total**	**IFAD Financing**	**% Financing**
A. Component 1: Participatory technology development				
1. Need assessment	470.0	0.4	423.0	90.0
2. ICAR capacity building	6,072.8	4.9	4,271.8	70.3
3. Innovation platform	9,781.4	7.9	5,888.6	60.2
Subtotal	16,324.2	13.1	10,583.4	64.8
B. Component 2: Demonstrations and Scaling up AE Technologies				
1. Demonstrations of AE technologies	25,621.7	20.6	13,804.2	53.9
2. Support service development	3,895.3	3.1	3,151.0	80.9
3. Scaling up AE technologies	67,489.3	54.3	31,935.9	47.3
Subtotal	97,006.3	78.1	48,891.0	50.4
C. Component 3: Project Management				
1. PIU and SPMUs	9,897.5	8.0	5,720.9	57.8
2. Project M&E and knowledge management	1,043.8	0.8	891.5	85.4
Subtotal	10,941.4	8.8	6,612.4	60.4
Total PROJECT COSTS	1,24,271.9	100.0	66,086.9	53.2

Detailed Cost Estimate by Expenditure Cat	**(INR '000)**			**(US$ '000)**			**Base**
	Foreign	**Local**	**Total**	**Foreign**	**Local**	**Total**	**Costs**
A. Investment Costs							
1. Technical assistance /a	-	13,91,240.2	13,91,240.2	-	19,874.9	19,874.9	18
2. Equipment & materials /b	-	29,57,965.2	29,57,965.2	-	42,256.6	42,256.6	39
3. Training and workshop	-	9,50,787.0	9,50,787.0	-	13,582.7	13,582.7	13
4. Grants and subsidies	-	3,11,700.0	3,11,700.0	-	4,452.9	4,452.9	4
5. Goods, services and inputs	-	43,875.0	43,875.0	-	626.8	626.8	1
6. Duties & Taxes	-	9,39,326.2	9,39,326.2	-	13,418.9	13,418.9	12
Total Investment Costs	-	65,94,893.5	65,94,893.5	-	94,212.8	94,212.8	87
B. Recurrent Costs							
1. Salaries and allowances	-	4,98,480.0	4,98,480.0	-	7,121.1	7,121.1	7
2. Incremental operating costs	-	4,01,058.0	4,01,058.0	-	5,729.4	5,729.4	5
3. Duties & Taxes	-	44,562.0	44,562.0	-	636.6	636.6	1
Total BASELINE COSTS	-	75,38,993.5	75,38,993.5	-	1,07,699.9	1,07,699.9	100
Physical Contingencies	-	-	-	-	-	-	-
Price Contingencies	-	11,60,038.3	11,60,038.3	-	16,572.0	16,572.0	15
Total PROJECT COSTS	-	86,99,031.8	86,99,031.8	-	1,24,271.9	1,24,271.9	115

Expenditure accounts by components

India
SCATE

Expenditure Accounts by Component (US$ '000)	Component 1: Participatory technology development			Component 2: Demonstrations and Scaling up AE Technologies			Component 3: Project Management		
	Need assessment	ICAR capacity building	Innovation platform	Demonstrations of AE technologies	Support service development	Scaling up AE technologies	PIU and SPMUs	Project M&E and knowledge management	Total
I. Investment Costs									
A. Technical assistance /a	416.4	4,416.9	8,217.1	3,046.1	-	4,113.1	942.9	603.6	21,756.2
B. Equipment & materials /b	-	500.0	-	1,328.6	-	49,142.9	159.7	109.7	51,240.9
C. Training and workshop	-	250.0	-	10,985.7	364.3	3,011.4	954.3	196.4	15,762.1
D. Grants and subsidies	-	-	-	-	3,042.9	1,714.3	-	-	4,757.1
E. Goods, services and inputs	-	-	-	-	-	-	696.4	-	696.4
Total Investment Costs	416.4	5,166.9	8,217.1	15,360.4	3,407.1	57,981.7	2,753.3	909.7	94,212.8
II. Recurrent Costs									
A. Salaries and allowances	-	-	-	7,121.1	-	-	-	-	7,121.1
B. Incremental operating costs	-	-	-	531.4	-	-	5,834.6	-	6,366.0
Total Recurrent Costs	-	-	-	7,652.6	-	-	5,834.6	-	13,487.1
Total BASELINE COSTS	416.4	5,166.9	8,217.1	23,013.0	3,407.1	57,981.7	8,587.9	909.7	1,07,699.9
Physical Contingencies	-	-	-	-	-	-	-	-	-
Price Contingencies									
Subtotal Price Contingencies	53.6	905.9	1,564.2	2,608.7	488.2	9,507.6	1,309.7	134.1	16,572.0
Total PROJECT COSTS	470.0	6,072.8	9,781.4	25,621.7	3,895.3	67,489.3	9,897.5	1,043.8	1,24,271.9
Taxes	47.0	469.6	978.1	1,878.0	389.5	11,424.9	990.7	102.5	16,280.4
Foreign Exchange	-	-	-	-	-	-	-	-	-

Project components by year –baseline costs

India
SCATE

Project Components by Year -- Base Costs	Base Cost (INR '000)							Base Cost (US$ '000)						
	20/21	21/22	22/23	23/24	24/25	25/26	Total	20/21	21/22	22/23	23/24	24/25	25/26	Total
A. Component 1: Participatory technology development														
1. Need assessment	7,350.0	5,550.0	5,150.0	5,150.0	5,150.0	800.0	29,150.0	105.0	79.3	73.6	73.6	73.6	11.4	416.4
2. ICAR capacity building	3,513.0	77,211.0	84,459.5	79,750.0	70,750.0	46,000.0	3,61,683.5	50.2	1,103.0	1,206.6	1,139.3	1,010.7	657.1	5,166.9
3. Innovation platform	7,650.0	1,11,900.0	1,12,650.0	1,06,500.0	1,06,500.0	1,30,000.0	5,75,200.0	109.3	1,598.6	1,609.3	1,521.4	1,521.4	1,857.1	8,217.1
Subtotal	18,513.0	1,94,661.0	2,02,259.5	1,91,400.0	1,82,400.0	1,76,800.0	9,66,033.5	264.5	2,780.9	2,889.4	2,734.3	2,605.7	2,525.7	13,800.5
B. Component 2: Demonstrations and Scaling up AE Technologie														
1. Demonstrations of AE technologies	4,08,070.0	5,26,140.0	2,37,140.0	2,05,640.0	1,44,640.0	89,280.0	16,10,910.0	5,829.6	7,516.3	3,387.7	2,937.7	2,066.3	1,275.4	23,013.0
2. Support service development	10,000.0	53,500.0	77,500.0	71,000.0	26,500.0	-	2,38,500.0	142.9	764.3	1,107.1	1,014.3	378.6	-	3,407.1
3. Scaling up AE technologies	26,400.0	7,14,200.0	12,30,040.0	10,94,040.0	9,63,640.0	30,400.0	40,58,720.0	377.1	10,202.9	17,572.0	15,629.1	13,766.3	434.3	57,981.7
Subtotal	4,44,470.0	12,93,840.0	15,44,680.0	13,70,680.0	11,34,780.0	1,19,680.0	59,08,130.0	6,349.6	18,483.4	22,066.9	19,581.1	16,211.1	1,709.7	84,401.9
C. Component 3: Project Management														
1. PIU and SPMUs	1,02,720.0	1,17,880.0	1,16,880.0	89,580.0	87,420.0	86,670.0	6,01,150.0	1,467.4	1,684.0	1,669.7	1,279.7	1,248.9	1,238.1	8,587.9
2. Project M&E and knowledge management	13,040.0	12,470.0	12,160.0	8,420.0	7,420.0	10,170.0	63,680.0	186.3	178.1	173.7	120.3	106.0	145.3	909.7
Subtotal	1,15,760.0	1,30,350.0	1,29,040.0	98,000.0	94,840.0	96,840.0	6,64,830.0	1,653.7	1,862.1	1,843.4	1,400.0	1,354.9	1,383.4	9,497.6
Total BASELINE COSTS	5,78,743.0	16,18,851.0	18,75,979.5	16,60,080.0	14,12,020.0	3,93,320.0	75,38,993.5	8,267.8	23,126.4	26,799.7	23,715.4	20,171.7	5,618.9	1,07,699.9
Physical Contingencies	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Price Contingencies														
Subtotal Price Contingencies	14,468.6	1,23,437.4	2,43,994.6	3,09,713.9	3,47,207.1	1,21,216.7	11,60,038.3	206.7	1,763.4	3,485.6	4,424.5	4,960.1	1,731.7	16,572.0
Total PROJECT COSTS	5,93,211.6	17,42,288.4	21,19,974.1	19,69,793.9	17,59,227.1	5,14,536.7	86,99,031.8	8,474.5	24,889.8	30,285.3	28,139.9	25,131.8	7,350.5	1,24,271.9
Taxes	48,425.0	2,05,592.5	3,00,093.5	2,89,481.2	2,56,504.1	39,530.3	11,39,626.6	691.8	2,937.0	4,287.0	4,135.4	3,664.3	564.7	16,280.4
Foreign Exchange	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project components by year –total including contingencies

India
SCATE

Project Components by Year -- Totals Including Contingencie	Totals Including Contingencies (INR '000)							Totals Including Contingencies (US$ '000)						
	20/21	21/22	22/23	23/24	24/25	25/26	Total	20/21	21/22	22/23	23/24	24/25	25/26	Total
A. Component 1: Participatory technology development														
1. Need assessment	7,533.8	5,973.2	5,819.8	6,110.8	6,416.4	1,046.6	32,900.5	107.6	85.3	83.1	87.3	91.7	15.0	470.0
2. ICAR capacity building	3,600.8	83,098.3	95,444.5	94,628.6	88,147.0	60,176.7	4,25,096.0	51.4	1,187.1	1,363.5	1,351.8	1,259.2	859.7	6,072.8
3. Innovation platform	7,841.3	1,20,432.4	1,27,301.5	1,26,369.2	1,32,687.7	1,70,064.5	6,84,696.6	112.0	1,720.5	1,818.6	1,805.3	1,895.5	2,429.5	9,781.4
Subtotal	18,975.8	2,09,503.9	2,28,565.9	2,27,108.7	2,27,251.0	2,31,287.7	11,42,693.1	271.1	2,992.9	3,265.2	3,244.4	3,246.4	3,304.1	16,324.2
B. Component 2: Demonstrations and Scaling up AE Techno														
1. Demonstrations of AE technologies	4,18,271.8	5,66,258.2	2,67,983.0	2,44,005.4	1,80,206.1	1,16,795.1	17,93,519.5	5,975.3	8,089.4	3,828.3	3,485.8	2,574.4	1,668.5	25,621.7
2. Support service development	10,250.0	57,579.4	87,579.8	84,246.2	33,016.2	-	2,72,671.6	146.4	822.6	1,251.1	1,203.5	471.7	-	3,895.3
3. Scaling up AE technologies	27,060.0	7,68,657.8	13,90,022.1	12,98,150.3	12,00,593.2	39,768.9	47,24,252.2	386.6	10,980.8	19,857.5	18,545.0	17,151.3	568.1	67,489.3
Subtotal	4,55,581.8	13,92,495.3	17,45,584.9	16,26,401.8	14,13,815.5	1,56,564.0	67,90,443.3	6,508.3	19,892.8	24,936.9	23,234.3	20,197.4	2,236.6	97,006.3
C. Component 3: Project Management														
1. PIU and SPMUs	1,05,288.0	1,26,868.4	1,32,081.7	1,06,292.5	1,08,916.0	1,13,380.7	6,92,827.4	1,504.1	1,812.4	1,886.9	1,518.5	1,555.9	1,619.7	9,897.5
2. Project M&E and knowledge management	13,366.0	13,420.8	13,741.6	9,990.9	9,244.5	13,304.3	73,068.1	190.9	191.7	196.3	142.7	132.1	190.1	1,043.8
Subtotal	1,18,654.0	1,40,289.2	1,45,823.3	1,16,283.4	1,18,160.6	1,26,685.0	7,65,895.4	1,695.1	2,004.1	2,083.2	1,661.2	1,688.0	1,809.8	10,941.4
Total PROJECT COSTS	5,93,211.6	17,42,288.4	21,19,974.1	19,69,793.9	17,59,227.1	5,14,536.7	86,99,031.8	8,474.5	24,889.8	30,285.3	28,139.9	25,131.8	7,350.5	1,24,271.9

Project components by year –investment and recurrent costs

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Project Components by Year -- Investment/Recurrent Costs	Totals Including Contingencies (US$ '000)						
	20/21	21/22	22/23	23/24	24/25	25/26	Total
A. Component 1: Participatory technology development							
1. Need assessment							
Investment Costs	107.6	85.3	83.1	87.3	91.7	15.0	470.0
Recurrent Costs	-	-	-	-	-	-	-
Subtotal	107.6	85.3	83.1	87.3	91.7	15.0	470.0
2. ICAR capacity building							
Investment Costs	51.4	1,187.1	1,363.5	1,351.8	1,259.2	859.7	6,072.8
Recurrent Costs	-	-	-	-	-	-	-
Subtotal	51.4	1,187.1	1,363.5	1,351.8	1,259.2	859.7	6,072.8
3. Innovation platform							
Investment Costs	112.0	1,720.5	1,818.6	1,805.3	1,895.5	2,429.5	9,781.4
Recurrent Costs	-	-	-	-	-	-	-
Subtotal	112.0	1,720.5	1,818.6	1,805.3	1,895.5	2,429.5	9,781.4
Subtotal	271.1	2,992.9	3,265.2	3,244.4	3,246.4	3,304.1	16,324.2
B. Component 2: Demonstrations and Scaling up AE Technolo							
1. Demonstrations of AE technologies							
Investment Costs	4,668.0	6,716.7	2,387.0	1,972.4	985.3	-	16,729.5
Recurrent Costs	1,307.3	1,372.7	1,441.3	1,513.4	1,589.0	1,668.5	8,892.2
Subtotal	5,975.3	8,089.4	3,828.3	3,485.8	2,574.4	1,668.5	25,621.7
2. Support service development							
Investment Costs	146.4	822.6	1,251.1	1,203.5	471.7	-	3,895.3
Recurrent Costs	-	-	-	-	-	-	-
Subtotal	146.4	822.6	1,251.1	1,203.5	471.7	-	3,895.3
3. Scaling up AE technologies							
Investment Costs	386.6	10,980.8	19,857.5	18,545.0	17,151.3	568.1	67,489.3
Recurrent Costs	-	-	-	-	-	-	-
Subtotal	386.6	10,980.8	19,857.5	18,545.0	17,151.3	568.1	67,489.3
Subtotal	6,508.3	19,892.8	24,936.9	23,234.3	20,197.4	2,236.6	97,006.3
C. Component 3: Project Management							
1. PIU and SPMUs							
Investment Costs	611.0	700.3	719.2	348.3	365.8	370.0	3,114.7
Recurrent Costs	893.1	1,112.1	1,167.7	1,170.1	1,190.2	1,249.7	6,782.8
Subtotal	1,504.1	1,812.4	1,886.9	1,518.5	1,555.9	1,619.7	9,897.5
2. Project M&E and knowledge management							
Investment Costs	190.9	191.7	196.3	142.7	132.1	190.1	1,043.8
Recurrent Costs	-	-	-	-	-	-	-
Subtotal	190.9	191.7	196.3	142.7	132.1	190.1	1,043.8
Subtotal	1,695.1	2,004.1	2,083.2	1,661.2	1,688.0	1,809.8	10,941.4
Total PROJECT COSTS	8,474.5	24,889.8	30,285.3	28,139.9	25,131.8	7,350.5	1,24,271.9
Total Investment Costs	6,274.1	22,405.1	27,676.4	25,456.4	22,352.6	4,432.3	1,08,596.8
Total Recurrent Costs	2,200.4	2,484.8	2,609.0	2,683.5	2,779.2	2,918.2	15,675.1

Expenditure accounts by year

India
SCATE

Expenditure Accounts by Years -- Totals In	Totals Including Contingencies (US$ '000)						
	20/21	21/22	22/23	23/24	24/25	25/26	Total
I. Investment Costs							
A. Technical assistance /a	1,032.4	4,971.8	5,570.6	5,224.3	4,837.6	3,812.4	25,449.1
B. Equipment & materials /b	676.8	9,625.1	17,079.4	16,615.6	15,595.4	4.1	59,596.4
C. Training and workshop	4,297.7	5,982.4	2,867.1	2,451.1	1,301.1	475.6	17,375.0
D. Grants and subsidies	146.4	1,698.9	2,026.0	1,025.5	471.7	-	5,368.6
E. Goods, services and inputs	120.8	126.8	133.2	139.8	146.8	140.2	807.7
Total Investment Costs	6,274.1	22,405.1	27,676.4	25,456.4	22,352.6	4,432.3	1,08,596.8
II. Recurrent Costs							
A. Salaries and allowances	1,216.5	1,277.4	1,341.2	1,408.3	1,478.7	1,552.6	8,274.7
B. Incremental operating costs	983.9	1,207.4	1,267.8	1,275.2	1,300.5	1,365.6	7,400.3
Total Recurrent Costs	2,200.4	2,484.8	2,609.0	2,683.5	2,779.2	2,918.2	15,675.1
Total PROJECT COSTS	8,474.5	24,889.8	30,285.3	28,139.9	25,131.8	7,350.5	1,24,271.9

\a includes studies etc
\b Farm and processing equipment plus office equipment

Financing Investment and recurrent costs by Financiers

India
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Financing of Investment/Recurre	Financing (US$ '000)						
	20/21	21/22	22/23	23/24	24/25	25/26	Total
I. Investment Costs							
Govt	1,058.1	3,416.1	4,317.9	4,131.6	3,623.8	500.6	17,048.0
ICAR	3.3	420.6	444.9	452.3	460.5	1,244.6	3,026.3
IFAD	4,928.1	14,045.9	15,360.1	13,770.5	11,693.1	2,687.1	62,484.8
IFAD Grant	29.8	298.4	342.7	226.5	108.1	-	1,005.6
Banks	-	605.2	1,747.4	1,709.7	1,663.8	-	5,726.0
Convergence	241.6	2,049.8	2,502.0	2,376.9	2,233.0	-	9,403.2
Beneficiaries	13.2	1,569.1	2,961.4	2,788.9	2,570.3	-	9,902.8
Total Investment Costs	6,274.1	22,405.1	27,676.4	25,456.4	22,352.6	4,432.3	1,08,596.8
II. Recurrent Costs							
Govt	177.5	203.8	214.0	219.1	226.2	237.5	1,277.9
ICAR	1,485.9	1,684.7	1,769.0	1,857.4	1,950.3	2,047.8	10,795.1
IFAD	537.0	596.3	626.1	607.0	602.8	632.9	3,602.1
IFAD Grant	-	-	-	-	-	-	-
Banks	-	-	-	-	-	-	-
Convergence	-	-	-	-	-	-	-
Beneficiaries	-	-	-	-	-	-	-
Total Recurrent Costs	2,200.4	2,484.8	2,609.0	2,683.5	2,779.2	2,918.2	15,675.1
Total Financing of Costs	8,474.5	24,889.8	30,285.3	28,139.9	25,131.8	7,350.5	1,24,271.9

DETAILED COST TABLES

Table 1.1: Need Assessment

India
SCATE

Table 1.1. Need Assessment

Detailed Costs	Unit	Quantities							Unit Cost (INR '000)	Unit Cost (US$ '000)	Base Cost (INR '000)							Other Accounts	
		20/21	21/22	22/23	23/24	24/25	25/26	Total			20/21	21/22	22/23	23/24	24/25	25/26	Total	Disb. Acct.	Fin. Rule
I. Investment Costs																			
A. Inventory preparation																			
Study team	study	1	-	-	-	-	-	1	2,500.0	35.7	2,500.0	-	-	-	-	-	2,500.0	TA_DA	IFAD (90%)
District level consultation	district	31	31	31	31	31	-	155	100.0	1.4	3,100.0	3,100.0	3,100.0	3,100.0	3,100.0	-	15,500.0	TA_DA	IFAD (90%)
State level validation	state	5	5	5	5	5	-	25	200.0	2.9	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	-	5,000.0	TA_DA	IFAD (90%)
National level finalisation	central	1	1	1	1	1	-	5	250.0	3.6	250.0	250.0	250.0	250.0	250.0	-	1,250.0	TA_DA	IFAD (90%)
Inventory publication	publicatior	1	-	-	-	-	-	1	500.0	7.1	500.0	-	-	-	-	-	500.0	TA_DA	IFAD (90%)
Inventory updating	publicatior	-	1	1	1	1	1	5	200.0	2.9	-	200.0	200.0	200.0	200.0	200.0	1,000.0	TA_DA	IFAD (90%)
Subtotal											7,350.0	4,550.0	4,550.0	4,550.0	4,550.0	200.0	25,750.0		
B. Database management																			
Database development	database	-	1	-	-	-	-	1	1,000.0	14.3	-	1,000.0	-	-	-	-	1,000.0	TA_DA	IFAD (90%)
Database management	database	-	-	1	1	1	1	4	600.0	8.6	-	-	600.0	600.0	600.0	600.0	2,400.0	TA_DA	IFAD (90%)
Subtotal											-	1,000.0	600.0	600.0	600.0	600.0	3,400.0		
Total											7,350.0	5,550.0	5,150.0	5,150.0	5,150.0	800.0	29,150.0		

Table-1.2: ICAR capacity building

India
SCATE

Table 1.2. ICAR capacity building

Detailed Costs	Unit	Quantities							Unit Cost (INR)	Unit Cost (US$)	Base Cost (INR '000)							Other Accounts
		20/21	21/22	22/23	23/24	24/25	25/26	Total			20/21	21/22	22/23	23/24	24/25	25/26	Total	Fin. Rule
I. Investment Costs																		
A. ICAR capacity building																		
1. National technology forum																		
Forum meetings	LS	-	1	1	1	1	-	4	700,000	10,000	-	700	700	700	700	-	2,800	IFAD (80%)
Forum meetings-ICAR	LS	-	-	-	-	-	1	1	700,000	10,000	-	-	-	-	-	700	700	IFAD (80%)
Subtotal											-	700	700	700	700	700	3,500	
2. Awards and fellowship																		
Research awards	award	-	10	10	10	10	-	40	400,000	5,714	-	4,000	4,000	4,000	4,000	-	16,000	IFAD (90%)
Research awards by ICAR	award	-	-	-	-	-	10	10	400,000	5,714	-	-	-	-	-	4,000	4,000	IFAD (90%)
Subtotal											-	4,000	4,000	4,000	4,000	4,000	20,000	
3. Fellowships in researches in AET /a																		
Fellowship by IFAD	fellowship	-	10	10	10	10	-	40	1,800,000	25,714	-	18,000	18,000	18,000	18,000	-	72,000	IFAD (90%)
Fellowship by ICAR	fellowship	-	-	-	-	-	10	10	1,800,000	25,714	-	-	-	-	-	18,000	18,000	IFAD (90%)
Subtotal											-	18,000	18,000	18,000	18,000	18,000	90,000	
Subtotal											-	22,700	22,700	22,700	22,700	22,700	1,13,500	
B. Training and capacity building																		
Techo-economic assessment of AET	LS	-	1	-	-	-	-	1	750,000	10,714	-	750	-	-	-	-	750	GRANT (90%), ICAR (10%)
Training in techno-economic protocols /b	batch	-	2	2	2	-	-	6	1,000,000	14,286	-	2,000	2,000	2,000	-	-	6,000	GRANT (90%), ICAR (10%)
Technology manuals for demonstrations /c	LS	10	20	20	-	-	-	50	100,000	1,429	1,000	2,000	2,000	-	-	-	5,000	GRANT (90%), ICAR (10%)
Training in technical manuals and POPs	LS	-	10	20	20	-	-	50	350,000	5,000	-	3,500	7,000	7,000	-	-	17,500	GRANT (90%), ICAR (10%)
Packages of practices for state specific crops	LS	10	10	10	-	-	-	30	100,000	1,429	1,000	1,000	1,000	-	-	-	3,000	GRANT (90%), ICAR (10%)
Exposure visits /d	LS	-	30	30	30	30	-	120	250,000	3,571	-	7,500	7,500	7,500	7,500	-	30,000	GRANT (90%), ICAR (10%)
Climate change adaptation	LS										513	7,211	6,710	-	-	-	14,434	GRANT (90%), ICAR (10%)
Subtotal											2,513	23,961	26,210	16,500	7,500	-	76,684	
C. Participation in Agri-expos																		
National Agri-expos	person	-	25	25	25	25	-	100	50,000	714	-	1,250	1,250	1,250	1,250	-	5,000	IFAD (80%)
International Agri-expos	persons	-	6	6	6	6	6	30	300,000	4,286	-	1,800	1,800	1,800	1,800	1,800	9,000	IFAD (80%)
Subtotal											-	3,050	3,050	3,050	3,050	1,800	14,000	
D. Acquisition of technologies																		
Purchase of machinery from overseas	LS	-	5	10	10	10	-	35	1,000,000	14,286	-	5,000	10,000	10,000	10,000	-	35,000	IFAD (90%)
E. Technical support to ICAR																		
Consultation with AMMA /e	pers_month	2	2	2	2	2	-	10	500,000	7,143	1,000	1,000	1,000	1,000	1,000	-	5,000	IFAD (90%)
Certification support	pers_month	-	20	20	20	20	20	100	200,000	2,857	-	4,000	4,000	4,000	4,000	4,000	20,000	IFAD (90%)
Technical assistance	pers_month	-	10	10	10	10	-	40	500,000	7,143	-	5,000	5,000	5,000	5,000	-	20,000	IFAD (90%)
Support for licensing of AET /f	pers_month	-	5	5	10	10	10	40	1,000,000	14,286	-	5,000	5,000	10,000	10,000	10,000	40,000	IFAD (90%)
Support for export of AET	LS	-	5	5	5	5	5	25	1,500,000	21,429	-	7,500	7,500	7,500	7,500	7,500	37,500	IFAD (90%)
Subtotal											1,000	22,500	22,500	27,500	27,500	21,500	1,22,500	
Total											3,513	77,211	84,460	79,750	70,750	46,000	3,61,684	

\a cost inclusive of all expenses for 24 months per fellowship
\b 2 batches of 20 person each for 5 days
\c for the use of selected agricultural technologies
\d 5 persons from each project area State
\e regarding centification,licensing,sales and services, quality control issues
\f such as AgIn, SAUs, legal support for licensing, etc

Table-1.3: Innovation Platform

India
SCATE
Table 1.3. Innovation platform

Detailed Costs	Unit	Quantities							Unit Cost (INR)	Unit Cost (US$)	Base Cost (INR '000)							Other Accounts	
		20/21	21/22	22/23	23/24	24/25	25/26	Total			20/21	21/22	22/23	23/24	24/25	25/26	Total	Disb. Acct.	Fin. Rule
I. Investment Costs																			
A. Techlogy development																			
1. Concept to prototype /a																			
Request for proposal	RFP	1	1	1	1	1	-	5	150,000	2,143	150	150	150	150	150	-	750	TA_DA	IFAD (90%)
Evaluation committee	RFP	3	3	3	3	3	-	15	150,000	2,143	450	450	450	450	450	-	2,250	TA_DA	IFAD (90%)
Funding for concept to prototype	RFP	-	7	7	7	7	7	35	4,000,000	57,143	-	28,000	28,000	28,000	28,000	28,000	1,40,000	TA_DA	IFAD (90%)
Funding for concept to prototype-ICAR	RFP	-	7	7	7	7	7	35	4,000,000	57,143	-	28,000	28,000	28,000	28,000	28,000	1,40,000	TA_DA	ICAR (100%)
Subtotal											600	56,600	56,600	56,600	56,600	56,000	2,83,000		
2. Adaptation and modification																			
Request for proposal	LS	1	1	1	1	1	-	5	150,000	2,143	150	150	150	150	150	-	750	TA_DA	IFAD (90%)
Evaluation of proposal by committee	each	-	15	20	25	25	-	85	150,000	2,143	-	2,250	3,000	3,750	3,750	-	12,750	TA_DA	IFAD (90%)
Funding for adaptation modification	LS	-	15	15	15	15	-	60	1,200,000	17,143	-	18,000	18,000	18,000	18,000	-	72,000	TA_DA	IFAD (90%)
Funding for adaptation modification-ICAR	each	-	-	-	-	-	15	15	1,200,000	17,143	-	-	-	-	-	18,000	18,000	TA_DA	ICAR (100%)
Subtotal											150	20,400	21,150	21,900	21,900	18,000	1,03,500		
3. Prototype to commercialisation																			
Technology challenges-Central	LS	1	1	1	-	-	-	3	1,000,000	14,286	1,000	1,000	1,000	-	-	-	3,000	TA_DA	IFAD (90%)
Technology challenges-states	LS	5	5	5	-	-	-	15	1,000,000	14,286	5,000	5,000	5,000	-	-	-	15,000	TA_DA	IFAD (90%)
Evaluation committee costs	LS	6	6	6	-	-	-	18	150,000	2,143	900	900	900	-	-	-	2,700	TA_DA	IFAD (90%)
Funding prototypes to commercialisation	state	-	7	7	7	7	7	35	4,000,000	57,143	-	28,000	28,000	28,000	28,000	28,000	1,40,000	TA_DA	IFAD (90%)
Funding prototype commercialisation -ICAR	each	-	-	-	-	-	7	7	4,000,000	57,143	-	-	-	-	-	28,000	28,000	TA_DA	ICAR (100%)
Subtotal											6,900	34,900	34,900	28,000	28,000	56,000	1,88,700		
Total											7,650	1,11,900	1,12,650	1,06,500	1,06,500	1,30,000	5,75,200		

Table-2.1: Demonstration of AE Technologies

India
SCATE
Table 2.1. Demonstrations of AE technologies

Detailed Costs	Unit	Quantities 20/21	21/22	22/23	23/24	24/25	25/26	Total	Unit Cost (INR)	Unit Cost (US$)	Base Cost (INR '000) 20/21	21/22	22/23	23/24	24/25	25/26	Total	Other Accounts Disb. Acct.	Fin. Rule
I. Investment Costs																			
A. Training																			
1. Lead farmer/ Krishi mitra training /a																			
lead farmer identification /b	Block	60	75	-	-	-	-	135	200,000	2,857	12,000	15,000	-	-	-	-	27,000	TRAIN_DA	IFAD (80%)
Lead farmer training, phase I /c	batch	20	100	80	-	-	-	200	50,000	714	1,000	5,000	4,000	-	-	-	10,000	TRAIN_DA	IFAD (80%)
Lead farmer training phase II	batch	-	20	100	80	-	-	200	50,000	714	-	1,000	5,000	4,000	-	-	10,000	TRAIN_DA	IFAD (80%)
KVK & Training agency management costs /d	agency	-	20	100	80	-	-	200	400,000	5,714	-	8,000	40,000	32,000	-	-	80,000	TRAIN_DA	IFAD (80%)
Subtotal											13,000	29,000	49,000	36,000	-	-	1,27,000		
2. Training and exposure visits																			
Training in processing /e	persons	-	100	500	400	-	-	1,000	50,000	714	-	5,000	25,000	20,000	-	-	50,000	TRAIN_DA	IFAD (80%)
Exposure visists to farmers /f	Block	-	20	40	40	35	-	135	200,000	2,857	-	4,000	8,000	8,000	7,000	-	27,000	TRAIN_DA	IFAD (80%)
Subtotal											-	9,000	33,000	28,000	7,000	-	77,000		
3. Third party assessment of lead farmer training																			
Verification and assessment	VO	200	2,200	2,000	1,600	-	-	6,000	2,500	36	500	5,500	5,000	4,000	-	-	15,000	TRAIN_DA	IFAD (80%)
Subtotal											13,500	43,500	87,000	68,000	7,000	-	2,19,000		
B. Field level demonstrations																			
1. Supply of AET equipment for demonstration																			
Demo machinery to KVK, convergence /g	set	11	20	-	-	-	-	31	1,500,000	21,429	16,500	30,000	-	-	-	-	46,500	EQUIP_DA	CONVER (100%)
Demo machinery to KVK, IFAD /h	set	11	20	-	-	-	-	31	1,500,000	21,429	16,500	30,000	-	-	-	-	46,500	EQUIP_DA	IFAD (80%)
Low cost AET implements	set	11	20	-	-	-	-	31			-	-	-	-	-	-	-	EQUIP_DA	IFAD (80%)
Subtotal											33,000	60,000	-	-	-	-	93,000		
2. In-field demonstrations in AET																			
Field days by lead farmers /krishi mitras /i	batch	1,000	1,000	-	-	-	-	2,000	12,500	179	12,500	12,500	-	-	-	-	25,000	TRAIN_DA	IFAD (90%)
Phase II Field days by lead farmers/krishi mitra	batch	-	1,000	1,000	-	-	-	2,000	12,500	179	-	12,500	12,500	-	-	-	25,000	TRAIN_DA	IFAD (90%)
Prime mover rental	batch	1,000	1,000	-	-	-	-	2,000	250,000	3,571	2,50,000	2,50,000	-	-	-	-	5,00,000	TRAIN_DA	IFAD (80%)
Subtotal											2,62,500	2,75,000	12,500	-	-	-	5,50,000		
3. Incremental staff to KVK																			
Agri engineer	pers_year	2.75	31	31	31	31	-	126.75	480,000	6,857	1,320	14,880	14,880	14,880	14,880	-	60,840	TA_DA	IFAD (90%)
Agri extension officer	pers_year	2.75	31	31	31	31	-	126.75	480,000	6,857	1,320	14,880	14,880	14,880	14,880	-	60,840	TA_DA	IFAD (90%)
Accounts Assistant	pers_year	2.75	31	31	31	31	-	126.75	300,000	4,286	825	9,300	9,300	9,300	9,300	-	38,025	TA_DA	IFAD (90%)
Assistants, multipurpose workers	pers_year	2.75	31	31	31	31	-	126.75	300,000	4,286	825	9,300	9,300	9,300	9,300	-	38,025	TA_DA	IFAD (90%)
Office equipment and materials	KVK	11	20	-	-	-	-	31	500,000	7,143	5,500	10,000	-	-	-	-	15,500	TA_DA	IFAD (90%)
Subtotal											9,790	58,360	48,360	48,360	48,360	-	2,13,230		
Subtotal											3,05,290	3,93,360	60,860	48,360	48,360	-	8,56,230		
Total Investment Costs											3,18,790	4,36,860	1,47,860	1,16,360	55,360	-	10,75,230		
II. Recurrent Costs																			
A. KVK Salary and allowances																			
1. Staff salary and allowances																			
Staff salary /k	pers_year	31	31	31	31	31	31	186	2,000,000	28,571	62,000	62,000	62,000	62,000	62,000	62,000	3,72,000	SAA_DA	ICAR (100%)
Staff allowances	pers_year	31	31	31	31	31	31	186	440,000	6,286	13,640	13,640	13,640	13,640	13,640	13,640	81,840	SAA_DA	ICAR (100%)
Office expenses	pers_year	31	31	31	31	31	31	186	240,000	3,429	7,440	7,440	7,440	7,440	7,440	7,440	44,640	SAA_DA	ICAR (100%)
Vehicle hiring	pers_year	31	31	31	31	31	31	186	200,000	2,857	6,200	6,200	6,200	6,200	6,200	6,200	37,200	IOC_DA	IFAD (90%)
Total Recurrent Costs											89,280	89,280	89,280	89,280	89,280	89,280	5,35,680		
Total											4,08,070	5,26,140	2,37,140	2,05,640	1,44,640	89,280	16,10,910		

\a a batch of 20
\b to be identified by respective KVK unit
\c one farmer from each of 4000 project villages in batch
\d including transport of machinery for in-field training ar in each village
\e 5 days of residential training
\f batches of 20 farmers for 3 days
\g machinery plus temporary shed
\h including low cost AET implements
\i 5 days of demonstration in batches of 20 lead farmers
\j One lead farmer from each village
\k assumed at 20% of KVK staff time is spent on the project

Table-2.2: Support services development

India
SCATE
Table 2.2. Support services development

Detailed Costs	Unit	Quantities							Unit Cost (INR)	Unit Cost (US$)	Base Cost (INR '000)							Other Accounts	
		20/21	21/22	22/23	23/24	24/25	25/26	Total			20/21	21/22	22/23	23/24	24/25	25/26	Total	Disb. Acct.	Fin. Rule
I. Investment Costs																			
A. Support to service development																			
Support to local manufactures /a	LS	-	36	36	36	36	-	144	500,000	7,143	-	18,000	18,000	18,000	18,000	-	72,000	SUB_DA	IFAD (90%), BEN (10%)
Support to State Agro-industries /b	state	2	3	-	-	-	-	5	5,000,000	71,429	10,000	15,000	-	-	-	-	25,000	SUB_DA	IFAD (90%), BEN (10%)
Support to existings ASC /c	centre	-	15	15	15	17	-	62	500,000	7,143	-	7,500	7,500	7,500	8,500	-	31,000	SUB_DA	IFAD (90%), BEN (10%)
Training local youth in repairs and maintenance /d	persons	-	20	80	70	-	-	170	150,000	2,143	-	3,000	12,000	10,500	-	-	25,500	TRAIN_DA	IFAD (80%)
Support to local youth in setting up of services centres	youth	-	20	80	70	-	-	170	500,000	7,143	-	10,000	40,000	35,000	-	-	85,000	SUB_DA	IFAD (90%), BEN (10%)
Total											10,000	53,500	77,500	71,000	26,500	-	2,38,500		

\a one in each state and in 31 districts
\b one in each state
\c Two in each district
\d 5 youth from each district

Table-2.3: Scaling up AE technologies

India
SCATE
Table 2.3. Scaling up AE technologies

Detailed Costs	Unit	Quantities							Unit Cost (INR)	Unit Cost (US$)	Base Cost (INR '000)							Other Accounts	
		20/21	21/22	22/23	23/24	24/25	25/26	Total			20/21	21/22	22/23	23/24	24/25	25/26	Total	Disb. Acct.	Fin. Rule
I. Investment Costs																			
A. Scaling up partnership																			
Preparation of guidelines	LS	1	-	-	-	-	-	1	1,000,000	14,286	1,000	-	-	-	-	-	1,000	TRAIN_DA	IFAD (80%)
Consultation workshop at district level	district	31	31	31	31	31	31	186	200,000	2,857	6,200	6,200	6,200	6,200	6,200	6,200	37,200	TRAIN_DA	IFAD (80%)
Consultation workshop at state level	state	5	5	5	5	5	5	30	500,000	7,143	2,500	2,500	2,500	2,500	2,500	2,500	15,000	TRAIN_DA	IFAD (80%)
Subtotal											9,700	8,700	8,700	8,700	8,700	8,700	53,200		
B. Incentives for AET upscaling																			
1. Farm mechanisation units																			
Prime movers (tractors and power tiller etc) /a	set	-	250	400	350	300	-	1,300	900,000	12,857	-	2,25,000	3,60,000	3,15,000	2,70,000	-	11,70,000	EQUIP_DA	IFAD (40%), CONVER (40%), BEN (20%)
Auxillary AET machineries /b	set	-	250	400	350	300	-	1,300	500,000	7,143	-	1,25,000	2,00,000	1,75,000	1,50,000	-	6,50,000	EQUIP_DA	IFAD (60%), BANKS (20%), BEN (20%)
Support to existing CHC	set	-	125	200	175	150	-	650	400,000	5,714	-	50,000	80,000	70,000	60,000	-	2,60,000	EQUIP_DA	IFAD (40%), BANKS (40%), BEN (20%)
Subtotal											-	4,00,000	6,40,000	5,60,000	4,80,000	-	20,80,000		
2. Common facility centres for processing																			
Setting up of CFC /c	set	-	200	250	250	250	-	950	600,000	8,571	-	1,20,000	1,50,000	1,50,000	1,50,000	-	5,70,000	EQUIP_DA	IFAD (50%), CONVER (30%), BEN (20%)
CFC with alternate energy	set	-	20	40	50	40	-	150	900,000	12,857	-	18,000	36,000	45,000	36,000	-	1,35,000	EQUIP_DA	IFAD (80%), BEN(20%)
Subtotal											-	1,38,000	1,86,000	1,95,000	1,86,000	-	7,05,000		
3. Agricultural tools bank /d	set	-	50	100	75	-	-	225	200,000	2,857	-	10,000	20,000	15,000	-	-	45,000	EQUIP_DA	IFAD (80%), BEN (20%)
4. Support to individual farmers for the purchase of AET machinery other than prime movers	set	-	100	2,000	2,000	2,000	-	6,100	100,000	1,429	-	10,000	2,00,000	2,00,000	2,00,000	-	6,10,000	EQUIP_DA	IFAD (50%), BANKS (30%), BEN (20%)
5. User expansion support	VO	-	2,000	2,000	-	-	-	4,000	30,000	429	-	60,000	60,000	-	-	-	1,20,000	SUB_DA	IFAD (90%), BEN (10%)
6. District and Block level platforms																			
District level platforms /e	district	-	62	62	62	62	-	248	200,000	2,857	-	12,400	12,400	12,400	12,400	-	49,600	TRAIN_DA	IFAD (80%)
Block level facilitation platform	Block	-	270	270	270	270	-	1,080	100,000	1,429	-	27,000	27,000	27,000	27,000	-	1,08,000	TRAIN_DA	IFAD (80%)
Subtotal											-	39,400	39,400	39,400	39,400	-	1,57,600		
Subtotal											-	6,57,400	11,45,400	10,09,400	9,05,400	-	37,17,600		
C. Performance assessment by third party	state	-	5	5	5	5	5	25	1,000,000	14,286	-	5,000	5,000	5,000	5,000	5,000	25,000	TA_DA	IFAD (80%)
D. Support to SRLM and other partners																			
Capacity building support to SRLM	state	5	5	5	5	5	5	30	1,670,000	23,857	8,350	8,350	8,350	8,350	8,350	8,350	50,100	TA_DA	IFAD (90%)
Block level staff support for SRLM /f	LS/year	-	110	226	226	116	-	678	240,000	3,429	-	26,400	54,240	54,240	27,840	-	1,62,720	TA_DA	IFAD (90%)
Capacity building support to other partners	state	5	5	5	5	5	5	30	1,670,000	23,857	8,350	8,350	8,350	8,350	8,350	8,350	50,100	TA_DA	IFAD (90%)
Subtotal											16,700	43,100	70,940	70,940	44,540	16,700	2,62,920		
Total											26,400	7,14,200	12,30,040	10,94,040	9,63,640	30,400	40,58,720		

\a one in two villages
\b one in two villages
\c to be set up by SHGs or VOs
\d agricultural tools and implements to be set up by SHGs
\e at the rate of 2 per district
\f for engaging the services of Agriculture enterprises promoters

Table-3.1: Project management Project implementation unit & State PMUs

India
SCATE
Table 3.1. PIU and SPMUs

Detailed Costs	Unit	Quantities							Unit Cost (INR)	Unit Cost (US$)	Base Cost (INR '000)							Other Accounts	
		20/21	21/22	22/23	23/24	24/25	25/26	Total			20/21	21/22	22/23	23/24	24/25	25/26	Total	Disb. Acct.	Fin. Rule
I. Investment Costs																			
A. Office equipment																			
1. Office equipment for PIU																			
Laptops	each	15	-	-	-	-	-	15	70,000	1,000	1,050	-	-	-	-	-	1,050	EQUIP_DA	IFAD (80%)
Desktops	each set	7	-	-	-	-	-	7	75,000	1,071	525	-	-	-	-	-	525	EQUIP_DA	IFAD (80%)
Printers, multi-functional	each	2	-	-	-	-	-	2	100,000	1,429	200	-	-	-	-	-	200	EQUIP_DA	IFAD (80%)
Photocopier	each	3	-	-	-	-	-	3	200,000	2,857	600	-	-	-	-	-	600	EQUIP_DA	IFAD (80%)
UPS	each	7	-	-	-	-	-	7	15,000	214	105	-	-	-	-	-	105	EQUIP_DA	IFAD (80%)
LCD projectors	each	2	-	-	-	-	-	2	200,000	2,857	400	-	-	-	-	-	400	EQUIP_DA	IFAD (80%)
Digital camera	each	3	-	-	-	-	-	3	25,000	357	75	-	-	-	-	-	75	EQUIP_DA	IFAD (80%)
Video camera	each	3	-	-	-	-	-	3	100,000	1,429	300	-	-	-	-	-	300	EQUIP_DA	IFAD (80%)
Tablets or smartphones	each	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	EQUIP_DA	IFAD (80%)
Office Furniture	set	15	-	-	-	-	-	15	150,000	2,143	2,250	-	-	-	-	-	2,250	EQUIP_DA	IFAD (80%)
Miscellaneous equipment	set	-	1	-	-	-	-	1	500,000	7,143	-	500	-	-	-	-	500	EQUIP_DA	IFAD (80%)
Subtotal											5,505	500	-	-	-	-	6,005		
2. Office equipment for SPMUs																			
Laptops	each	5	-	-	-	-	-	5	70,000	1,000	350	-	-	-	-	-	350	EQUIP_DA	IFAD (80%)
Desktops	each set	5	-	-	-	-	-	5	75,000	1,071	375	-	-	-	-	-	375	EQUIP_DA	IFAD (80%)
Printers, multi-functional	each	5	-	-	-	-	-	5	100,000	1,429	500	-	-	-	-	-	500	EQUIP_DA	IFAD (80%)
Photocopier	each	5	-	-	-	-	-	5	200,000	2,857	1,000	-	-	-	-	-	1,000	EQUIP_DA	IFAD (80%)
UPS	each	5	-	-	-	-	-	5	15,000	214	75	-	-	-	-	-	75	EQUIP_DA	IFAD (80%)
LCD projectors	each	5	-	-	-	-	-	5	200,000	2,857	1,000	-	-	-	-	-	1,000	EQUIP_DA	IFAD (80%)
Digital camera	each	5	-	-	-	-	-	5	25,000	357	125	-	-	-	-	-	125	EQUIP_DA	IFAD (80%)
Video camera	each	5	-	-	-	-	-	5	100,000	1,429	500	-	-	-	-	-	500	EQUIP_DA	IFAD (80%)
Office Furniture	set	5	-	-	-	-	-	5	150,000	2,143	750	-	-	-	-	-	750	EQUIP_DA	IFAD (80%)
Miscellaneous equipment	set	-	5	-	-	-	-	5	100,000	1,429	-	500	-	-	-	-	500	EQUIP_DA	IFAD (80%)
Subtotal											4,675	500	-	-	-	-	5,175		
Subtotal											10,180	1,000	-	-	-	-	11,180		
B. Techical assistance /a	pers_months	36	48	48	-	-	-	132	500,000	7,143	18,000	24,000	24,000	-	-	-	66,000	TA_DA	IFAD (90%)
C. Audits and accounts																			
Internal audits	year	6	6	6	6	6	6	36	1,000,000	14,286	6,000	6,000	6,000	6,000	6,000	6,000	36,000	GSI_DA	IFAD (90%)
External audit	year	1	1	1	1	1	1	6	1,000,000	14,286	1,000	1,000	1,000	1,000	1,000	1,000	6,000	GSI_DA	IFAD (90%)
Account software maintenance	year	1	1	1	1	1	1	6	500,000	7,143	500	500	500	500	500	500	3,000	GSI_DA	IFAD (90%)
Software training	year	30	30	30	30	30	-	150	25,000	357	750	750	750	750	750	-	3,750	GSI_DA	IFAD (90%)
Annual finance reports	year	1	1	1	1	1	1	6			-	-	-	-	-	-	-	GSI_DA	IFAD (90%)
Subtotal											8,250	8,250	8,250	8,250	8,250	7,500	48,750		
D. Coordination meetings																			
PSC meeting	year	2	2	2	2	2	2	12	300,000	4,286	600	600	600	600	600	600	3,600	TRAIN_DA	IFAD (80%)
PMC meetings	year	2	2	2	2	2	2	12	250,000	3,571	500	500	500	500	500	500	3,000	TRAIN_DA	IFAD (80%)
State level coordination meetings	year	4	10	10	10	10	10	54	500,000	7,143	2,000	5,000	5,000	5,000	5,000	5,000	27,000	TRAIN_DA	IFAD (80%)
Distric level coordination meetings	year	22	62	62	62	62	62	332	100,000	1,429	2,200	6,200	6,200	6,200	6,200	6,200	33,200	TRAIN_DA	IFAD (80%)
Subtotal											5,300	12,300	12,300	12,300	12,300	12,300	66,800		
Total Investment Costs											41,730	45,550	44,550	20,550	20,550	19,800	1,92,730		

Continued

Table-3.1: Project management Project Recurrent costs

India
SCATE
Table 3.1. PIU and SPMUs

Detailed Costs	Unit	Quantities							Unit Cost (INR)	Unit Cost (US$)	Base Cost (INR '000)						
		20/21	21/22	22/23	23/24	24/25	25/26	Total			20/21	21/22	22/23	23/24	24/25	25/26	Total
II. Recurrent Costs																	
A. Incremental staff salary, PIU																	
1. Staff salary of PIU /b																	
Project Director	annual	1	1	1	1	1	1	6	4,000,000	57,143	4,000	4,000	4,000	4,000	4,000	4,000	24,000
Additional Director	annual	1	1	1	1	1	1	6	3,600,000	51,429	3,600	3,600	3,600	3,600	3,600	3,600	21,600
National Coordinators	annual	2.5	5	5	5	5	5	27.5	3,600,000	51,429	9,000	18,000	18,000	18,000	18,000	18,000	99,000
Head, Finanace	annual	1	1	1	1	1	1	6	1,800,000	25,714	1,800	1,800	1,800	1,800	1,800	1,800	10,800
Asst Coordinators /c	annual	5	5	5	5	5	5	30	1,560,000	22,286	7,800	7,800	7,800	7,800	7,800	7,800	46,800
Finance and Accounts Managers /d	annual	1	2	2	2	2	2	11	1,440,000	20,571	1,440	2,880	2,880	2,880	2,880	2,880	15,840
Procurement specialist	annual	1	1	1	-	-	-	3	1,800,000	25,714	1,800	1,800	1,800	-	-	-	5,400
Procurement assistant	annual	1	1	1	1	1	1	6	900,000	12,857	900	900	900	900	900	900	5,400
Manager KM	annual	1	1	1	1	1	1	6	1,200,000	17,143	1,200	1,200	1,200	1,200	1,200	1,200	7,200
M&E Specialist	annual	1	1	1	1	1	1	6	1,800,000	25,714	1,800	1,800	1,800	1,800	1,800	1,800	10,800
M&E Assistant	annual	-	1	1	1	1	1	5	900,000	12,857	-	900	900	900	900	900	4,500
Capacity development & training specialist	annual	1	1	1	-	-	-	3	1,500,000	21,429	1,500	1,500	1,500	-	-	-	4,500
Support staff /e	annual	3	3	3	3	-	-	12	720,000	10,286	2,160	2,160	2,160	2,160	-	-	8,640
Subtotal											37,000	48,340	48,340	45,040	42,880	42,880	2,64,480
2. Office operating cost																	
Travel allowance	annual	1	1	1	1	1	1	6	2,000,000	28,571	2,000	2,000	2,000	2,000	2,000	2,000	12,000
Vehicle hiring	annual	1	1	1	1	1	1	6	1,500,000	21,429	1,500	1,500	1,500	1,500	1,500	1,500	9,000
Office expenditure	annual	1	1	1	1	1	1	6	1,000,000	14,286	1,000	1,000	1,000	1,000	1,000	1,000	6,000
Office facilities and utilities	annual	1	1	1	1	1	1	6	840,000	12,000	840	840	840	840	840	840	5,040
Subtotal											5,340	5,340	5,340	5,340	5,340	5,340	32,040
Subtotal											42,340	53,680	53,680	50,380	48,220	48,220	2,96,520
B. State level staff /f																	
State Project Directors	annual	5	5	5	5	5	5	30	1,200,000	17,143	6,000	6,000	6,000	6,000	6,000	6,000	36,000
State project managers	annual	5	5	5	5	5	5	30	1,000,000	14,286	5,000	5,000	5,000	5,000	5,000	5,000	30,000
M&E Officers	annual	5	5	5	5	5	5	30	900,000	12,857	4,500	4,500	4,500	4,500	4,500	4,500	27,000
Young Professional	annual	5	5	5	5	5	5	30	480,000	6,857	2,400	2,400	2,400	2,400	2,400	2,400	14,400
Office operating costs	annual	5	5	5	5	5	5	30	150,000	2,143	750	750	750	750	750	750	4,500
Subtotal											18,650	18,650	18,650	18,650	18,650	18,650	1,11,900
Total Recurrent Costs											60,990	72,330	72,330	69,030	66,870	66,870	4,08,420
Total											1,02,720	1,17,880	1,16,880	89,580	87,420	86,670	6,01,150

\a Individual consultants for financial management, MIS, M&E, etc
\b to be housed in ICAR
\c Positions equivalent to Senior Reaserach Fellow or Senior Research Associates
\d Two managers
\e One each of Data entry operator, Admin assistant and Programme assistant
\f to be housed in the office of Director (Extension); 25% of salary has been accounted for

Table-3.1: Project M&E and Knowledge management

India
SCATE
Table 3.2. Project M&E and Knowledge Manage

Detailed Costs	Unit	Quantities							Unit Cost (INR)	Unit Cost (US$)	Base Cost (INR '000)						
		20/21	21/22	22/23	23/24	24/25	25/26	Total			20/21	21/22	22/23	23/24	24/25	25/26	Total
I. Investment Costs																	
A. Office equipment																	
Laptops	each	9	-	-	-	-	-	9	70,000	1,000	630	-	-	-	-	-	630
Desktops /a	each set	5	-	-	-	-	-	5	75,000	1,071	375	-	-	-	-	-	375
Printers /b	each	5	-	-	-	-	-	5	8,000	114	40	-	-	-	-	-	40
Xerox mechines	each	-	-	-	-	-	-	-			-	-	-	-	-	-	-
UPS	each	-	-	-	-	-	-	-			-	-	-	-	-	-	-
LCD projectors	each	-	-	-	-	-	-	-			-	-	-	-	-	-	-
Digital camera /c	each	5	-	-	-	-	-	5	25,000	357	125	-	-	-	-	-	125
Video camera	each	-	-	-	-	-	-	-			-	-	-	-	-	-	-
Tablets or smartphones /d	each	-	120	116	-	-	-	236	15,000	214	-	1,800	1,740	-	-	-	3,540
Office Furniture	set	5	-	-	-	-	-	5	150,000	2,143	750	-	-	-	-	-	750
MIS software & installation	LS	1	-	-	-	-	-	1	1,000,000	14,286	1,000	-	-	-	-	-	1,000
Repairs and maintenance of MIS software	annual	-	1	1	1	1	1	5	100,000	1,429	-	100	100	100	100	100	500
Purchase of books & periodicals	each	1	1	1	1	1	1	6	120,000	1,714	120	120	120	120	120	120	720
Subtotal											3,040	2,020	1,960	220	220	220	7,680
B. Studies and surveys																	
1. Annual outcome surveys	year	2	5	5	5	5	5	27	500,000	7,143	1,000	2,500	2,500	2,500	2,500	2,500	13,500
2. Impact assessment surveys																	
Baseline surveys	survey	1	-	-	-	-	-	1	5,000,000	71,429	5,000	-	-	-	-	-	5,000
MTR survey	survey	-	-	1	-	-	-	1			-	-	-	-	-	-	-
Endline survey	survey	-	-	-	-	-	1	1	5,000,000	71,429	-	-	-	-	-	5,000	5,000
Thematic surveys	LS	2	2	2	2	2	-	10	500,000	7,143	1,000	1,000	1,000	1,000	1,000	-	5,000
Subtotal											6,000	1,000	1,000	1,000	1,000	5,000	15,000
Subtotal											7,000	3,500	3,500	3,500	3,500	7,500	28,500
C. Annual reports																	
Start up workshops	event	2	3	-	-	-	-	5	500,000	7,143	1,000	1,500	-	-	-	-	2,500
Performance review workshop	event	-	3	3	3	3	3	15	150,000	2,143	-	450	450	450	450	450	2,250
Annual supervision	year	1	1	1	1	1	1	6	500,000	7,143	500	500	500	500	500	500	3,000
MIS report	year	1	1	1	1	1	1	6	500,000	7,143	500	500	500	500	500	500	3,000
Annual progress report	year	1	1	1	1	1	1	6	500,000	7,143	500	500	500	500	500	500	3,000
Subtotal											2,500	3,450	1,950	1,950	1,950	1,950	13,750
D. Knowledge management																	
Studies																	
New technology adoption	LS	-	1	1	1	-	-	3	750,000	10,714	-	750	750	750	-	-	2,250
Market demand for new technologies	LS	-	1	1	1	-	-	3	750,000	10,714	-	750	750	750	-	-	2,250
Drudgery reduction	LS	-	-	1	-	-	-	1	750,000	10,714	-	-	750	-	-	-	750
Feasibility of CHC model	LS	-	1	-	-	-	-	1	750,000	10,714	-	750	-	-	-	-	750
Renewable energy-based equipment	LS	-	-	1	-	-	-	1	750,000	10,714	-	-	750	-	-	-	750
Gender aspects in farm mechanisation	LS	-	-	1	-	1	-	2	500,000	7,143	-	-	500	-	500	-	1,000
Success stories	LS	-	1	1	1	1	-	4	750,000	10,714	-	750	750	750	750	-	3,000
Miscellaneous	LS	1	1	1	1	1	1	6	500,000	7,143	500	500	500	500	500	500	3,000
Subtotal											500	3,500	4,750	2,750	1,750	500	13,750
Total											13,040	12,470	12,160	8,420	7,420	10,170	63,680

\a SRLM units
\b SRLM units
\c at SRLM units
\d to cover 110 enterprises mitra, MIS assistants with SRLM and M&E officers with SPICT

IFAD
Investing in rural people

India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

Annex 4: Economic and Financial Analysis

Document Date:	25/07/2019
Project No.	2000001941

Asia and the Pacific Division
Programme Management Department

Annex 4. Economic and Financial Analysis (EFA)

A. Introduction

1. The SCATE project will commence implementation in January 2020 and expected to be completed by 2025 covering 31 selected districts from the states of Assam, Chhattisgarh, Odisha, Jharkhand and Nagaland. The project is expected to provide 1,300 farm mechanisation units along with equal number of agricultural engineering technology machineries, provide support for 1,100 common facilities centres for post-harvest processing, support to some 650 existing custom service centres,150 CFCs with alternate sources of energy in particular solar power, establishment of 225 agricultural tools banks and direct support to individual farmers. All these facilities are provided to some 4,000 villages. Thus in all some 400,000 direct households would be the project outreach. With the implementation of SCATE interventions, there would be significant changes in production patterns, incomes and overall well-being of the participating households. These aspects are examined under the economic and financial analysis (EFA).

2. **Approach and methodology for EFA**: Cost-benefit analysis method was used for carrying out the economic and financial analysis of the project at ex-ante. All incremental investment costs were adjusted to April 2019 prices. Incremental benefits were estimated based on estimated physical outputs and likely chances of building up of incremental benefits during the project life period. Crop data[1] were obtained from the field and prices were collected for all inputs and commodities and these were adjusted to farm-gate prices using the standard conversion factor. Commodity prices are the mean values of the year 2018. For the post-harvest processing, the models developed by the previous IFAD mission[2] were adopted with a little modification. Using all these data and other available information, production type or activity models for each commodity or product were developed; from these production models to the next level Area models, followed by aggregated Subproject models and finally the project model prepared applying the FARMOD software.

3. Major interventions under the project are given in Table-2.1 below.

Table-4.1: Interventions and households reached out

Interventions	# of participating VOs		# of in-field demonstrations (# of lead farmers)	# of households reached *b/*	Average operational area/VO (ha) c/	Average landholding size (ha/hh) d/
1.Total number of FMU:	*1300*		*40,000*	*130,000*	*109*	*1.09*
-Assam	170	-		17,000	108	1.08
-Chhattisgarh	315	-		31,500	125	1.25
-Odisha	415	-		41,500	95	0.95
-Jharkhand	360	-		36,000	117	1.17
-Nagaland	40	-		4,000	100	1.00
2.CFC processing units	*950*			*95,000*	*109*	*1.09*
3.Custom hiring centres a/	*650*		*-*	*65,000*	*200*	*1.09*
4. Agri tools banks	*225*		*-*	*22,500*	*100*	*-*
5 User expansion service	*4,000*			*400,000*		
Total direct beneficiary hh	*-*	*-*		*400,000*		

a/ each existing CHC cater to some 200 households
b/ average number of farmer-members per VO assumed at 100 and that of existing CHC
c/ average operational area per VO or village has been estimated on the basis of average operational landholding size
d/ source: Agricultural Census 2015-16, Ministry of Agriculture and Farmer Welfare, Govt of India

[1] From the Directorate of Statistics, Govt Assam for Assam and also from the KVKs visited by the mission, Department of Agricultural Economics, IGKVV Raipur for Chhattisgarh, from the Orissa Agricultural University, Bhubaneswar, Birsa Agricultural University for Jharkhand and mission data for Nagaland

[2] Enrico Mazzoli and Jeevan Mohanty: Screening and cost-benefits analysis of Agricultural Machineries in Rural India, Draft Report prepared in collaboration with ICAR AED.

B. Financial Analysis

(i) Assumptions

- In all 400,000 households will receive the project services directly including 328,110 households directly benefited by AET. These participating households respond to the introduction of new packages of technologies that are demonstrated to them in field.
- Average size of operational landholding is 1.09 ha but it varied between states such as 1.08 ha in Assam, 1.25 ha in Chhattisgarh, 0.95 ha in Odisha, 1.1 ha in Jharkhand and 5 ha in Nagaland[3].
- On an average a village organisation (VO) , village council, watershed committee has 100 farmer-members and most of whom are smallholder farmers: about 85% of VO farmers in Assam, 81% farmers in Chhattisgarh, 92% in Odisha, 84% in Jharkhand and 19% in Nagaland are smallholder farmers[4].
- The participating households organised themselves into village organisations, village councils, watershed committees, producer organisations or cooperatives or SHGs etc are participating effectively in project implementation.
- Most of the members VO carry out their farming operations on traditional lines using locally available draught animals and plough and implements but there has been increasing tendency to go for partial mechanisation of farming operations subject to availability of such facilities and affordability.
- On the one hand available farm labour per unit crop area has been declining and farm wages increasing and on the other average size of operational landholding has been reducing[5].
- Most of farmer-members of VO do not have enough financial capacity to purchase individually the farm machinery and implements for using them on their farm; ICAR farm technologies are currently demonstrated on a restricted scale but these have the potential for scaling up through large number of multi-local demonstrations.
- A set up technologies consisting of traction power (both tractor and power tiller), other implements such as weeder, seed-drill, direct paddy seeder, drum-seeded, sweep cultivator, power weeder, self-propelled reaper, multi-crop thresher, seed cleaner, etc would be provided to a VO/CIs who are selected on the basis of a set of selection criteria[6].
- Average economic life of the implements has been assumed at 5 years and that of the tractor and power tiller at 10 years; and there are manufacturers who could fabricate these farm implements in accordance to the ICAR specifications under standard terms and conditions.
- It is assumed that the members of VO would be able to possess and manage the set of implements and tractors acquired by them and make them available for their members at the time of the cropping seasons. The VO could also select one of its SHG to look after the implements and the tractors and they would also provide the services of the drivers and make available required shed[7] for housing the set of machineries.
- On an average a VO's farm mechanisation unit with the active involvement of respective KVK would be able to cover some 40% of its operational area in a year ie 40 ha and these would include all types of farm operations such as ploughing, seed drilling, weeding, harvesting, threshing, transporting, etc

[3] Although average operational area is 5 ha, only about 1 ha land is put to crop agriculture
[4] Source: All India Agricultural Census, MoAFW, GOI
[5] Source: Agricultural Census 2015/16, MOAFW, GOI: Operational landholding gradually declining due to population growth and parcellisation from 1.33 ha in 2000/01 to 1.08 ha in 2015/16 and during the same period agricultural workers share declined from 55% to 47%.
[6] Selection criteria are outlined in PIM
[7] Average value has been assumed at INR 70,000 per shed of 1000 sq ft and the drivers salary is assumed at INR 6,000 per month

- Maintenance and upkeep of the machinery would be the responsibility of the concerned VO and these would be ensured through the rental incomes of the machinery.
- Commonly grown crops in the project area states are paddy, wheat, maize; millets, oilseeds etc and the models of these crops are used for the analysis. Households mostly apply farm yard manure or compost and very limited quantities of chemical fertilisers.
- Crop productivity marginally improved through use of such farm machinery implements as direct paddy seeder, weeder, line-sowing using seed-drill, reduction in post-harvest loses etc.
- Cultivation practices are mostly traditional and it is assumed that over 40% of farmers would be adopting improved practices and farm mechanisation.
- Existing custom service centres will be provided financial support in acquiring the AET machineries. These CHCs would accord priority to the project VOs and all services would be rendered on payment basis.
- There is considerable potential for introducing post-harvest processing facilities such as turmeric processing, mini dal milling, millet processing, tamarind de-seeding and packaging in the tribal area, rope-making from banana fibres, etc.
- *Overall uptake and adoption rate* will be low but steady. It is assumed at 70% of the 40% area of the respective farm mechanisation units ie some 28 ha per unit per annum.
- *Custom hiring rates* vary significantly between states, for example:

Table-4.2: Custom hiring rates (INR/ha)

Type of service	Chhattis a/	Average b/	CHC b/
Tractor ploughing	600	1,200	950
Harvester	1700		
Transport trolley	500/day		
Threshing by tractor		1000	850
Fan winnowing	75		
Power tiller	600	600	500
Tractor seed-drill			700
Sprayer	50		
Paddy combines			1200
Seed drill		800	

a/ Data collected during the mission;
b/Source: SMAM evaluation study by WAPCOS, 2018

- Average farm power in the project area districts vary between 0.504 kwh/ha in Nagaland and 1.617 kwh/ha in Odisha; although there is potential for increasing the farm power but the farmers are unaware of these potential and also means of securing the farm implements.
- Availability of farm power increased between 14% and 20% during the last 3 years as illustrated in the table 2.3 below, ie average annual growth rate has been only 6%. Some experts argue that there is a close correlation between farm power and productivity[8]

Table-4.3: Farm Power Availability in the project states a/

State	Farm Power (kwh/ha) (2013/14)	Farm Power (kwh/ha) (2016/17)	Change in %
Assam	0.869	0.993	14%
Chhattisgarh	1.020	1.035	19%
Odisha	1.442	1.617	14%
Jharkhand	0.998	1.206	20%

[8] Source: Gajendra Singh, Agricultural Mechanisation in India, Indian Journal of Agricultural Economists, Jan-March 2015. The author produced a graph showing that productivity of 1,750 kg/ha, 2,700 kg/ha and 3,200 kg/ha were related to 1 kwh/ha, 1.5 kwh/ha and 2 kwh/ha respectively. *He further observes that (i) farm operations requiring high power inputs and low skill are the first to be mechanised (tillage, transport, water pumping, milling, threshing, etc); operations requiring medium levels of power and skill such as seeding, spraying, inter-row operations are mechanised next and operations requiring high degree of skills and varying level of inputs are mechanised last (such as transplanting, planting of vegetables, harvesting, grading etc are the last to be mechanised*.

Nagaland	0.415	0.504	21%
Source: Final Report on Monitoring, concurrent evaluation and Impact assessment of SMAM, MoAFW, GoI by WAPCOS, March 2018			

- An average wage rate of INR 250/personday for both male and female labour has been assumed although the farm-wages tended to vary between the states. As recommended by the IFAD EFA Guidance Notes, a wage rate of INR 250/day has been assumed for "proxy labour under without project situation" for such new interventions under project such as post-harvest processing, etc.

Project area

4. Overall mechanisation in India is less than 50% as compared to 90% in most developed countries. On an average the growth rate has been less than 5% in last two decades, although one can see acceleration over the last 3 years especially in states with low agricultural productivity. Currently machines are used in land preparation, seed-bed preparation, seeding and planting, harvesting and threshing usually by the large farmers. The eastern region comprising Assam, Nagaland, Odisha and Jharkhand struggles by using power operated tool and machines; hand operated tool and machinery (about 43%), animal drawn tools constitute 24%. In Chhattisgarh, a combination of hand-operated and machine-operated tools are used and of late, more and more machine operated tools are used, in particular the harvesters, combines, threshers, winnowers, etc for the paddy crop. The region falls under, "humid subtropical climate with extreme summers, heavy rains during monsoon and mild winters". About 10% of India's cultivated land falls in this region with rice occupying 68% area and wheat 9%.

(ii) Production models. Following production crop models, which are indicative, were developed for the purposes of ex-ante EFA:

Table-4.4: Crop distribution per land unit area by the Project State (%)

Major crops a/	Assam b/ (1 ha)	Chhattisgarh b/ (1 ha)	Odisha c/ (1 ha)	Jharkhand d/ (1 ha)	Nagaland e/ (1 ha)
Paddy	87%	85%	20%	65%	40%
Maize	-	5%	20%	15%	40%
Wheat	-	-	-	15%	-
Pulses	7%	5%	15%	5%	-
Oilseeds	6%	5%	-	-	-
Millets	-	-	45%	-	-
Turmeric	-	-	-	-	20%
Total crop area	17,000	31,500	41,500	36,000	4,000
a/ crop distribution in a unit ha area is based on % of major crops grown in the respective state b/ Data collected from the Directorate of Statistics, Guwahati, GOA and also from Moregaon and Nalbari KVKs; c/ data obtained from the Odisha Agriculture Technology University, Bhubaneswar d/ data obtained from the Birsa Agriculture University, Ranchi; e/ from previous IFAD mission reports					

5. *Other activity models* developed and considered for EFA are (i) typical processing models for (a) banana rope-making unit; (b) millet processing unit, (c) mini pulses processing unit, (d) turmeric processing unit, (e) tamarind de-seeding and packaging unit and (f) generic CFC unit[9] (ii) support to existing Custom hiring centre (CHC) model. (iii) agricultural tools bank model and (iv) supply of AET machinery to individual farmers

(iii) Area Models

6. Using all the above-mentioned production models, AREA models were developed with a view to estimating the project "expected impacts" on the incomes, and use of household labour adopting agricultural machineries both on-farm and non-farm. For the purpose of assessing the performance of "VO operation", average size of operational landholding size of a village organisation has been taken into consideration but the number of membership has been kept as 100 per VO. Average crop area and crop distribution of major crops of a VO has been taken on the basis of the average cropping patterns of the respective state. On an average in

[9] Based on live models from CAIM, an IFAD project in Maharashtra

each VO some 40% of the operational area is brought under farm mechanisation. These features are described briefly below:

7. Assam VO area model[10]: Average Assam VO has some 108 ha of area and operated by 100 member-farmers. The area has 93.96 ha under paddy, 6.48 ha under oilseeds such as mustard and 7.56 ha under pulses. Each year about 40% of area of all *participating farmers* would be covered under farm mechanisation: 37.56 ha of paddy area, 2.5 ha of oilseeds area and 3.0 ha of pulses area. As a result of farm mechanisation, the financial analysis shows that gross incomes increases by 15% and the overall cost of production is reduced by about 31%.

8. Chhattisgarh[11] VO area model: Average Chhattisgarh VO has some 125 ha of area and operated by 100 member-farmers. The VO command area has 106.25 ha under paddy, 6.25 ha each under oilseeds, maize, and pulses. Each year about 35 to 40% of area of *all participating* farmers would be covered under farm mechanisation: 43.0 ha of paddy area, 2.5 ha each under oilseeds, maize and pulses. As a result of farm mechanisation, the financial analysis shows that gross incomes increases by 15% and the overall cost of production reduced by about 29%.

9. Odisha[12] VO area model: Average Odisha VO has some 95 ha of area and operated by 100 member-farmers. The area has 19 ha under paddy, 19 ha maize, 14.25 ha under pulses and 42.75 ha under millets. Each year about 40% of area of all participating farmers would be covered under farm mechanisation: 7.6 ha under paddy, 7.6 ha under maize, 5.7 ha under pulses and 17.5 ha under millets. The financial analysis shows that gross incomes increases by 15%over the baseline value and the overall cost of production reduced by about 41%.

10. Jharkhand[13] VO area model: Average Jharkhand VO has some 117 ha of area and operated by 100 member-farmers. The area has 76.5 ha under paddy, 17.55 ha maize, 17.55 ha under wheat and 5.85 ha pulses. Each year about 35 to 40% of area of all participating farmers would be covered under farm mechanisation: 30.6 ha of rice,3.34 ha of pulses, 7 ha each of maize and wheat. As a result of farm mechanisation, the financial analysis shows that gross incomes increases by 14% and the overall cost of production reduced by about 48%.

11. Nagaland[14] VO area model: Average Nagaland VO has some 100 ha of area and operated by 100 member-farmers. The area has 35 ha under paddy, 40 ha maize, 5 ha under oilseeds and 20 ha turmeric. Each year about 40% of area of all participating farmers would be covered under farm mechanisation: 16 ha under paddy, 18 ha of maize, 2 ha of oilseeds and 8 ha of turmeric. As a result of farm mechanisation, the financial analysis shows that gross incomes increases by 10% and the overall cost of production declined by about 24%.

12. With regard to use of farm machinery agricultural technologies, the following assumptions have been made:

Table-4.5: Assumed in-field agricultural technologies

Major crops a/	Assam b/	Chhattisgarh b/	Odisha c/	Jharkhand d/	Nagaland e/
Paddy	DPS, reaper, trolley, tractor plough, weeder Winnower	DPS, tractor ploughing, harvester, weeder, winnower	DPS, tractor ploughing, harvester, weeder, winnower	DPS, tractor ploughing, harvester, weeder, winnower	DPS, trolley for transport, weeder
Maize			Seed-drill, weeder, thresher	Seed-drill, weeder, thresher	Seed-drill, weeder, thresher
Wheat			Harvester, thresher, seed drill, tractor	Harvester, thresher, seed drill, tractor ploughing	

[10]Refer Annex 3.1 for details
[11]Refer Annex 3.2 for details
[12]Refer Annex 3.3 for details
[13]Refer Annex 3.4 for details
[14]Refer Annex 3.5 for details

			ploughing		
Pulses	Seed drill, weeder, reaper	Seed drill, weeder, reaper	Seed drill, weeder, reaper	Seed drill, weeder, reaper	
Oilseeds	Seed-drill, tractor plough	Seed-drill, tractor plough			Seed-drill, tractor plough
Millets			Animal drawn drill, weeder, thresher	Animal drawn drill, cono weeder, thresher	
DPS = direct paddy seeder					

13. Support to existing CHC activity model[15]: Each of the existing CHCs will be considered for financial support subject certain selection criteria as spelt out in PIM. Each CHC is expected to operate for 700 hrs or less in a year, for example the reaper will operate for only 400[16] hrs in a year. The CHC obtains a 30% of average annual operating cost as working capital loan. Cash flow statement of a CHC is given in Annex-3.7

14. Agricultural implements banks: These are small shops managed either by a SHG or VO that procure tools and implements and provide them to their members on rental basis. Typical model presented in Annex-3.8 is based on the data collected from one of the other IFAD projects in India and it is therefore an indicative model while there could be several variations.

15. Support to individual farmers: Individual farmers interested in procuring any of the AET machineries are supported by the project and in all some 6,100 farmers are provided with financial package for acquiring these machineries. An activity model has been developed and presented in Annex-3.9

16. Post-harvest processing[17] activity models or CFC: These models are adopted from the work done by the previous IFAD mission and its report, "Screening and cost-benefit analysis of Agricultural machineries in rural India" by *Enrico Mazzoli* and *Jeevan Mohanty*. For the purposes of EFA, the following assumptions are used:

Table 4.6: Investment and operational details of Post-harvest Processing units:

Particulars	Unit	Banana rope	Turmeric power	Mini-dal mill	Millet processing	Tamarind
Annual revenue	INR 000	1,296	26,230	3,674	1,458	3,604.0
Plant & machinery 1/	INR 000	235	925	175	180	249.0
Operating costs 2/	INR 000	1,004	24,387	1,381	3,462	3,293.0
Interest payments:						
Principal 3/	INR 000	12.7	71.0	7.8	7.3	13.7
Working capital 4/	INR 000	0	459.5	18.9	65.5	61.7
Net income	INR 000	2,790	1,781	49.6	1,38.8	216.5
Work force	Pers_day	1,200	720	480	900	240.0
Raw materials	INR/kg	0.15	70	40	30	70.0
Sales	INR/kg	0.40	110	75	75	180.0
1/ investment costs includes work-shed; 2/ includes annual payment of insurance, marketing costs and other miscellaneous costs 3/ assumed that bank loan is secured at 70% cost of plant and machinery; 4/ working capital loan on 3 month cost of operation and both principal and WC at 14%. Refer Annex 4.2 to 4.6 for further details						

Above models are indicative and have been considered for the purposes of EFA and these are shown in Annex-4.1 to 4.5. At the time of implementation and based on need assessment study, appropriate technology models would be offered to each VO. Eventually one of its SHGs

[15] This, CHC model has been adopted from one of the reports from NABARD and modified
[16] Average fuel consumption assumed at 3 litre/hr diesel for tractor, 1.5 lit for power tiller, 0.5 lit for reaper and lubricant requirement at 2.5% of the cost of fuel. Drivers salary at INR 7000/month and helper at INR 5,000/month
[17] Refer Annex 3.6 for the summary details of an indicative PHP unit.

or women's group will take it over and run it as an enterprise. One generic CFC model has also been developed and used.

17. **Assessment of financial models:** Above-mentioned area and activity models are summarised in Table-2.7 below and detailed in Annex-3. From these household models, it is evident that all farm mechanisation units (Assam, Chhattisgarh, Odisha, Jharkhand, and Nagaland) are both economically feasible and financially viable. These show a very robust NPV. The CFC model show 20% IRR and an NPV of INR 356,430 and the support to existing CHC model also show financial viability and in this case all sunk investments have not been taken in to account. It shows 43% increase in net revenue. The agricultural implements bank model show an IRR of 25% and NPV of INR 714,707. Gross incomes, labour input, total production costs and net returns under "without project and with project" situations are presented in Table 4.7 below:

Table-4.7: Financial Efficiency Measures of unit Area or Activity model (Amount in 000 INR) a/

Particular	Gross income (INR)		Labour inputs (INR)b/		Production cost (INR)		Net income (INR)	
	WOP	WP	WOP	WP	WOP	WP	WOP	WP
Assam VO	1975.5	2264.7	2154.2	1204.9	2581.5	1804.8	-606.0	460.7
Chhattisgarh VO	2267.7	2599.4	2436.4	1358.8	2917.7	2060.2	-649.9	539.2
Odisha VO	1094.6	1236.9	1353.7	589.9	1722.6	1045.7	-628.8	191.1
Jharkhand VO	1758.5	2010.5	2530.8	660.6	3033.3	1566.8	-1274.8	443.6
Nagaland VO	2221.2	2423.7	1695.5	1091.0	3009.9	2290.2	-788.8	133.6
CFC unit c/	0	364	0	0	0	183.4	0	180.6
Support to CHC	750	1074.	0	0	840.9	842.4	-91.	231.7
AIB units	0	344	0	0	0	93.	0	250.9
Individual farmer	32.9	37.1	32.2	15.15	47.54	32.7	-14.6	4.4

a/ at full development stage; b/ including family labour; c/ combination of 5 processing units; d/ one existing custom hiring centre

(iii) Sub-project Models

18. Area and activity models when grouped and aggregated are called "sub-project models" and these are required in order to assess the overall project performance indicators. Implementation phasing of these subproject will start from the year 2 or later. It is assumed that 40% of the participating farmer-members continue to adopt the practices that are demonstrated to them.

19. **Farm mechanisation subproject**: This subproject model includes a total of 1,300 VOs or 130,000 households participating in the technology upscaling programme in a gradual manner as shown in Table below:

Table 4.8 Implementation phasing of farm mechanisation unit & households participating

Technology	Year 2	Year 3	Year 4	Year 5	Year 6
Farm mechanisation units #	250	400	350	300	
Auxiliary AET technologies # a/	250	400	350	300	
Households covered # (cumulative)	25,000	65,000	100,000	130,000	
a/ agri engineering technology auxiliary set of equipment					

The implementation phasing is shown in Annex D. Overall adoption rate[18] has been assumed as 70%. This model covers some 130,000 participating households involving 63,220 ha in any one year. This sub-project model generates an annual financial incremental income of INR 1,650.96 million and an NPV of INR 13,378 million for a 20 year economic cash flow stream. Aggregate Financial and economic budgets of this model are presented in Annex-2.1 & 2.2.

20. **CFC & Post-harvest processing subproject**: This subproject model includes a total 1,100 VOs and or SHGs and the total number of targeted households is participating in a phased manner: 22000, 29000, 30000 and 29000 in year 2, 3, 4 and 5 respectively. It has been assumed

[18] This and other adoption rates of value chains are based on MIS data

that in all, 40% VOs would go for mini dal mill processing units, 20% each for turmeric processing and millet processing, 15% of VOs opting for banana rope-making units and 5% of VOs for tamarind de-seeding units. Between CFC and PHP, the participation rate has been assumed at 50% each. This subproject generates an incremental economic NPV of INR 3,450 million for a 20 year financial cash-flow stream and a very high IRR. Aggregate of financial and economic budgets of this model are presented in Annex-2.3 & 2.4.

21. **Agricultural implements subproject**: In all 225 groups of SHGs are facilitated with the setting up of agricultural implements banks starting from year 2 and these are phased for a 4 year period: 50,100, 75 in year 2, 3 and 4 and 5 respectively. This subproject generates an annual financial income of INR 54.0 million, an NPV of INR 161.6 million and an IRR of 25%. Aggregate financial and economic budgets of the sub-project are shown in Annex-2.5 & 2.6

Table 4.9 Implementation phasing of farm mechanisation unit & households participating

Technology	PY 2	PY 3	PY 4	PY 5	PY 6
CFC & post-harvest processing unit #	200	250	250	250	
CFC with alternate energy #	20	40	50	40	
Agricultural tools bank #	50	100	75		
Support to existing CHC units #	125	200	175	150	
Each unit will cover some 100 households					

22. **Assessment of the subproject results**: *Results of analysis* of these THREE subprojects in terms of incremental incomes, production costs, labour and input etc are provided in Annex-2. Overall, due to technology demonstrations and use of agricultural engineering technologies production increased between 10 and 16%, labour (both hired and family) requirement reduced by about 38%, production costs reduced significantly, by about 39%. CFC Post-harvest processing units are both financially and economically viable but have high operating costs. At the same time it is noted that the analysis of the post-harvest units is based on some randomly selected models and is not field-based situations.

23. CHCs are neither economically viable nor financially feasible. In order to understand better the various factors affecting the functional viability of CHC field-based case studies under varying operating conditions would be necessary. In the interest of the smallholder farmers, it would be necessary to provide continued hand-holding support in terms of finance, manpower etc as without the effective functioning of these CHC, these farmers would not have any access to farm mechanization and the use of modern implements at affordable costs. By and large, large farmers are able to organise required farm power for their operations from any available source. But this is not the case with the smallholders. Secondly continued support to CHC units would enable to keep a tag on the charges used for hiring the machineries.

C. Economic analysis

(i) Assumptions

- A twenty year analysis period has been assumed, which included 6 year project investment period.
- All agricultural inputs and outputs that are traded are valued at prices as of March 2019.
- Economic investment costs are net of taxes, credit in the form of recurrent investments, etc. All costs directly associated with the incremental production are included in full, including incremental inputs, labour and wages and salaries.
- A standard conversion factor (SCF) of 0.85 is applied to both traded and non-traded items for adjusting financial prices.
- The average financial rural wage rate is taken to be the best estimate of the economic value of labour.

- The analysis includes only direct on-farm and off-farm benefits that are attributed to SCATE investments.
- All costs and benefits are relating to investments made on targeted project area households and the resultants benefits.
- No significant changes or shifts in cropping patters are assumed but the key assumptions have been adoption of appropriate agricultural technologies and practices including use of ICAR designed farm machineries.
- The analysis employs an Opportunity Cost of Capital (OCC) at 7.5%, which is the current long-term bond rate in India.

(ii) Costs - Benefits Streams and Analysis

24. The **project economic costs** were direct expenditures after adjusting for taxes and inflation and all investments on farm mechanisation, CFC and post-harvest processing that are included part of investment and operating costs. Recurrent costs for continued operations and maintenance have been included in full. Economic prices for inputs and output models were estimated by applying the conversion factors on the financial prices. Commodity prices[19] were collected from various sources: respective state govt directorate of statistics, Agricultural Universities, GOI website on Agricultural Marketing and Prices and by the mission during the field visits. (Annex-1.3).

25. **Production Benefits:** The farm productions are direct output from the respective sub-project models. In all 400,000households are direct recipients of the project services. Improved farming practices and mechanisation will result in productivity increases ranging between 10%and 15% (Annex-1.5). Overall the average productivity increases is 316kg/ha at full development stage.

26. **Environmental Effects**: Key environmental benefits have been increased social mobilisation and effective participation of rural poor and scheduled tribal people in particular, linkages with rural economy and markets and overall reduction in vulnerability of the participating farmers. Environmental benefits are also related to timely implementation of the farm operations, as well as switch to renewal energy where applicable. But one of the negative aspects of farm mechanisation in the short run is the feeling of insecurity among the agricultural workers. But in the long run they also stand to benefit significantly as their on-farm drudgery would be reduced. Another issue is the increased use of fossil fuel for operating various machineries and the implements.

27. **EX-ACT Carbon balance analysis[20]**: The EX-ACT tool developed by FAO in 2011 for measuring the GHG (green house gas such as carbon dioxide, methane, nitrogen oxide etc) emission per unit of land in agriculture production systems can be employed. For the purpose of the project, carbon dioxide emission as a result of using the fossil fuel from the use of incremental agricultural machineries, use of 122 kwh electricity replacing fossil fuel and alternate energy ie solar for some 150 processing units, increased use of farm yard manure and compost replacing chemical fertilisers and reducing the use of chemical pesticides from 1500 ton to 970 ton, bringing about 10% area of degraded land to permanent crops have all been considered. Initially the project will add 1,350 tractors of 35 hp, equal number of 15 hp power tillers, 1,350 threshers, 1,350 power seed drills, 1,350 power reapers, weeders etc. totalling some 35,646 hp/year. Annual diesel consumption is estimated at 68,650 litres. Combined effect of all these will have both positive and negative impact on the carbon balance of the project area. It is estimated that annual carbon balance will be -46,522 tCO2eq or -0.69 tCO2eq/ha per year

[19]See Annex-1.10containing list of financial and economic prices used in EFA
[20]See Annex-H for the summary results of EX-ACT analysis

28. **Project Performance Indicators**: Cost-benefit analysis yields an overall IRR of 18%. The estimated NPV for a 7.5% discount rate is INR 3,389 million and the BCR of 1.26. A positive NPV under the current Opportunity Cost of Capital (OCC) of 7.5% indicated that the project investments are sound and robust. See Annex-A to G for details. A sensitivity analysis of the project is presented in Table 2.9 below and details in Annex-1.1 & 1.2 and also in Annex-E.

Table-4.10: Project performance indicators

Indicator	scenario				
	Base	Cost Increases by		Benefits down by	
	Case	15%	20%	15%	20%
NPV on discounted cash flows (million INR)	3389	1408	754	902	80
BCR on discounted cash-flow	1.26	1.09	1.05	1.07	0.94
IRR %	18%	12%	10%	11%	8%
.					

29. If benefits delayed by two years (in effect, if the project's future production activities take longer to become fully developed or established) then the IRR declines to 12% and yet yielding a NPV of 1,700 million. Under a scenario of costs increases by 10% and benefits decline by 10% over the base-case, a 9% IRR and a NPV of 417 million INR is obtained. The switching value analysis indicates that the project is capable of sustaining a cost increase of 26% and decline in overall benefits by 20%. Details are presented in Annex-1.2

D. Benefits and Beneficiaries

30. Benefits and Beneficiaries: The Project will benefit a total of about 400,000 households directly and thus a total of 2 million individuals. These beneficiary households will include smallholder farmers and member-farmers of the VOs, SHGs, FPOs, existing CHC units, watershed development committees, Tribal farmers and other disadvantaged households. Women-headed and poor households will be especially targeted under the project. Table below gives an estimate of the cumulative number of beneficiaries by year.

Table-4.11: Number of Benefited Households by year, cumulative

Beneficiary categories	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6l
Farm mechanisation units hh a/	*0*	*25,000*	*65,000*	*100,000*	*130,000*	*130,000*
CFC processing unit hh b/	*0*	*20,000*	*45,000*	*70,000*	*95,000*	*95,000*
Agri tool bank unit hh c/	*0*	*5,000*	*15,000*	*22,500*	*22,500*	*22,500*
Support to existing CHC d/	*0*	*12,500*	*32,500*	*50,000*	*65,000*	*65,000*
Individual farmers hh	*0*	*100*	*2,100*	*4,100*	*6,100*	*6,100*
Total direct beneficiaries	*0*	*62,500*	*159,600*	*246,600*	*318,600*	*318,600*
User expansion services hh	*200,000*	*200,000*				
Total beneficiaries	*200,000*	*262,500*	*159,500*	*246,600*	*318,600*	*318,600*

a/ VO members participating in technology demonstrations and use of farm machinery units
b/ direct beneficiaries of some 950 CFC and post-harvest technology demonstrations and participation
c/ direct beneficiaries of some 225 units of agricultural tools bank
d/ direct beneficiaries of support to existing CHC units
e/ indirect beneficiaries who are the potential for the technology up-taking and replication and these are farmers from the adjoining VO areas who are brought in for technology show-how

31. The immediate benefits from the project are significant reduction in production costs, access of the smallholders and other farmers to the farm mechanisation services, agri-based primary processing of pulses, spices, millets and also opportunities for availing many a diversified intervention that are aimed at increasing the incomes to farmers. On an average, a household's production benefits increase by a modest estimate of 316 kg/ha due to improved cultivation and farming practices and on an average the incremental income per household

would be INR 16,230. There is potential for reducing labour input costs significantly by about 56% and reducing total production costs by about 31%.

32. There are also benefits in terms of positive social and environmental impacts. The social benefits accrue mainly as a result of greater social cohesion among the target group communities due to greater interaction with VO, SHGs, watershed committees and their federations increased recognition and participation of the role of women and provision of capacity building and training opportunities and access to financial service for a range of on-farm and off-farm activities to the participating households.

33. **Other benefits:** Additional benefits also came from the project's capacity building interventions. First, all participating households and VO groups have the benefit and advantages of the services of their KVKs, CFCs, AIBs and CHCs which were capacitated and provided fund support for various social and commercial developments. Secondly, women from the poor groups would participate in and managing their social and economic development in particular developing the post-harvest processing facilities and will have access to inputs and marketing of their products. Thirdly various support facilities provided by the project to the manufacturers and other agencies would trigger the demand for engineering farm technologies and spread the use of application of these technologies in fields. All these benefits have not been quantified and hence are not included in the EFA.

E. Risks and sustainability

34. There were a number of risks associated with the project. These were relating to farm technology, reluctance on the part of the farmers to continue the new technology post demonstrations, inadequate extension and market linkages and poor price margins, lack of institutional credit, lack of service providers and poor coordination and institutional support and policy risks. These issues and risks are expected to be addressed during the implementation of the programme as described below:

Risks	Risk description	Probability of occurrence post-project	Mitigation measures adopted by the project	Had no corrective measures adopted, project performance would have been as below
Institutional	Delay in technology transfer/lack of quality machineries slowing down the uptake rates and production	Medium	Project implementation readiness by loan negotiation Extensive training and demonstrations etc are taken up	Benefits lag by 2 years: IRR= 12% NPV= 1,700 million INR BCR= 1.13
	Lack of financial capacity to invest in high value agriculture	High to Medium	VO are facilitating credit supply;	Decline in benefits by 20%: IRR=8 % NPV= 80 million BCR= 0.94
Market	Inadequate profit margins due to poor access, lack of transport and of market information	High to medium	Market information strengthened but *this risk continues to exist*	Decline in benefits and increases in cost by 10%: IRR= 9% NPV= 417 million BCR=1.01
	Lower market prices for commodities	Medium	Diversified production, primary value addition	

Risks	Risk description	Probability of occurrence post-project	Mitigation measures adopted by the project	Had no corrective measures adopted, project performance would have been as below
Policy	Slowing down funds flow to the project (delayed and partial release of funds to project)	Medium	Govt giving priority to farmers' welfare and incomes and recognize producers' organization as an effective vehicle for remunerative farming systems	Farm operating costs increase by 20%: IRR=10% NPV=754 million BCR=1.05
Others	Remoteness of villages and difficulty of access during rainy season for processed products	High	Promotion of products that combine high margin for small volumes and easy to transport are emphasised and supported	Decline in benefits by 15%: IRR=11% NPV= 902 million BCR=1.07
	Climate change risks of delayed and abnormal rainfall, drought, floods, frosts, etc	Medium	Training farmers on use of machinery for timely land preparation and sowing, as well as storage and processing	

Ex-ante EFA framework for SCATE Project, India

INDIA ICAR SCATE PROJECT DETAILED DESIGN

A)

		Farms	CFC	AIB	Support CHC				0
		Net incremental benefits of Farm and Activity subproject models in 000 INR							
FINANCIAL ANALYSIS	PY1	2,086.36	0	0	0	0	0	0	0
	PY2	5,65,571	-64,370	-24,048	579	–	–	–	–
	PY3	8,78,678	-91,335	-46,324	44,640	0	0	0	0
	PY4	11,54,287	-91,355	-28,788	1,12,605	–	–	–	–
	PY5	11,55,722	-91,855	15,355	1,46,484	0	0	0	0
	PY6	11,55,722	17,365	25,492	6,28,188	D	D	D	D
	PY7	11,55,722	49,272	34,930	-3,46,219	0	0	0	0
	PY8	11,55,722	64,041	39,402	1,46,484	D	D	D	D
	PY9	11,55,722	69,603	39,402	1,46,484	0	0	0	0
	PY10	11,55,722	69,603	39,402	1,46,484	D	D	D	D
	PY11	11,55,722	69,603	39,402	9,16,355	0	0	0	0
	PY12	11,55,722	54,215	39,402	-4,23,296	D	D	D	D
	PY13	11,55,722	50,368	39,402	1,46,484	0	0	0	0
	PY14	11,55,722	50,368	39,402	1,46,484	D	D	D	D
	PY15	11,55,722	50,368	39,402	1,46,484	0	0	0	0
	PY16	11,55,722	69,603	39,402	6,28,188	D	D	D	D
	PY17	11,55,722	69,603	39,402	-3,46,219	0	0	0	0
	PY18	11,55,722	69,603	39,402	1,46,484	D	D	D	D
	PY19	11,55,722	69,603	39,402	1,46,484	0	0	0	0
	PY20	16,52,173	69,603	39,402	1,46,484	D	D	D	D
NPV (INR, 000)		71,68,961	-11,223	81,531	8,12,100	D	D	D	D
NPV (USD 000)		1,02,426.6	-160.3	1,164.7	11,601.4	0.0	0.0	0.0	
FIRR		#DIV/0!	11%	25%	#DIV/0!	#N/A	#N/A	#N/A	

D)

BENEFICIARIES, PHASING BY INTERVENTION AND ADOPTION RATES

Project year →	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	Total	
Interventions	Project implementation period, cumulative								Adoption rates
# of farm mechanisation households	0	25,000	65,000	1,00,000	1,30,000	1,30,000	1,30,000	1,30,000	
(adopting hh)	0	17,500	45,500	70,000	91,000	91,000	91,000	91,000	70%
# of CFC Processing units households	0	20,000	45,000	70,000	95,000	95,000	95,000	95,000	
(adopting hh)	0	14,000	31,500	49,000	66,500	66,500	66,500	66,500	70%
# of Agricultural tool banks households	0	5,000	15,000	17,500	17,500	17,500	17,500	17,500	
(adopting hh)	0	3,500	10,500	12,250	12,250	12,250	12,250	12,250	70%
# existing CHC households	0	12,500	32,500	50,000	65,000	65,000	65,000	65,000	
(adopting hh)	0	8,750	22,750	35,000	45,500	45,500	45,500	45,500	70%
# of individual farmers	0	100	2,100	4,100	6,100	6,100	6,100	6,100	
(adopting hh)	0	70	1,470	2,870	4,270	4,270	4,270	4,270	70%
(adopting hh)									#DIV/0
(adopting hh)									#DIV/0
Total # of participating households	0	62,600	1,59,800	2,41,600	3,13,600	3,13,600	3,13,600	3,13,600	
Total # of adopting households	0	43,820	1,11,720	1,69,120	2,19,520	2,19,520	2,19,520	2,19,520	70%

F)

SENSITIVITY ANALYSIS (SA)

	Δ%	Link with the risk matrix	IRR	NPV 1/
Basecase scenario			18%	3,389
Project benefits	-10%		13%	1,725
Project costs	10%			
Project benefits	10%		9%	417
2 years lag in benefits				
			12%	1,700
Project benefits	-20%	climate risks, frost, drought, flood,) etc	8%	80
Input prices	10%	lack of policy commitment	14%	2,062

1/ NPV is in million INR discounted at 7.5%

B)

PROJECT COSTS AND INDICATORS FOR LOGFRAME

TOTAL PROJECT COSTS (in million USD)			122.82	Base costs	105.99	PMU	9.02
Number of Beneficiaries	3,13,600	Households	KVK	VO	FPO	SRLM Blocks	PACS
			31	11,500	118	118	
Cost per beneficiary (HEAD resources= $66.00 million)	210	USD/ household	Outreach			Adoption rates	70%

Components	Cost USD M	Outcomes	Indicators
Participatory technology development	16.19	Appropriate AE technologies identified	at least 70% activities accomplished
Demonstration & upscaling	96.11	Successful demo & upscaling of AET	At least 70% of participating hhs using AET
Project Management	10.52	Management structure in place	Effective project management
Total	122.82		

C)

MAIN ASSUMPTIONS & SHADOW PRICES[1]

	Output, production	Incremental value (%)	Price (in NPR)	Input prices	Price (NPR)
FINANCIAL	Paddy	10%	Paddy INR 16/kg	Fertilizer, average, per kg	25/kg
	Maize	15%	Maize 15/kg	Pesticides, average, per lit	1500/lit
	Pulses & oilseeds	14%	Pulses & oilseeds 60/kg	organic /manure	1/kg
	Millets	14%	Millets 35/kg	Rural wage rate, pers_day	250/day
	Turmeric	10%	Turmeric 60/kg		
	Wheat	10%	Wheat 25/kg		

ECONOMIC	Official Exchange rate, April 2019	70		Discount rate (opportunity cost of capital)	7.5%
	Shadow Exchange rate	70		Long term bond rate, Central Bank rate	7.5%
	Standard Conversion Factor	1.00		Output conversion factor a/	0.93
	Labour Conversion Factor	0.85		Input Conversion factor a/	0.85

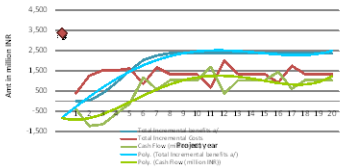
[1] All prices expressed in INR Currency. a/ estimated from data generated using farmod

E)

ECONOMIC ANALYSIS

Project year	NET INCREMENTAL BENEFITS (INR million)								NET INCREMENTAL COSTS (INR million)			Cash Flow (million INR)
	Farm mechanisation units	CFC & processing units	Agricultural implements bank units	Support to existing CHC				Total incremental benefits a/	Economic investment Costs	Economic recurrent Costs	Total incremental Costs	
1	0.00	0.00	0.0	0.0	0.0	0.0		0.0	390.2	0.0	390.2	-390.2
2	32.14	0.00	0.0	0.7	0.0	0.0		32.8	1,388.0	45.3	1,433.6	-1,267.7
3	100.99	248.06	2.9	44.9	0.0	0.0		396.9	1,487.4	48.0	1,535.3	-1,138.4
4	156.85	635.13	18.5	133.1	0.0	0.0		935.7	1,272.5	255.8	1,528.4	-592.8
5	206.18	1,130.88	21.1	147.1	0.0	0.0		1,505.3	1,063.7	377.1	1,440.8	-135.6
6	286.23	1,652.91	21.2	142.1	0.0	0.0		2,102.5	0.0	528.2	528.2	1,574.3
7	206.23	1,888.89	39.8	147.1	0.0	0.0		2,282.0	23.0	1,450.4	1,473.0	809.0
8	286.23	1,888.89	43.2	142.1	0.0	0.0		2,360.3	0.0	1,336.8	1,336.8	1,023.5
9	206.23	1,888.37	43.2	147.1	0.0	0.0		2,285.1	0.0	1,339.3	1,339.3	1,045.8
10	286.23	1,888.57	43.2	142.1	0.0	0.0		2,360.1	0.0	1,339.5	1,339.5	1,020.6
11	206.23	1,888.37	43.2	147.1	0.0	0.0		2,285.1	0.0	685.1	685.1	1,700.0
12	286.23	1,888.57	43.2	142.1	0.0	0.0		2,360.1		2,882.8	2,882.8	-522.7
13	206.23	1,888.37	43.2	147.1	0.0	0.0		2,285.1		1,333.9	1,333.9	1,029.2
14	286.23	1,888.57	43.2	142.1	0.0	0.0		2,360.1		1,355.9	1,355.9	1,004.2
15	206.23	1,888.37	43.2	147.1	0.0	0.0		2,285.1		1,333.9	1,333.9	1,029.2
16	286.23	1,888.57	43.2	142.1	0.0	0.0		2,360.1		1,339.7	1,339.7	1,020.4
17	206.23	1,888.37	43.2	147.1	0.0	0.0		2,285.1		1,708.3	1,708.3	576.8
18	286.23	1,888.57	43.2	142.1	0.0	0.0		2,360.1		1,339.5	1,339.5	1,020.6
19	206.23	1,888.37	43.2	147.1	0.0	0.0		2,285.1		1,339.3	1,339.3	1,045.8
20	286.23	1,888.57	43.2	142.1	0.0	0.0		2,360.1		1,339.5	1,339.5	1,020.6
		NPV at 7.5% ('million)		3,389		Long term Bond rate applied as Discount rate		16,447			13,077	
		BCR		1.26								

G)



Annex-A NET INCREMENTAL BENEFITS OF SUBPROJECTS, FINANCIAL

A)		Farms	CFC	AIB	Support CHC				0
		Net incremental benefits of Farm and Activity subproject models in 000 INR							
FINANCIAL ANALYSIS	PY1	208536	0	0	0	0	0	0	0
	PY2	5,65,571	- 64,370	- 24,049	579	-	-	-	-
	PY3	8,78,678	-91,335	-46,324	44,640	0	0	0	0
	PY4	11,54,397	- 91,855	- 28,709	1,12,606	-	-	-	-
	PY5	11,55,722	-91,855	15,355	1,46,484	0	0	0	0
	PY6	11,55,722	17,365	25,492	6,39,188	0	0	0	0
	PY7	11,55,722	49,272	34,930	-3,46,219	0	0	0	0
	PY8	11,55,722	64,841	39,402	1,46,484	0	0	0	0
	PY9	11,55,722	69,603	39,402	1,46,484	0	0	0	0
	PY10	11,55,722	69,603	39,402	1,46,484	0	0	0	0
	PY11	11,55,722	69,603	39,402	9,16,355	0	0	0	0
	PY12	11,55,722	54,215	39,402	-6,23,386	0	0	0	0
	PY13	11,55,722	50,368	39,402	1,46,484	0	0	0	0
	PY14	11,55,722	50,368	39,402	1,46,484	0	0	0	0
	PY15	11,55,722	50,368	39,402	1,46,484	0	0	0	0
	PY16	11,55,722	69,603	39,402	6,39,188	0	0	0	0
	PY17	11,55,722	69,603	39,402	-3,46,219	0	0	0	0
	PY18	11,55,722	69,603	39,402	1,46,484	0	0	0	0
	PY19	11,55,722	69,603	39,402	1,46,484	0	0	0	0
	PY20	16,52,173	69,603	39,402	1,46,484	0	0	0	0
NPV (INR, 000)		71,69,861	-11,223	81,531	8,12,100	0	0	0	0
NPV (USD 000)		1,02,426.6	-160.3	1,164.7	11,601.4	0.0	0.0	0.0	
FIRR		#DIV/0!	11%	25%	#DIV/0!	#NUM!	#NUM!	#NUM!	

Annex-B PROJECT COSTS AND INDICATORS FOR LOGFRAME

B)

PROJECT COSTS AND INDICATORS FOR LOGFRAME						
TOTAL PROJECT COSTS (in million USD)		**122.82**	Base costs	**105.99**	PMU	**9.02**
Number of Beneficiaries	3,13,600 Households	KVK	VO	FPO	SRLM Blocks	PACS
		31	11,500	118	108	
Cost per beneficiary (IFAD resources= $66.00 million)	210 USD/ household		Outreach		**Adoption rates**	**70%**

Components	**Cost USD M**	**Outcomes**	**Indicators**
Participatory technology development	16.19	Appropriate AE technologies identified	at least 70% activities accomplished
Demonstration & upscaling	96.11	Successful demo & upscaling of AET	At least 70% of participating hh using AET
Project Management	10.52	Management structure in place	Effective project management
Total	122.82		

Annex-C MAIN ASSUMPTIONS AND SHADOW PRICES

C)	MAIN ASSUMPTIONS & SHADOW PRICES[1]				
FINANCIAL	**Output, production**	Incremental value (%)	**Price (in NPR)**	**Input prices**	Price (NPR)
	Paddy	16%	Paddy INR 16/kg	Fertilizer, average, per kg	25/kg
	Maize	15%	Maize 15/kg	Pesticides, average, per lit	1500/lit
	Pulses & oilseeds	14%	Pulses & oilseeds 60/kg	organic /manure	1/kg
	Millets	14%	Millets 35/kg	Rural wage rate, pers_day	250/day
	Turmeric	10%	Turmeric 60/kg		
	Wheat	16%	Wheat 23/kg		

ECONOMIC					
	Official Exchange rate, April 2019	70		Discount rate (opportunity cost of capital)	7.5%
	Shadow Exchange rate	70		Long term bond rate, Central Bank rate	7.5%
	Standard Conversion Factor	1.00		Output conversion factor a/	0.91
	Labour Conversion factor	0.85		Input Conversion factor a/	0.83

[1] All prices expressed in INR Currency.

a/ estimated from data generated using farmod

Annex-D BENEFICIARIES, PHASING BY INTERVENTION AND ADOPTION RATES

D)

BENEFICIARIES, PHASING BY INTERVENTION AND ADOPTION RATES

Project year →	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	Total	
Interventions	*Project Implementation period, cumulative*								Adoption rates
# of farm mechanisation households	*0*	*25,000*	*65,000*	*1,00,000*	*1,30,000*	*1,30,000*	*1,30,000*	*1,30,000*	
(adopting hh)	*0*	*17,500*	*45,500*	*70,000*	*91,000*	*91,000*	*91,000*	*91,000*	*70%*
# of CFC Processing units households	*0*	*20,000*	*45,000*	*70,000*	*95,000*	*95,000*	*95,000*	*95,000*	
(adopting hh)	*0*	*14,000*	*31,500*	*49,000*	*66,500*	*66,500*	*66,500*	*66,500*	*70%*
# of Agricultural tool banks households	*0*	*5,000*	*15,000*	*22,500*	*22,500*	*22,500*	*22,500*	*22,500*	
(adopting hh)	*0*	*3,500*	*10,500*	*15,750*	*15,750*	*15,750*	*15,750*	*15,750*	*70%*
# existing CHC households	*0*	*12,500*	*32,500*	*50,000*	*65,000*	*65,000*	*65,000*	*65,000*	
(adopting hh)	*0*	*8,750*	*22,750*	*35,000*	*45,500*	*45,500*	*45,500*	*45,500*	*70%*
# of individual farmers	*0*	*100*	*2,100*	*4,100*	*6,100*	*6,100*	*6,100*	*6,100*	
(adopting hh)	*0*	*70*	*1,470*	*2,870*	*4,270*	*4,270*	*4,270*	*4,270*	*70%*
(adopting hh)									*#DIV/0!*
(adopting hh)									*#DIV/0!*
Total # of participating households	0	62,600	1,59,600	2,46,600	3,18,600	3,18,600	3,18,600	3,18,600	
Total # of adopting households	0	43,820	1,11,720	1,72,620	2,23,020	2,23,020	2,23,020	2,23,020	70%

Annex-E: NET INCREMENTAL BENEFITS & IRR

ECONOMIC ANALYSIS

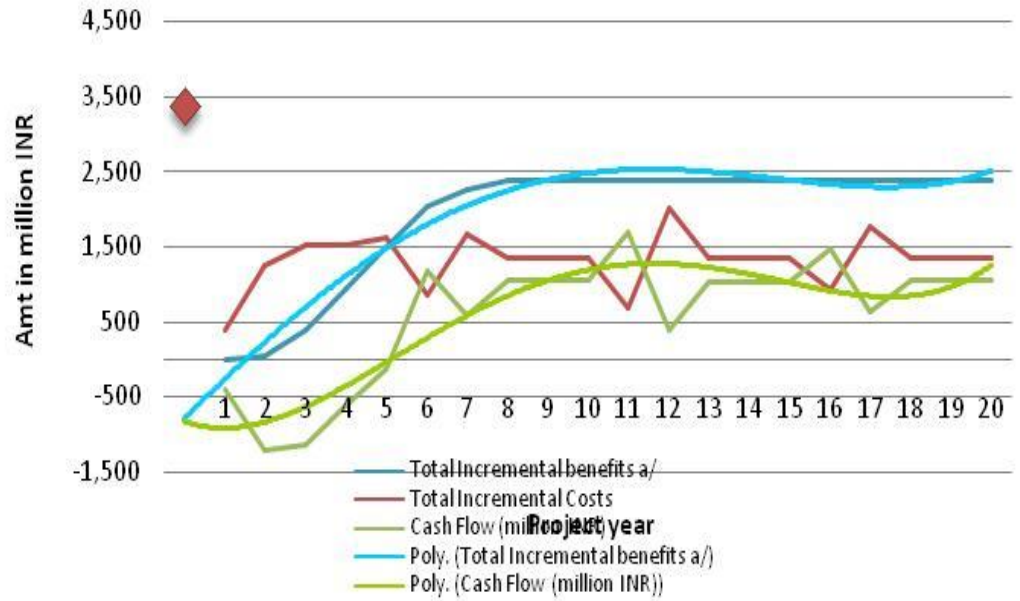
E)		NET INCREMENTAL BENEFITS (INR million)							NET INCREMENTAL COSTS (INR million)			
Project year	Farm mechanisation units	CFC & processing units	Agricultural implements bank units	Support to existing CHC				Total Incremental benefits a/	Economic investment Costs	Economic recurrent Costs	Total Incremental Costs	Cash Flow (million INR)
1	0.00	0.00	0.0	0.0	0.0	0.0		0.0	390.2	0.0	*390.2*	**-390.2**
2	37.14	0.00	0.0	0.7	0.0	0.0		37.8	1,300.9	-45.3	*1,255.6*	**-1,217.7**
3	100.99	245.06	2.9	44.9	0.0	0.0		393.9	1,487.6	43.0	*1,530.5*	**-1,136.6**
4	156.86	635.13	10.6	113.1	0.0	0.0		915.7	1,272.6	255.8	*1,528.4*	**-612.8**
5	206.18	1,130.88	21.1	147.1	0.0	0.0		1,505.3	1,053.7	572.1	*1,625.9*	**-120.6**
6	206.23	1,652.91	31.2	147.1	0.0	0.0		2,037.5	250.1	610.2	*860.3*	**1,177.1**
7	206.23	1,869.89	39.6	147.1	0.0	0.0		2,262.9	22.6	1,650.4	*1,673.0*	**589.9**
8	206.23	1,982.20	43.2	147.1	0.0	0.0		2,378.7	0.0	1,336.8	*1,336.8*	**1,041.9**
9	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1	0.0	1,339.5	*1,339.5*	**1,045.6**
10	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1	0.0	1,339.5	*1,339.5*	**1,045.6**
11	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1	0.0	685.1	*685.1*	**1,700.0**
12	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1		2,007.0	*2,007.0*	**378.1**
13	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1		1,355.9	*1,355.9*	**1,029.2**
14	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1		1,355.9	*1,355.9*	**1,029.2**
15	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1		1,355.9	*1,355.9*	**1,029.2**
16	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1		920.7	*920.7*	**1,464.4**
17	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1		1,758.3	*1,758.3*	**626.8**
18	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1		1,339.5	*1,339.5*	**1,045.6**
19	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1		1,339.5	*1,339.5*	**1,045.6**
20	206.23	1,988.57	43.2	147.1	0.0	0.0		2,385.1		1,339.5	*1,339.5*	**1,045.6**
		NPV at 7.5% ('million)		3,369		**Long term Bond rate applied as Discount rate**		16,447			13,077	
		BCR		1.26								
		EIRR		18%				**a/ including tax and other benefits of INR 820.6 million**				

Annex-F SENSITIVITY ANALYSIS

F)

SENSITIVITY ANALYSIS (SA)				
	Δ%	**Link with the risk matrix**	**IRR**	**NPV 1/**
Basecase scenario			18%	3,389
Project benefits	-10%		13%	1,725
Project costs	10%			
Project benefits	10%		9%	417
2 years lag in benefits			12%	1,700
Project benefits	-20%	climate risks, frost, drought, floods,l etc	8%	80
Input prices	10%	lack of policy commitment	14%	2,062
1/ NPV is in million INR discounted at 7.5%				

Annex-G: GRAPH SHOWING INCREMENTAL BENEFITS, COSTS AND NET INCOME



Green Trend line denotes "cash flow or net incremental incomes"
Blue Trend lines denotes " total incremental benefits"

Annex-H: EX-ACT CARBON BALANCE FOR THE SCATE PROJECT

Project Name	*SCATE*		**Climate**	*Tropical (Moist)*				**Duration of the Project (Years)**			*20*
Continent	*Asia (Indian subcontinent)*		**Regional Soil Type**	*LAC Soils*				**Total area (ha)**			*67120*
Components of the project	**Gross fluxes Without**	**With**	**Balance**	**Share per GHG of the Balance All GHG in tCO2eq**					**Result per year Without**	**With**	**Balance**
	All GHG in tCO2eq			**CO_2**			**N_2O**	**CH_4**			
	Positive = source / negative = sink			**Biomass**	**Soil**	**Other**					
Land use changes											
Deforestation	0	0	0	0	0		0	0	0	0	0
Afforestation	0	0	0	0	0		0	0	0	0	0
Other LUC	0	-7,72,448	-7,72,448	-1,52,179	-6,20,269		0	0	0	-38,622	-38,622
Agriculture											
Annual	-28,52,231	-28,52,231	0	0	0		0	0	-1,42,612	-1,42,612	0
Perennial	0	0	0	0	0		0	0	0	0	0
Rice	62,67,892	62,67,892	0	0	0		0	0	3,13,395	3,13,395	0
Grassland & Livestocks											
Grassland	0	0	0	0	0		0	0	0	0	0
Livestocks	0	0	0				0	0	0	0	0
Degradation & Management	0	0	0	0	0		0	0	0	0	0
Coastal wetlands	0	0	0	0	0		0	0	0	0	0
Inputs & Investments	15,43,713	13,85,714	-1,57,999			-2,55,999	94,939	0	77,186	69,286	-7,900
Fishery & Aquaculture	0	0	0			0	0	0	0	0	0
Total	49,59,374	40,28,927	**-9,30,447**	-1,52,179	-6,20,269	-2,55,999	94,939	0	2,47,969	2,01,446	-46,522
Per hectare	74	60	-14	-6.1	-9.2	-3.8	1.4	0.0			
Per hectare per year	3.69	3.00	-0.69	-0.30	-0.46	-0.19	0.07	0.00	3.69	3.00	-0.69

PROJECT PERFORMANCE INDICATORS AND SENSITIVITY ANALYSIS

Annex-1.1: Project performance indicators (IRR, NPV & BCR)

ECONOMIC ANALYSIS: SCATE

Country:	INDIA										Discount rate:DR	**0.075**	7.5%								
Project:	**SCATE PDR**																				
(amount in million INR)																					
											Project Year										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Incremental benefits																					
Incremental benefits	0.0	37.8	393.9	915.7	1505.3	2037.5	2262.9	2378.7	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	
Total Incremental benefits	0.0	37.8	393.9	915.7	1505.3	2037.5	2262.9	2378.7	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	2385.1	
Incremental costs																					
Investment costs	390.2	1300.9	1487.6	1272.6	1053.7	250.1	22.6	0.0													
Operating costs, inputs & labour	0.0	-45.3	43.0	255.8	572.1	610.2	1650.4	1336.8	1339.5	1339.5	685.1	2007.0	1355.9	1355.9	1355.9	920.7	1758.3	1339.5	1339.5	1339.5	
Incremental costs	390.2	1255.6	1530.5	1528.4	1625.9	860.3	1673.0	1336.8	1339.5	1339.5	685.1	2007.0	1355.9	1355.9	1355.9	920.7	1758.3	1339.5	1339.5	1339.5	
Incremental net benefits	-390.2	-1217.7	-1136.6	-612.8	-120.6	1177.1	589.9	1041.9	1045.6	1045.6	1700.0	378.1	1029.2	1029.2	1029.2	1464.4	626.8	1045.6	1045.6	1045.6	

Basecase results discounted:		7.5%
NPV of benefit streams discounted at	7.5%	16,447
NPV of costs stream discounted at	7.5%	13,077
NPV of project discounted at	7.5%	3,369
BCR- discounted benefits & costs at	7.5%	1.26
IRR		18%

Benefits lagged by 2 year DR at	7.5%	
NPV of benefit streams discounted at	7.5%	14,777
NPV of costs stream discounted at	7.5%	13,077
NPV of project discounted at	7.5%	1,700
BCR- discounted benefits & costs at	7.5%	1.13
IRR		12%

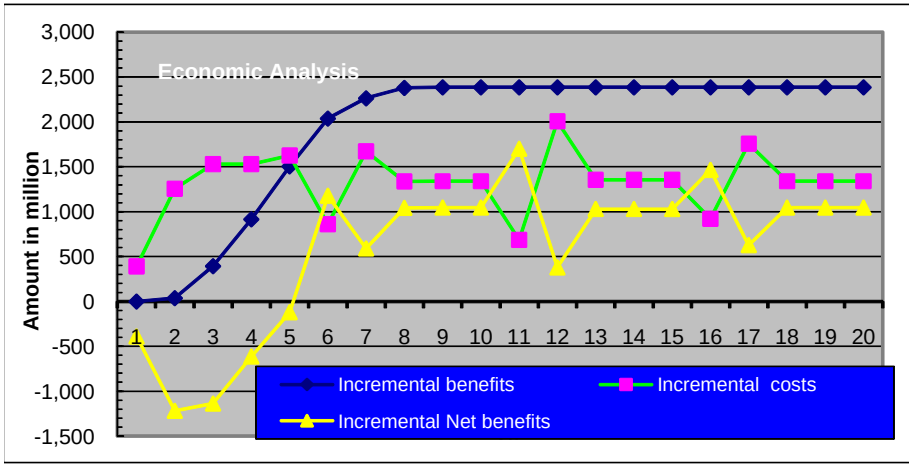
Annex-1.2: Project sensitivity analysis (Switching values etc…)

Results of Sensitivity Analysis:

		Costs increased by				Benefits down by				Both cost increase & benefits down			
Project Performance indicators		10%	15%	20%	25%	10%	15%	20%	25%	10%	15%	20%	25%
NPV of at discount rate of	7.5%	2,062	1,408	754	100	1,725	902	80	-742	417	-1,059	-2,535	-4,011
BCR at discount rate of	7.5%	1.14	1.09	1.05	1.01	1.13	1.07	1.01	0.94	1.03	0.93	0.84	0.75
IRR		14%	12%	10%	8%	13%	11%	8%	5%	9%	4%	-2%	#DIV/0!

Switching Value Analysis:

Switching Value:	Appraisal	Switching value	% change
Total Benefits at 7.5% DR	16,447	13,077	-20
Total Costs at 7.5% DR	13,077	16,447	26



Annex-1.3: Project economic costs (From costab)

India
SCATE

Expenditure Accounts by Years	Base Cost (INR '000)							
	20/21	21/22	22/23	23/24	24/25	25/26	26/27	Total
I. Investment Costs								
A. Technical assistance /a	65,790.0	3,21,660.0	3,48,775.0	3,05,250.0	2,71,850.0	1,94,800.0	-	15,08,125.0
B. Equipment & materials /b	35,346.0	6,14,500.0	10,61,940.0	9,85,200.0	8,80,200.0	100.0	-	35,77,286.0
C. Training and workshop	2,92,700.0	3,87,100.0	1,75,600.0	1,42,600.0	71,100.0	22,450.0	-	10,91,550.0
D. Grants and subsidies	10,000.0	1,02,500.0	1,20,000.0	50,000.0	10,000.0	-	-	2,92,500.0
E. Goods, services and inputs	12,050.0	12,050.0	12,050.0	12,050.0	12,050.0	11,300.0	-	71,550.0
Total Investment Costs	4,15,886.0	14,37,810.0	17,18,365.0	14,95,100.0	12,45,200.0	2,28,650.0	-	65,41,011.0
II. Recurrent Costs								
A. Salaries and allowances	7,370.0	83,080.0	83,080.0	83,080.0	83,080.0	83,080.0	62,310.0	4,85,080.0
B. Incremental operating costs	17,832.5	71,830.0	71,830.0	70,330.0	68,530.0	65,755.0	31,522.5	3,97,630.0
Total Recurrent Costs	25,202.5	1,54,910.0	1,54,910.0	1,53,410.0	1,51,610.0	1,48,835.0	93,832.5	8,82,710.0
Total BASELINE COSTS	4,41,088.5	15,92,720.0	18,73,275.0	16,48,510.0	13,96,810.0	3,77,485.0	93,832.5	74,23,721.0
Physical Contingencies	-	-	-	-	-	-	-	-
Price Contingencies								
Subtotal Price Contingencies	11,027.2	1,21,444.9	2,43,642.8	3,07,555.3	3,43,467.1	1,16,336.6	35,055.6	11,78,529.5
Total PROJECT COSTS	4,52,115.7	17,14,164.9	21,16,917.8	19,56,065.3	17,40,277.1	4,93,821.6	1,28,888.1	86,02,250.5
Taxes	42,996.2	2,02,573.9	2,96,443.9	2,86,635.1	2,53,822.2	38,113.4	4,329.9	11,24,914.7
Calculation of economic costs								
Deductions								
Taxes	42,996	2,02,574	2,96,444	2,86,635	2,53,822	38,113	4,330	
Price Contingencies	11,027	1,21,445	2,43,643	3,07,555	3,43,467	1,16,337	35,056	
KVK staff salaries	7920	89280	89280	89280	89280	89280	66900	
__ Sub-total deductions	61,943	4,13,299	6,29,367	6,83,470	6,86,569	2,43,730	1,06,286	
Economic costs	3,90,172	13,00,866	14,87,551	12,72,595	10,53,708	2,50,092	22,603	

Annex-1.4: Project incremental economic "benefits and costs" streams (From FARMOD)

India
SCATE Redesign
Project Summary

ECONOMIC BUDGET (AGGREGATED) (In INR Million)	Increments																			Present 1	Future Without 17	Future With 18	ercentag Change %
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
Main Production																							
Assam farms	17.5	47.0	72.4	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9	636.3	636.3	731.2	15.0
Chhattisgarh farms	2.5	7.7	12.5	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	152.7	152.7	169.5	11.0
Odisha farms	4.8	13.2	20.5	26.9	26.9	26.9	26.9	26.9	26.9	26.9	26.9	26.9	26.9	26.9	26.9	26.9	26.9	26.9	26.9	217.9	217.9	244.8	12.0
Jharkhand farms	9.2	24.7	38.3	50.2	50.2	50.2	50.2	50.2	50.2	50.2	50.2	50.2	50.2	50.2	50.2	50.2	50.2	50.2	50.2	356.5	356.5	406.6	14.0
Nagaland farms	3.1	8.4	13.1	17.4	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	123.1	123.1	140.6	14.0
CFC	-	245.1	635.1	1,130.9	1,652.9	1,869.9	1,982.2	1,988.6	1,988.6	1,988.6	1,988.6	1,988.6	1,988.6	1,988.6	1,988.6	1,988.6	1,988.6	1,988.6	1,988.6	-	-	1,988.6	-
AIB	-	2.9	10.6	21.1	31.2	39.6	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	43.2	-	-	43.2	-
Support to existing CHC	0.7	44.9	113.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	340.5	340.5	487.6	43.0
Sub-total Main Production	37.8	393.9	915.7	1,505.3	2,037.5	2,262.9	2,378.7	2,385.1	2,385.1	2,385.1	2,385.1	2,385.1	2,385.1	2,385.1	2,385.1	2,385.1	2,385.1	2,385.1	2,385.1	1,827.0	1,827.0	4,212.1	131.0
Production Cost																							
Investment																							
Purchased Inputs																							
Seeds & Planting materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.1	24.1	24.1	-
Fertilisers	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.3	4.3	4.3	-
Custom hiring centre	0.1	0.3	0.5	0.6	-492.1	493.3	0.6	0.6	0.6	-769.3	770.5	0.6	0.6	0.6	-492.1	493.3	0.6	0.6	0.6	381.8	381.8	382.4	-
Primary processing units	19.6	276.5	666.3	1,154.7	1,640.7	1,836.8	1,939.2	1,941.9	1,941.9	1,941.9	1,955.0	1,958.3	1,958.3	1,958.3	1,941.9	1,941.9	1,941.9	1,941.9	1,941.9	-	-	1,941.9	-
Common facility centre	35.1	50.3	60.7	73.8	43.6	49.1	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8	-	-	51.8	-
Agricultural implements bank	20.4	42.4	35.7	9.4	11.5	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	-	-	12.4	-
Farm machinery	6.3	17.9	28.2	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	-	-	37.3	-
Sub-Total Purchased Inputs	81.6	387.4	791.2	1,275.7	1,314.7	2,354.9	2,041.3	2,044.0	2,044.0	1,389.6	2,711.5	2,060.4	2,060.4	2,060.4	1,625.2	2,462.8	2,044.0	2,044.0	2,044.0	352.9	352.9	2,396.9	579.0
Labor																							
Labour	-9.9	-29.8	-48.2	-64.9	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	-65.8	91.1	91.1	25.2	-72.0
Sub-total Investment Costs	71.7	357.6	743.0	1,210.8	1,248.9	2,289.0	1,975.4	1,978.2	1,978.2	1,323.8	2,645.6	1,994.5	1,994.5	1,994.5	1,559.4	2,397.0	1,978.2	1,978.2	1,978.2	444.0	444.0	2,422.1	446.0
Operating																							
Purchased Inputs																							
Seeds & Planting materials	-5.0	-13.6	-21.0	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	152.2	152.2	124.6	-18.0
Fertilisers	-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	325.1	325.1	325.1	-0.0
Farm machinery	40.9	112.2	174.7	229.8	229.8	229.8	229.8	229.8	229.8	229.8	229.8	229.8	229.8	229.8	229.8	229.8	229.8	229.8	229.8	-	-	229.8	-
Sub-Total Purchased Inputs	35.9	98.6	153.6	202.2	202.2	202.2	202.2	202.2	202.2	202.2	202.2	202.2	202.2	202.2	202.2	202.2	202.2	202.2	202.2	477.4	477.4	679.5	42.0
Labor																							
Labour	-152.9	-413.2	-640.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	-840.8	1,491.5	1,491.5	650.7	-56.0
Sub-total Operating Costs	-117.0	-314.6	-487.2	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	-638.7	1,968.9	1,968.9	1,330.2	-32.0
Sub-Total Production Cost	-45.3	43.0	255.8	572.1	610.2	1,650.4	1,336.8	1,339.5	1,339.5	685.1	2,007.0	1,355.9	1,355.9	1,355.9	920.7	1,758.3	1,339.5	1,339.5	1,339.5	2,412.8	2,412.8	3,752.3	56.0
Other Costs																							
Project investment costs	1,300.9	1,487.6	1,272.6	1,053.7	250.1	22.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OUTFLOWS	1,255.6	1,530.5	1,528.4	1,625.9	860.3	1,673.0	1,336.8	1,339.5	1,339.5	685.1	2,007.0	1,355.9	1,355.9	1,355.9	920.7	1,758.3	1,339.5	1,339.5	1,339.5	2,412.8	2,412.8	3,752.3	56.0
Cash Flow	-1,217.7	-1,136.6	-612.8	-120.6	1,177.1	589.9	1,041.9	1,045.6	1,045.6	1,700.0	378.1	1,029.2	1,029.2	1,029.2	1,464.4	626.8	1,045.6	1,045.6	1,045.6	-585.8	-585.8	459.8	178.0

IRR = 17.9%, NPV = 3,369.47

Annex-1.5: Project incremental Production

India
SCATE Redesign
Project Summary

PRODUCTION (Detailed) (In Units)		Increments													Future	Percentag Change
	Unit	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**	**Present**	**Future**	**Project**	**%**
Main Production																	
Paddy	ton		1,792	4,845	7,504	9,848	9,848	9,848	9,848	9,848	9,848	9,848	9,848	63,027	63,027	72,874	72
Maize	ton		364	1,025	1,612	2,133	2,133	2,133	2,133	2,133	2,133	2,133	2,133	21,286	21,286	23,419	39
Wheat	ton		89	232	357	465	465	465	465	465	465	465	465	3,100	3,100	3,565	15
Pulses	ton		59	149	228	298	298	298	298	298	298	298	298	3,231	3,231	3,529	48
Millets	ton		149	385	590	767	767	767	767	767	767	767	767	7,669	7,669	8,436	10
Mustard & oilseeds	ton		13	33	50	65	65	65	65	65	65	65	65	436	436	501	30
Turmeric	ton		12	28	42	56	56	56	56	56	56	56	56	840	840	896	7
Byproduct & fodder	ton		1,886	5,016	7,744	10,128	10,128	10,128	10,128	10,128	10,128	10,128	10,128	75,538	75,538	85,666	64

Annex-1.6: Project incremental use of farm machineries

SCATE Redesign
Project Summary
FINANCIAL BUDGET (DETAILED) WOP WP
(In INR Million) **Incremental**

	WOP	**WP**	
Tractor ploughing	-	12.64	12.6
Tractor, seed drill	-	4.62	4.6
Thresher by tractor	-	8.80	8.8
Sprayer	-	0.05	0.0
Cono weeder	-	26.21	26.2
Animal drawn seed drill	-	0.01	0.0
Power weeder	-	0.64	0.6
Self propelled reaper	-	9.90	9.9
_____ Total		62.9	

IRR = 44.2%, NPV = 9,903.99

India
SCATE Redesign
Project Summary
USE FARM MACHINERY UNI
(In Units)

		WOP	**Increments**											
	Unit	**20**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**
Tractor ploughing	ha		80	4,345	11,836	18,489	24,232	24,232	24,232	24,232	24,232	24,232	24,232	24,232
Tractor seed drill	hour		320	6,136	16,937	26,662	34,963	34,963	34,963	34,963	34,963	34,963	34,963	34,963
Thresher by tracor	ha		144	3,531	9,513	14,866	19,418	19,418	19,418	19,418	19,418	19,418	19,418	19,418
Sprayer	ha		64	2,861	7,649	11,910	15,541	15,541	15,541	15,541	15,541	15,541	15,541	15,541
Cono weeder	ha		272	11,206	30,272	47,073	61,618	61,618	61,618	61,618	61,618	61,618	61,618	61,618
Power weeded	ha		64	160	240	320	320	320	320	320	320	320	320	320
Self propelled reaper	ha		-	4,497	12,461	19,345	25,518	25,518	25,518	25,518	25,518	25,518	25,518	25,518
Harvester	ha		-	3,170	8,634	13,480	17,678	17,678	17,678	17,678	17,678	17,678	17,678	17,678
Direct paddy seeder	ha		128	6,777	18,056	27,891	36,431	36,431	36,431	36,431	36,431	36,431	36,431	36,431
Animal drawn seed drill	ha		-	1,419	3,677	5,643	7,336	7,336	7,336	7,336	7,336	7,336	7,336	7,336
Transport trolley	ha		128	6,777	18,056	27,891	36,431	36,431	36,431	36,431	36,431	36,431	36,431	36,431

Annex-1.7: Project incremental Labour

India
SCATE Redesign
Project Summary

LABOR BUDGET (In Units)	Unit	WOP	WP									Increments	Present	Future Without	Future With	Percentage Change
		20	20	2	3	4	5	6	7	8	9	10	1	20	6	%
Labor Requirements																
Site clearance	Pers_day	123,603	100,504	-3,638	-9,977	-16,035	-21,699	-23,099	-23,099	-23,099	-23,099	-23,099	123,603	123,603	100,504	-19
Land Preparation	pers_day	1,597,642	982,947	-111,633	-301,299	-467,812	-614,414	-614,694	-614,694	-614,694	-614,694	-614,694	1,597,642	1,597,642	982,947	-38
Planting	pers_day	513,288	23,408	-90,268	-241,390	-373,609	-489,880	-489,880	-489,880	-489,880	-489,880	-489,880	513,288	513,288	23,408	-95
Sowing	pers_day	178,952	-	-34,713	-89,775	-137,655	-178,952	-178,952	-178,952	-178,952	-178,952	-178,952	178,952	178,952	-	-
Line sowing	pers_day	43,050	80,138	7,310	18,672	28,566	37,088	37,088	37,088	37,088	37,088	37,088	43,050	43,050	80,138	86
Transplanting	pers_day	1,202,100	-	-218,170	-591,051	-916,170	-1,202,100	-1,202,100	-1,202,100	-1,202,100	-1,202,100	-1,202,100	1,202,100	1,202,100	-	-
Manuring, fert application	pers_day	416,154	416,154	-	-0	-	-	-	-	-	-	-	416,154	416,154	416,154	-
Fencing	pers_day	30,758	30,758	-	-	-	-	-	-	-	-	-	30,758	30,758	30,758	-
Weeding	pers_day	180,848	37,475	-21,780	-66,537	-106,840	-143,373	-143,373	-143,373	-143,373	-143,373	-143,373	180,848	180,848	37,475	-79
spraying	pers_day	2,464	-	-528	-1,232	-1,848	-2,464	-2,464	-2,464	-2,464	-2,464	-2,464	2,464	2,464	-	-
PP application	pers_day	17,798	17,798	-0	-	-	-	-	-	-	-	-	17,798	17,798	17,798	-
Interculture	pers_day	1,754,037	625,052	-202,350	-549,960	-856,478	-1,125,619	-1,128,986	-1,128,986	-1,128,986	-1,128,986	-1,128,986	1,754,037	1,754,037	625,052	-64
Transportation	pers_day	299,744	297,595	-577	-1,066	-1,509	-2,148	-2,148	-2,148	-2,148	-2,148	-2,148	299,744	299,744	297,595	-1
Harvesting	pers_day	1,452,397	365,384	-191,920	-529,220	-825,397	-1,087,013	-1,087,013	-1,087,013	-1,087,013	-1,087,013	-1,087,013	1,452,397	1,452,397	365,384	-75
Watch and ward	pers_day	627,608	627,608	-	-	-	-	-	-	-	-	-	627,608	627,608	627,608	-
Sub-Total Labor Requirements		8,440,442	3,604,820	-868,265	-2,362,835	-3,674,786	-4,830,576	-4,835,622	-4,835,622	-4,835,622	-4,835,622	-4,835,622	8,440,442	8,440,442	3,604,820	-57

Annex-1.8: Project incremental "financial benefit stream" and household incomes

India
SCATE Redesign
Project Summary

FINANCIAL BUDGET (AGGREGATED (In INR Million)	**Increments**																		
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Main Production																			
Assam farms	19.5	52.2	80.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5
Chhattisgarh farms	2.7	8.6	13.9	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7
Odisha farms	5.4	14.6	22.7	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9
Jharkhand farms	10.8	29.1	45.1	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0
Nagaland farms	3.6	9.8	15.4	20.4	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
CFC	-	306.3	793.9	1,413.6	2,066.1	2,337.4	2,477.8	2,485.7	2,485.7	2,485.7	2,485.7	2,485.7	2,485.7	2,485.7	2,485.7	2,485.7	2,485.7	2,485.7	2,485.7
AIB	-	3.6	13.2	26.4	39.0	49.5	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Support to existing CHC	0.7	44.9	113.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1	147.1
Sub-total Main Production	42.7	469.2	1,097.8	1,820.5	2,485.7	2,767.5	2,912.3	2,920.3	2,920.3	2,920.3	2,920.3	2,920.3	2,920.3	2,920.3	2,920.3	2,920.3	2,920.3	2,920.3	2,920.3
Production Cost																			
Investment																			
Purchased Inputs																			
Seeds & Planting materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fertilisers	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Custom hiring centre	0.1	0.3	0.5	0.6	-492.1	493.3	0.6	0.6	0.6	-769.3	770.5	0.6	0.6	0.6	-492.1	493.3	0.6	0.6	0.6
Primary processing units	23.1	338.4	814.4	1,407.3	1,997.5	2,230.4	2,351.9	2,355.1	2,355.1	2,355.1	2,370.5	2,374.4	2,374.4	2,374.4	2,355.1	2,355.1	2,355.1	2,355.1	2,355.1
Common facility centre	41.3	59.2	71.4	86.8	51.2	57.7	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0
Agricultural implements bank	24.0	49.9	42.0	11.1	13.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
Farm machinery	7.4	21.1	33.1	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9
Sub-Total Purchased Inputs	96.0	469.0	961.3	1,549.6	1,614.1	2,839.9	2,472.0	2,475.2	2,475.2	1,705.3	3,260.5	2,494.4	2,494.4	2,494.4	1,982.5	2,967.9	2,475.2	2,475.2	2,475.2
Labor																			
Labour	-13.2	-39.7	-64.2	-86.5	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8
Sub-total Investment Costs	82.8	429.2	897.1	1,463.1	1,526.3	2,752.1	2,384.2	2,387.4	2,387.4	1,617.5	3,172.7	2,406.7	2,406.7	2,406.7	1,894.7	2,880.1	2,387.4	2,387.4	2,387.4
Operating																			
Purchased Inputs																			
Seeds & Planting materials	-5.0	-13.6	-21.0	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6
Fertilisers	-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
Farm machinery	48.2	132.0	205.5	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4
Sub-Total Purchased Inputs	43.1	118.4	184.5	242.8	242.8	242.8	242.8	242.8	242.8	242.8	242.8	242.8	242.8	242.8	242.8	242.8	242.8	242.8	242.8
Labor																			
Labour	-203.9	-551.0	-854.5	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1	-1,121.1
Sub-total Operating Costs	-160.7	-432.6	-670.0	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3	-878.3
Sub-Total Production Cost	-77.9	-3.3	227.1	584.8	648.0	1,873.8	1,505.9	1,509.1	1,509.1	739.2	2,294.3	1,528.3	1,528.3	1,528.3	1,016.4	2,001.8	1,509.1	1,509.1	1,509.1
Other Costs																			
Project investment costs	1,300.9	1,487.6	1,272.6	1,053.7	250.1	22.6	-	-	-	-	-	-	-	-	-	-	-	-	-
OUTFLOWS	1,222.9	1,484.2	1,499.7	1,638.5	898.1	1,896.4	1,505.9	1,509.1	1,509.1	739.2	2,294.3	1,528.3	1,528.3	1,528.3	1,016.4	2,001.8	1,509.1	1,509.1	1,509.1
Cash Flow Before Financing	-1,180.2	-1,015.0	-401.9	182.1	1,587.7	871.1	1,406.4	1,411.2	1,411.2	2,181.1	626.0	1,392.0	1,392.0	1,392.0	1,903.9	918.5	1,411.2	1,411.2	1,411.2

IRR = 30.2%, NPV = 6,226.52

Annex-1.9: Project implementation phasing of activities

Project Summary
CROPPING PATTERNS/ACTI
(In Units)

	Unit	Increments										
		2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**
Cropping Intensity	Percent	-	-	-	-	-	-	-	-	-	-	-
Cropping Pattern												
New Technology												
Rice	ha	2,652	7,116	10,981	14,390	14,390	14,390	14,390	14,390	14,390	14,390	14,390
Oilseeds	ha	65	166	246	321	321	321	321	321	321	321	321
Pulses	ha	76	194	287	375	375	375	375	375	375	375	375
Oilseeds	ha	100	260	403	523	523	523	523	523	523	523	523
Pulses	ha	100	260	403	523	523	523	523	523	523	523	523
Maize	ha	100	260	403	523	523	523	523	523	523	523	523
Rice	ha	441	1,140	1,748	2,272	2,272	2,272	2,272	2,272	2,272	2,272	2,272
Pulses	ha	345	1,149	1,885	2,558	2,558	2,558	2,558	2,558	2,558	2,558	2,558
Maize	ha	441	1,140	1,748	2,272	2,272	2,272	2,272	2,272	2,272	2,272	2,272
Millets	ha	992	2,565	3,933	5,113	5,113	5,113	5,113	5,113	5,113	5,113	5,113
Rice	ha	1,438	3,764	5,783	7,528	7,528	7,528	7,528	7,528	7,528	7,528	7,528
Pulses	ha	110	288	442	576	576	576	576	576	576	576	576
Maize	ha	343	1,155	1,897	2,576	2,576	2,576	2,576	2,576	2,576	2,576	2,576
Wheat	ha	329	861	1,323	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722
Rice	ha	96	224	336	448	448	448	448	448	448	448	448
Maize	ha	122	546	952	1,358	1,358	1,358	1,358	1,358	1,358	1,358	1,358
Mustard	ha	12	28	42	56	56	56	56	56	56	56	56
Turmeric	ha	48	112	168	224	224	224	224	224	224	224	224
Rice	ha	14	294	574	854	854	854	854	854	854	854	854
Sub-total New Technology		7,823	21,521	33,554	44,211	44,211	44,211	44,211	44,211	44,211	44,211	44,211
Activity Pattern												
New Technology												
Common facility centre	CFC	70	158	245	333	333	333	333	333	333	333	333
Banana rope making unit	PHP	11	24	37	50	50	50	50	50	50	50	50
Turmeric processing	PHP	14	32	49	67	67	67	67	67	67	67	67
Millet processing unit	PHP	14	32	49	67	67	67	67	67	67	67	67
Mini dal mill unit	PHP	28	63	98	133	133	133	133	133	133	133	133
Tamarind de-seeder unit	PHP	4	8	12	17	17	17	17	17	17	17	17
Agricultural implements	Units	35	105	157	157	157	157	157	157	157	157	157
Support to CHC	CHC	87	227	349	454	454	454	454	454	454	454	454
Total units		*262*	*647*	*996*	*1,276*	*1,276*	*1,276*	*1,276*	*1,276*	*1,276*	*1,276*	*1,276*

Annex-1.10: Prices used in the EFA, (Oct 2018 data updated in May 2019) a/

India
ICAR Farm Technologies
ECONOMIC PRICES
(In INR)

	Unit	Economic	Financial
Outputs			
Food crops Assam			
Paddy, main season /a	ton	13,050	14,500
Pulses	ton	58,500	65,000
Oilseeds	ton	32,400	36,000
Food crops Chhattisgarh			
Paddy, main season /b	ton	15,300	17,000
Pulses	ton	49,500	55,000
Mustard	ton	32,400	36,000
Maize, shelled	ton	12,600	14,000
Food crops Odisha			
Paddy, main season /c	ton	12,600	14,000
Wheat	ton	21,600	24,000
Maize	ton	13,500	15,000
Millets	ton	13,500	15,000
Pulses	ton	32,400	36,000
Food crops Jharkhand			
Rice	ton	14,450	17,000
Millets	ton	12,750	15,000
Pulses	ton	42,500	50,000
Maize	ton	11,900	14,000
Wheat	ton	18,700	22,000
Food Crops Nagaland			
Paddy, main season /d	ton	15,750	17,500
Byproduct /e	ton	2,250	2,500
Maize, shelled	ton	12,600	14,000
Mustard	ton	40,500	45,000
Pulses	ton	49,500	55,000
Turmeric	ton	27,000	30,000
Ginger	ton	27,000	30,000
Chilli	ton	49,500	55,000
Post harvest processing			
Annual revenue	year	Value Basis	Value Basis
Annual revenue	INR/year	1	1
Custom hiring centre (CHC)			
CHC	CHC	Value Basis	Value Basis
Tax revenue			
Tax revenue	INR	Value Basis	Value Basis
Proxy labour			
Proxy labour	Pers_day	213	250
Inputs			
Seeds & Planting materials			
Paddy seed	Kg	49	49
Paddy, scented	Kg	33	33
Maize seed	Kg	120	120
Soybean_seed	Kg	106	106
Pulses seed	Kg	60	60
Millet seeds	Kg	20	20
wheat seed	Kg	25	25
Beans seed	Kg	60	60
Mustard seed	Kg	60	60
Ginger Planting materials	Kg	30	30
Turmeric planting materials	Kg	30	30
Chilli planting materials	Kg	9,150	9,150
Vegetable Seeds	ha	10,000	10,000
Banana suckers	sett	20	20

a/ Source: Collected form the states of Assam, Chhattisgarh, Odisha and Jharkhand

(In INR)

	Unit	Economic	Financial
Fertilisers			
N Fertiliser	Kg	10	10
P Fertiliser	Kg	10	10
K Fertiliser	Kg	10	10
DAP	Kg	23	24
Organic Manure	ton	2,500	2,500
PP chemicals	lit	220	250
PPC organic	litre	264	300
NPK Fertilisers	Kg	9	9
Urea	Kg	14	15
SSP	Kg	26	12
MOP	Kg	35	15
FYM	ton	2,375	2,500
FPO Custom hiring centre			
Building	each	Value Basis	Value Basis
Work shed	each	Value Basis	Value Basis
Power connection	lumpsum	Value Basis	Value Basis
Machinery and implements	each	Value Basis	Value Basis
Replacement	set	Value Basis	Value Basis
Operating costs	year	Value Basis	Value Basis
Insurance /h	year	Value Basis	Value Basis
Repairs and maintenance /i	annual	Value Basis	Value Basis
Interest on loan capital	year	Value Basis	Value Basis
Interest on WC loan	year	Value Basis	Value Basis
Primary processing units			
Building and workshed	unit	Value Basis	Value Basis
Machinery and equipment	unit	Value Basis	Value Basis
Replacement cost	unit	Value Basis	Value Basis
Operating costs	year	Value Basis	Value Basis
Wages and salaries	year	Value Basis	Value Basis
Wages and salaries	INR/year	1	1
Opearational costs	INR/year	1	1
Replacement costs	iNR	1	1
Machinery and equipment	INR	1	1
Building and workshed	INR	1	1
Farm mechinery			1
Tractor ploughing /j	ha	2,040	2,400
Tractor cultivator	ha	1,530	1,800
Tractor, seed drill	hr	680	800
Thresher by tractor	ha	1,020	1,200
Paddy combine harvester	hr	1,190	1,400
Power tiller	ha	1,020	1,200
Sprayer	ha	128	150
Harvester	ha	3,613	4,250
Transport trolley	ha	1,700	2,000
Winnower	ha	191	225
Direct paddy seeder /k	ha	340	400
Cono weeder /l	ha	1,700	2,000
Animal drawn seed drill /m	ha	1	1
Power weeder /n	ha	1,700	2,000
Self propelled reaper	ha	1,700	2,000
Labor			
Site clearance	Pers_day	188	250
Land Preparation	pers_day	188	250
Planting	pers_day	188	250
Sowing	pers_day	188	250
Line sowing	pers_day	188	250
Transplanting	pers_day	188	250
Manuring, fert application	pers_day	188	250
Weeding	pers_day	188	250
Dusting	pers_day	188	250
spraying	pers_day	188	250
PP application	pers_day	188	250
Interculture	pers_day	188	250
Transportation	pers_day	188	250
Harvesting	pers_day	188	250
Shed construction	pers_day	188	250
Watch and ward	pers_day	188	250

\a Unhusked rice
\b Unhusked rice
\c Unhusked rice
\d Unhusked rice
\e straw
\f at 8% of unit cost
\g construction of agronet shade
\h at 2% of capital cost
\i at 10% of capital cost of the machinery and equipment
\j 4 hours per ha
\k as against INR 6250 by manual labour
\l as INR 4170 by manual labour
\m 35% labour cost saved
\n for maize, oilseed and pulses crops

SUBPROJECT MODELS

Annex-2.1 Mechanisation farm units sub-project, economic model (130,000 households)

India
SCATE Redesign
Mechanisation farms Subproject Model
ECONOMIC BUDGET (AGGREGATEI
(In INR '000)

	Increments										
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**
Main Production											
Assam farms	17,533	46,983	72,437	94,909	94,909	94,909	94,909	94,909	94,909	94,909	94,909
Chhattisgarh farms	2,468	7,717	12,503	16,798	16,798	16,798	16,798	16,798	16,798	16,798	16,798
Odisha farms	4,843	13,152	20,466	26,868	26,868	26,868	26,868	26,868	26,868	26,868	26,868
Jharkhand farms	9,187	24,729	38,326	50,170	50,170	50,170	50,170	50,170	50,170	50,170	50,170
Nagaland farms	3,113	8,413	13,125	17,434	17,488	17,488	17,488	17,488	17,488	17,488	17,488
Sub-total Main Production	37,143	100,994	156,856	206,180	206,233	206,233	206,233	206,233	206,233	206,233	206,233
Production Cost											
Investment											
Purchased Inputs											
Seeds & Planting materials	-	-	-	-	-	-	-	-	-	-	-
Fertilisers	-	0	-	-	-	-	-	-	-	-	-
Farm machinery	6,330	17,905	28,161	37,297	37,297	37,297	37,297	37,297	37,297	37,297	37,297
Sub-Total Purchased Inputs	6,330	17,905	28,161	37,297	37,297	37,297	37,297	37,297	37,297	37,297	37,297
Labor											
Labour	-9,906	-29,812	-48,184	-64,899	-65,846	-65,846	-65,846	-65,846	-65,846	-65,846	-65,846
Sub-total Investment Costs	-3,577	-11,907	-20,023	-27,602	-28,548	-28,548	-28,548	-28,548	-28,548	-28,548	-28,548
Operating											
Purchased Inputs											
Seeds & Planting materials	-5,008	-13,566	-21,039	-27,610	-27,610	-27,610	-27,610	-27,610	-27,610	-27,610	-27,610
Fertilisers	-26	-37	-37	-35	-35	-35	-35	-35	-35	-35	-35
Farm machinery	40,939	112,191	174,682	229,826	229,826	229,826	229,826	229,826	229,826	229,826	229,826
Sub-Total Purchased Inputs	35,904	98,588	153,606	202,181	202,181	202,181	202,181	202,181	202,181	202,181	202,181
Labor											
Labour	-152,893	-413,219	-640,838	-840,834	-840,834	-840,834	-840,834	-840,834	-840,834	-840,834	-840,834
Sub-total Operating Costs	-116,989	-314,632	-487,232	-638,653	-638,653	-638,653	-638,653	-638,653	-638,653	-638,653	-638,653
Sub-Total Production Cost	-120,566	-326,539	-507,256	-666,255	-667,201	-667,201	-667,201	-667,201	-667,201	-667,201	-667,201
OUTFLOWS	-120,566	-326,539	-507,256	-666,255	-667,201	-667,201	-667,201	-667,201	-667,201	-667,201	-667,201
Cash Flow	157,709	427,533	664,112	872,435	873,435	873,435	873,435	873,435	873,435	873,435	873,435

IRR = None, NPV = 6,956,013.92

Annex-2.2 Mechanisation farm units sub-project, financial model (130,000 households)

India
SCATE Redesign
Mechanisation farms Subproject Model
FINANCIAL BUDGET (AGGREGATED
(In INR '000)

	Increments										
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**
Main Production											
Assam farms	19,481	52,203	80,485	105,455	105,455	105,455	105,455	105,455	105,455	105,455	105,455
Chhattisgarh farms	2,742	8,574	13,892	18,665	18,665	18,665	18,665	18,665	18,665	18,665	18,665
Odisha farms	5,381	14,613	22,740	29,853	29,853	29,853	29,853	29,853	29,853	29,853	29,853
Jharkhand farms	10,808	29,093	45,089	59,024	59,024	59,024	59,024	59,024	59,024	59,024	59,024
Nagaland farms	3,641	9,848	15,368	20,412	20,475	20,475	20,475	20,475	20,475	20,475	20,475
Sub-total Main Production	42,053	114,333	177,573	233,408	233,471	233,471	233,471	233,471	233,471	233,471	233,471
Production Cost											
Investment											
Purchased Inputs											
Seeds & Planting materials	-	-	-	-	-	-	-	-	-	-	-
Fertilisers	-	0	-	-	-	-	-	-	-	-	-
Farm machinery	7,447	21,064	33,131	43,879	43,879	43,879	43,879	43,879	43,879	43,879	43,879
Sub-Total Purchased Inputs	7,447	21,064	33,131	43,879	43,879	43,879	43,879	43,879	43,879	43,879	43,879
Labor											
Labour	-13,208	-39,749	-64,246	-86,533	-87,794	-87,794	-87,794	-87,794	-87,794	-87,794	-87,794
Sub-total Investment Costs	-5,762	-18,685	-31,115	-42,654	-43,915	-43,915	-43,915	-43,915	-43,915	-43,915	-43,915
Operating											
Purchased Inputs											
Seeds & Planting materials	-5,008	-13,566	-21,039	-27,610	-27,610	-27,610	-27,610	-27,610	-27,610	-27,610	-27,610
Fertilisers	-19	-17	-8	3	3	3	3	3	3	3	3
Farm machinery	48,163	131,989	205,508	270,383	270,383	270,383	270,383	270,383	270,383	270,383	270,383
Sub-Total Purchased Inputs	43,136	118,406	184,461	242,776	242,776	242,776	242,776	242,776	242,776	242,776	242,776
Labor											
Labour	-203,858	-550,959	-854,451	-1,121,111	-1,121,111	-1,121,111	-1,121,111	-1,121,111	-1,121,111	-1,121,111	-1,121,111
Sub-total Operating Costs	-160,722	-432,553	-669,990	-878,335	-878,335	-878,335	-878,335	-878,335	-878,335	-878,335	-878,335
Sub-Total Production Cost	-166,483	-451,238	-701,105	-920,989	-922,250	-922,250	-922,250	-922,250	-922,250	-922,250	-922,250
OUTFLOWS	-166,483	-451,238	-701,105	-920,989	-922,250	-922,250	-922,250	-922,250	-922,250	-922,250	-922,250
Cash Flow Before Financing	208,536	565,571	878,678	1,154,397	1,155,722	1,155,722	1,155,722	1,155,722	1,155,722	1,155,722	1,155,722

IRR = None, NPV = 9,335,013.87

Annex-2.3 CFC (Post-harvest Processing) sub-project model, Financial (95,000 households)

India
SCATE Redesign
Common facility centres, processing Sut

FINANCIAL BUDGET (DETAILED)
(In INR '000) /a

	Increments																			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Main Production																				
Annual revenue	-	-	298,684	771,611	1,369,005	1,991,291	2,240,223	2,364,688	2,364,688	2,364,688	2,364,688	2,364,688	2,364,688	2,364,688	2,364,688	2,364,688	2,364,688	2,364,688	2,364,688	2,364,688
Annual revenue	-	-	7,644	22,295	44,590	74,848	97,143	113,068	121,030	121,030	121,030	121,030	121,030	121,030	121,030	121,030	121,030	121,030	121,030	121,030
Sub-total Main Production	-	-	306,328	793,906	1,413,595	2,066,139	2,337,366	2,477,756	2,485,718	2,485,718	2,485,718	2,485,718	2,485,718	2,485,718	2,485,718	2,485,718	2,485,718	2,485,718	2,485,718	2,485,718
Production Cost																				
Wages and salaries	-	-	15,408	39,805	70,624	102,728	115,572	121,994	121,994	121,994	121,994	121,994	121,994	121,994	121,994	121,994	121,994	121,994	121,994	121,994
Opearational costs	-	106	280,208	713,027	1,254,950	1,821,407	2,038,542	2,152,272	2,155,472	2,155,472	2,155,472	2,155,472	2,155,472	2,155,472	2,155,472	2,155,472	2,155,472	2,155,472	2,155,472	2,155,472
Replacement costs	-	-	-	-	-	-	-	-	-	-	-	15,388	19,235	19,235	19,235	-	-	-	-	-
Machinery and equipment	-	17,048	21,310	21,310	21,310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Building and workshed	-	5,950	7,438	7,438	7,438	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Term loan interest	-	-	1,492	3,357	5,222	7,087	7,087	7,087	7,087	7,087	7,087	7,087	7,087	7,087	7,087	7,087	7,087	7,087	7,087	7,087
Working capital loan interest	-	-	12,581	29,446	47,735	66,309	69,157	70,581	70,581	70,581	70,581	70,581	70,581	70,581	70,581	70,581	70,581	70,581	70,581	70,581
Investment	-	35,700	44,625	44,625	44,625	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual rent	-	2,450	5,513	8,575	11,638	11,638	11,638	11,638	11,638	11,638	11,638	11,638	11,638	11,638	11,638	11,638	11,638	11,638	11,638	11,638
Electricity charges	-	439	1,280	2,560	4,298	5,578	6,492	6,949	6,949	6,949	6,949	6,949	6,949	6,949	6,949	6,949	6,949	6,949	6,949	6,949
Labour charges	-	2,363	6,891	13,781	23,133	30,023	34,945	37,406	37,406	37,406	37,406	37,406	37,406	37,406	37,406	37,406	37,406	37,406	37,406	37,406
Other expenses	-	315	919	1,838	3,084	4,003	4,659	4,988	4,988	4,988	4,988	4,988	4,988	4,988	4,988	4,988	4,988	4,988	4,988	4,988
Sub-Total Production Cost	-	64,370	397,663	885,762	1,494,057	2,048,774	2,288,093	2,412,915	2,416,115	2,416,115	2,416,115	2,431,503	2,435,350	2,435,350	2,435,350	2,416,115	2,416,115	2,416,115	2,416,115	2,416,115
OUTFLOWS	-	64,370	397,663	885,762	1,494,057	2,048,774	2,288,093	2,412,915	2,416,115	2,416,115	2,416,115	2,431,503	2,435,350	2,435,350	2,435,350	2,416,115	2,416,115	2,416,115	2,416,115	2,416,115
Cash Flow Before Financing	-	-64,370	-91,335	-91,855	-80,462	17,365	49,272	64,841	69,603	69,603	69,603	54,215	50,368	50,368	50,368	69,603	69,603	69,603	69,603	69,603

IRR = 11.7%, NPV = 97,676.28

\a Post-harvest processing units, operated by VO or SHG

Annex-2.4 CFC (Post-harvest Processing) sub-project model, Economic (95,000 households)

India
SCATE Redesign
Common facility centres, processing Su

ECONOMIC BUDGET (DETAILED)
(In INR '000) /a

	Increments																			
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Main Production																				
Annual revenue CFC	-	238,947	617,289	1,095,204	1,593,033	1,792,178	1,891,751	1,891,751	1,891,751	1,891,751	1,891,751	1,891,751	1,891,751	1,891,751	1,891,751	1,891,751	1,891,751	1,891,751	1,891,751
Annual revenue CHC	-	6,115	17,836	35,672	59,878	77,714	90,454	96,824	96,824	96,824	96,824	96,824	96,824	96,824	96,824	96,824	96,824	96,824	96,824
Sub-total Main Production	-	245,062	635,125	1,130,876	1,652,911	1,869,892	1,982,205	1,988,575	1,988,575	1,988,575	1,988,575	1,988,575	1,988,575	1,988,575	1,988,575	1,988,575	1,988,575	1,988,575	1,988,575
Production Cost																				
Wages and salaries	-	13,867	35,824	63,562	92,455	104,015	109,795	109,795	109,795	109,795	109,795	109,795	109,795	109,795	109,795	109,795	109,795	109,795	109,795
Opearational costs	90	238,177	606,073	1,066,708	1,548,196	1,732,761	1,829,431	1,832,151	1,832,151	1,832,151	1,832,151	1,832,151	1,832,151	1,832,151	1,832,151	1,832,151	1,832,151	1,832,151	1,832,151
Replacement costs	-	-	-	-	-	-	-	-	-	-	13,080	16,349	16,349	16,349	-	-	-	-	-
Machinery and equipment	14,491	18,114	18,114	18,114	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Building and workshed	5,058	6,322	6,322	6,322	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Investment	30,345	37,931	37,931	37,931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual rent	2,083	4,686	7,289	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892
Electricity charges	373	1,088	2,176	3,653	4,741	5,518	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907
Labour charges	2,008	5,857	11,714	19,663	25,520	29,704	31,795	31,795	31,795	31,795	31,795	31,795	31,795	31,795	31,795	31,795	31,795	31,795	31,795
Other expenses	268	781	1,562	2,622	3,403	3,960	4,239	4,239	4,239	4,239	4,239	4,239	4,239	4,239	4,239	4,239	4,239	4,239	4,239
Sub-Total Production Cost	54,715	326,822	727,005	1,228,466	1,684,207	1,885,850	1,991,059	1,993,779	1,993,779	1,993,779	2,006,859	2,010,129	2,010,129	2,010,129	1,993,779	1,993,779	1,993,779	1,993,779	1,993,779
OUTFLOWS	54,715	326,822	727,005	1,228,466	1,684,207	1,885,850	1,991,059	1,993,779	1,993,779	1,993,779	2,006,859	2,010,129	2,010,129	2,010,129	1,993,779	1,993,779	1,993,779	1,993,779	1,993,779
Cash Flow	-54,715	-81,760	-91,880	-97,590	-31,296	-15,958	-8,854	-5,205	-5,205	-5,205	-18,284	-21,554	-21,554	-21,554	-5,205	-5,205	-5,205	-5,205	-5,205

IRR = None, NPV = -330,714.76

\a Post-harvest processing units, operated by VO or SHG

Annex-2.5 Agricultural implements banks sub-project financial model (93,600 households a/)

India
SCATE Redesign
Agricultural implements bank Subproject
FINANCIAL BUDGET (DETAILED)
(In INR '000) /a

	Increments										
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**
Main Production											
Annual revenue	-	3,612	13,244	26,436	39,044	49,536	54,008	54,008	54,008	54,008	54,008
Production Cost											
Investment	22,778	45,556	33,842	-	-	-	-	-	-	-	-
Annual rent	420	1,260	1,884	1,884	1,884	1,884	1,884	1,884	1,884	1,884	1,884
Electricity charges	32	116	231	341	432	471	471	471	471	471	471
Labour charges	118	431	861	1,271	1,613	1,758	1,758	1,758	1,758	1,758	1,758
Other expenses	702	2,573	5,136	7,585	9,624	10,492	10,492	10,492	10,492	10,492	10,492
Sub-Total Production Cost	24,049	49,936	41,953	11,081	13,552	14,606	14,606	14,606	14,606	14,606	14,606
OUTFLOWS	24,049	49,936	41,953	11,081	13,552	14,606	14,606	14,606	14,606	14,606	14,606
Cash Flow Before Financing	-24,049	-46,324	-28,709	15,355	25,492	34,930	39,402	39,402	39,402	39,402	39,402

IRR = 24.8%, NPV = 161,660.05
\a Operated by SHG or VO

a/ includes 22, 500 households under agricultural tool banks, 65,000 households under support to existing CHCs and 6,100 individual households

Annex-2.6 Agricultural implements sub-project economic model (93,600 households)

India
SCATE Redesign
Agricultural implements bank Subprojec

ECONOMIC BUDGET (DETAILED)
(In INR '000) /a

	Increments											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**
Main Production												
Annual revenue	-	-	2,890	10,595	21,149	31,235	39,629	43,206	43,206	43,206	43,206	43,206
Production Cost												
Investment	-	19,361	38,723	28,765	-	-	-	-	-	-	-	-
Annual rent	-	357	1,071	1,601	1,601	1,601	1,601	1,601	1,601	1,601	1,601	1,601
Electricity charges	-	27	98	196	289	367	400	400	400	400	400	400
Labour charges	-	100	367	732	1,081	1,371	1,495	1,495	1,495	1,495	1,495	1,495
Other expenses	-	596	2,187	4,366	6,447	8,180	8,918	8,918	8,918	8,918	8,918	8,918
Sub-Total Production Cost	-	20,441	42,445	35,660	9,419	11,519	12,415	12,415	12,415	12,415	12,415	12,415
OUTFLOWS	-	20,441	42,445	35,660	9,419	11,519	12,415	12,415	12,415	12,415	12,415	12,415
Cash Flow	-	-20,441	-39,556	-25,065	11,730	19,716	27,214	30,792	30,792	30,792	30,792	30,792

IRR = 22.9%, NPV = 119,864.97
\a Operated by SHG or VO

a/ includes 22, 500 households under agricultural tool banks, 65,000 households under support to existing CHCs and 6,100 individual households

Annex-2.7 Support to existing CHC subproject economic model (65,000 households)

India
SCATE Redesign
Support to existing CHC Subproject Mod
ECONOMIC BUDGET (DETAILED)
(In INR '000)

	Increments																			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Main Production																				
CHC	-	696	44,946	113,076	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096
Production Cost																				
Replacement	-	-	-	-	-	-418,798	418,798	-	-	-	-654,390	654,390	-	-	-	-418,798	418,798	-	-	-
Operating costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Insurance	-	50	130	200	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260
Repairs and maintenance	-	28	72	111	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145
Interest on loan capital	-	22	57	88	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
Interest on WC loan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-Total Production Cost	-	100	260	400	520	-418,278	419,318	520	520	520	-653,870	654,910	520	520	520	-418,278	419,318	520	520	520
OUTFLOWS	-	100	260	400	520	-418,278	419,318	520	520	520	-653,870	654,910	520	520	520	-418,278	419,318	520	520	520
Cash Flow	-	596	44,686	112,676	146,576	565,374	-272,222	146,576	146,576	146,576	800,966	-507,814	146,576	146,576	146,576	565,374	-272,222	146,576	146,576	146,576

IRR = None, NPV = 1,172,921.48

Annex 2.8 Support to existing CHC subproject financial model (65,000 households)

India
SCATE Redesign
Support to existing CHC Subproject Moc
FINANCIAL BUDGET (DETAILED)
(In INR '000)

	Increments																			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Main Production																				
CHC	-	696	44,946	113,076	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096	147,096
Production Cost																				
Replacement	-	-	-	-	-	-492,704	492,704	-	-	-	-769,871	769,871	-	-	-	-492,704	492,704	-	-	-
Operating costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Insurance	-	59	153	236	306	306	306	306	306	306	306	306	306	306	306	306	306	306	306	306
Repairs and maintenance	-	33	85	131	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170
Interest on loan capital	-	26	67	104	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
Interest on WC loan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-Total Production Cost	-	117	306	470	612	-492,092	493,315	612	612	612	-769,259	770,482	612	612	612	-492,092	493,315	612	612	612
OUTFLOWS	-	117	306	470	612	-492,092	493,315	612	612	612	-769,259	770,482	612	612	612	-492,092	493,315	612	612	612
Cash Flow Before Financing	-	579	44,640	112,606	146,484	639,188	-346,219	146,484	146,484	146,484	916,355	-623,386	146,484	146,484	146,484	639,188	-346,219	146,484	146,484	146,484

IRR = None, NPV = 1,180,787.07

AREA AND HOUSEHOLD MODELS:

Annex-3.1: Assam VO: Technology Demonstration (108 ha/VO)

India
SCATE Redesign
Assam MFU crop

FINANCIAL BUDGET (DETAILED) (In INR)	WOP	WP				Present	Future Without	Future Witl	Percentage Change
	20	20	1	2	20	1	20	20	%
Main Production									
Paddy, main season	1,524,936	1,770,015	245,079	245,079	245,079	1,524,936	1,524,936	1,770,015	16
Byproduct	258,225	281,700	23,475	23,475	23,475	258,225	258,225	281,700	9
Pulses	164,324	180,835	16,511	16,511	16,511	164,324	164,324	180,835	10
Oilseeds	27,994	32,193	4,199	4,199	4,199	27,994	27,994	32,193	15
Sub-total Main Production	1,975,479	2,264,743	289,264	289,264	289,264	1,975,479	1,975,479	2,264,743	15
Production Cost									
Investment									
Purchased Inputs									
Pulses seed	2,540	2,540	-	-	-	2,540	2,540	2,540	-
DAP	1,161	1,161	-	-	-	1,161	1,161	1,161	-
PP chemicals	1,512	1,512	-	-	-	1,512	1,512	1,512	-
Tractor ploughing	-	7,258	7,258	7,258	7,258	-	-	7,258	-
Tractor, seed drill	-	2,419	2,419	2,419	2,419	-	-	2,419	-
Cono weeder	-	6,048	6,048	6,048	6,048	-	-	6,048	-
Self propelled reaper	-	6,048	6,048	6,048	6,048	-	-	6,048	-
Sub-Total Purchased Inputs	5,213	26,986	21,773	21,773	21,773	5,213	5,213	26,986	418
Labor									
Land Preparation	2,268	2,268	-	-	-	2,268	2,268	2,268	-
Planting	7,560	756	-6,804	-6,804	-6,804	7,560	7,560	756	-90
Manuring, fert application	2,268	2,268	-	-	-	2,268	2,268	2,268	-
Weeding	18,900	3,780	-15,120	-15,120	-15,120	18,900	18,900	3,780	-80
PP application	3,780	3,780	-	-	-	3,780	3,780	3,780	-
Interculture	18,900	-	-18,900	-18,900	-18,900	18,900	18,900	-	-
Transportation	2,268	3,024	756	756	756	2,268	2,268	3,024	33
Harvesting	27,972	3,780	-24,192	-24,192	-24,192	27,972	27,972	3,780	-86
Sub-Total Hired Labor	83,916	19,656	-64,260	-64,260	-64,260	83,916	83,916	19,656	-77
Sub-total Investment Costs	89,129	46,642	-42,487	-42,487	-42,487	89,129	89,129	46,642	-48
Operating									
Purchased Inputs									
Sub-Total Purchased Inputs	338,156	552,512	214,355	214,355	214,355	338,156	338,156	552,512	63
Labor									
Site clearance	9,072	4,536	-4,536	-4,536	-4,536	9,072	9,072	4,536	-50
Land Preparation	480,516	469,500	-11,016	-11,016	-11,016	480,516	480,516	469,500	-2
Planting	13,608	-	-13,608	-13,608	-13,608	13,608	13,608	-	-
Transplanting	450,720	-	-450,720	-450,720	-450,720	450,720	450,720	-	-
Manuring, fert application	150,240	150,240	-	-	-	150,240	150,240	150,240	-
Fencing	15,552	15,552	-	-	-	15,552	15,552	15,552	-
Weeding	12,960	12,960	-	-	-	12,960	12,960	12,960	-
Interculture	469,500	234,750	-234,750	-234,750	-234,750	469,500	469,500	234,750	-50
Transportation	59,910	59,910	-	-	-	59,910	59,910	59,910	-
Harvesting	297,900	63,150	-234,750	-234,750	-234,750	297,900	297,900	63,150	-79
Watch and ward	194,280	194,280	-	-	-	194,280	194,280	194,280	-
Sub-Total Hired Labor	2,154,258	1,204,878	-949,380	-949,380	-949,380	2,154,258	2,154,258	1,204,878	-44
Sub-total Operating Costs	2,492,414	1,757,390	-735,025	-735,025	-735,025	2,492,414	2,492,414	1,757,390	-29
Sub-Total Production Cost	2,581,544	1,804,032	-777,512	-777,512	-777,512	2,581,544	2,581,544	1,804,032	-30
OUTFLOWS	2,581,544	1,804,032	-777,512	-777,512	-777,512	2,581,544	2,581,544	1,804,032	-30
Cash Flow Before Financing	-606,065	460,711	1,066,776	1,066,776	1,066,776	-606,065	-606,065	460,711	176

IRR = None, NPV = 8,581,827.72

Annex-3.2: Chhattisgarh VO: Technology demonstrations (125 ha/VO)

India
SCATE Redesign
Chhattisgarh MFU crop

FINANCIAL BUDGET (DETAILED) (In INR)	**WOP**	**WP**				**Present**	**Future Without**	**Future With**	**Percentage Change**
	20	**20**	**1**	**2**	**20**	**1**	**20**	**20**	**%**
Main Production									
Paddy, main season	1,724,688	2,001,870	277,182	277,182	277,182	1,724,688	1,724,688	2,001,870	16
Byproduct	292,050	318,600	26,550	26,550	26,550	292,050	292,050	318,600	9
Pulses	89,375	98,313	8,937	8,937	8,937	89,375	89,375	98,313	10
Mustard	58,500	67,230	8,730	8,730	8,730	58,500	58,500	67,230	15
Maize, shelled	87,500	96,250	8,750	8,750	8,750	87,500	87,500	96,250	10
Maize fodder	15,625	17,188	1,563	1,563	1,563	15,625	15,625	17,188	10
Sub-total Main Production	2,267,738	2,599,450	331,712	331,712	331,712	2,267,738	2,267,738	2,599,450	15
Production Cost									
Investment									
Purchased Inputs									
Pulses seed	3,000	3,000	-	-	-	3,000	3,000	3,000	-
DAP	960	960	-	-	-	960	960	960	-
PP chemicals	1,250	1,250	-	-	-	1,250	1,250	1,250	-
Tractor ploughing	-	6,000	6,000	6,000	6,000	-	-	6,000	-
Tractor, seed drill	-	2,000	2,000	2,000	2,000	-	-	2,000	-
Cono weeder	-	5,000	5,000	5,000	5,000	-	-	5,000	-
Self propelled reaper	-	5,000	5,000	5,000	5,000	-	-	5,000	-
Sub-Total Purchased Inputs	5,210	23,210	18,000	18,000	18,000	5,210	5,210	23,210	345
Labor									
Land Preparation	1,875	1,875	-	-	-	1,875	1,875	1,875	-
Planting	6,250	1,250	-5,000	-5,000	-5,000	6,250	6,250	1,250	-80
Manuring, fert application	1,875	1,875	-	-	-	1,875	1,875	1,875	-
Weeding	15,625	3,125	-12,500	-12,500	-12,500	15,625	15,625	3,125	-80
PP application	1,250	1,250	-	-	-	1,250	1,250	1,250	-
Interculture	15,625	3,125	-12,500	-12,500	-12,500	15,625	15,625	3,125	-80
Transportation	2,500	2,500	-	-	-	2,500	2,500	2,500	-
Harvesting	23,125	3,125	-20,000	-20,000	-20,000	23,125	23,125	3,125	-86
Sub-Total Hired Labor	68,125	18,125	-50,000	-50,000	-50,000	68,125	68,125	18,125	-73
Sub-total Investment Costs	73,335	41,335	-32,000	-32,000	-32,000	73,335	73,335	41,335	-44
Operating									
Purchased Inputs									
Sub-Total Purchased Inputs	407,916	660,158	252,242	252,242	252,242	407,916	407,916	660,158	62
Labor									
Site clearance	17,500	13,125	-4,375	-4,375	-4,375	17,500	17,500	13,125	-25
Land Preparation	550,375	539,750	-10,625	-10,625	-10,625	550,375	550,375	539,750	-2
Planting	18,750	2,500	-16,250	-16,250	-16,250	18,750	18,750	2,500	-87
Transplanting	509,760	-	-509,760	-509,760	-509,760	509,760	509,760	-	-
Manuring, fert application	169,920	169,920	-	-	-	169,920	169,920	169,920	-
Weeding	12,500	6,250	-6,250	-6,250	-6,250	12,500	12,500	6,250	-50
Interculture	531,000	265,500	-265,500	-265,500	-265,500	531,000	531,000	265,500	-50
Transportation	61,225	61,850	625	625	625	61,225	61,225	61,850	1
Harvesting	337,350	71,850	-265,500	-265,500	-265,500	337,350	337,350	71,850	-79
Watch and ward	228,025	228,025	-	-	-	228,025	228,025	228,025	-
Sub-Total Hired Labor	2,436,405	1,358,770	-1,077,635	-1,077,635	-1,077,635	2,436,405	2,436,405	1,358,770	-44
Sub-total Operating Costs	2,844,321	2,018,928	-825,393	-825,393	-825,393	2,844,321	2,844,321	2,018,928	-29
Sub-Total Production Cost	2,917,656	2,060,263	-857,393	-857,393	-857,393	2,917,656	2,917,656	2,060,263	-29
OUTFLOWS	2,917,656	2,060,263	-857,393	-857,393	-857,393	2,917,656	2,917,656	2,060,263	-29
Cash Flow Before Financing	-649,918	539,188	1,189,105	1,189,105	1,189,105	-649,918	-649,918	539,188	183

IRR = None, NPV = 9,558,602.37

Annex-3.3: Odisha VO: Technology Demonstration (95 ha/VO)

India
SCATE Redesign
Odisha MFU crop

FINANCIAL BUDGET (DETAILED) (In INR)	WOP	WP				Present	Future Without	Future With	Percentage Change
	20	20	1	2	20	1	20	20	%
Main Production									
Maize, shelled	266,000	292,600	26,600	26,600	26,600	266,000	266,000	292,600	10
Paddy, main season	223,440	256,956	33,516	33,516	33,516	223,440	223,440	256,956	15
Maize fodder	47,500	52,250	4,750	4,750	4,750	47,500	47,500	52,250	10
Millets	384,750	423,225	38,475	38,475	38,475	384,750	384,750	423,225	10
Pulses	102,600	117,990	15,390	15,390	15,390	102,600	102,600	117,990	15
Byproduct	70,300	93,860	23,560	23,560	23,560	70,300	70,300	93,860	34
Sub-total Main Production	1,094,590	1,236,881	142,291	142,291	142,291	1,094,590	1,094,590	1,236,881	13
Production Cost									
Investment									
Purchased Inputs									
Pulses seed	6,840	6,840	-	-	-	6,840	6,840	6,840	-
Millet seeds	8,550	8,550	-	-	-	8,550	8,550	8,550	-
DAP	2,189	2,189	-	-	-	2,189	2,189	2,189	-
PP chemicals	2,850	2,850	-	-	-	2,850	2,850	2,850	-
Tractor ploughing	-	13,680	13,680	13,680	13,680	-	-	13,680	-
Tractor, seed drill	-	4,560	4,560	4,560	4,560	-	-	4,560	-
Thresher by tractor	-	20,520	20,520	20,520	20,520	-	-	20,520	-
Cono weeder	-	45,600	45,600	45,600	45,600	-	-	45,600	-
Animal drawn seed drill	-	17	17	17	17	-	-	17	-
Self propelled reaper	-	11,400	11,400	11,400	11,400	-	-	11,400	-
Sub-Total Purchased Inputs	20,429	116,206	95,777	95,777	95,777	20,429	20,429	116,206	469
Labor									
Land Preparation	4,275	4,275	-	-	-	4,275	4,275	4,275	-
Planting	14,250	2,850	-11,400	-11,400	-11,400	14,250	14,250	2,850	-80
Manuring, fert application	4,275	4,275	-	-	-	4,275	4,275	4,275	-
Weeding	35,625	7,125	-28,500	-28,500	-28,500	35,625	35,625	7,125	-80
PP application	2,850	2,850	-	-	-	2,850	2,850	2,850	-
Interculture	35,625	-	-28,500	-35,625	-35,625	35,625	35,625	-	-
Transportation	5,700	5,700	-	-	-	5,700	5,700	5,700	-
Harvesting	52,725	7,125	-45,600	-45,600	-45,600	52,725	52,725	7,125	-86
Sub-Total Hired Labor	155,325	34,200	-114,000	-121,125	-121,125	155,325	155,325	34,200	-78
Sub-total Investment Costs	175,754	150,406	-18,223	-25,348	-25,348	175,754	175,754	150,406	-14
Operating									
Purchased Inputs									
Paddy seed	65,170	55,860	-9,310	-9,310	-9,310	65,170	65,170	55,860	-14
Maize seed	45,600	45,600	-	-	-	45,600	45,600	45,600	-
PP chemicals	6,650	6,650	-	-	-	6,650	6,650	6,650	-
Urea	21,090	21,090	-	-	-	21,090	21,090	21,090	-
SSP	34,656	34,656	-	-	-	34,656	34,656	34,656	-
MOP	19,950	19,950	-	-	-	19,950	19,950	19,950	-
Tractor ploughing	-	18,240	18,240	18,240	18,240	-	-	18,240	-
Tractor, seed drill	-	12,160	12,160	12,160	12,160	-	-	12,160	-
Thresher by tractor	-	9,120	9,120	9,120	9,120	-	-	9,120	-
Sprayer	-	1,140	1,140	1,140	1,140	-	-	1,140	-
Harvester	-	32,300	32,300	32,300	32,300	-	-	32,300	-
Transport trolley	-	15,200	15,200	15,200	15,200	-	-	15,200	-
Direct paddy seeder	-	3,040	3,040	3,040	3,040	-	-	3,040	-
Cono weeder	-	30,400	30,400	30,400	30,400	-	-	30,400	-
Sub-Total Purchased Inputs	193,116	305,406	112,290	112,290	112,290	193,116	193,116	305,406	58
Labor									
Sub-Total Hired Labor	1,353,750	589,950	-763,800	-763,800	-763,800	1,353,750	1,353,750	589,950	-56
Sub-total Operating Costs	1,546,866	895,356	-651,510	-651,510	-651,510	1,546,866	1,546,866	895,356	-42
Sub-Total Production Cost	1,722,620	1,045,762	-669,733	-676,858	-676,858	1,722,620	1,722,620	1,045,762	-39
OUTFLOWS	1,722,620	1,045,762	-669,733	-676,858	-676,858	1,722,620	1,722,620	1,045,762	-39
Cash Flow Before Financing	-628,030	191,119	812,024	819,149	819,149	-628,030	-628,030	191,119	130

IRR = None, NPV = 6,646,394.66

Annex-3.4: Jharkhand VO: Technology Demonstrations (117 ha/VO)

Jharkhand MFU crop

FINANCIAL BUDGET (DETAILED) (In INR)	WOP	WP				Present	Future Without	Future With	Percentage Change
	20	20	1	2	20	1	20	20	%
Main Production									
Rice	1,040,400	1,196,460	156,060	156,060	156,060	1,040,400	1,040,400	1,196,460	15
Pulses	87,750	97,110	9,360	9,360	9,360	87,750	87,750	97,110	11
Maize	169,540	187,180	17,640	17,640	17,640	169,540	169,540	187,180	10
Maize fodder	30,625	35,000	4,375	4,375	4,375	30,625	30,625	35,000	14
Wheat	277,200	318,780	41,580	41,580	41,580	277,200	277,200	318,780	15
Byproduct	153,000	175,950	22,950	22,950	22,950	153,000	153,000	175,950	15
Sub-total Main Production	1,758,515	2,010,480	251,965	251,965	251,965	1,758,515	1,758,515	2,010,480	14
Production Cost									
Investment									
Purchased Inputs									
Pulses seed	2,808	2,808	-	-	-	2,808	2,808	2,808	-
DAP	899	899	-	-	-	899	899	899	-
PP chemicals	1,170	1,170	-	-	-	1,170	1,170	1,170	-
Tractor, seed drill	-	1,872	1,872	1,872	1,872	-	-	1,872	-
Cono weeder	-	4,680	4,680	4,680	4,680	-	-	4,680	-
Sub-Total Purchased Inputs	4,877	11,429	6,552	6,552	6,552	4,877	4,877	11,429	134
Labor									
Land Preparation	14,625	14,625	-	-	-	14,625	14,625	14,625	-
Planting	5,850	5,850	-	-	-	5,850	5,850	5,850	-
Manuring, fert application	1,755	1,755	-	-	-	1,755	1,755	1,755	-
Weeding	14,625	2,925	-11,700	-11,700	-11,700	14,625	14,625	2,925	-80
PP application	1,170	1,170	-	-	-	1,170	1,170	1,170	-
Interculture	14,625	-	-14,625	-14,625	-14,625	14,625	14,625	-	-
Transportation	1,755	2,340	585	585	585	1,755	1,755	2,340	33
Harvesting	20,475	20,475	-	-	-	20,475	20,475	20,475	-
Sub-Total Hired Labor	74,880	49,140	-25,740	-25,740	-25,740	74,880	74,880	49,140	-34
Sub-total Investment Costs	79,757	60,569	-19,188	-19,188	-19,188	79,757	79,757	60,569	-24
Operating									
Purchased Inputs									
Paddy seed	149,940	112,455	-37,485	-37,485	-37,485	149,940	149,940	112,455	-25
Maize seed	42,000	42,000	-	-	-	42,000	42,000	42,000	-
wheat seed	5,250	3,500	-1,750	-1,750	-1,750	5,250	5,250	3,500	-33
N Fertiliser	13,300	13,300	-	-	-	13,300	13,300	13,300	-
P Fertiliser	5,600	5,600	-	-	-	5,600	5,600	5,600	-
K Fertiliser	6,860	6,860	-	-	-	6,860	6,860	6,860	-
PP chemicals	21,425	21,425	-	-	-	21,425	21,425	21,425	-
Urea	53,775	53,775	-	-	-	53,775	53,775	53,775	-
SSP	88,560	88,560	-	-	-	88,560	88,560	88,560	-
MOP	36,075	36,075	-	-	-	36,075	36,075	36,075	-
Tractor ploughing	-	90,240	90,240	90,240	90,240	-	-	90,240	-
Tractor, seed drill	-	28,000	28,000	28,000	28,000	-	-	28,000	-
Thresher by tractor	-	16,800	16,800	16,800	16,800	-	-	16,800	-
Sprayer	-	4,590	4,590	4,590	4,590	-	-	4,590	-
Harvester	-	159,800	159,800	159,800	159,800	-	-	159,800	-
Transport trolley	-	61,200	61,200	61,200	61,200	-	-	61,200	-
Direct paddy seeder	-	12,240	12,240	12,240	12,240	-	-	12,240	-
Cono weeder	-	89,200	89,200	89,200	89,200	-	-	89,200	-
Sub-Total Purchased Inputs	422,785	845,620	422,835	422,835	422,835	422,785	422,785	845,620	100
Labor									
Site clearance	24,500	24,500	-	-	-	24,500	24,500	24,500	-
Land Preparation	450,750	28,000	-422,750	-422,750	-422,750	450,750	450,750	28,000	-94
Planting	384,700	-	-384,700	-384,700	-384,700	384,700	384,700	-	-
Line sowing	43,750	3,500	-40,250	-40,250	-40,250	43,750	43,750	3,500	-92
Transplanting	367,200	-	-367,200	-367,200	-367,200	367,200	367,200	-	-
Manuring, fert application	122,400	122,400	-	-	-	122,400	122,400	122,400	-
Weeding	17,500	-	-17,500	-17,500	-17,500	17,500	17,500	-	-
PP application	8,750	8,750	-	-	-	8,750	8,750	8,750	-
Interculture	461,250	170,500	-290,750	-290,750	-290,750	461,250	461,250	170,500	-63
Transportation	75,000	76,750	1,750	1,750	1,750	75,000	75,000	76,750	2
Harvesting	395,750	47,000	-348,750	-348,750	-348,750	395,750	395,750	47,000	-88
Watch and ward	179,250	179,250	-	-	-	179,250	179,250	179,250	-
Sub-Total Hired Labor	2,530,800	660,650	-1,870,150	-1,870,150	-1,870,150	2,530,800	2,530,800	660,650	-74
Sub-total Operating Costs	2,953,585	1,506,270	-1,447,315	-1,447,315	-1,447,315	2,953,585	2,953,585	1,506,270	-49
Sub-Total Production Cost	3,033,342	1,566,839	-1,466,503	-1,466,503	-1,466,503	3,033,342	3,033,342	1,566,839	-48
OUTFLOWS	3,033,342	1,566,839	-1,466,503	-1,466,503	-1,466,503	3,033,342	3,033,342	1,566,839	-48
Cash Flow Before Financing	-1,274,827	443,641	1,718,468	1,718,468	1,718,468	-1,274,827	-1,274,827	443,641	135

IRR = None, NPV = 13,993,349.90

Annex-3.5: Nagaland VO: Technology Demonstrations (100 ha/VO)

Nagaland MFU crop

FINANCIAL BUDGET (DETAILED) (In INR)	WOP	WP				Present	Future Without	Future With	Percentage Change
	20	20	1	2	3	1	20	20	%
Main Production									
Paddy, main season	630,000	700,000	70,000	70,000	70,000	630,000	630,000	700,000	11
Byproduct	90,000	100,000	10,000	10,000	10,000	90,000	90,000	100,000	11
Maize, shelled	403,200	441,000	37,800	37,800	37,800	403,200	403,200	441,000	9
Maize fodder	72,000	78,750	6,750	6,750	6,750	72,000	72,000	78,750	9
Mustard	126,000	144,000	9,000	18,000	18,000	126,000	126,000	144,000	14
Turmeric	900,000	960,000	60,000	60,000	60,000	900,000	900,000	960,000	7
Sub-total Main Production	2,221,200	2,423,750	193,550	202,550	202,550	2,221,200	2,221,200	2,423,750	9
Production Cost									
Investment									
Purchased Inputs									
Turmeric planting materials	600,000	600,000	-	-	-	600,000	600,000	600,000	-
DAP	3,840	3,840	-	-	-	3,840	3,840	3,840	-
PP chemicals	8,000	8,000	-	-	-	8,000	8,000	8,000	-
Urea	2,400	2,400	-	-	-	2,400	2,400	2,400	-
MOP	4,800	4,800	-	-	-	4,800	4,800	4,800	-
Tractor ploughing	-	19,200	19,200	19,200	19,200	-	-	19,200	-
Sprayer	-	1,200	1,200	1,200	1,200	-	-	1,200	-
Power weeder	-	16,000	16,000	16,000	16,000	-	-	16,000	-
Sub-Total Purchased Inputs	619,040	655,440	36,400	36,400	36,400	619,040	619,040	655,440	6
Labor									
Site clearance	150,000	-	-100,000	-150,000	-150,000	150,000	150,000	-	-
Land Preparation	160,000	-	-150,000	-160,000	-160,000	160,000	160,000	-	-
Sub-Total Hired Labor	310,000	-	-250,000	-310,000	-310,000	310,000	310,000	-	-
Sub-total Investment Costs	929,040	655,440	-213,600	-273,600	-273,600	929,040	929,040	655,440	-29
Operating									
Purchased Inputs									
Paddy seed	47,040	39,200	-7,840	-7,840	-7,840	47,040	47,040	39,200	-17
Maize seed	43,200	43,200	-	-	-	43,200	43,200	43,200	-
Mustardd seed	2,400	2,400	-	-	-	2,400	2,400	2,400	-
PP chemicals	13,500	15,750	2,250	2,250	2,250	13,500	13,500	15,750	17
Urea	76,440	75,930	-510	-510	-510	76,440	76,440	75,930	-1
SSP	121,992	120,120	-1,872	-1,872	-1,872	121,992	121,992	120,120	-2
MOP	80,850	82,350	1,500	1,500	1,500	80,850	80,850	82,350	2
Tractor ploughing	-	4,800	4,800	4,800	4,800	-	-	4,800	-
Tractor, seed drill	-	32,000	32,000	32,000	32,000	-	-	32,000	-
Thresher by tractor	-	21,600	21,600	21,600	21,600	-	-	21,600	-
Transport trolley	-	32,000	32,000	32,000	32,000	-	-	32,000	-
Direct paddy seeder	-	6,400	6,400	6,400	6,400	-	-	6,400	-
Cono weeder	-	68,000	68,000	68,000	68,000	-	-	68,000	-
Sub-Total Purchased Inputs	385,422	543,750	158,328	158,328	158,328	385,422	385,422	543,750	41
Labor									
Site clearance	70,000	66,500	-3,500	-3,500	-3,500	70,000	70,000	66,500	-5
Land Preparation	271,500	143,000	-128,500	-128,500	-128,500	271,500	271,500	143,000	-47
Planting	287,500	40,000	-247,500	-247,500	-247,500	287,500	287,500	40,000	-86
Manuring, fert application	30,000	30,000	-	-	-	30,000	30,000	30,000	-
Fencing	99,000	99,000	-	-	-	99,000	99,000	99,000	-
Weeding	55,000	10,000	-45,000	-45,000	-45,000	55,000	55,000	10,000	-82
spraying	22,000	-	-22,000	-22,000	-22,000	22,000	22,000	-	-
Interculture	150,000	150,000	-	-	-	150,000	150,000	150,000	-
Transportation	215,500	147,500	-68,000	-68,000	-68,000	215,500	215,500	147,500	-32
Harvesting	272,500	182,500	-90,000	-90,000	-90,000	272,500	272,500	182,500	-33
Watch and ward	222,500	222,500	-	-	-	222,500	222,500	222,500	-
Sub-Total Hired Labor	1,695,500	1,091,000	-604,500	-604,500	-604,500	1,695,500	1,695,500	1,091,000	-36
Sub-total Operating Costs	2,080,922	1,634,750	-446,172	-446,172	-446,172	2,080,922	2,080,922	1,634,750	-21
Sub-Total Production Cost	3,009,962	2,290,190	-659,772	-719,772	-719,772	3,009,962	3,009,962	2,290,190	-24
OUTFLOWS	3,009,962	2,290,190	-659,772	-719,772	-719,772	3,009,962	3,009,962	2,290,190	-24
Cash Flow Before Financing	-788,762	133,560	853,322	922,322	922,322	-788,762	-788,762	133,560	117

IRR = None, NPV = 7,395,662.18

Annex-3.6: CFC (Post-harvest Processing units) (combination of 5 indicative units)

SCATE Redesign
Common facility centre activity
FINANCIAL BUDGET (DETAILED)
(In INR) /a

	1	2	3	4	5	19	20
Main Production							
Annual revenue	-	109,200	182,000	273,000	364,000	364,000	364,000
Production Cost							
Investment	510,000	-	-	-	-	-	-
Annual rent	35,000	35,000	35,000	35,000	35,000	35,000	35,000
Electricity charges	6,270	10,450	15,675	20,900	20,900	20,900	20,900
Labour charges	33,750	56,250	84,375	112,500	112,500	112,500	112,500
Other expenses	4,500	7,500	11,250	15,000	15,000	15,000	15,000
Sub-Total Production Cost	589,520	109,200	146,300	183,400	183,400	183,400	183,400
OUTFLOWS	589,520	109,200	146,300	183,400	183,400	183,400	183,400
Cash Flow Before Financing	-589,520	-	35,700	89,600	180,600	180,600	180,600

IRR = 19.5%, NPV = 356,432.06
\a for processing

Annex-3.7: Support to existing Custom hiring centre (1 unit with average of 100 customers)

India
SCATE Redesign
Support to Custom hiring centre activity

FINANCIAL BUDGET (DETAILED) (In INR)	**WOP**	**WP**					**Present**	**Future Without**	**Future With**	**Percentage Change**
	20	**20**	**1**	**2**	**3**	**20**	**1**	**17**	**17**	**%**
Main Production										
CHC	750,000	1,074,000	8,000	198,000	324,000	324,000	750,000	750,000	1,074,000	43
Production Cost										
Replacement	-	-	-	-	-	-	-	-	-	-
Operating costs	422,000	422,000	-	-	-	-	422,000	422,000	422,000	-
Insurance	35,000	35,675	675	675	675	675	35,000	35,000	35,675	2
Repairs and maintenance	178,000	178,375	375	375	375	375	178,000	178,000	178,375	-
Interest on loan capital	187,000	187,297	297	297	297	297	187,000	187,000	187,297	-
Interest on WC loan	18,990	18,990	-	-	-	-	18,990	18,990	18,990	-
Sub-Total Production Cost	840,990	842,337	1,347	1,347	1,347	1,347	840,990	840,990	842,337	-
OUTFLOWS	840,990	842,337	1,347	1,347	1,347	1,347	840,990	840,990	842,337	-
Cash Flow Before Financing	-90,990	231,663	6,653	196,653	322,653	322,653	-90,990	-90,990	231,663	355

IRR = None, NPV = 2,027,449.11

Annex-4.8 Agricultural implements banks

India
SCATE Redesign
Agricultural implements activi
FINANCIAL BUDGET (DET
(In INR)

	1	2	3	4	5	19	20
Main Production							
Annual revenue	-	103,200	172,000	258,000	344,000	344,000	344,000
Production Cost							
Investment	650,800	-	-	-	-	-	-
Annual rent	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Electricity charges	900	1,500	2,250	3,000	3,000	3,000	3,000
Labour charges	3,360	5,600	8,400	11,200	11,200	11,200	11,200
Other expenses	20,049	33,415	50,123	66,830	66,830	66,830	66,830
Sub-Total Production Cos	687,109	52,515	72,773	93,030	93,030	93,030	93,030
OUTFLOWS	687,109	52,515	72,773	93,030	93,030	93,030	93,030
Cash Flow Before Financi	-687,109	50,685	99,228	164,970	250,970	250,970	250,970

IRR = 25.0%, NPV = 714,707.89

Annex-4,9 Support to individual farmers

India
SCATE Redesign
Individual farmers crop

FINANCIAL BUDGET (DETAILED) (In INR)	WOP	WP						Future	Future	ercentag
							Present	Without	With	Change
	20	20	1	2	3	20	1	20	20	%
Main Production										
Paddy, main season	8,120	9,425	1,305	1,305	1,305	1,305	8,120	8,120	9,425	16
Byproduct	1,375	1,500	125	125	125	125	1,375	1,375	1,500	9
Paddy, main season	7,565	8,704	1,139	1,139	1,139	1,139	7,565	7,565	8,704	15
Byproduct	1,250	1,250	-	-	-	-	1,250	1,250	1,250	-
Pulses	3,600	4,140	540	540	540	540	3,600	3,600	4,140	15
Maize	4,844	5,348	504	504	504	504	4,844	4,844	5,348	10
Maize fodder	875	1,000	125	125	125	125	875	875	1,000	14
Maize, shelled	4,480	4,900	420	420	420	420	4,480	4,480	4,900	9
Maize fodder	800	875	75	75	75	75	800	800	875	9
Sub-total Main Production	32,909	37,142	4,233	4,233	4,233	4,233	32,909	32,909	37,142	13
Production Cost										
Investment										
Purchased Inputs										
Pulses seed	240	240	-	-	-	-	240	240	240	-
DAP	77	77	-	-	-	-	77	77	77	-
PP chemicals	100	100	-	-	-	-	100	100	100	-
Tractor ploughing	-	480	480	480	480	480	-	-	480	-
Tractor, seed drill	-	160	160	160	160	160	-	-	160	-
Cono weeder	-	400	400	400	400	400	-	-	400	-
Self propelled reaper	-	400	400	400	400	400	-	-	400	-
Sub-Total Purchased Inputs	417	1,857	1,440	1,440	1,440	1,440	417	417	1,857	345
Labor										
Land Preparation	150	150	-	-	-	-	150	150	150	-
Planting	500	100	-400	-400	-400	-400	500	500	100	-80
Manuring, fert application	150	150	-	-	-	-	150	150	150	-
Weeding	1,250	250	-1,000	-1,000	-1,000	-1,000	1,250	1,250	250	-80
PP application	100	100	-	-	-	-	100	100	100	-
Interculture	1,250	-	-1,000	-1,250	-1,250	-1,250	1,250	1,250	-	-
Transportation	200	200	-	-	-	-	200	200	200	-
Harvesting	1,850	250	-1,600	-1,600	-1,600	-1,600	1,850	1,850	250	-86
Sub-Total Hired Labor	5,450	1,200	-4,000	-4,250	-4,250	-4,250	5,450	5,450	1,200	-78
Sub-total Investment Costs	5,867	3,057	-2,560	-2,810	-2,810	-2,810	5,867	5,867	3,057	-48
Operating										
Purchased Inputs										
Paddy seed	2,401	1,960	-441	-441	-441	-441	2,401	2,401	1,960	-18
Maize seed	1,680	1,680	-	-	-	-	1,680	1,680	1,680	-
PP chemicals	325	350	25	25	25	25	325	325	350	8
Urea	1,350	1,350	-	-	-	-	1,350	1,350	1,350	-
SSP	2,280	2,280	-	-	-	-	2,280	2,280	2,280	-
MOP	1,440	1,440	-	-	-	-	1,440	1,440	1,440	-
Tractor ploughing	-	480	480	480	480	480	-	-	480	-
Tractor, seed drill	-	640	640	640	640	640	-	-	640	-
Thresher by tractor	-	480	480	480	480	480	-	-	480	-
Sprayer	-	30	30	30	30	30	-	-	30	-
Harvester	-	850	850	850	850	850	-	-	850	-
Transport trolley	-	800	800	800	800	800	-	-	800	-
Direct paddy seeder	-	160	160	160	160	160	-	-	160	-
Cono weeder	-	1,600	1,600	1,600	1,600	1,600	-	-	1,600	-
Self propelled reaper	-	400	400	400	400	400	-	-	400	-
Sub-Total Purchased Inputs	9,476	14,500	5,024	5,024	5,024	5,024	9,476	9,476	14,500	53
Labor										
Sub-Total Labor	32,200	15,150	-17,050	-17,050	-17,050	-17,050	32,200	32,200	15,150	-53
Sub-total Operating Costs	41,676	29,650	-12,026	-12,026	-12,026	-12,026	41,676	41,676	29,650	-29
Sub-Total Production Cost	47,543	32,707	-14,586	-14,836	-14,836	-14,836	47,543	47,543	32,707	-31
OUTFLOWS	47,543	32,707	-14,586	-14,836	-14,836	-14,836	47,543	47,543	32,707	-31
Cash Flow Before Financing	-14,634	4,435	18,819	19,069	19,069	19,069	-14,634	-14,634	4,435	130

IRR = None, NPV = 153,920.03

Individual farmers crop

SUMMARY FINANCIAL EFFICIENCY MEASURES

(In INR)	Appraisal Value	Switching Value	Percent Change
Switching values before financing at 12%			
Incremental inflows	31,618	-110,593	-450
Incremental outflows			
Investment costs	-20,766	-	-
Operating costs	-89,828	52,384	-
Total outflows	-110,593	31,618	-
Net Present Value = 142,211.61			
Internal rate of return = None			
Benefits cost ratio = -0.29			

3.8Financial efficiency measures of Assam, Chhattisgarh, Odisha and Jharkhand VO models

Assam MFU crop
SUMMARY FINANCIAL EFFICIENCY MEASU

(In INR)	Appraisal Value	Switching Value	Percent Change
Switching values before financing at 12%			
Incremental inflows	2,160,642	-5,807,581	-369
Incremental outflows			
Investment costs	-317,356	-	-
Operating costs	-5,490,225	2,477,997	-
Total outflows	-5,807,581	2,160,642	-
Net Present Value = 7,968,222.83			
Internal rate of return = None			
Benefits cost ratio = -0.37			

Chhattisgarh MFU crop
SUMMARY FINANCIAL EFFICIENCY MEASU

(In INR)	Appraisal Value	Switching Value	Percent Change
Switching values before financing at 12%			
Incremental inflows	2,477,704	-6,404,252	-358
Incremental outflows			
Investment costs	-239,022	-	-
Operating costs	-6,165,229	2,716,726	-
Total outflows	-6,404,252	2,477,704	-
Net Present Value = 8,881,955.75			
Internal rate of return = None			
Benefits cost ratio = -0.39			

Odisha MFU crop
SUMMARY FINANCIAL EFFICIENCY MEASU

(In INR)	Appraisal Value	Switching Value	Percent Change
Switching values before financing at 12%			
Incremental inflows	1,062,835	-5,049,390	-575
Incremental outflows			
Investment costs	-182,973	-	-
Operating costs	-4,866,417	1,245,808	-
Total outflows	-5,049,390	1,062,835	-
Net Present Value = 6,112,224.92			
Internal rate of return = None			
Benefits cost ratio = -0.21			

India
SCATE Redesign
Jharkhand MFU crop
SUMMARY FINANCIAL EFFICIENCY MEASU

(In INR)	Appraisal Value	Switching Value	Percent Change
Switching values before financing at 12%			
Incremental inflows	1,882,038	-10,953,961	-682
Incremental outflows			
Investment costs	-143,324	-	-
Operating costs	-10,810,638	2,025,362	-
Total outflows	-10,953,961	1,882,038	-
Net Present Value = 12,835,999.85			
Internal rate of return = None			
Benefits cost ratio = -0.17			

3.9 Financial efficiency measures of Nagaland VO, Processing unit and CHC unit models

Nagaland MFU crop
SUMMARY FINANCIAL EFFICIENCY MEASU

(In INR)	Appraisal Value	Switching Value	Percent Change
Switching values before financing at 12%			
Incremental inflows	1,504,900	-5,322,725	-454
Incremental outflows			
Investment costs	-1,990,068	-	-
Operating costs	-3,332,657	3,494,968	-
Total outflows	-5,322,725	1,504,900	-
Net Present Value = 6,827,625.04			
Internal rate of return = None			
Benefits cost ratio = -0.28			

Common facility centre activity
SUMMARY FINANCIAL EFFICIENCY MEASU

(In INR) /a	Appraisal Value	Switching Value	Percent Change
Switching values before financing at 12%			
Incremental inflows	2,003,376	1,646,944	-18
Incremental outflows			
Investment costs	1,646,944	2,003,376	22
Operating costs	-	356,432	-
Total outflows	1,646,944	2,003,376	22
Net Present Value = 2,003,376.33			
Internal rate of return = None			
Benefits cost ratio = 0.00			

Agricultural implements activity
SUMMARY FINANCIAL EFFICIENCY MEASU

(In INR)	Appraisal Value	Switching Value	Percent Change
Switching values before financing at 12%			
Incremental inflows	1,893,301	1,178,593	-38
Incremental outflows			
Investment costs	1,178,593	1,893,301	61
Operating costs	-	714,708	-
Total outflows	1,178,593	1,893,301	61
Net Present Value = 1,893,300.71			
Internal rate of return = None			
Benefits cost ratio = 0.00			

Support to Custom hiring centre activity
SUMMARY FINANCIAL EFFICIENCY MEASU

(In INR)	Appraisal Value	Switching Value	Percent Change
Switching values before financing at 12%			
Incremental inflows	2,037,510	10,061	-100
Incremental outflows			
Investment costs	10,061	2,037,510	20,151
Operating costs	-	2,027,449	-
Total outflows	10,061	2,037,510	20,151
Net Present Value = 2,037,510.45			
Internal rate of return = None			
Benefits cost ratio = 0.00			

4.2 Cash-flow model of a Banana rope-making unit, ICAR technology[21]

BANANA ROPE MAKING UNIT MANAGED BY VO OR SHG

(Amount INR per CHC)

	Details	Unit	units/year	Unit cost	Year 1	2	3	4	5	6	7	8	9	10	11	20	
1	Revenue				0	60%	80%	100%									
	Production of banana rope	year	1	1,440,000	0	864,000	1,152,000	1,440,000	1,440,000	1,440,000	1,440,000	1,440,000	1,440,000	1,440,000	1,440,000	1,440,000	
	Post-processin losses				0	-86,400	-115,200	-144,000	-144,000	-144,000	-144,000	-144,000	-144,000	-144,000	-144,000	-144,000	
					0	0	0	0	0	0	0	0	0	0	0	0	
	Total income				0	777,600	1,036,800	1,296,000	1,296,000	1,296,000	1,296,000	1,296,000	1,296,000	1,296,000	1,296,000	1,296,000	9,232,226.21
2	Investment costs																
	Work shed	sq ft	500	70	35,000												
	Power connection	LS	1	50,000	50,000												
	Work tables & with desktop	set			0												
	Sub-total building & power				85,000												
	Mechinery and implements																
	Mechinery and implements	unit	1	130,000	130,000												
	Intallation costs	LS	1	13,000	13,000												
	Transportation to site	LS	1	2,600	2,600												
	Total mechinery and implements				145,600												
	Replacement a/	set	1	145,600											145,600		
	Insurance at 2% of mechnery costs	year	1	2,912									0	0	0	0	
	Total investment costs				230,600	0	0	0	0	0	0	0	0	0	0	0	
Opearing costs																	
	Raw material purchase	LS	year	432,000	0	259,200	345,600	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	
	Electricity charges	LS	year	17,280	0												
	Fuel	LS	year														
	Miscellaneous costs																
	Tools and equipment	LS	year	7,500		7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	
	Transportation to markets	LS	year	6,800		6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	
	Insurance at 2% of mechnery costs	year	1	2,912	2,912	2,912	2,912	2,912	2,912	2,912	2,912	2,912	2,912	2,912	2,912	2,912	
	O&M of machinery at 10%	LS	year	13,000		13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	
	Sub-total operating costs				2,912	289,412	375,812	462,212	462,212	462,212	462,212	462,212	462,212	462,212	462,212	462,212	
Labour costs																	
	On-machine labour	LS	year	542,000	0	325,200	433,600	542,000	542,000	542,000	542,000	542,000	542,000	542,000	542,000	542,000	
	Off-machine labour	LS	year	0	0												
	Sub-total labour			0	0	325,200	433,600	542,000	542,000	542,000	542,000	542,000	542,000	542,000	542,000	542,000	
	Total production costs				233,512	614,612	809,412	1,004,212	1,004,212	1,004,212	1,004,212	1,004,212	1,004,212	1,004,212	1,004,212	1,004,212	
9	Interest on loans																
	Term loan at 14% interest		annual	91,000	0	12,740	12,740	12,740	12,740	12,740	12,740	12,740	12,740	12,740	12,740	12,740	
	Working capital at 14% interest		annual		0	0	0	0	0	0	0	0	0	0	0	0	
	Total interst payable		annual		0	12,740	12,740	12,740	12,740	12,740	12,740	12,740	12,740	12,740	12,740	12,740	
10	Total production costs		annual		233,512	627,352	822,152	1,016,952	1,016,952	1,016,952	1,016,952	1,016,952	1,016,952	1,016,952	1,016,952	1,016,952	7,477,327.88
	Net income		annual		*-233,512*	*150,248*	*214,648*	*279,048*	*279,048*	*279,048*	*279,048*	*279,048*	*279,048*	*279,048*	*279,048*	*279,048*	1,754,898.34

FIRR	87%
BCR at 10% DF	1.23
NPV at 10% DF	1,754,898

a/ machinery life assumed at 10 year

[21]Source: Screening and Cost-benefits Analysis of Agricultural Machineries in Rural India, IFAD, Enrico Mazzoli, Economist, IFAD, Rome

4.3 Cash-flow model of a Turmeric processing unit, ICAR technology[22]

TURMERIC PROCESSING MANAGED BY VO OR SHG																	
(Amount INR per CHC)				Year													
Details	Unit	units/year	Unit cost	1	2	3	4	5	6	7	8	9	10	11	20		
1 Revenue				0	60%	80%	100%										
Production of turmeric powder	annual		29,700,000	0	17,820,000	23,760,000	29,700,000	29,700,000	29,700,000	29,700,000	29,700,000	29,700,000	29,700,000	29,700,000	29,700,000		
Post-processin losses	annual		2,970,000	0	-1,782,000	-2,376,000	-2,970,000	-2,970,000	-2,970,000	-2,970,000	-2,970,000	-2,970,000	-2,970,000	-2,970,000	-2,970,000		
				0	0	0	0	0	0	0	0	0	0	0	0		
				0	0	0	0	0	0	0	0	0	0	0	0		
Total income				0	16,038,000	21,384,000	26,730,000	26,730,000	26,730,000	26,730,000	26,730,000	26,730,000	26,730,000	26,730,000	26,730,000	190,414,665.67	
2 Investment costs																	
Work shed	sq ft	500	70	35,000													
Power connection	LS	1	50,000	50,000													
Work tables & with desktop	set			0													
Sub-total building & power				85,000													
Mechinery and implements																	
Mechinery and implements	unit	1	725,000	725,000													
Intallation costs	LS	1	72,500	72,500													
Transportation to site	LS		14,500	14,500													
Total mechinery and implements				812,000													
Replacement a/	set	1	725,000											725,000			
Total investment costs				897,000													
Opearing costs																	
Raw material purchase	LS	year	23,310,000	0	13,986,000	18,648,000	23,310,000	23,310,000	23,310,000	23,310,000	23,310,000	23,310,000	23,310,000	23,310,000	23,310,000		
Electricity charges	LS	year	32,270	0	19,362	25,816	32,270	32,270	32,270	32,270	32,270	32,270	32,270	32,270	32,270		
Fuel	LS	year															
Insurance at 2% of mechnery costs	year	1	16,240	16,240	16,240	16,240	16,240	16,240	16,240	16,240	16,240	16,240	16,240	16,240	16,240		
Miscellaneous costs																	
Tools and equipment	LS	year	137,000		137,000	137,000	137,000	137,000	137,000	137,000	137,000	137,000	137,000	137,000	137,000		
Output packages	LS	year	243,000		243,000	243,000	243,000	243,000	243,000	243,000	243,000	243,000	243,000	243,000	243,000		
Transportation to markets	LS	year	145,000		145,000	145,000	145,000	145,000	145,000	145,000	145,000	145,000	145,000	145,000	145,000		
O&M of machinery at 10%	LS	year	36,250		36,250	36,250	36,250	36,250	36,250	36,250	36,250	36,250	36,250	36,250	36,250		
Sub-total operating costs				16,240	14,582,852	19,251,306	23,919,760	23,919,760	23,919,760	23,919,760	23,919,760	23,919,760	23,919,760	23,919,760	23,919,760		
Labour costs																	
On-machine labour	LS	year	234,000	0	140,400	187,200	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000		
Off-machine labour	LS	year	234,000	0	140,400	187,200	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000	234,000		
Sub-total labour			0	0	280,800	374,400	468,000	468,000	468,000	468,000	468,000	468,000	468,000	468,000	468,000		
Total production costs				913,240	14,863,652	19,625,706	24,387,760	24,387,760	24,387,760	24,387,760	24,387,760	24,387,760	24,387,760	24,387,760	24,387,760		
9 Interest on loans																	
Term loan at 14% interest		annual	507,500	0	71,050	71,050	71,050	71,050	71,050	71,050	71,050	71,050	71,050	71,050	71,050		
Working capital at 14% interest		annual	3,496,500	0	489,510	489,510	489,510	489,510	489,510	489,510	489,510	489,510	489,510	489,510	489,510		
Total interst payable		annual		0	560,560	560,560	560,560	560,560	560,560	560,560	560,560	560,560	560,560	560,560	560,560		
10 Total production costs		annual		913,240	15,424,212	20,186,266	24,948,320	24,948,320	24,948,320	24,948,320	24,948,320	24,948,320	24,948,320	24,948,320	24,948,320	179,100,074.00	
Net income		annual		*-913,240*	*613,788*	*1,197,734*	*1,781,680*	*1,781,680*	*1,781,680*	*1,781,680*	*1,781,680*	*1,781,680*	*1,781,680*	*1,781,680*	*1,781,680*	11,314,591.66	
FIRR				112%													
BCR at 10% DF				1.06													
NPV at 10% DF				11,314,592													
a/ machinery life assumed at 10 year																	

[22]Source: Screening and Cost-benefits Analysis of Agricultural Machineries in Rural India, IFAD, Enrico Mazzoli, Economist, IFAD, Rome

4.4 Cash-flow model of a Mini-dal mill unit, ICAR technology[23]

	MINI DAL MILL MANAGED BY VO-SHG															
	(Amount INR per CHC)				Year											
	Details	Unit	units/year	Unit cost	1	2	3	4	5	6	7	8	9	10	11	20	
1	Revenue				0	60%	80%	100%									
	Production of processed DAL pulses			4,536,000	0	2,721,600	3,628,800	4,536,000	4,536,000	4,536,000	4,536,000	4,536,000	4,536,000	4,536,000	4,536,000	4,536,000	
	Post-processin losses			453,600	0	-272,160	-362,880	-453,600	-453,600	-453,600	-453,600	-453,600	-453,600	-453,600	-453,600	-453,600	
	Total income				0	2,449,440	3,265,920	4,082,400	4,082,400	4,082,400	4,082,400	4,082,400	4,082,400	4,082,400	4,082,400	4,082,400	29,081,512.57
2	Investment costs																
	Work shed	sq ft	500	70	35,000												
	Power connection	LS	1	50,000	50,000												
	Work tables & with desktop	set			0												
	Sub-total building & power				85,000												
	Mechinery and implements																
	Mechinery and implements	unit	1	75,000	75,000												
	Intallation costs	LS	1	7,500	7,500												
	Transportation to site	LS		1,500	1,500												
	Total mechinery and implements				84,000												
	Replacement *a/*	set	1	75,000											75,000		
	Total investment costs				169,000	0	0	0	0	0	0	0	0	0	0	0	
Opearing costs																	
	Raw material purchase	LS	year	3,120,000	0	1,872,000	2,496,000	3,120,000	3,120,000	3,120,000	3,120,000	3,120,000	3,120,000	3,120,000	3,120,000	3,120,000	
	Electricity charges	LS	year	11,520	0	6,912	9,216	11,520	11,520	11,520	11,520	11,520	11,520	11,520	11,520	11,520	
	Fuel	LS	year														
	Insurance at 2% of mechnery costs	year	1	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	
	Miscellaneous costs																
	Tools and equipment	LS	year	37,580		37,580	37,580	37,580	37,580	37,580	37,580	37,580	37,580	37,580	37,580	37,580	
	Output packages	LS	year	42,300		42,300	42,300	42,300	42,300	42,300	42,300	42,300	42,300	42,300	42,300	42,300	
	Transportation to markets	LS	year	5,600		5,600	5,600	5,600	5,600	5,600	5,600	5,600	5,600	5,600	5,600	5,600	
	O&M of machinery at 10%	LS	year	3,750		3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	
	Sub-total operating costs				1,680	1,969,822	2,596,126	3,222,430	3,222,430	3,222,430	3,222,430	3,222,430	3,222,430	3,222,430	3,222,430	3,222,430	
Labour costs																	
	On-machine labour	LS	year	120,000	0	72,000	96,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	
	Off-machine labour	LS	year	120,000	0	72,000	96,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	
	Sub-total labour			0	0	144,000	192,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	
	Total production costs				170,680	2,113,822	2,788,126	3,462,430	3,462,430	3,462,430	3,462,430	3,462,430	3,462,430	3,462,430	3,462,430	3,462,430	
9	Interest on loans																
	Term loan at 14% interest		annual	52,500	0	7,350	7,350	7,350	7,350	7,350	7,350	7,350	7,350	7,350	7,350	7,350	
	Working capital at 14% interest		annual	468,000	0	65,520	65,520	65,520	65,520	65,520	65,520	65,520	65,520	65,520	65,520	65,520	
	Total interst payable		annual		0	72,870	72,870	72,870	72,870	72,870	72,870	72,870	72,870	72,870	72,870	72,870	
10	Total production costs		annual		170,680	2,186,692	2,860,996	3,535,300	3,535,300	3,535,300	3,535,300	3,535,300	3,535,300	3,535,300	3,535,300	3,535,300	25,418,089.72
	Net income		annual		*-170,680*	*262,748*	*404,924*	*547,100*	*547,100*	*547,100*	*547,100*	*547,100*	*547,100*	*547,100*	*547,100*	*547,100*	3,663,422.85
	FIRR				192%												
	BCR at 10% DF				1.14												
	NPV at 10% DF				3,663,423												
	a/ machinery life assumed at 10 year																

[23]Source: Screening and Cost-benefits Analysis of Agricultural Machineries in Rural India, IFAD, Enrico Mazzoli, Economist, IFAD, Rome

4.5 Cash-flow model of a Millet processing unit, ICAR technology[24]

	MILLET PROCESSING UNIT MANAGED BY VO-SHG																
	(Amount INR per CHC)				Year												
	Details	Unit	units/year	Unit cost	1	2	3	4	5	6	7	8	9	10	11	12	20
1	Revenue				0	60%	80%	100%									
	Production of processed millet			1,620,000	0	972,000	1,296,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000
	Post-processin losses			162,000	0	-97,200	-129,600	-162,000	-162,000	-162,000	-162,000	-162,000	-162,000	-162,000	-162,000	-162,000	-162,000
	Total income				0	874,800	1,166,400	1,458,000	1,458,000	1,458,000	1,458,000	1,458,000	1,458,000	1,458,000	1,458,000	1,458,000	1,458,000
2	Investment costs																
	Work shed	sq ft	500	70	35,000												
	Power connection	LS	1	50,000	50,000												
	Work tables & with desktop	set			0												
	Sub-total building & power				85,000												
	Mechinery and implements																
	Mechinery and implements	unit	1	80,000	80,000												
	Intallation costs	LS	1	8,000	8,000												
	Transportation to site	LS		1,600	1,600												
	Total mechinery and implements				89,600												
	Replacement a/	set	1	80,000											80,000		
	Total investment costs				174,600												
	Opearing costs																
	Raw material purchase	LS	year	900,000	0	540,000	720,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000
	Electricity charges	LS	year	14,400	0	8,640	11,520	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400
	Fuel	LS	year														
	Insurance at 2% of mechnery costs	year	1	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792
	Miscellaneous costs																
	Tools and equipment	LS	year	5,000		5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
	Output packages	LS	year	32,000		32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000
	Transportation to markets	LS	year	4,500		4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
	O&M of machinery at 10%	LS	year	4,000		4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
	Sub-total operating costs				1,792	595,932	778,812	961,692	961,692	961,692	961,692	961,692	961,692	961,692	961,692	961,692	961,692
	Labour costs																
	On-machine labour	LS	year	420,000	0	252,000	336,000	420,000	420,000	420,000	420,000	420,000	420,000	420,000	420,000	420,000	420,000
	Off-machine labour	LS	year		0	0	0	0									
	Sub-total labour			0	0	252,000	336,000	420,000	420,000	420,000	420,000	420,000	420,000	420,000	420,000	420,000	420,000
	Total production costs				176,392	847,932	1,114,812	1,381,692	1,381,692	1,381,692	1,381,692	1,381,692	1,381,692	1,381,692	1,461,692	1,381,692	1,381,692
9	Interest on loans																
	Term loan at 14% interest		annual	56,000	0	7,840	7,840	7,840	7,840	7,840	7,840	7,840	7,840	7,840	7,840	7,840	7,840
	Working capital at 14% interest		annual	135,000	0	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900
	Total interst payable		annual		0	26,740	26,740	26,740	26,740	26,740	26,740	26,740	26,740	26,740	26,740	26,740	26,740
10	Total production costs		annual		176,392	874,672	1,141,552	1,408,432	1,408,432	1,408,432	1,408,432	1,408,432	1,408,432	1,408,432	1,488,432	1,408,432	1,408,432
	Net income		annual		*-176,392*	*128*	*24,848*	*49,568*	*49,568*	*49,568*	*49,568*	*49,568*	*49,568*	*49,568*	*-30,432*	*49,568*	*49,568*
	FIRR				19.19%												
	BCR at 10% DF				1.01												
	NPV at 10% DF				129,111												
	a/ machinery life assumed at 10 year																

[24]Source: Screening and Cost-benefits Analysis of Agricultural Machineries in Rural India, IFAD, Enrico Mazzoli, Economist, IFAD, Rome

4.6 Cash-flow model of a Tamarind de-seeding and packaging unit, ICAR technology[25]

	TAMARIND DE-HULLER & DE-SEEDER UNIT															
	(Amount INR per CHC)				Year											
	Details	Unit	units/year	Unit cost	1	2	3	4	5	6	7	8	9	10	11	20
1	Revenue				0	60%	80%	100%								
	Production of processed Tamarind pulp			4,482,000	0	2,689,200	3,585,600	4,482,000	4,482,000	4,482,000	4,482,000	4,482,000	4,482,000	4,482,000	4,482,000	4,482,000
	Post-processin losses			448,200	0	-268,920	-358,560	-448,200	-448,200	-448,200	-448,200	-448,200	-448,200	-448,200	-448,200	-448,200
	Total income				0	2,420,280	3,227,040	4,033,800	4,033,800	4,033,800	4,033,800	4,033,800	4,033,800	4,033,800	4,033,800	4,033,800
2	Investment costs															
	Work shed	sq ft	500	70	35,000											
	Power connection	LS	1	50,000	50,000											
	Work tables & with desktop	set			0											
	Sub-total building & power				85,000											
	Mechinery and implements															
	Mechinery and implements	unit	1	140,000	140,000											
	Intallation costs	LS	1	14,000	14,000											
	Transportation to site	LS		2,800	2,800											
	Total mechinery and implements				156,800											
	Replacement a/	set	1	140,000											140,000	
	Total investment costs				241,800	0	0	0	0	0	0	0	0	0	0	0
	Opearing costs															
	Raw material purchase	LS	year	2,940,000	0	1,764,000	2,352,000	2,940,000	2,940,000	2,940,000	2,940,000	2,940,000	2,940,000	2,940,000	2,940,000	2,940,000
	Electricity charges	LS	year	6,480	0	3,888	5,184	6,480	6,480	6,480	6,480	6,480	6,480	6,480	6,480	6,480
	Fuel	LS	year													
	Insurance at 2% of mechnery costs	year	1	3,136	3,136	3,136	3,136	3,136	3,136	3,136	3,136	3,136	3,136	3,136	3,136	3,136
	Miscellaneous costs															
	Tools and equipment	LS	year	22,000		22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
	Output packages	LS	year	60,000		60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
	Transportation to markets	LS	year	15,000		15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
	O&M of machinery at 10%	LS	year	7,000		7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000
	Sub-total operating costs				3,136	1,875,024	2,464,320	3,053,616	3,053,616	3,053,616	3,053,616	3,053,616	3,053,616	3,053,616	3,053,616	3,053,616
	Labour costs															
	On-machine labour	LS	year	120,000	0	72,000	96,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
	Off-machine labour	LS	year	120,000	0	72,000	96,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
	Sub-total labour			0	0	144,000	192,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000
	Total production costs				244,936	2,019,024	2,656,320	3,293,616	3,293,616	3,293,616	3,293,616	3,293,616	3,293,616	3,293,616	3,293,616	3,293,616
9	Interest on loans															
	Term loan at 14% interest		annual	98,000	0	13,720	13,720	13,720	13,720	13,720	13,720	13,720	13,720	13,720	13,720	13,720
	Working capital at 14% interest		annual	441,000	0	61,740	61,740	61,740	61,740	61,740	61,740	61,740	61,740	61,740	61,740	61,740
	Total interst payable		annual		0	75,460	75,460	75,460	75,460	75,460	75,460	75,460	75,460	75,460	75,460	75,460
10	Total production costs		annual		244,936	2,094,484	2,731,780	3,369,076	3,369,076	3,369,076	3,369,076	3,369,076	3,369,076	3,369,076	3,369,076	3,369,076
	Net income		annual		*-244,936*	*325,796*	*495,260*	*664,724*	*664,724*	*664,724*	*664,724*	*664,724*	*664,724*	*664,724*	*664,724*	*664,724*
	FIRR				168%											
	BCR at 10% DF				1.18											
	NPV at 10% DF				4,424,780											
	a/ machinery life assumed at 10 year															

[25]Source: Screening and Cost-benefits Analysis of Agricultural Machineries in Rural India, IFAD, Enrico Mazzoli, Economist, IFAD, Rome

IFAD
Investing in rural people

India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

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

Document Date:	25/07/2019
Project No.	2000001941

Asia and the Pacific Division
Programme Management Department

SECAP Review Note on India:
Scaling Up Agricultural Technologies for Smallholder Farmers (SCATE)

I. Major landscape characteristics and Issues (Social, natural resources, and climate)

A. Development Profile

1. Scaling up Agricultural Technologies (SCATE) for Smallholder Farmers is a project designed to promote research and uptake of current innovations in agro-engineering technologies in India. The project is proposed to be implemented in a total of 31 districts in the 5 states of Chhattisgarh, Jharkhand, Odisha, Assam and Nagaland. Target groups include a) small and marginal farmers; b) women; c) youth keen on setting up enterprises; d) Non-Timber Forest Produce (NTFP) gatherers; and e) livestock rearers. It is anticipated that the total number of direct beneficiaries from the project would be 322,000 households and indirect beneficiaries would be 201,000 households. The immediate benefits accrued from the project are intended to result in significant reduction in current agricultural production costs, with reduction of labour costs by about 36% and reduction of post-harvest losses by 50%.[1] The project has two main components: Component 1: Augmenting demand for new technologies among smallholder farmers; and Component 2: Development of Supply Chain for Appropriate Technologies.

2. **Assam:** Assam is situated alongside the Eastern Himalayas, covering 2.4 percent of India's geographical area, and is characterized by undulating topography. Its population is 2.58 percent of country's total population (31.17 million, Census 2011[2]), with decadal growth rate of 17 percent. Population density is 396.8 persons per sq.km, literacy rate is 73.18 percent in the state and poverty ratio is 32 percent.[3] Traditionally, Assam is home to many ethnic groups such as Assamese Brahmins, Koch Rajbongshi, Ahom, Bodo, Mishings, Sonowal Kacharis, Hajong, Karbi, Meitei, Rengma Naga, Dimasa, etc. Scheduled Tribe (ST) population in Assam is 13 percent, of which Bodos hold the majority (40 percent). Selected districts for SCATE include Barpeta, Baksa, Golaghat, Marigaon, Nalbari and Sonitpur covering 23.6 percent population of the state. Barpeta has the highest percent of ST population (35%) followed by Marigaon (14%). Golaghat with 32% household and Nalbari districts with 29% households are below poverty line. Women constitute about 7% of main (54,032) and 32% (1,42,312) of marginal workers under cultivators and agriculture labourers[4] (Figure 1). The share of small and marginal land holdings is 18% and 68% respectively which accounts for 50% of the total operational holding of Assam. Parts of 7 protected area/wild life sanctuaries fall under the selected districts. They include Orang National Park, Manas Tiger Reserve, Manas National Park, Burachapori WLS, Pabitora WLS, Sonai Rupai WLS and Nameri National Park/Tiger Reserve. Percentage of

[1] The immediate benefits from the project are significant reduction in production costs, with reduction of labour costs by about 36%, modest increase in household's production by about 316 kg/ha, and 50% reduction in post-harvest losses.

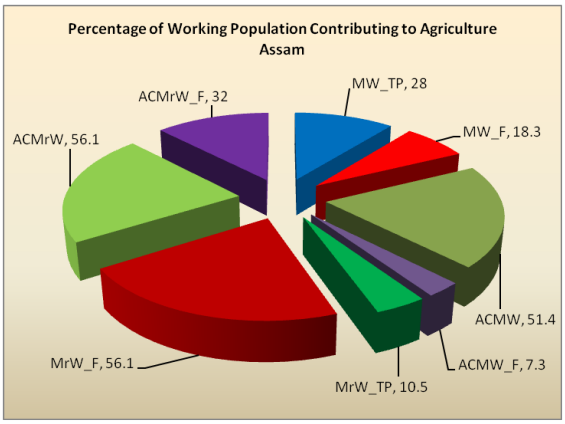
[2] Data from Census 2011 as published by Office of the Registrar General & Census Commissioner.

[3] Handbook of Statistics on Indian States 2017-18, Reserve Bank of India 2017-18.

[4] ACMW: % Main Agricultural Labourers and main Cultivator to Main Working Population; ACMW_F: % Main Female Agricultural Labourers and main female Cultivator to Main Working Population; ACMW: % Marginal Agricultural Labourers and Marginal Cultivator to Marginal Working Population; ACMW_F: % Marginal Female Agricultural Labourers and Marginal female Cultivator to Marginal Working Population.

protected area falling in the selected districts is, Baksa (24.4%), Golaghat (8.3%), Morigaon (1.7%), Sonitpur (8.9%).

Figure 1 Percentage of working population contributing to agriculture for selected districts of Assam

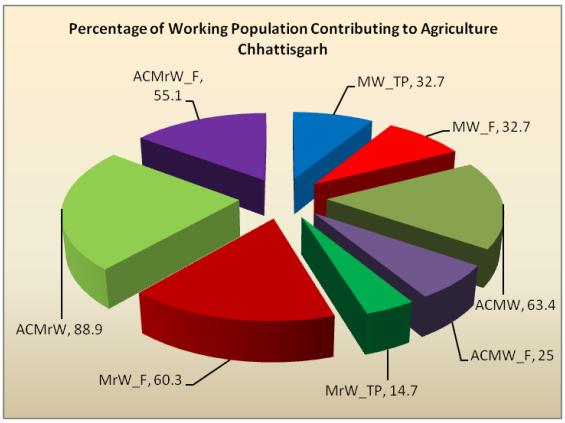


Workers	%
Main workers (% of total population)	28
Main female workers (% of main workers)	18.3
Cultivators and Agriculture labourers (% of main workers)	51.4
Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	7.3
Marginal workers (% of total population)	10.5
Marginal female workers (% of Marginal workers)	56.1
Marginal Cultivators and Agriculture labourers (% of Marginal workers)	56.1
Marginal Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	32

3. **Chhattisgarh**: Chhattisgarh is the 29th state of India, established in November 2000 by partitioning Madhya Pradesh, and is located in the centre-east of the country, covering 4.1 percent of India's geographical area. The northern and southern parts of the state are hilly, while the central part is a fertile plain. Its population is 2.11 percent of the country's total population (26 million) with decadal growth rate of 22.6 percent. Population density is 189 persons per sq.km, literacy rate is 70 percent in the state and poverty ratio is 40 percent. Two regional tribal development authorities have been created in the north and south tribal regions for improving administration in Fifth Schedule areas. Fifth schedule areas cover 65 percent of the land areas. Northern regions of the state are home to Paharikorba and Pando tribes. Korba is the largest town in the region. The communities mainly depend on agriculture and NTFPs. Scheduled Tribe (ST) population in Chhattisgarh is 30.6 percent. Selected districts under SCATE include Jagdalpur, Gariyaband, Kanker, Raipur and Rajnandgaon covering 30.4 percent population of the state. Rajnandgaon has the highest percent of ST population (55%). 45-70 percent households in the selected districts are below poverty line. Women constitute about 25% of main (310,813) and 55% (473,320) of marginal workers under cultivators and agriculture labourers (
4.
5.

6. Figure 2). Share of small and marginal land holdings is 22% and 58% respectively which accounts for 42% of total operational holding of Chhattisgarh. Parts of 3 protected area/wild life sanctuaries namely Udanti-Sitanadi Tiger Reserve, Kanger Ghati National Park and Udanti WLS, fall under the selected districts. Percentage of protected area falling in the selected districts is, Bastar/Jagadalpur (3.4%), Ghariyaband (31.7%), Kanker (0.6%).

Figure 2 Percentage of working population contributing to agriculture for selected districts of Chhattisgarh

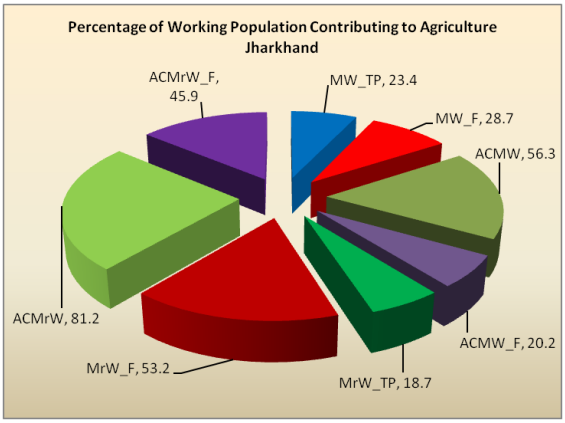


Workers	%
Main workers (% of total population)	32.7
Main female workers (% of main workers)	32.7
Cultivators and Agriculture labourers (% of main workers)	63.4
Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	25
Marginal workers (% of total population)	14.7
Marginal female workers (% of Marginal workers)	60.3
Marginal Cultivators and Agriculture labourers (% of Marginal workers)	88.9
Marginal Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	55.1

7. **Jharkhand**: Jharkhand is the 28th state formed in 2000 by partitioning Bihar and is located in the eastern part of the country, covering 2.4 percent of India's geographical area. Physiography of the state is mainly plateau based; the Chhota Nagpur Plateau covers much of Jharkhand state and the Ranchi Plateau forms the largest part it. Its population is 2.62 percent of country's total population (33 million) with decadal growth rate of 22.4 percent. Population density is 414 persons per sq.km, literacy rate is 68 percent in the state and poverty ratio is 37 percent. Of the total population, 26 percent belong to Scheduled Tribes and 12 percent belong to Scheduled Castes. 76 percent of the population reside in rural areas and two-thirds of the population derive its livelihood directly or indirectly from agricultural activities and allied sectors. 91 percent of tribal population reside in rural areas. 82 percent rural households in Jharkhand are living with subsistence income. Selected districts for the project include West Singhbhum, Gumla, Hazaribagh, Khunti, Latehar and Ranchi covering 25.6 percent population of the state. West Singhbhum, Hazaribagh and Latehar districts have more than 65 percent of ST population. 27-51 percent households in the selected districts are below poverty line. Women constitute about 20% of main (125,597) and 46% (397,315) of marginal workers under cultivators and agriculture labourers (
8.
9.

10. Figure 3). Share of small and marginal land holdings is 16% and 68% respectively which accounts for 43% of total operational holding of Jharkhand. Parts of 5 protected area/wild life sanctuaries namely, Mahauadanr WLS, Hazaribag WLS, Betla National Park, Palamau WLS/Tiger Reserve and Palkot WLS fall under the selected districts. Percentage of protected area falling in the selected districts is, Gumla (5.7%), Hazaribagh (3.4%), Latehar (27.4%).

Figure 3 Percentage of working population contributing to agriculture for selected districts of Jharkhand

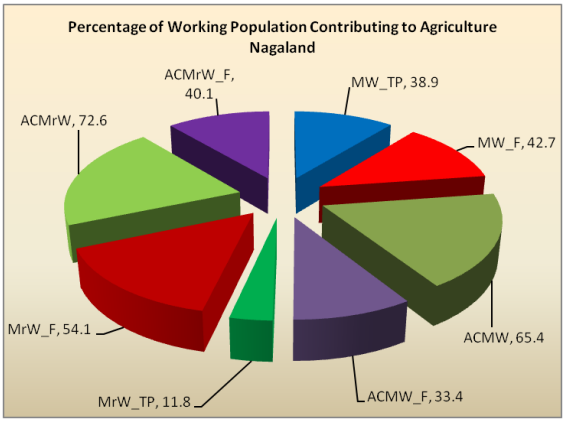


Workers	%
Main workers (% of total population)	23.4
Main female workers (% of main workers)	28.7
Cultivators and Agriculture labourers (% of main workers)	56.3
Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	20.2
Marginal workers (% of total population)	18.7
Marginal female workers (% of Marginal workers)	53.2
Marginal Cultivators and Agriculture labourers (% of Marginal workers)	81.2
Marginal Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	45.9

11. **Nagaland**: Nagaland is the 16th state formed in 1963 and is located in the north eastern of the country, covering 0.5 percent of India's geographical area. The terrain is hilly, rugged and mountainous. Most of the Naga villages are located on hilltops, which make supply of drinking water a challenging task. Its population is 2.62 percent of country's total population (2 million) with decadal growth rate of -0.6 percent. Population density is 119 persons per sq.km, literacy rate is 80 percent in the state and poverty ratio is 19 percent. Of the total population, 86.5 percent belong to Scheduled Tribes. Nagaland is inhabited by 16 major tribes along with other sub-tribes. Each tribe is distinct in character from the other in terms of customs, language and dress; although all tribes belong to the Naga ethnic group. The state's agriculture system is mainly based on shifting cultivation. Selected districts under the project include Kiphire, Kohima, Longleng, Mokokchung, Mon, Phek, Wokha and Zunheboto covering 66.1 percent population of the state. All the selected districts have more than 93 percent of ST population. Kiphire with 56% house hold and Longleng districts with 50% households are below poverty line. 14-56 percent households in the selected districts are below poverty line. Women constitute about 33% of main (7,034) and 40% (15,930) of marginal workers under cultivators and agriculture labourers (

12. Figure 4). Share of small and marginal land holdings is 3.6% and 11.4% respectively which accounts for 2.5% of total operational holding of Nagaland. Parts of 2 protected area/wild life sanctuaries namely, Fakim WLS and Puliebadze WLS fall under the selected districts. Percentage of protected area falling in the selected districts is, Kiphire (2.3%), Kohima (3.2%).

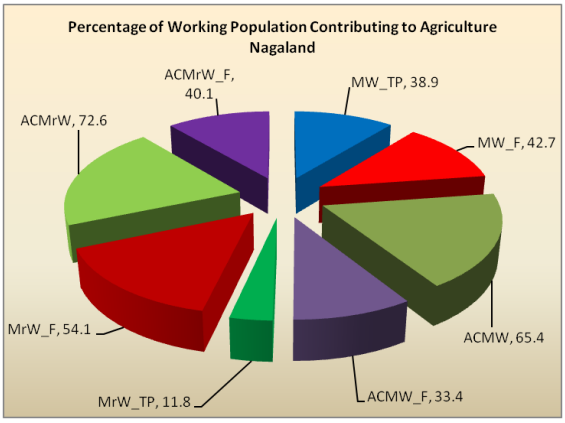
Figure 4 Percentage of working population contributing to agriculture for selected districts of Nagaland



Workers	%
Main workers (% of total population)	38.9
Main female workers (% of main workers)	42.7
Cultivators and Agriculture labourers (% of main workers)	65.4
Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	33.4
Marginal workers (% of total population)	11.8
Marginal female workers (% of Marginal workers)	54.1
Marginal Cultivators and Agriculture labourers (% of Marginal workers)	72.6
Marginal Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	40.1

13. **Odisha:** Odisha is located in the eastern part of the country, covering 4.7 percent of India's geographical area. Geographically, the state is covered with mountain ranges, and valleys. Its population is 3.47 percent of country's total population (42 million) with decadal growth rate of 14 percent. Population density is 269 persons per sq.km, literacy rate is 73.5 percent in the state and poverty ratio is 33 percent. 83 percent of the state's population resides in rural areas. Poverty rate is 33 percent, higher than the national average of 22 percent. National Sample Survey Organization (NSSO) divides the state into three regions: coastal, northern, southern. The share of poor is the highest in northern region, though share of calorie-poor is the highest in the coastal region (40 percent). Selected districts under SCATE include Bolangir, Dhenkanal, Gajapati, Kandhamal, Mayurbhanj and Sundargarh covering 20.9 percent population of the state. Gajapati, Kandhamal, Mayurbhanj, Sundargarh districts have more than 51 percent of ST population. 27-51 percent households in the selected districts are below poverty line. Women constitute about 12% of main (167,426) and 43% (699,269) of marginal workers under cultivators and agriculture labourers (Figure 5). Share of small and marginal land holdings is 72% and 20% respectively which accounts for 70.5% of total operational holding of Jharkhand. Parts of 5 protected area/wild life sanctuaries fall under the selected districts. They include, Similipal-Hadagarh WLS/Tiger Reserve, Kapilash WLS, Kothgarh WLS, Lakhari Valley WLS and Simlipal National Park. Percentage of protected area falling in the selected districts is, Dhenkanal (3.2%), Gajapati (0.9%), Kandhamal (5.4%), Mayurbhanj (30.9%).

Figure 5 Percentage of working population contributing to agriculture for selected districts of Odisha



Workers	%
Main workers (% of total population)	24
Main female workers (% of main workers)	21.4
Cultivators and Agriculture labourers (% of main workers)	52.4
Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	11.8
Marginal workers (% of total population)	20.6
Marginal female workers (% of Marginal workers)	56.1
Marginal Cultivators and Agriculture labourers (% of Marginal workers)	74
Marginal Cultivators and Agriculture labourers - Female (% of Cultivators and Agriculture labourers)	43.3

14. **Summary Development Profile:** Odisha has highest percentage of small and marginal land holdings followed by Assam and Chhattisgarh. Chhattigarh has the highest percentage of household below poverty line, followed by Odisha, Jharkhand, Nagaland and Assam. Nagaland has the highest percentage of scheduled tribes followed by Jharkhand, Odisha, Chhattisgarh and Assam. Chhattigarh has the highest percentage of cultivators and agriculture labourers under main workers category, followed by Nagaland, Jharkhand, Odisha and Assam, out of this percentage of female cultivators and agriculture labourers is highest in Nagaland, followed by Chhattisgarh, Jharkhand, Odisha and Assam. Similarly Chhattigarh has the highest percentage of cultivators and agriculture labourers under marginal workers category, followed by Jharkhand, Odisha, Nagaland and Assam, out of this percentage of female cultivators and agriculture labourers is highest in Chhattisgarh followed by Jharkhand, Odisha, Nagaland and Assam.

B. Natural Resources Profile

a) Assam

15. **Assam Water Resources:** Assam is endowed with enormous water resources. The large perennial rivers and other water bodies with the rich aquifer speak about vastness of its water resource. Surface water is available in the forms of river, stream, lake, swamps, pond etc. The ground water is available at low to moderate depth almost in entire state. The state is drained by two river system, viz the Brahmaputra and the Barak. These rivers have large number of tributaries joining them from both the banks. There are about 73 important tributaries of the Brahmaputra river and 11 tributaries of Barak river.[5]
16. **Assam Soil:** The soils of Assam, geology (parent material), topography and climate seem to play vital role in their formations. Therefore, under varying geological conditions, topographical characteristics and agro-climatic situations different types of soils are found to occur in the hills, piedmonts, plateaus and plains. The soils of Assam may thus generally be divided into four groups, viz. Alluvial soils, Piedmont soils, Hill soils and Lateritic soils.5
17. **Assam Land use:** The total geographical area of the state is around 7850 thousand ha. The contribution of forest is (23.6 per cent) area was found to be maximum in total geographical area followed by net area sown (35.07 per cent), area not available for cultivation (33.45 per cent), other cultivated land excluding waste land (2.5 per cent), current fallow land (1.61

[5] ENVIS Centre: Assam Status of Environment and Related Issues.

percent), land other than current fallow land (0.75 percent), permanent pastures & other grazing lands (2.04 percent).[6]

18. **Assam Forest:** Assam has recorded forest area forest which is 34.21 percent of its geographical area. Reserved and Unclassified Forests constitute 66.58 percent, and 33.42 percent of the total forest area respectively. The protected area network of Assam includes 5 National Parks and 18 wildlife sanctuaries covering an area of 0.40 million ha constituting 4.98% of the geographical area. The state has three Tiger Reserves, namely Kaziranga, Manas and Nameri. Kaziranga National Park and Manas Wildlife Sanctuary are in the list of World Heritage sites.[7]
19. **Assam Biodiversity:** Assam is endowed with wide ranging flora and fauna. It is one of the best destinations where tourist can encounter a great variety of wildlife. The State of Assam is famous worldwide as the home of great one horned Rhinoceros which is largely concentrated in the Kaziranga National Park. Other notable faunal species found here are Hoolock Gibbon, Stump Tailed Macaque, Capped Langur and Golden Langur, Pigmy Hog, Clouded Leopard, Golden Cat and White Winged Wood Duck. Elephants are found in all parts in Assam.7
20. **Assam Agriculture:** Agriculture is the dominant land use category in the state. It account for about for about 54.11 per cent of the total geographical area of the state. Including persons dependent on plantation, more than 80 per cent of the total population of Assam is dependent on agriculture. Rice is the main food crop in Assam agriculture as it is the main diet in the state too. Other food crops cultivated in Assam agriculture include jute, sugarcane, fruits, tea, pulses, coconut, potatoes, cotton, and arecanuts. More than 50 percent of the total population of the state are involved in agricultural activities of Assam.5
21. **Assam Animal Husbandry and Dairying:** As per the 19th livestock census 2012, Cattle contributes highest with 54.02% followed by Goat 32.33%, Pigs 8.57%, Sheep 2.71% and Buffalo 2.28% besides marginal contribution is attributed by other livestock species such as Camel, Mules, Donkeys, Horses and Ponies.[8]

b) Chhattisgarh

22. **Chhattisgarh Water Resources:** Mahanadi, Sheonath, Indravati, Arpa, Hasdeo, Kelo, Son, Rehar, and Kanhar are some of the main rivers providing a lifeline to the socio-economic development of the state. Most of the rivers in the state have a torrential regime characterized by high flow of water for three to four months during monsoon (June to September) during which around 80% of the annual runoff flows. Floods and droughts are the main characteristics of the annual flow of the rivers in Chhattisgarh requiring storage reservoirs for efficient use of the available surface water resources[9]. Surface water utilization stands at 44% of available surface water resources and ground water exploitation is about 18.3%. Selected districts of Chhattisgarh mainly fall in Mahanadi and Godavari river basins.
23. **Chhattisgarh Soil:** The soil types are diverse because of the topographical variations in Chhattisgarh. In the upper part of the landscape, the soils are usually shallow and young, with less developed features, and are highly prone to erosion. Soil of Chhattisgarh fall under 5 orders and 9 dominating sub groups. Entisols covers 19.5% cultivated area of the state, Inceptisols 14.8%, Alfisols 39%, Mollisols 0.3% and Vertisols 26.4%. Upland consists of Entisols

[6] India State of Forest Report, 2011: Assam.
[7] http://apfbcs.nic.in/about-assam.html
[8] 19th Livestock Census.
[9] Water Resources Department, Government of Chhattisgarh.

which are extremely shallow, very well drained, and sandy-loam in texture. The shallow depth, low water holding capacity, poor physical condition and low soil fertility are the major constraints to their use for productive cropping.[10]

24. **Chhattisgarh Land use:** The total geographical area of the state isaround13790 thousand ha. The contribution of forest(45.95 per cent)area was found to be maximum in total geographical area followed by net area sown (34.06 per cent), area not available for cultivation(7.39 per cent), other cultivated land excluding waste land(2.57 per cent), current fallow land (1.83 percent), land other than current fallow land(1.99 percent), permanent pastures & other grazing lands (6.20 percent).
25. **Chhattisgarh Forest:** Chhattisgarh is endowed with abundant forest which is 44.21 percent of its geographical area. Reserved, Protected and Unclassed Forests constitute 43.13 percent, 40.21 percent, and 16.65 percent of the total forest area respectively. The collection of fuel wood, uncontrolled grazing for sustenance, food security, as well as income generation, and ever growing population has led to an increased rate of consumption of bio-resources.[11]
26. **Chhattisgarh Biodiversity:** The state of Chhattisgarh is part of Deccan bio-geographical area, houses an important part of that rich and unique biological diversity. What is a more conspicuous is that the state is significantly rich in endemism with respect to many plants having medicinal importance.
27. **Chhattisgarh Agriculture:** About 80 percent of the population in the state is engaged in agriculture and 43 percent of the entire arable land is under cultivation. Paddy is the principal crop; other major crops include coarse grains, wheat, maize, groundnut, pulses and oilseeds. Chhattisgarh has embarked on a concerted plan to increase double cropped areas, diversify the cropping pattern and improve incomes from agro-based small-scale enterprises.[12.]

    Horticulture has a growing popularity owing to the high value of horticulture produces than agriculture crops. Horticulture plays important role in livelihood security of poor farmers. It provides food security and perennial source of income to poorest of poor. It is a dynamic tool for ensuring ecological sustainability.[13]

28. **Chhattisgarh Animal Husbandry and Dairying:** The state has about 14.4 million animal population out of which 9.5 million are cattle, 1.6 million are buffaloes and rest 3.3 million are other animals which includes sheep goat, horse and other species[14]. Paddy is the main crop of the state and animals survive on paddy straw for 7 to 8 months in a year.

c) Jharkhand

29. **Jharkhand Water Resources:** Damodar, Son, Subarnarekha and Brahmani are some of the main rivers providing a lifeline to the socio-economic development of the state. Surface water utilization stands at 17% of available surface water resources (83%) and ground water exploitation is about 15% (17% available ground water).
30. **Jharkhand Soil:** Soil content of Jharkhand state mainly consist of soil formed from disintegration of rocks and stones, and soil composition is further divided into: Red soil, found

[10] State of Chhattisgarh in Agriculture, 2014. jnkvv.org/PDF/AERC/Study-113.pdf
[11] http://chtenvis.nic.in/Forest.html
[12] http://chtenvis.nic.in/Agriculture.html
[13] Directorate Horticulture and farm forestry Chhattisgarh.
[14] Department of Animal Husbandry, Government of Chhattisgarh.

mostly in the Damodar valley, and Rajmahal area, Micacious soil (containing particles of mica), found in Koderma, Jhumri Telaiya, Barkagaon, and areas around the Mandar hill, Sandy soil, generally found in Hazaribagh and Dhanbad, Black soil, found in Rajmahal area and Laterite soil, found in western part of Ranchi, Palamu, and parts of Santhal Parganas and Singhbhum.[15]

31. **Jharkhand Land use:** The total geographical area of the state is around 7970 thousand ha. The contribution of forest (28.09 per cent) area was found to be maximum in total geographical area followed by net area sown (18.87per cent), area not available for cultivation (16.71 per cent), other cultivated land excluding waste land (1.17 per cent), current fallow land (17.49 percent), land other than current fallow land (12.07 percent), culturable wasteland (4.22 percent) and permanent pastures & other grazing lands (1.38percent).
32. **Jharkhand Forest:** Jharkhand has recorded forest area forest which is 29.61 percent of its geographical area. Reserved, Protected and Unclassified Forests constitute 18.58 percent, 81.28 percent, and 0.14 percent of the total forest area respectively. It has one national park and 11 wildlife sanctuaries which constitutes 2.74 percent of the state's geographical area. Palamu tiger Reserve is also located in the State covering an area of 1026 sq km.
33. **Jharkhand Biodiversity:** The state of Jharkhand is a part of biodiversity rich regions of India because of its diverse physiographic and climatic conditions. The landscape of the state has a mix of wild, semi-wild and cultivated habitats. The bio-diversity of the state is under some threat due to a variety of adverse factors. These are mining, roads and, rails construction, Dams and irrigation schemes, construction of mineral based factories and industries, stone quarrying and unrestricted grazing by free range cattle etc.
34. **Jharkhand Agriculture:** Agriculture is one of the largest means of earning livelihood for the people in Jharkhand State. About 82.20% of people reside in the village area and solely depend on primary sector, i.e. Agriculture. Rice is the leading crop in the State. The agriculture is fully dependent on the vagaries of the monsoon. Besides paddy other important crops are Maize, Millet, Ragi (Marua), Wheat, Barley, etc. 14% of total area sown is being irrigated.
35. **Jharkhand Animal Husbandry and Dairying:** Cattle contributes highest with 48.39% followed by Goat 36.48%, Buffalo 6.57%, Pigs 5.33% and Sheep 3.23% besides marginal contribution is attributed by other livestock species such as camel, mithun, yak, mules, donkeys, horses and ponies.8

d) Nagaland

36. **Nagaland Water Resources:** Nagaland depends on surface water sources such as streams, rivulets, springs and ponds, which are monsoon fed for its drinking water. Nagaland has four main rivers, namely, Doyang, Dhansiri, Dhiku and Tizu. Of these, the first three flows towards west through Assam plains to join the mighty Brahmaputra, while Tizu river system flows towards the east and southeast and pours into the Irrawaddy in Myanmar. Other rivers include, Tsurong, Nanung, Tsurang or Disai, Tsumok, Menung, Dzu, Langlong, Zunki,, Likimro, Lanye, Dzuza and Manglu. The catchment area of Brahmaputra in the state is 65 percent (10,803 sq. km) of the total area leading to a total water yield of 537000 million cu. m. The catchment area of Barak River is only 728 sq. km, which is around 4 percent of the total area.[16] The ground water resource potential of the State has been computed as 0.36 BCM as on 2009

[15] https://www.jhpolice.gov.in/about-jharkhand
[16] SAPCC Nagaland, http://moef.gov.in/wp-content/uploads/2017/09/Nagaland.pdf

and utilization is only 0.008 BCM. For domestic utilisation, most of the populations depend upon spring water.[17]

37. **Nagaland Soil:** The soil of Nagaland is derivative of shales and sandstones. Soils are light and porous to heavy texture. They are non- calcareous, acidic and rich in organic carbon. The available phosphate and potash varies from low to very low. Soil of Nagaland fall under 4 orders and 7 dominating sub groups. Alfisols, Entisols, Inceptisols and Ultisols are the 4 orders found in Nagaland.

38. **Nagaland Land use:** In Nagaland, about 92% of the land is unclassified and are unde r the community ownership, which may fall under any one of the recognized four categories - Private land, Clan land, Morung land, and Common land. The state government owns just about 7% of the total land area. The total geographical area of the state is around 1,658 thousand ha. The contribution of forest (52.24 per cent) followed by net area sown (23 per cent), area not available for cultivation (5.75 per cent), current fallow land (3 percent), land other than current fallow land (6 percent), cultuarable wasteland (4.24 per cent).

39. **Nagaland Forest:** Based on interpretation of satellite data pertaining to Oct-Dec 2015, the forest cover in the State is 12,489 sq km, which is 75.33% of the State's geographical area. In terms of forest canopy density classes, the state has 1,279 sq km under very dense forest, 4,587 sq km under moderately dense forest and 6,623 sq km under open forest. State has recorded forest area of 8,623 sq km amounting to 52.01% of its geographical area. The Reserved and Unclassed Forests are 2.71% and 97.29% respectively of the recorded forest area.[18]

40. **Nagaland Biodiversity:** The topography of Nagaland is full of hill ranges, which break into spurs and ridges. The terrain is mountainous covered by rich and varied biodiversity of flora and fauna. It is one of the 25 hot spots of the world with respect to its biological diversity. Many staple Indian species live in Nagaland including dholes, pangolins, porcupines, elephants, leopards, bears, many species of monkeys, deer, and buffaloes thrive across the state's forests. Nagaland is home to 396 species of orchids, belonging to 92 genera of which 54 having horticultural and medicinal economic importance.[19]

41. **Nagaland Agriculture:** About 70% of the population is dependent on agriculture. Out of the total geographical area of the State (16,57,900 ha.) 7, 22,464 ha is cultivable area (43.58%). The major land use pattern is slash and burn cultivation locally known as Jhum. The Angami and Chakesang tribes have on the other hand, developed a system of Wet Terrace Rice Cultivation (WTRC) which is practiced alongside jhum cultivation. The other land use systems include horticulture and agro-forestry. The combination of horticultural crops with forestry will ensure permanent plant cover on hill-slopes. Hill slopes are occupied by mixed forests The main crops are rice, millet, maize and pulses. Cash crops like sugarcane and potato are also becoming popular. Coffee, cardamom and tea are grown as plantation crops in Nagaland.

    Horticulture is growing popularity owing to the high value of horticulture produces than agriculture crops. 9.95% of the gross cropped area is covered by horticulture crops. Based on the elevation, both sub-tropical fruits such as pineapple, banana, citrus, guava, etc. and

[17] Nagaland Water Policy, 2016, http://phed.nagaland.gov.in/assets/nagaland-state-water-policy-20164.pdf
[18] State of Forest Report 2017, Forest Survey of India.
[19] Chitta Ranjan Deb (2013), Orchids of Nagaland, propagation, conservation and sustainable utilization: a review, Pleione 7(1): 52 – 58

temperate fruits such as plum, peach, pear, passion fruit and various nuts have potential for exploitation. Important among the vegetable crops grown are potato, cassava, colocasia, cabbage, cauliflower, peas and cucumber while ginger, chillies, cardamom, garlic, black pepper make up the major spice crops.

42. **Nagaland Animal Husbandry and Dairying:** Animal husbandry is a tradition with the Nagas and therefore, rearing of domestic animal such as Cattle, Mithun, Pig and Poultry birds play a significant role in the socio-economic development of the Nagas. As per the 19th Livestock Census conducted in 2012, the total livestock population of Nagaland state stand at 31, 91, 149 numbers. pig accounted for 47.19 per cent followed by cattle at 22.01 per cent, dog at 10.59 per cent and goat at 9.31 per cent while mithun and buffalo population accounted for only 3.30 per cent and 3.06 per cent respectively.

e) Odisha

43. **Odisha Water Resources:** Odisha has a number of big and small rivers flowing across the state. All the rivers fall in the Bay of Bengal. Out of all rivers Mahanadi is the biggest one. It is originated at Amarkantak plateu of Mahdhya Pradesh. The length of the river is 858 km. The river forms a delta at Cuttack from which many Subsidiaries Rivers like Kathjodi, Kuakhia, Birupa etc. have come out. Besides Mahanadi, there are other rivers like Subamarekha, Budhabalang, Baitarani, Brahmani, Rushikulya, Bansadhara present in the states. There are two big lakes namely Chilika and Anshupa in the state. These two lakes are big attraction for the tourists and they provide good quality of variety of fishes.[20]
44. **Odisha Soil:** Odisha is a state with different physiographic and agro-climatic zones. Soils are generally fertile, but some deficient and problematic soils need proper management. Soils of Odisha are mainly developed by the relief, parent material and climate. Soil types range from fertile alluvial deltaic soils in coastal plains, mixed red and black soils in central tableland, red and yellow soils with low fertility in northern plateau to red, black & brown forest soils in Eastern Ghat region. They differ widely from highly acidic to slightly alkaline and from light sandy to stiff clays. Soils are mainly acidic with the degree of acidity varying widely.[21]
45. **Odisha Land use:** The total geographical area of the state is around 15.6 million ha. The contribution of forest (37.33 per cent) area was found to be maximum in total geographical area followed by net area sown (35.99per cent), area not available for cultivation (13.73 per cent), other cultivated land excluding waste land (2.2 per cent), current fallow land (3.7 percent), land other than current fallow land (1.47 percent), culturable wasteland (2.41 percent) and permanent pastures & other grazing lands (3.17 percent).[22]
46. **Odisha Forest:** Odisha has recorded forest area forest which is 37.34 percent of its geographical area. Reserved, Protected and Unclassified Forests constitute 45.29 percent, 26.7 percent, and 28.01 percent of the total forest area respectively. The forest's naturally vigorous growth accounts for a tremendous wealth of biodiversity, filling many catalogues of the wild

[20] Natural Resources of Orissa: Forest, Minerals, Water and Land Resources (http://www.yourarticlelibrary.com/environment/natural-resources/natural-resources-of-orissa-forest-minerals-water-and-land-resources/44746)
[21] https://agriodisha.nic.in/Home/StatusofAgriculture
[22] Forest Survey of India, Odhisa, 2011

plant and animal species dwelling within. There have been attempts at conservation and reforestation.[23]

47. **Odisha Biodiversity:** The forests in the State are rich in biodiversity. There are two National parks, 18 Sanctuaries and one Biosphere Reserve in the State. There are two notified and one proposed Tiger Reserves namely Similipal, Satkosia and Sunabeda (proposed).There are three elephant reserves in the State namely Mayurbhanj, Sambalpur and Mahanadi. The protected area for wildlife management constitutes 4.25% of the total geographical area of the State. Chilika Ramsar site is the Asia's largest brakish water lagoon having rich esturine and marine fauna including 152 Irrawady dolphins (as per 2013 Jan, census). About nine lakh migratory birds visit Chilika every year.[24]

48. **Odisha Agriculture:** Odisha Agriculture is the major contributor to the state's economy. Agriculture is the chief occupation in Odisha. About 76% of the total working population is engaged with agriculture and agriculture related industries. Odisha is one of the largest producers of rice in India. The state grows almost one tenth of the total rice production of the country. Favourable climate and presence of rich soils accounts for the flourishing agriculture of Odisha. The main crops cultivated in the state are: rice, jute, oil seeds, pulses, coconut, mesta, sugarcane, tea, rubber, cotton, gram, mustard, maize, sesame, ragi, potato and soybean.[25]

49. **Odisha Animal Husbandry and Dairying:** Livestock population is 20.73 million (excluding 1.13 million stray cattle)according to 2012 livestock census. Cattle contributes highest with 56.05% followed by goat 31.41%, sheep 7.63%, Buffalo 3.50%, 1.35% of livestock is contributed by pigs and marginal contribution is made by other livestock species such as Camel, Mules, Donkeys, Horses and Ponies.8

C. Climate Profile

50. **Historical climate:** For purposes of this SECAP an assessment of the historical climate variability and trends in mean climate (maximum temperature, minimum temperature and precipitation) for the participating states (districts in Annex) over the period 1951-2013 (63 years), using historical gridded observations from the India Meteorological Department (IMD)[26] has been made. Orography and landuse influence spatial distribution of rainfall and temperature. Human-induced landscapes and human activities play a key role in altering the climate at a local and regional scale. It is important to understand the variation in rainfall as well as temperature since these variations have to be kept in mind while designing appropriate interventions (conservation practices or machineries etc.). Therefore analysis has been carried out at the district level. Summary of observed temperature and rainfall for the 5 states is presented.

51. **Assam:** Mean maximum temperature of 28.0° C (26.7 - 291°C) and increasing trend with high confidence is observed. Mean minimum temperature of 18.0°C (17.0 - 18.8°C) and increasing trend with low confidence is observed. Mean annual rainfall is 2245.3 mm (1537 – 3066 mm) and shows decreasing trend (low confidence). South west monsoon contributes 64.5% (1468.8mm) and 25% of annual rainfall contribution comes from pre-monsoon months.

[23] https://en.wikipedia.org/wiki/Odisha
[24] Deartment of Forest and Environment, Odisha
[25] https://www.mapsofindia.com/orissa/economy/agriculture.html
[26] www.imd.gov.in/advertisements/20170320_advt_34.pdf

52. **Chhattisgarh:** Mean maximum temperature of 32.1° C (31.5 - 32.7°C) and increasing trend with high confidence is observed. Mean minimum temperature of 19.9°C (18.6 - 22.1°C) and decreasing trend with low confidence is observed. Mean annual rainfall is 1296.0 mm (1118 – 1531 mm) and shows decreasing trend (low confidence). South west monsoon contributes 88.6% (1148 mm).
53. **Jharkhand:** Mean maximum temperature of 31.5° C (31.2 - 32.0°C) and decreasing trend with low confidence is observed. Mean minimum temperature of 19.6° C (18.7 – 20.5°C) and decreasing trend with low confidence is observed. Mean annual rainfall is 1295.2 mm (1043 – 1507 mm) and shows increasing trend (low confidence). South west monsoon contributes 82.4% (1066.9 mm).
54. **Nagaland:** Mean maximum temperature of 28.7° C (27.7 - 29.1°C) and increasing trend with high confidence is observed. Mean minimum temperature of 18.4° C (17.7 - 18.6°C) and increasing trend with low confidence is observed. Mean annual rainfall is 1832.0 mm (1504 – 2186 mm) and shows decreasing trend (high confidence). South west monsoon contributes 65.6% (1202.1 mm) and 23% of annual rainfall contribution comes from pre-monsoon months.
55. **Odisha:** Mean maximum temperature of (31.5 - 32.6°C) and increasing trend with high confidence is observed. Mean minimum temperature of 18.4° C 21.1° C (19.7 - 22.2°C) and decreasing trend with low confidence is observed. Mean annual rainfall is 1439.4 mm (1227 - 1687) and shows increasing trend (low confidence). South west monsoon contributes 78.2% (1125.8mm).
56. **Summary historical climate**: In summary the selected districts historically show an increasing trend in maximum temperature (high confidence) and minimum temperature (low confidence). Decreasing trend in annual rainfall is observed in 8 districts (high confidence) and 12 districts (low confidence). Decreasing trend in rainy days is observed in 8 districts (high confidence) and 18 districts (low confidence). Annual rainfall distribution analysis shows that majority of the 31 districts on an average had 70% normal rainfall years, 14% and 13% deficient and excess rainfall years[27]. Analysis carried out at district level for seasonal temperature and rainfall is given in Annexure. Increasing trend in maximum temperature for the districts results in additional water demand (crop, human and livestock). Districts with increasing trend in temperature and decreasing trend in rainfall would likely to have water stress and drought like situation. Districts with decreasing trend in minimum temperature may experience increase in frost days which will have impacts on crop growth and hence impact crop yield.
57. **Projected Climate:** The CORDEX South Asia modelled climate data on precipitation, maximum temperature, minimum temperature and climate extremes indices have been analysed for 5 participating states (districts in Annex) for baseline (BL, 1981-2010)and mid-century (MC, 2021-2050). Ensemble mean of 10 RCMs at a spatial resolution of 50kmx50km has been used. The CORDEX South Asia simulations with the models indicate an all-round warming over the participating states. Summary of observed temperature and rainfall for the 5 states is presented.
58. **Assam:** For the state of Assam as whole, increase in maximum and minimum temperature is projected to be around 1.1°C towards mid-century under IPCC AR5 RCP4.5 scenario while increase of 1.4°C towards mid-century under IPCC AR5 RCP8.5 scenario is projected. Average

[27] +/-19% Long Period Average (LPA): Normal rainfall year, <-19% to -59% LPA: Deficient rainfall year, >+19% to +59%: Excess rain fall year (http://www.imdpune.gov.in/weather_forecasting/glossary.pdf).

annual rainfall is projected to increase by 2.5% (RCP4.5) and 5.1% (RCP8.5) towards mid-century as compared to the baseline.

59. **Chhattisgarh:** For the state of Chhattisgarh as whole, increase in maximum and minimum temperature is projected to be around 1.4°C towards mid-century under IPCC AR5 RCP4.5 scenario while increase of 1.7°C (maximum temperature) and 1.8°C (minimum temperature) towards mid-century under IPCC AR5 RCP8.5 scenario is projected. Average annual rainfall is projected to increase marginally (1.5%, RCP4.5) and decrease marginally under RCP8.5 towards mid-century as compared to baseline.

60. **Jharkhand:** For the state of Jharkhand as whole, increase in maximum and minimum temperature is projected to be around 1.2°C and 1.3°C respectively towards mid-century under IPCC AR5 RCP4.5 scenario while increase of 1.7°C and 1.8°C respectively towards mid-century under IPCC AR5 RCP8.5 scenario is projected. Average annual rainfall is projected to increase marginally under RCP4.5 and increase marginally (3%) under RCP8.5 towards mid-century as compared to baseline.

61. **Nagaland:** For the state of Nagaland as whole, increase in maximum and minimum temperature is projected to be around 1.1°C and 1.0°C respectively towards mid-century under IPCC AR5 RCP4.5 scenario while increase around 1.5°C and 1.3°C respectively towards mid-century under IPCC AR5 RCP8.5 scenario is projected. Average annual rainfall is projected to increase by 11% (RCP4.5) and 13% (RCP8.5) towards mid-century as compared to baseline.

62. **Odisha:** For the state of Odisha as whole, increase in maximum and minimum temperature is projected to be around 1.3°C and 1.2°C respectively towards mid-century under IPCC AR5 RCP4.5 scenario while increase of 1.5°C towards mid-century under IPCC AR5 RCP8.5 scenario is projected. Average annual rainfall is projected to increase marginally (3%) under RCP4.5 and negligible change under RCP8.5 towards mid-century as compared to baseline.

63. **Climate Extremes:** Indices representing climate extremes are developed to communicate more complex climate change impact relations in a simplified way. Mean temperature and precipitation sums can be seen as simple climate extremes indices, More complex climate extremes indices incorporate information on the sensitivity of a specific system, such as exposure time, threshold levels of event intensity etc[28]. Six temperature indices (responsible for crop loss, infrastructure loss, heat stress, reduction in outdoor activity time, forest fire etc.) and four rainfall indices (responsible for drought, flood, erosion, infrastructure loss, etc.) which may influence the project objectives.

64. **Temperature Indices:** Cool nights (TN10P) and cool days (TX10P) are projected to decrease (high confidence) for all 31 districts while warm nights (TN90P) and warm days (TX90P) projected to increase (high confidence) for the districts. However, the trend is statistically not significant for 2 districts of Assam. Warm spell duration indicator (WSDI) is projected to increase for all the districts; however projection for 20 districts is with high confidence and with low confidence for 11 districts.

65. **Rainfall Indices:** Consecutive dry days (CDD) are projected to increase for 7 districts (high confidence) and 21 districts (low confidence). Impact of increase in CDD may manifest in occurrence of drought and may impact human health. Consecutive wet days (CWD), extremely wet days precipitation (R99p) and 1 day maximum precipitation (RX1DAY) are projected to increase (low confidence) for about 14 districts and decrease (low confidence) for 17 districts.

[28] http://www.smhi.se/polopoly_fs/1.805!Climate%20indices%20for%20vulnerability%20assessments.pdf

Wet weather may affect standing crops, cause floods and soil erosion, emergence of pest and diseases.

66. **Summary projected climate**: Projected climate indicate hotter and drier future for most of the selected districts. Spatial and temporal variability makes these districts more vulnerable. Projected change in **annual rainfall** for the selected districts varies from state to state; Assam (-4% to 6%), Chhattisgarh (-3% to 1%), Jharkhand (1% to 2%), Nagaland (8% to 14%), and Odisha (-4% to 3%) towards mid-century for low emission (RCP4.5) scenario. Projected change in annual rainfall for the selected districts range from; Assam (0.3% to 8%), Chhattisgarh (-2% to 1.2%), Jharkhand (1% to 3.5%), Nagaland (8% to 17%), and Odisha (0% to 7%) towards mid-century for high emission (RCP8.5) scenario.

Projected change in **maximum temperature** for the selected districts; Assam (1.0°C and 1.2°C), Chhattisgarh (1.4°C and 1.5°C), Jharkhand (1.2°C and 1.3°C), Nagaland (1.0°C and 1.2°C), and Odisha (1.1°C and 1.5°C) towards mid-century for low emission (RCP4.5) scenario. Projected change in annual rainfall for the selected districts range from; Assam (1.2°C and 1.4°C), Chhattisgarh (1.7°C and 1.8 °C), Jharkhand (1.5°C and 1.6°C), Nagaland (1.5°C and 1.6°C), and Odisha (1.2°C and 1.7°C) towards mid-century for high emission (RCP8.5) scenario.

Projected change in **minimum temperature** for the selected districts; Assam (1.0°C and 1.2°C), Chhattisgarh (1.3°C and 1.5°C), Jharkhand (1.2°C and 1.3°C), Nagaland (1.0°C and 1.1°C), and Odisha (1.1°C and 1.4°C) towards mid-century for low emission (RCP4.5) scenario. Projected change in annual rainfall for the selected districts range from; Assam (1.2°C and 1.5°C), Chhattisgarh (1.6°C and 1.9 °C), Jharkhand (1.6°C and 1.7°C), Nagaland (1.2°C and 1.3°C), and Odisha (1.3°C and 1.7°C) towards mid-century for high emission (RCP8.5) scenario.

Warm spell duration indicator (WSDI) is projected to increase for all the districts, Consecutive dry days (CDD) and Consecutive wet days (CWD) are projected to increase (low confidence).

District-wise analysis carried out for projected temperature and rainfall at district level is given in Annexure.

67. In light of these consistent temporal trends (annual and seasonal) of warming and uncertain decreasing/increasing precipitation in 5 participating states with large geographic spatial variation, these climate trends may be of use in informing policy and resource allocation for climate change adaptation.

D. District Climate Change Vulnerability

68. At the national level, there are studies or unified documents available which assess climate change vulnerability at the district level using the new IPCC risk framework or latest climate change projects of IPCC. The Vulnerability Atlas published by NICRA in 2013 dealt with agriculture vulnerability for 572 rural districts of India[29]. In the study "Climate Vulnerability Assessment for the Indian Himalayan Region Using a Common Framework", done by the Indian Institute of Technology-Guwahati and the Indian Institute of Technology-Mandi in

[29] Rama Rao C A, Raju B M K, Subba Rao A V M, Rao K V, Rao V U M, Kausalya Ramachandran, Venkateswarlu B and Sikka A K (2013). Atlas on Vulnerability of Indian Agriculture to Climate Change. Central Research Institute for Dryland Agriculture, Hyderabad.

collaboration with the Indian Institute of Science, Bengaluru[30,] used latest IPCC climate projections to categorise 12 states in the Indian Himalayan Region (IHR). Assam is found to be the most and Nagaland to be moderately vulnerable to the changing climate.

[30] http://himalayageoportal.in/wp-content/uploads/Knowledge_Resources/IHCAP_Climate-Vulnerability-Assessment_30Nov2018_Final_aw.pdf

69. Figure 6 depicts the vulnerability category for the selected districts. Climate change vulnerability compiled from these two literatures is summarised below (some of the new districts have been excluded);

70. **Assam:** Based on IHR study (2018); Baksa (Moderate), Barpeta (High), Golaghat (Moderate), Morigaon (High), Nalbari (Moderate), Sonitpur (High). Major drivers of vulnerability identified are low per capita income, loss of forest cover, low female literacy rate and high percentage of BPL households. NICRA[29] report highlights projected decrease in July rainfall as one of the contributing factor.

71. **Nagaland:** Based on IHR study (2018); Kiphire (High), Kohima (Moderate), Longleng (High), Mokokchung (Low), Mon (High), Phek (Moderate), Wokha (Low), Zunheboto (High). Steepness of slope, loss of forest cover, high variability in crop yield and high percentage of BPL households are the major drivers contibuting to district vulnerability[30].

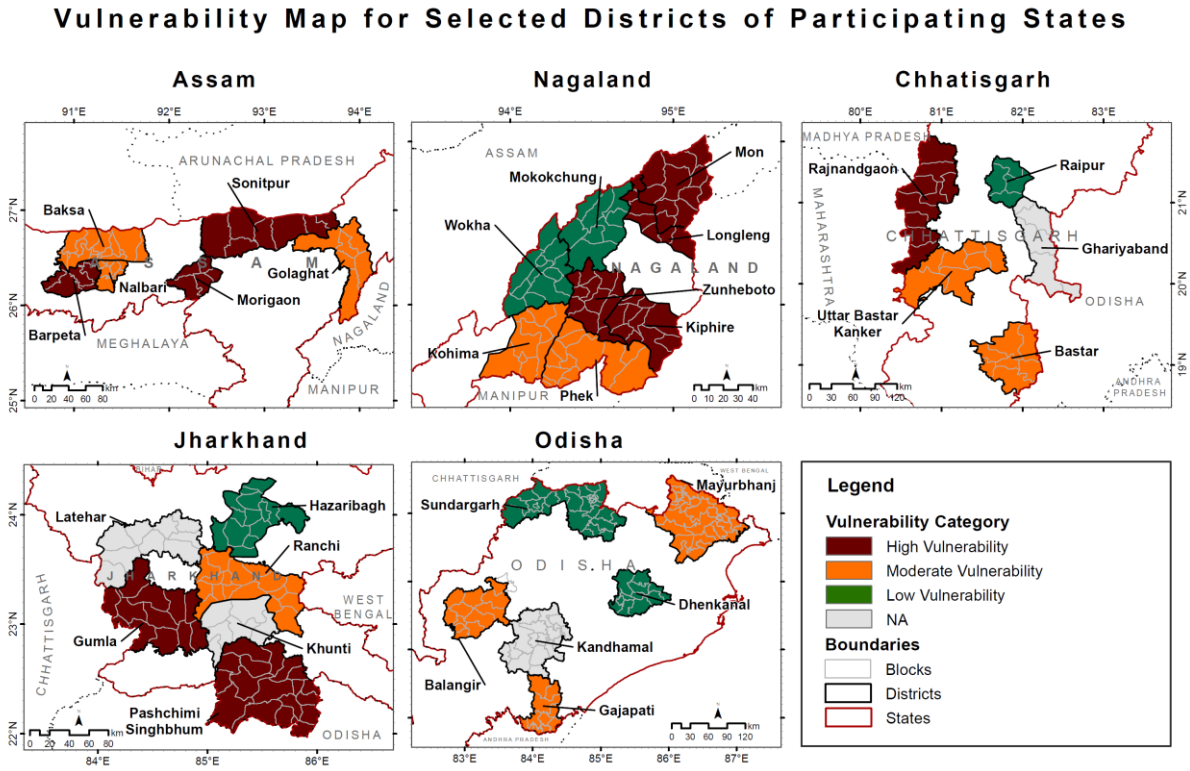
72. **Chhattisgarh:** Based on NICRA study (2013); Bastar (Moderate), Kanker (Moderate), Raipur (Low), Rajnandgaon (High). Contributing factors for district vulnerability are projected increase in number of drought years, high net sown area and low net irrigated area.

73. **Jharkhand:** Based on NICRA study (2013); Gumla (High), Hazaribagh (Low), Ranchi (Moderate), West Singhbhum (High). Projected rise in minimum temperature, high percentage land holding area operated by small and marginal farmers, low net irrigated area are identified as contributing factors to district vulnerability.

74. **Odisha:** Based on NICRA study (2013); Bolangir (Moderate), Dhenkanal (Low), Gajapati (Moderate), Mayurbhanj (Moderate), Sundargarh (Low). Contributing factors for district vulnerability are projected increase in number of drought years, high net sown area and low net irrigated area.

75. **Summary District Vulnerability:** Out of 31 selected districts vulnerability assessment is available for 27 districts. 10 districts belong to high, 11 belong to moderate and 6 belong to low vulnerability category. Though the assessments used to derive the vulnerability do not have the same methodology, indicators and common data sets, these carry value and should be used in conjunction with the inferences drawn from climate analysis made using the latest IPCC AR5 climate scenarios.

Figure 6 District Vulnerability Map

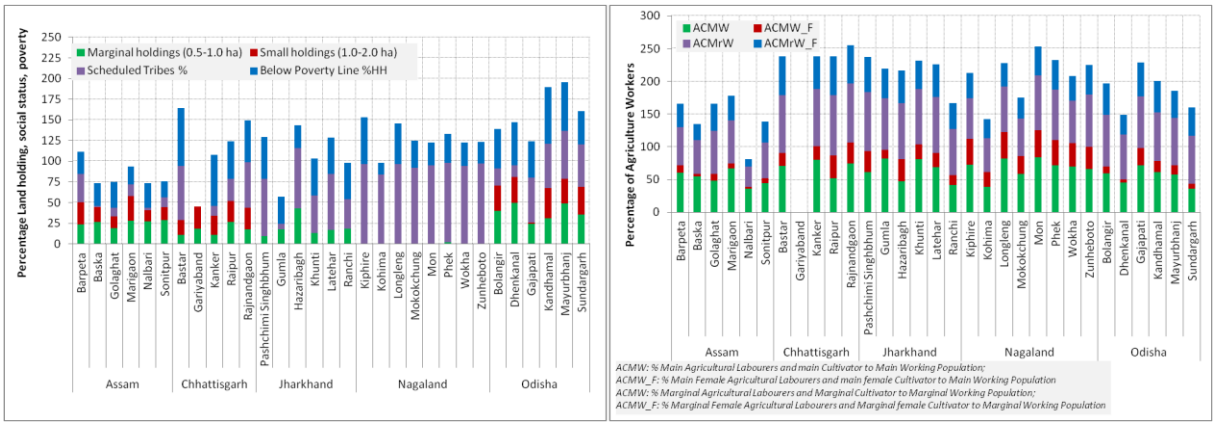


Atlas on Vulnerability of Indian Agriculture to Climate Change. Central Research Institute for Dryland Agriculture, Hyderabad.
Climate Vulnerability Assessment for the Indian Himalayan Region Using a Common Framework, IHCAP

E. Potential project's social, environmental, and climate change impacts and risks

76. **Social Risk:** Close to 52% presence of scheduled tribes, 32% small and marginal land holding, 40% below poverty household make the selected 31 districts socially vulnerable. In addition to these, feminisation of agriculture sector with 22% of main agriculture labourers and cultivators and 42% marginal agriculture labourers and cultivators add to the vulnerability and enhance climate risks (Figure 7). All these factors contribute to low access to information, technology and capacity building in these districts.

Figure 7 Social Risk based on relevant indicators



77. **Environmental Risk:** Steep topographical feature implies lack of availability of flat land and difficulty in access; likely to be adversely affected during floods, landslide, cloudburst, etc. and therefore increases risk. Proximity to protected areas/wild life sanctuaries (man-animal conflicts), dense forest covers may impose restrictions and may need to design appropriate strategies to circumvent.

78. **Climate Risk:** It is evident from the analysis of climate scenarios that the selected districts would have hotter and drier future. Increased Temperature, changes in daytime/nighttime temperatures, changes in Seasons (e.g., start date of rainy season), increased/decreased/more variable rainfall, more severe and/or more frequent extreme events may impact agriculture. Crop loss, change in crop yield, quality of harvest, increase in crop-water demand, reduced soil moisture availability at critical growth period, emergence of new pests and disruption in farm activities etc., may need to be addressed. In addition, duration of out-door farm activities of agriculture labourers are likely to be affected due to heat stress since farm workers do strenuous work continuously under extreme weather conditions. Reduction in livestock products (milk) are also likely to be impacted due to projected increased THI (temperature humidity index). The project should design strategies to prevent farm workers from heat stress which may include building awareness about heat related illness to farm workers and imparting trainings on heat preventive measures.

79. Some of the potential impacts of the project activities are listed in the table.

Potential project impacts	**Measures to address the impacts**
The increased impetus on farm mechanization can increase the energy use, and greenhouse gas emissions. Further, untimely availability of/access to renewable energy-based farm machinery can promote usage of fossil fuel-based conventional farm equipment.	In India, energy use in agriculture is estimated at 2-2.25 kW/ha, which is very low when compared with other countries. The level of farm mechanization is low in the target states. Since the agricultural operations are mostly time-bound, the non-availability or untimely availability of farm equipment promoted under this project can demotivate farmers in adopting renewable energy-based machinery options. Rather, they could shift to traditional sources of farm mechanization. The project should focus on dissemination of technological options that need alternative sources of energy, thus, restricting greenhouse gas emissions. The adequate supply of farm machinery based on the requirements of the target areas needs to be ensured for achieving desired results. This also includes providing timely extension and repair services for farm machinery provided in the target areas.
Increased productivity through farm mechanization can further aggravate crop losses in the absence of effective post- harvest management.	If not properly addressed, the increased production of farm produce can increase post-harvest losses. Thus, the project interventions should focus on strengthening marketing channels and improve capacity of local farmers to invest in value addition. The value addition techniques operated on renewable sources of energy and practices at farm level can bring down the storage costs, reduce crop losses and restrict agricultural waste

Potential project impacts	Measures to address the impacts
Improved profitability of farming could provide incentives for increased use of pesticides and fertilizers, which may adversely impact environment, health of humans, livestock and other animals.	The project areas operate subsistence-based agricultural farming. Though the application of nitrogen (N), phosphorus (P) and potassium (K) fertilizer is far lower as compared to the national average, it is showing a rising trend. The project interventions should bring extension services to the villages more frequently. The project would need to ensure access to extension services would include timely advice to the farmers on adoption of integrated pest and fertilizer management practices in the project areas. This might require investments in capacity building to appropriate government extension workers , lead farmers and community resource persons .
Farm mechanization may bring down women participation in agricultural operations.	Research studies have established that with rise in conventional mechanization, women participation has decreased in agriculture, marginalizing women. Often the women labour force shift to low paying non-agricultural occupations. The project the women participating in the project are members of active Self Help Groups which translates into enterprising women managing IGAs. The project focus on reduced drudgery and reduction of labour inputs and costs, would free up women's time to engage in other productive and remunerative activities through their SHGs.
Higher level of mechanization at affordable prices would improve profitability from farming, which may provide incentives for unsustainable extraction and use of available natural resources such as forest and water.	Improved mechanization as a result of project interventions can increase the environmental and social costs that may further constrain the already limited natural resource repository. The project interventions should focus on climate adaptation interventions to reduce current and expected risk levels cost- effectively
Rural inequality in the target states in case of missing out on proper implementation of the ideal targeting approach as envisaged in project design.	The project implementation should ensure targeting farming households that indeed need project interventions. The selection of households should focus on marginalized sections such as poorest households, landless, agricultural labourers, and women farmers. Work through existing village level institutions such as existing farmer organizations, and the line departments to build capacity and commitment to climate risk management, rather than build project specific institutions to avoid duplication and conflict and ensure institutional sustainability of climate response.

F. SCATE Project's compliance to Climate Finance tracking requirements

80. **Context:** Government of India (GoI) has requested IFAD to finance a project on Scaling up of Agricultural Engineering Technology for smallholder farmers (SCATE). The estimated cost of the project is USD 123.6 million financed by a loan of USD 66.00 million, IFAD grant of USD 1.00 million and the balance by GoI, ICAR, banks and beneficiaries, primarily the users of the technology. The project area covers five states of India namely Assam, Jharkhand, Orissa, Chhattisgarh and Nagaland. Agriculture in these selected states is primarily rain-fed.

81. The major cropping systems and practices in all the five participating states of the SCATE project relate to rice based systems. They are: (i) Assam: Rice-rice (both the crops are rice); Rice- pulses/ oil seeds; (ii) Jharkhand: Rice-pulses / oil seeds; Rice- potato; (iii) Chhattisgarh: Rice-pulses; (iv) Orissa: Rice-pulses/ some oil seeds; and (v) Nagaland: Rice-vegetables in terraces; Rice+ ginger/ (turmeric) + maize + vegetables, and only pineapple, in Jhum lands.

82. **Vulnerability context of this project:** The National Initiative on Climate Resilient Agriculture (NICRA) has ranked all the districts in India using a vulnerability index, which is based on the internationally accepted vulnerability assessment criteria. According to this analysis provided in this report, only 7 out of 31 project districts, (from Assam, Chhattisgarh, Jharkhand and Odisha) are classified an highly vulnerable districts falling within the top 50 percentile districts (largely very high and high vulnerability). The remaining 24 districts are the bottom 50 percentile districts (medium, low and very low vulnerability) and of this 8 districts in Nagaland are least vulnerable to climate change with their vulnerability rankings falling in the bottom 20 percentile districts. This indicates that the climate risk in major parts of the project area is not high.

83. Though with high variation in the length of the rainy season, the number of rainy days, and overall annual precipitation volume, most of these states experience unimodal precipitation, the majority of which occurs between June and December (the rainy, kharif season). In addition to being rain-fed, the entire agriculture (cropping system particularly) in these states is highly influenced by the climate change impacts. There is evidence of shifting of seasons and erratic precipitation (moving on-set and end of rainy season, high rainfall intensity, shortened, or extended rainy period, intermittent long breaks in the rainy season, etc.). Rains during Rabi (winter) season are also scanty. Scanty rains do not provide enough water / moisture to meet the water requirement (evapo-transpirational demand) of the crops. Since the project area is primarily rain-fed without much developed water resources, farmers hesitate to grow a second crop after kharif rice. This result is low cropping intensity as well as in lower yields if at all any crop is sown after kharif rice.

84. Rice being the primary crop of the rainy season, two of the most important rice production operations affected by the climate change are crop establishment and harvesting and threshing operations. Often, due to the vagaries of the climate, rice crop establishment is either delayed, or not done at all, as was the case, e.g. for transplanted rice in Jharkhand in 2018. In this particular year, as observed in Jharkhand Tribal Empowerment and Livelihoods Project (JTELP), rain fall was delayed and farmers in the state kept waiting for the rains till mid-August to transplant their kharif rice crop. Finally some were able to do so as late as in mid-September, leaving the crop growing period too short to produce any decent yields. Only the direct seeded rice, which was sown in July, was successful in this state. At the occurrence of rainfall, there is also a short window to accomplish crop establishment, which through manual

and animal labour means alone is not viable. Delayed planting also extends the crop growing season, eating up the time which could be used for a second crop after kharif rice.

85. Similarly, when rains occur at crop maturity, the harvesting time is prolonged beyond reasonable duration and this extension does not allow a second crop to be planted, and the accumulated residual soil moisture goes to waste. In such a situation there is also a significant loss of the produce (poor recovery) due to wet weather not allowing threshing and drying of the produce.

86. The climate change impacts mentioned above and the associated stress points, such as the high temperature (heat) at the time of occurrence of drought affecting physiological processes of the plant, etc., are difficult to mitigate. However, adaptations to them through introduction of appropriate agricultural engineering technologies to improve productivity as well as higher recovery of the produce is possible . These appropriate farm machinery and equipment need to be demonstrated and scaled up which can ensure timely crop establishment and harvesting as well as post-harvest operations in a short period of time. Some of these technologies related to conservation agriculture also tend to reduce the green-house gas emissions. For example, the direct seeded rice and the aerobic rice have been shown to reduce the methane emissions from the soil as compared to the puddled transplanted rice.

87. **Climate stress challenges pertinent to this project:**

88. **Limited technology solutions:** There is a dearth of agricultural production and processing technologies with smallholder and climate change adaptation focus. Focus on development of renewable energy and energy efficient technologies for farming operations including post-harvest processing are limited. There is also inadequate focus on modification of existing technologies to suit the needs of small farmers especially women. This apart, limited technology demonstrations and scaling up efforts of existing technologies have resulted in low technology adoption reducing farmers' ability to not only lower cost of cultivation, but also to adapt to climate change events particularly in the five participating states of the SCATE project. In the face of this, farming communities continue to practice traditional methods, which are based on manual and animal labour for ploughing and land preparation and harvesting. As a result, particularly with the effects of climate change, most of the field operations are unduly delayed, affecting productivity and increasing production costs.

89. **Precipitation:** One of the principal culprits in relation to climate change is the vagaries of annual precipitation. The on-set and cessation of the rainy period, duration of the rainy season and intensity of rainfall are unpredictable and significantly sliding even within a district, leave alone the state. Occurrence of unexpected rains, or their long break is also common in many cases. This unpredictability constrains the ability of the farmers to adapt to climate change events. Adaptation to this challenge needs support in the mechanization of the land including land preparation, crop establishment (direct seeded and transplanted), harvesting, post-harvest processing and storage.

90. **Large number of animals in agriculture:** As has been mentioned, a large number of animals are used in farm operations, which put pressure on the environment and the natural resources in the project area, especially in terms of enteric fermentation, and adequate forage resources. Supplementing animal power or totally replacing it through mechanical means is expected to resolve much of this stress in the system, though doing so completely may have some bearing on the human nutrition in states where cows and buffalos are used for both, the draft and

milk. However, it will be worth mentioning that the use of animals for dual purpose is uncommon in the states having SCATE Project.

91. The unavailability of technology and its high level adoption can be addressed through a concerted effort on technology development and promotion. Though the vagaries of the precipitation cannot be mitigated, however, adaptations to them are very much feasible and practically possible through mechanical technology.

92. **Intent of the project:** The SCATE project is designed to address the climatic stress challenges of the farmers' through two major components as described in the sections below. The intent of the project is to enhance the ability of the smallholders to adapt to climate change events and this is clearly articulated in the goal and objectives of the project.

93. **Project activities to enable farmers to adapt to climate stress:** This project has two components: (i) Participatory technology development; and (ii) Business models for scaling up of appropriate Agricultural Engineering (AE) technologies. Under the Participatory technology development component, two sub-components will be funded: (i) Assessment and capacity building; and (ii) Innovation platform. Under the Business models for scaling up of appropriate AE technologies two sub-component will be funded: (i) Demonstrations and support service development; and (ii) Scaling up partnerships.

94. **The Participatory technology development component** of the project will build the capacity of ICAR to develop and promote technologies that enable the farmers to adapt to climate change events and to support development of technology needed by the smallholders with reference to development of machineries that are required to adapt to climate change events using renewable energy and energy efficient technologies. The technology development modality will be participatory in nature and will involve consultations with the farmers and also demonstrations in the farmers' field. This component directly addresses the climate stress challenge in the project area related to limited technology solutions to enable farmers adapt to climate change events.

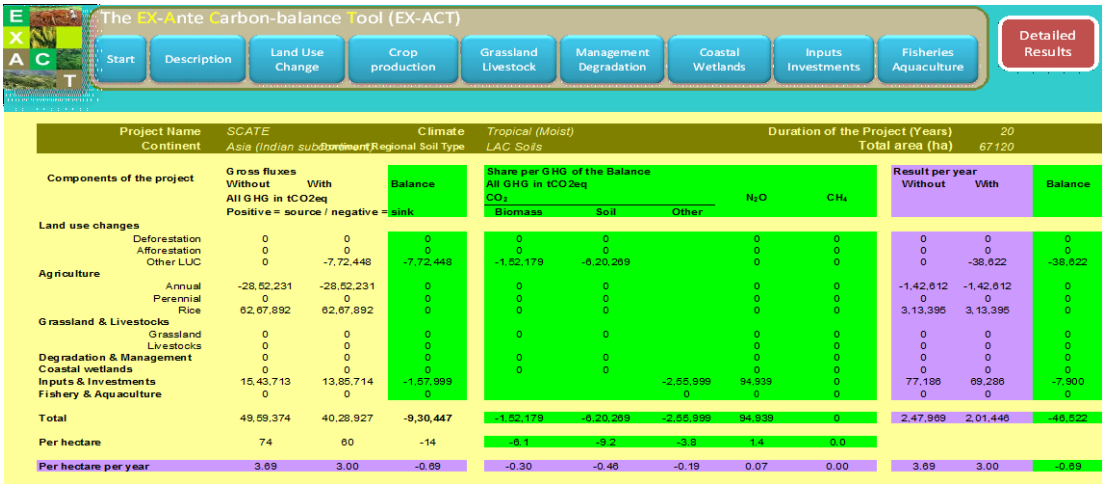
95. **The Business models employed for scaling up of the appropriate AE technologies component** intends to promote both the existing technologies and the newly developed technologies. This will be undertaken through demonstrations, support service development and scaling up of technologies through Farm mechanization units (FMUs), Common facility centres (CFCs) and Agriculture Tool Banks (ATBs), and also machinery and farming tools to farmers. The demonstrations carried out through the Krishi Vigyan Kendras (KVKs), government's extension arm, will not only train the farmers in the use of technology but also on package of practices that will result in replacement of agro-chemicals and use of inorganic fertilizers.

96. **Support service development activities** of the project are an enabling set of activities that facilitate farmers to use the technology required optimally. This, coupled with the scaling up of AE technologies, will enable the farmers to address the climate stress challenges. Mechanization will enable farmers to complete their crop production operations (mechanical crop establishment and weeding, etc.) within a short period, and will ensure use of less agro-chemicals and fertilizers, which will be included in the package of practices that will go along with the use of farm machineries. Farmers will be able to harvest and evacuate the crop fields quickly, resulting in the possibility of a second crop using the residual soil moisture, and further conserving the moisture through crop residue as mulch by harvesting the crop through mechanical means, or seeding with zero tillage. In addition, post-harvest losses will reduce due to solar drying and mechanical threshing technologies.

97. **Mechanization of agriculture operations** replaces animal power with mechanical power. This reduces the climatic stress related to having large number of draft animals in terms of GHG emission and also stress on the forage resources. This gain is partly offset by the use of fossil fuels for prime movers.

98. **EX-ACT Carbon balance analysis:** An analysis using Ex-Ante Carbon-balance Tool (EX-ACT) was carried out during project design. The EX-ACT tool developed by FAO in 2011 for measuring the GHG (greenhouse gases such as carbon dioxide, methane, nitrogen oxide, etc.) emission per unit of land in agriculture production systems is employed. For the purpose of the project, carbon dioxide emission as a result of using the fossil fuel from the use of incremental agricultural machineries, use of 122 kwh electricity replacing fossil fuel and alternate energy (solar power for some 150 processing units), increased use of farm yard manure and compost replacing chemical fertilisers and reducing the use of chemical pesticides from 1,500 ton to 970 ton, bringing 10% area of degraded land to permanent crops have all been considered. Initially the project will add 1,350 tractors of 35 hp, equal number of 15 hp power tillers, 1,350 threshers, 1350 power seed drills, 1350 power reapers, weeders, etc., totalling some 35,646 hp/year. Annual diesel consumption is estimated at 68,650 litres. All these will have some positive and negative impact on the carbon balance of the project area. It is estimated that annual carbon balance will be -46,522 tCO_2 e.q. or -0.69 tCO_2eq/ha per year. The details are in the Table 1 below.

Table 1 Annual Carbon balance estimate



Project Name: SCATE	Climate: Tropical (Moist)	Duration of the Project (Years): 20
Continent: Asia (Indian sub-continent)	Regional Soil Type: LAC Soils	Total area (ha): 67120

Components of the project	Gross fluxes Without	Gross fluxes With	Balance	Share per GHG of the Balance All GHG in tCO2eq CO2 Biomass	CO2 Soil	CO2 Other	N2O	CH4	Result per year Without	Result per year With	Balance
	All GHG in tCO2eq										
	Positive = source / negative = sink										
Land use changes											
Deforestation	0	0	0	0	0		0	0	0	0	0
Afforestation	0	0	0	0	0		0	0	0	0	0
Other LUC	0	-7,72,448	-7,72,448	-1,52,179	-6,20,269		0	0	0	-38,622	-38,622
Agriculture											
Annual	-28,52,231	-28,52,231	0	0	0		0	0	-1,42,612	-1,42,612	0
Perennial	0	0	0	0	0		0	0	0	0	0
Rice	62,67,892	62,67,892	0	0	0		0	0	3,13,395	3,13,395	0
Grassland & Livestocks											
Grassland	0	0	0	0	0		0	0	0	0	0
Livestocks	0	0	0				0	0	0	0	0
Degradation & Management	0	0	0	0	0		0	0	0	0	0
Coastal wetlands	0	0	0	0	0		0	0	0	0	0
Inputs & Investments	15,43,713	13,85,714	-1,57,999			-2,55,999	94,939	0	77,186	69,286	-7,900
Fishery & Aquaculture	0	0	0			0	0	0	0	0	0
Total	49,59,374	40,28,927	**-9,30,447**	-1,52,179	-6,20,269	-2,55,999	94,939	0	2,47,969	2,01,446	-46,522
Per hectare	74	60	-14	-0.1	-9.2	-3.8	1.4	0.0			
Per hectare per year	3.69	3.00	-0.69	-0.30	-0.46	-0.19	0.07	0.00	3.69	3.00	-0.69

G. Recommended features of project design and implementation

99. **Strengths:** Project design is well suited to address impending climate risk envisaged in the selected districts highlighted in Section E. A large section of the target groups belong to rural poor, small and marginal farmers, especially women farmers and NTFP gatherers who are likely to be most affected by climate change, are deemed vulnerable and who may not have ready access to risk-mitigation tools. Development and customization of climate-adapted and mitigation-adapted machinery, tools, and practices for agriculture would thus be of great relevance. This initiative would enable the farm community to adapt early and in an economically efficient way to rapidly changing conditions. Mechanization with due consideration to the fragile environmental settings of the selected districts and customisation would decrease women's workload and drudgery (and hence improved quality of life). Time

spent outdoor on manual field work with extreme heat stress can be shortened by using appropriate customised tools. Considering high slope and smaller farm plots, the Project do not anticipate the use of heavy machinery rather miniaturization some of the farm machineries (e.g. laser land levellers are expected to be downsized to fit with smaller plots). The Project should attempt to develop innovative tools (crop establishment, fertilizer / pest control machinery which makes use of chemicals more efficient) and which would be also more environmental friendly.

100. **Weakness:** Project is mainly focussed on Agricultural mechanization. Climate change impacts on agriculture sector have implications on crop production system. In the event of agriculture becoming not viable due to impact on other inputs (e.g. water, pests), the overall project objective may not be met. Tagging this project initiative with other ongoing programs/policies/projects on agriculture to adopt and enhance production should be adequately addressed and SCATE should seek to integrate itself as part of an integrated farming systems approach

101. **Recommendations:** Due consideration to site/beneficiary selection should be done to minimise environmental risks, for example :: High slopes prone to landslide as well as protected areas should be avoided; area where there is on-going work on soil and water conservation and creation of small-scale irrigation should be targeted as it reduces the risks of rainfed farming; conservation agriculture should be promoted. Other considerations include effective mobile and ICT based advisory services, with adequate training and special emphasis on developing a cadre of women community service providers for capacity building on use of these advisory services. Finally advocacy and capacity building are required to rationalize the use of agrochemicals, and improve post-harvest practices.

H. Primary beneficiary and Institutional stakeholders

102. **The key institutions** relevant to the implementation of project include; (i) SMAM of the MoA&FW; (ii) Agriculture Engineering Division (AED) of Indian Council of Agricultural Research (ICAR) with its network of Agriculture Engineering and Technology Institutes, Farm Machinery Testing and Training Institutes (FMT&TIs) and All India Coordinated Research Project on agricultural machinery technologies (AICRPs); (iii) State Agricultural Universities (SAUs) and the Central Agricultural Universities; (iv) Krishi Vigyan Kendras (KVKs); (v) Agriculture Machinery Manufacturers Association (AMMA); (vi) the State Departments of Agriculture (SDAs); and (vii) farmers & their organisations..

103. **Legal and policy frameworks relevant to the project:** Various policies of both the central government as well as state level will come into play during the implementation of the project.

104. With a view to improve the condition of small and marginal farmers and to double the income of farmers by 2022, Government is realigning its interventions from a production-centric approach to that of a farmers' income-centric initiatives, with focus on better and new technological solutions. These include implementation of schemes like, Pradhan Mantri Krishi Sinchai Yojana (PMKSY), Paramparagat Krishi Vikas Yojana (PKVY), Soil Health Card, Neem Coated Urea, Rainfed Area Development under National Mission for Sustainable Agriculture (NMSA), Pradhan Mantri Fasal Bima Yojana (PMFBY), National Agriculture Market scheme (e-NAM), National Food Security Mission (NFSM), National Mission on Oilseeds & Oilpalm (NMOOP), Mission for Integrated Development of Horticulture (MIDH), Rashtriya Krishi Vikas Yojana (RKVY), National Mission on Agriculture Extension & Technology (NMAET) etc. In

addition, farmers are provided information through Focused Publicity Campaigns, Kisan Call Centres (KCCs), Agri--Clinics and Agri-Business Centres (ACABC) of entrepreneurs, Agri Fairs and exhibitions, Kisan SMS Portal etc.[31]

105. The project can be aligned to the existing policies/programs/acts. Some of the relevant policies/programs/acts are summarized in Table 2 below.

[31] Information given by Minister of State for Ministry of Agriculture & Farmers Welfare, Feb, 2019, http://pib.nic.in/newsite/PrintRelease.aspx?relid=188051

Table 2 Relevant National Acts/Polices/Programs

Act/Rule/Policy	Description	Relevance to the Project
Aajeevika - National Rural Livelihoods Mission (NRLM)	Community managed sustainable agriculture (agro-ecology approaches), Usage of locally available natural inputs – for pest management and soil fertility management, Integrated farming practice with small ruminants, Non Pesticide Management and Natural soil fertility Management, Ensuring the scalability of climate change resilient agriculture practices through Community Best Practitioners (CBPs).	Highly relevant. The State Rural Livelihood Missions will be the project partners for the scaling up of agri-engineering technologies through set-up, management and financing of the farm mechanization units, the CFC and the Agriculture Implements Bank.
Sub-Mission on Agricultural Mechanization (SMAM),	31 drudgery reducing technologies for women in agriculture developed by ICAR are promoted through training, demonstration and financial assistance, Women beneficiaries are also provided 10% additional financial assistance for purchase of various agricultural machines and equipment, Farm Machinery Training and Testing Institutes conducts training on Agricultural Mechanization for women farmers on regular basis.	Project objectives are directly in line with the mission. Project will work with SMAM on demonstration of AET, inclusion of tested AET in the list of subsidized machinery of SMAM, and set up of service and repair centres for the machinery. The project also foresees a strong coordination between AED-ICAR and SMAM-DAC&FW.
Mahila Kisan Sashaktikaran Pariyojana (MKSP)	A sub component of the Deendayal Antodaya Yojana-NRLM (DAY-NRLM) seeks to improve the present status of women in agriculture, and enhance the opportunities available to empower.	Applicable as women constitute an important project beneficiary group and the project needs to ensure participation of women and strengthen their role in decision making, in institutions, access to trainings, in reduction of drudgery.
National commission of women (1990) and National policy for the Empowerment of Women (2001)	These are intended to create a positive environment for the overall development of women and safeguard the rights and legal entitlements of women.	For ensuring their right to equal remuneration.
National Policy on Tribal Development, 1999	"The policy seeks to bring scheduled tribes into the mainstream of society through a multi-pronged approach for their all-round development without disturbing their distinct culture.	Highly relevant and the project uses a participatory approach to technology development,

		demonstration and scaling-up.
Development and empowerment of STs is enshrined in the Constitution and the tribal sub- plans included covered under the Five Year Plans."	"This policy will be applicable to project activities in tribal dominated districts. Project has to ensure participation of tribal communities in the project activities without any adverse impacts on local tribal groups."	Please see below
Tribal Sub Plan	all funds from various programs are pooled and used strategically to support the socio- economic development of tribals within a specified period.	The policy is applicable in the tribal districts. The project interventions can be dovetailed with the Tribal Development Sub Plan.
Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	Land Rights: Right to continue cultivating land (less than or equal to four hectares) where they have been cultivating prior to 13 December 2005., Use Rights: Provides for rights to use and/or collect a) minor forest produce (tendu patta, herbs, medicinal plants) that has been traditionally collected, b) Grazing grounds and water bodies, c) Traditional areas of use by nomadic or pastoralist communities, Right to protect and conserve: Gives the community the right to protect and manage the forest.	One of the project beneficiary group include NTFP gatherers.
Van Dhan Yojana	Aims at mainstreaming tribal community by promoting primary level value addition to Non Timber Minor Forest Produce (MFP) at gatherers and artisans. Through this initiative, the share of tribals in the value chain of Non-Timber Forest Produce is expected to rise from present 20% to around 60%.	Project beneficiary groups include NTFP gatherers and tribal communities.
All India Coordinated Agricultural Research Projects (AICRP)		There are two AIRCP of relevance to the present project: 1) farm implements and machinery; 2) energy in agriculture and agro-based industries.
National Food Security Mission (NFSM)	National Food Security Mission (NFSM) is a Central Scheme of GOI launched in 2007 to increase production and productivity of wheat, rice and pulses on a sustainable basis so as to ensure food security of the country. The aim is to bridge the yield gap in respect of these crops through dissemination of improved technologies and farm management practices.	Highly relevant since all the selected districts are covered under National Food Security Mission.
Mission for Integrated Development of Horticulture (MIDH)	Mission for Integrated Development of Horticulture (MIDH) is a Centrally Sponsored Scheme for the holistic growth of the horticulture sector covering fruits, vegetables, root & tuber crops, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo.	Small and marginal farmers in all the North Eastern States are covered.
Special provisions for women farmers in national schemes		

National Mission on Agricultural Extension & Technology (NMAET) – Sub-Mission on Agricultural Extension (SAME)	Agriculture Technology Management Agency (ATMA) Agri-Clinics & Agri-Business Centers (ACABC) Mass Media Support to Agricultural Extension.	
Mission for Integrated Development of Horticulture (MIDH)		
National Mission on Oilseeds & Oil Palm (NMOOP)		
Integrated Scheme for Agricultural Marketing (ISAM)		
National Food Security Mission (NFSM)		Covered above
National Mission for Sustainable Agriculture (NMSA)		
Sub-Mission on Agricultural Mechanization (SMAM)		As mentioned in the table (row 2)
Agricultural Insurance		
SDG/NDC/National Action Plan on Climate Change (NAPCC), State Action Plan		

I. Monitoring and Evaluation

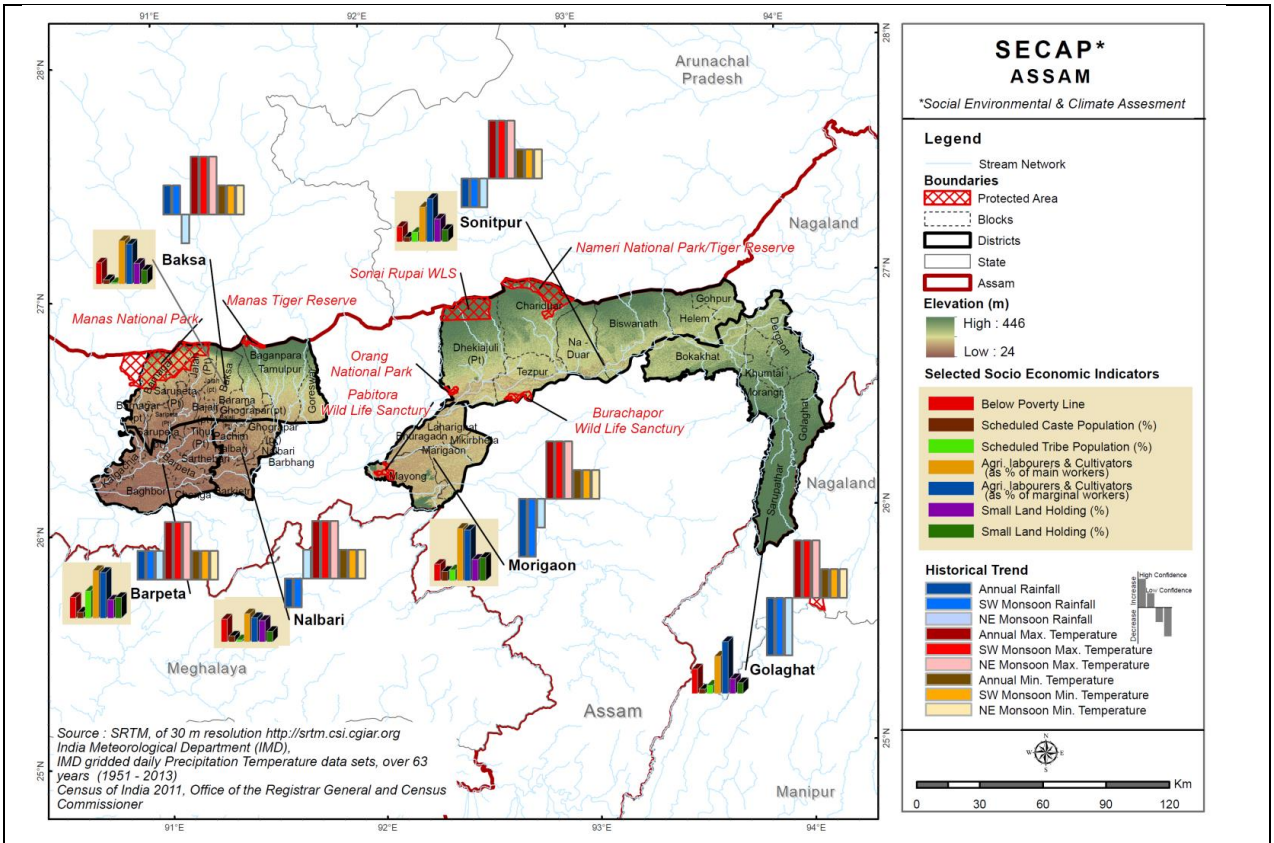
106. The project's M&E system will be aligned to the project log-frame. M&E data will be disaggregated by gender, by age, and by ST. A management information system will be developed in line with other ongoing projects. Baseline, midline and endline surveys as well as annual outcomes surveys will be carried out to document project results and impact. It is recommended that the project staff collect GPS coordinates of all interventions to plot the data in maps and provide a visual representation of activities. This approach enhances monitoring, impact assessment and overall accountability.
107. Given the high climate risk , the project M&E will include periodic studies, every 2 years, to assess beneficiaries' understanding of climate change based on training received from the lead farmers and from their SHGs/VOs/ CIs, and the extent the machinery demonstrated and scaled up is building their adaptive capacity to climate change. The studies will include interviews and focus group discussions with women and men, hill farmers and lowland farmers, ST and non ST households, and with youth. The findings from these studies will allow to fine tune the training, package of practices and AE technologies being promoted.

It is worth noting that all materials related to the SECAP review note of SCATE are available on https://drive.google.com/open?id=14dNqiB65LPen0H4-lu_JxL6leNQwNTYG

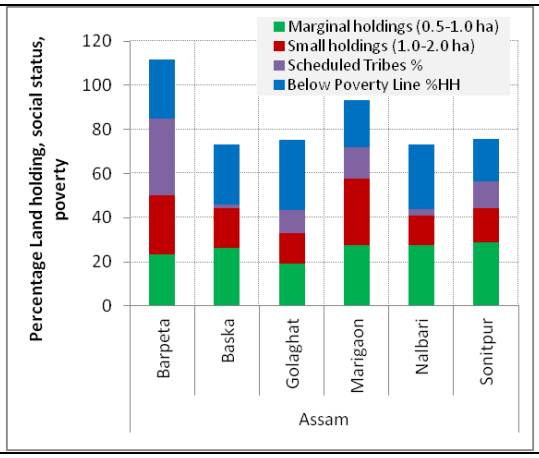
Annexure document

Annexure 1 - List of Figures

Figure 8 Physiographic and Demographic Profile of selected districts of Assam



Socio-economic profile



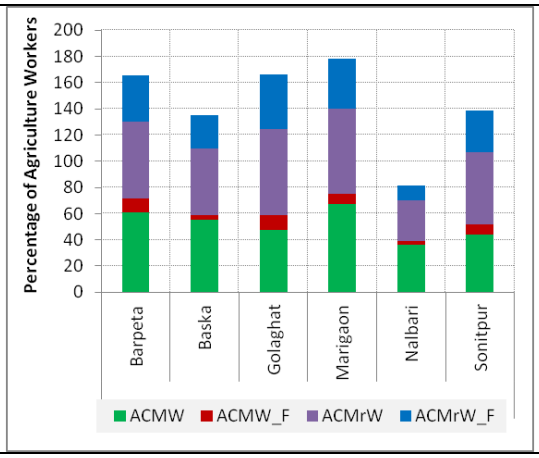
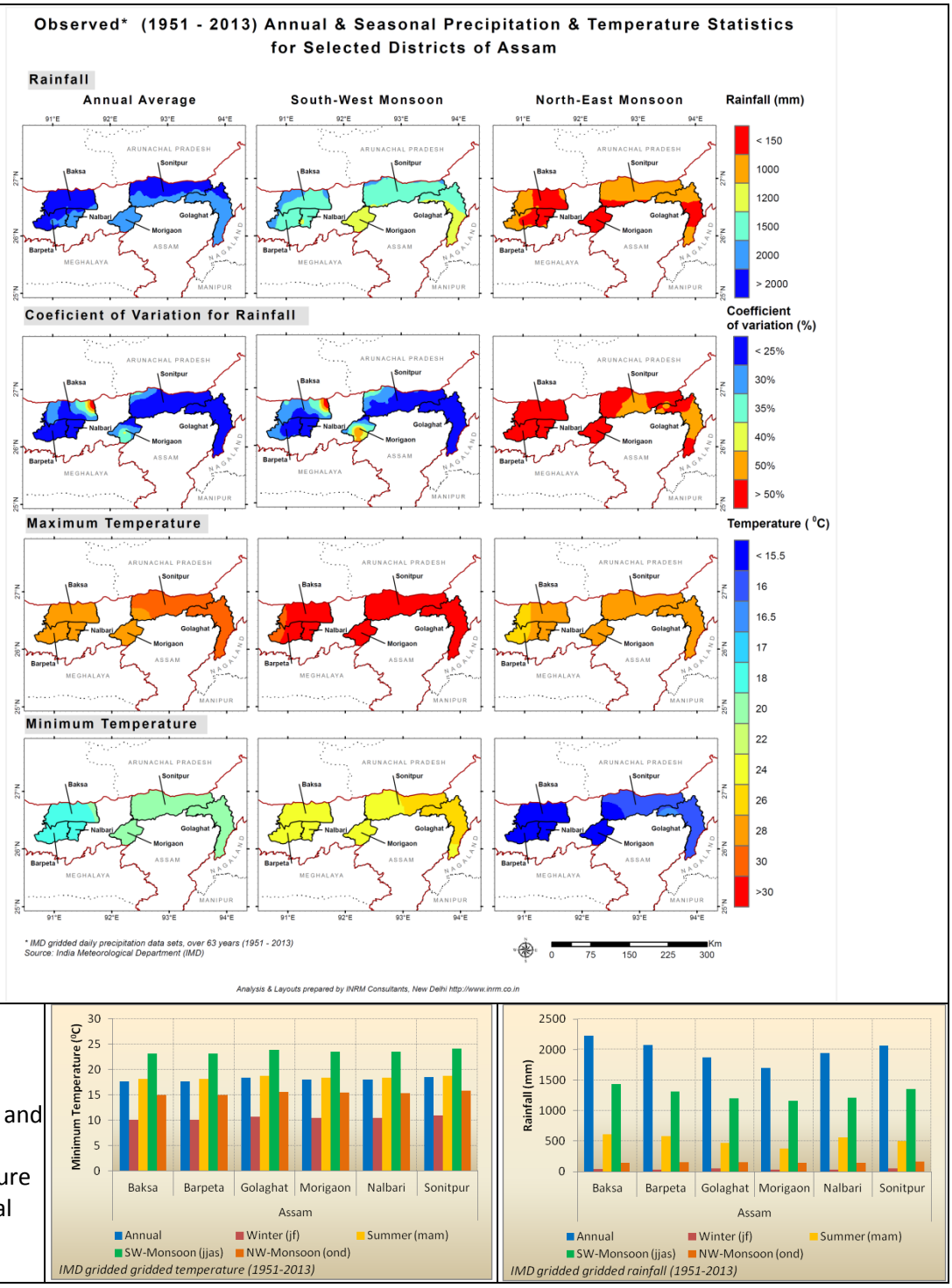
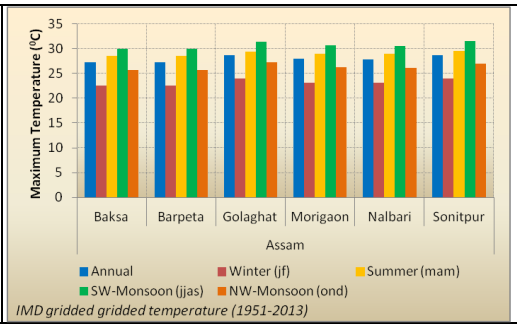

Percentage of Agriculture Workers
200
180
160
140
120
100
80
60
40
20
0
Barpeta
Baska
Golaghat
Marigaon
Nalbari
Sonitpur
ACMW
ACMW_F
ACMrW
ACMrW_F

Figure 9 Historical Climate Profile of selected districts of Assam

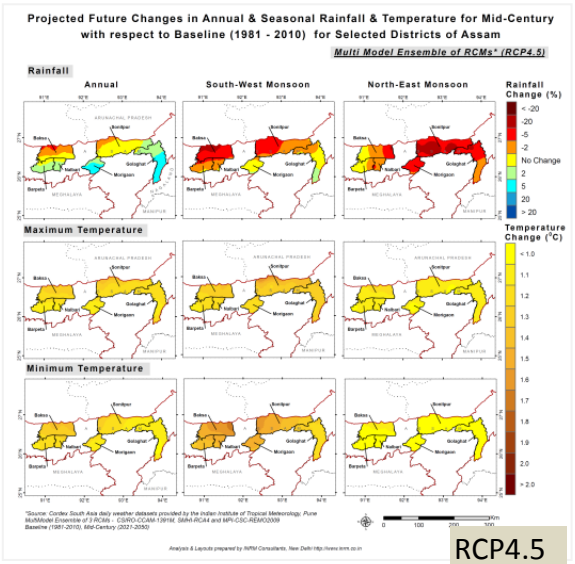


Historical Seasonal Rainfall, maximum and minimum Temperature and Annual trend

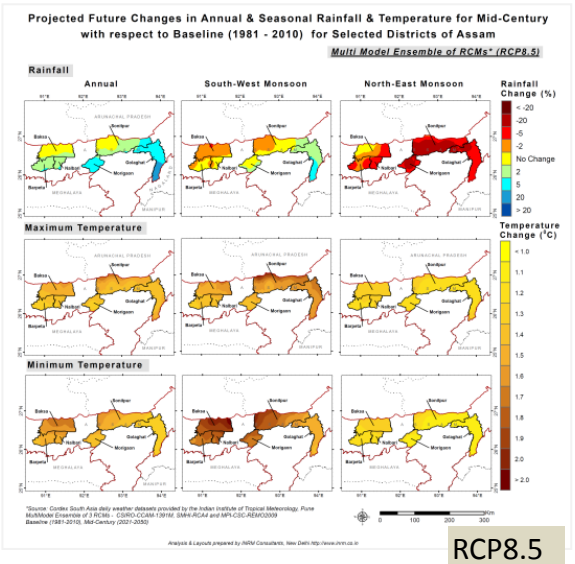


State	District	Rainfall		Tempe-rature	
		ANN	RDAY	MAX	MIN
Assam	Baksa				
	Barpeta				
	Golaghat				
	Morigaon				
	Nalbari				
	Sonitpur				

Figure 10 Projected Climate Profile of selected districts of Assam

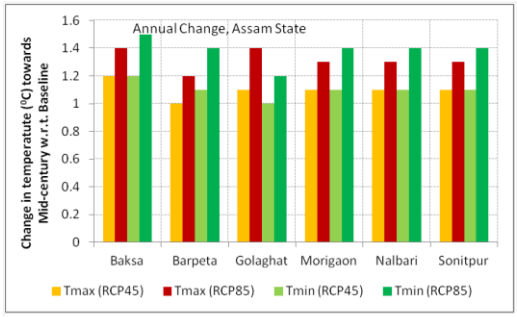


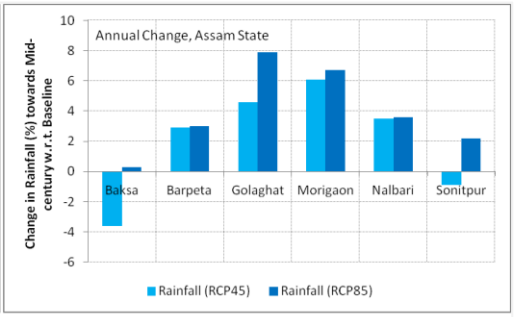
RCP4.5

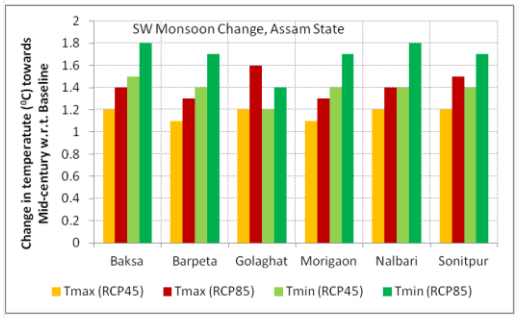


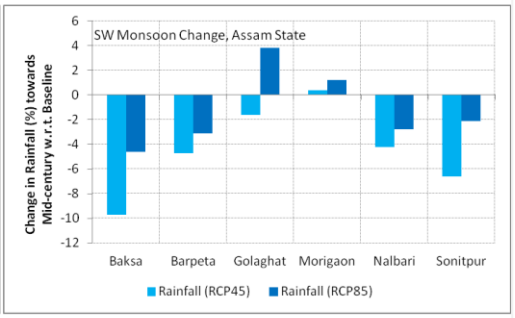
RCP8.5

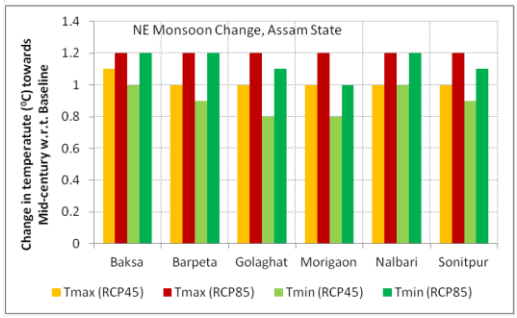
Projected change in Annual and Seasonal maximum and minimum Temperature and Rainfall

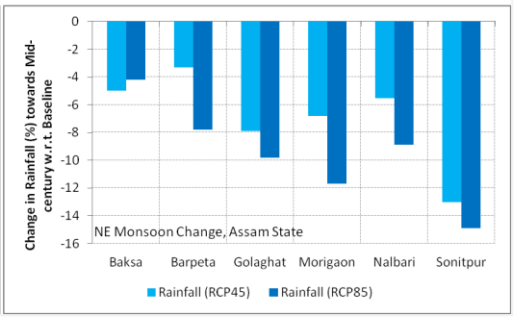












Change from

Scenario	Parameter	Range-Annual	Range-Winter(jf)	Range-Pre-monsoon (mam)	Range-SW-monsoon (jjas)	Range-NE-monsoon (ond)

baseline	rcp45	Rain (%)	-3.6 to 6.1	-23.4 to -5.5	8.4 to 15.8	-9.7 to 0.4	-13 to -3.3
		Tmax	1 to 1.2	1.2 to 1.4	0.8 to 1	1.1 to 1.2	1 to 1.1
		Tmin	1 to 1.2	1.1 to 1.6	0.9 to 1	1.2 to 1.5	0.8 to 1
	rcp85	Rain (%)	0.3 to 7.9	-14.2 to 2	10.5 to 16.5	-4.6 to 3.8	-14.9 to -4.2
		Tmax	1.2 to 1.4	1.4 to 1.6	1.1 to 1.4	1.3 to 1.6	1.2 to 1.2
		Tmin	1.2 to 1.5	1.3 to 1.9	1.2 to 1.4	1.4 to 1.8	1 to 1.2

Trend in Extreme Climate Indices

PS PNS NS

State	District	Baseline									Mid-century - RCP45									Mid-century - RCP85									
		CDD	CWD	R99P	RX1DAY	TN10P	TN90P	TX10P	TX90P	WSDI	CDD	CWD	R99P	RX1DAY	TN10P	TN90P	TX10P	TX90P	WSDI	CDD	CWD	R99P	RX1DAY	TN10P	TN90P	TX10P	TX90P	WSDI
Assam	Baksa																												
	Barpeta																												
	Golaghat																												
	Morigaon																												
	Nalbari																												
	Sonitpur																												

Precipitation indices			
CDD	Duration Indices	Consecutive Dry Days	Maximum number of consecutive days with RR<1mm
CWD	Duration Indices	Consecutive Wet Days	Maximum number of consecutive days with RR>=1mm
R99P	Percentile Indices	Extremely wet day precipitation	Annual total PRCP when RR>99th percentile
RX1DAY	Absolute Indices	Max 1-day precipitation	Monthly maximum 1-day precipitation
Temperature indices			
TN10P	Percentile Indices	Cool nights	Percentage of days when TN<10th percentile
TN90P	Percentile Indices	Warm nights	Percentage of days when TN>90th percentile
TX10P	Percentile Indices	Cool days	Percentage of days when TX<10th percentile
TX90P	Percentile Indices	Warm days	Percentage of days when TX>90th percentile
WSDI	Duration Indices	Warm Spell Duration Indicator	Annual count of days with at least 6 consecutive days when TX>90th percentile

Annexure 2 – Environment and Social Management Plan

A. Positive impact of project implementation

The project places emphasis on supporting marginal smallholder farming through affordable technological options to ensure farming systems are both remunerative as well as resilient to climate change. Various positive social, environment, and economic impacts can be foreseen through implementation of this project. While this project would be instrumental in bridging the gaps between 'lab to land' by providing farmers with appropriate and affordable AE technologies for farming, it would also help(i) develop packages of practices in conjunction with the demonstration and scaling up of AE technologies to address future climate scenarios especially with regard to available 'time slots' for land preparation, crop establishment, disease surveillance and pest control. In order to be sustainable and fully integrated, farmer training should be conducted accordingly; (ii) there should be convergence between project implementation and those SHGs/VOs/CIs involved in the development of irrigation through watershed development, water harvesting and storage, aquifer recharge, lift irrigation etc; (iii) promote conservation agriculture; (iv) extending IT based advisory services to the project target group with special focus on building a cadre of women who are able to deliver these services in their communities. Such a service can well be integrated to the Farm Mechanization Units, Agriculture Tool Banks, and Common Facility Centres to provide an integrated service to farmers. It is expected that these measures will result in improved labour and farm productivity, reduced labour costs and reduced drudgery especially for women .

B. Potential project's social, environmental, and climate change impacts and risks

Social Risk: High percentage of scheduled tribes, people with small and marginal land holding, below poverty household and high percentage of female marginal workers as agriculture labour make the selected 31 districts socially vulnerable. All these factors contribute to low access to information, technology and capacity building in these districts and hence enhanced vulnerability to climate risks.

Environmental Risk: The steep topographical features in the project districts implies lack of availability of flat land and difficulty in access; increased likelihood of being adversely affected during floods, landslide, cloudburst, etc. and therefore increased levels of risks to the proposed interventions. Closeness/proximity to protected areas/wild life sanctuaries (man-animal conflicts), dense forest cover may also impose constraints to project interventions and this may need to be appropriately designed and mitigated against to circumvent the severity of these impacts.

Climate Risk: It is evident from the analysis of climate scenarios presented in the SECAP that the selected districts would experience hotter and drier futures. Increased Temperature, changes in daytime/nighttime temperatures, changes in Seasons (e.g., start date of rainy season), increased/decreased/more variable rainfall, more severe and/or more frequent extreme events which may also impact agricultural activities in the project districts. Districts in Assam (Golaghat,Sonitpur and Morigaon), Chhattisgarh (Raipur), Jharkhand (Lathehar,Ranchi and Gumla), Nagaland (Mon and Mokokchung), Odisha (Balangi and Sundargarh) are particularly vulnerable due to decreasing trend in seasonal rainfall, increasing trend in maximum and minimum seasonal temperature, decreasing trend in rainy days. An implication of this trend directly translates in increase in crop water demand, change in

crop growth and establishment. Crop loss, change in crop yield, quality of harvest, increase in crop-water demand, reduced soil moisture availability at critical growth periods, emergence of new pests and disruption in farm activities etc., may need to be addressed by appropriate and suitable agricultural package of practices which is built into the project. In addition, duration of out-door farm activities of agriculture labourers are likely to be affected due to heat stress since farm workers do strenuous work continuously under extreme weather conditions. Reduction in livestock products (milk) are also likely to be impacted due to projected increased THI (temperature humidity index). The project should design strategies to prevent farm workers from heat stress which may include building awareness about heat related illness to farm workers and imparting trainings on heat preventive measures.

C. Proposed Mitigation Measures

Since the project will operate predominantly in mountainous and forested areas. The risk mitigation measures included in the project design are focused on: (i) facilitating the smallholder to adapt to climate change events related to precipitation, water availability, soil moisture management and replacement of draft animals through introduction of appropriate AE technologies; and (ii) excluding districts/blocks/villages with ecologically sensitive and forest buffer zones areas from the project area. Introduction of fossil fuel driven AE technologies are expected to increase GHG emission but the Ex-ACT analysis conducted indicates negative carbon balance on account of other climate positive changes such as replacement of draft animals. Similarly, introduction of AE machineries will increase farm and labour productivity, and reducing women's workload. The project is not likely to have any adverse environment impacts on the project area and as a result of the risks and mitigation measures highlighted above, the project is classified as Category B for the environmental and social category .

The project will also seek to avoid intervention in fragile areas or biodiversity hotspots and will seek to converge the project interventions with schemes promoting improved agronomic practices. For example the project is working with State Rural Livelihood Missions which seeks to promote best practise in agronomy as part of MKSP (this scheme is listed in table 2 of SECAP review note). The SCATE project is also developing a package of practices that are suitable to use with the agri-machinery for KVKs to work on developing these packages of practices and train the lead farmers accordingly. The project will also seek to rationalize the use of agro-chemicals with more precise and efficient application of regulated pesticides used.

D. Monitoring Programs and Parameters

The project's M&E system will be aligned to the project log-frame. M&E data will be disaggregated by gender, age, and by ST. A management information system will be developed in line with other ongoing projects. Baseline, midline and endline surveys as well as annual outcome surveys will be carried out to document project results and impact. It is recommended that the project staff collect GPS coordinates of all interventions to plot the data in maps and provide a visual representation of activities. This approach enhances monitoring, impact assessment and overall accountability.

Given the high climate risk , the project M&E will include periodic thematic studies, every year, to assess beneficiaries' understanding of climate change based on training received from the lead farmers and from their SHGs/VOs/ CIs, and the extent the machinery demonstrated and scaled up is building their adaptive capacity to climate change. The studies will include interviews and focus group discussions with

women and men, hill farmers and lowland farmers, ST and non ST households, and with youth. The findings from these studies will enable fine tuning of the training andpackage of practices and AE technologies being promoted.

E. Public consultation activities

The project plans to use participatory monitoring and evaluation (PME) whereby an annual workshop is organized by the project at district levels, in which the participating VOs and CIs would be given the opportunity to share their views about the project and identify mechanisms for improvement. With regards to potential environmental and climate risks, PME will focus on building the capacity of the farming extension staff and local communities to analyse, reflect and take decisions and actions for environment and climate risk mitigation. This will help the project further customize the technologies demonstrated and the package of practices promoted in conjunction with the AE technologies, fine tune the businesses of the FMUs, CFCs and ATBs, promote larger market for the tested technologies. The results of the PME will also inform the convergence efforts of the SPMUs and the creation of synergies with state schemes promoting resilience to climate change (such as watershed missions, PMKSY, etc..).

F. Responsibilities

The responsibilities for the implementation of the ESMP lie with the Additional Project Director of the Project and with the 5 State Project Managers. Funding for the ennvironmental monitoring activities outlined in the ESMP are costed in the project finances and listed in the ESMP (annexure 2).

G. Reporting and reviewing

Reporting on the ESMP will be incorporated as part of the reporting system developed for the project. Dedicated environmental/climate change staff from IFAD will join supervisions and review missions to monitor progress of the implementation of the ESMP and associated activities.

H. Capacity building

The project design foresees training of the project staff , researchers and scaling-up partners on climate change adaptation. In the training, the future climate scenario for the project area will be presented and its impact on agriculture and allied activities as relevant to the project, will be detailed. It is worth mentioning that NICRA has developed for each district, a contingency plan to reduce risks of climate change on crop production. These plans may be incorporated into location specific crop advisories. The ESMP will also be presented during the training, so that reporting and consultation requirements are clearly delineated and an implementation plan for support developed.

I. Climate Risk Matrix

Target Groups	Threats	Climate triggers	Risk	Mitigation/Adaptation	Monitoring
Engaged in upland hill farming	Erosion, High Slopes, Undulating terrain, shallow soil, protected area	Heavy/excess rainfall days, 1 day maximum precipitation, Floods	Landslide, soil nutrient loss, erosion leading to shallow soil and hence low water holding capacity	Vegetative bunds, afforestation, soil conservation, Soil test based nutrient application; EbA approaches to support stability of farming lands	Soil Health
Belonging to small and marginal land holding category	Climate shocks, low adaptive capacity	Drought, Consecutive dray days, floods, Pest and diseases, High temperature	Loss of crop leading to income loss, Livestock fodder shortage, malnutrition	Strengthen smallholder associations, Farm mechanisation and customisation, Water harvesting, Farm ponds, heat tolerant crop variety, access to crop/weather insurance	Crop yield, crop health (Leaf Color Chart (LCC)[32])
With rice as one of the main crops	Water availability, methane emission	Temperature, Co2, Flood, drought, High temperature (Early mature, loss of yield), Pests and diseases	Yield loss, poor seed quality	Farm ponds, Conservation agriculture, SRI, adoption of CA approaches to sustain farming	Recording weed frequency for SRI
Under rainfed conditions	Water availability, erratic rainfall distribution, early maturity	Consecutive wet and dry days, low seasonal rainfall, shifting season (1	Crop loss	Agriculture advisories, extension worker support, Farm ponds, Conservation agriculture, SRI, Water budget and distribution/communi	NICRA advisories and recording of rainfall by CIs and KVKs

[32] Leaf Color Chart (LCC) is an innovative cost effective tool for real-time or crop-need-based N management in Rice, Maize and Wheat. LCC is a visual and subjective indicator of plant nitrogen deficiency and is an inexpensive and easy to use. It measures leaf color intensity that is related to leaf N status. LCC is an ideal tool to optimize N use in Rice/Maize/Wheat at high yield levels, irrespective of the source of N applied, viz.,organic manure, biologically fixed N, or chemical fertilizers. Thus, it is an eco-friendly tool in the hands of farmers. The LCC had been jointly developed by International Rice Research Institute (IRRI) and Philippines Rice Research Institute (PhilRice) from a Japanese prototype, for the purpose of measuring the required quantity of nitrogen to be applied in Rice field and thereby to get a maximum productivity. The LCC is also suitable for maize & wheat providing farmers with a good diagnostic tool for detecting N deficiency.The LCCs relevant to use for Sugarcane, Potato, Cotton, Cassava,Vegetables,Mustard,Oilpalm etc. are under Research and Development in order to maximize the yield of these crops. (http://www.nitrogenparameters.com/about.html)

		week to 10 days)		ty based demand management	
With special focus on women farming community including agriculture labourers	Drudgery, health	Heat stress, flood/malaria	Physical exhaustion, health hazards	AE machineries, Early warning, advisories, Develop a cadre of women CSPs for capacity building of women farmers, guidelines for framed and implemented for protection of farm workers from heat, capacity building	Mobile advisory based on AWS, Milk yield from livestock/small ruminants
Support other livelihood activities like Non Timber Forest Produce gathering; and small scale livestock rearing	Forest Fire, forest disturbance, threat to biodiversity	Temperature, humidity, wind speed	Income loss, loss of biodiversity, forest defragmentation, grazing/fodder loss, fuelwood loss	Capacity building, awareness	Veterinary care, disease surveillance, improved feeding and shelter

J. Environmental and Social Management Plan (ESMP)

Key Requirements	Actions	Indicator	Responsibility	Time Frame	Budget Source
Steep topographical feature, High Slopes, Undulating terrain, shallow soil	Hazard, Risk, Vulnerability assessment should be done before finalising the sites	HVRA Maps and hotspots	Project Implementation Agency/unit	Beginning of project	Inventory preparation (component 1) and scaling up partnership (component 2)
Landslide, soil nutrient loss, erosion leading to shallow soil and hence low water holding capacity	Preparation of environmental guidelines for selected districts/sites of the projects	Crop yield, CA practices adapted (no of farmers practicing SRI etc.)	PIU /local KVKs/CIs	To be prepared in advance of project interventions and implementation to be monitored at quarterly intervals thereafter	Scaling up partnership (village selection)
Proximity to Protected Area/ fragile areas or biodiversity hotspots	Environmental guidelines including environmental screening, approvals, mitigation measures and selection criteria which exclude interventions in close proximity/adjacent to PA's	Environment sensitive design/eco-friendly design	PIU/State Env department/Wild life Institute	To be prepared in advance of project interventions and implementation to be monitored at quarterly intervals thereafter	No budget as such areas are excluded from project coverage
Soil nutrient loss, fertilizers	Soil health card, Leaf colour chart training	No of people trained and amount of fertilizers used	ICAR/KVKs/Local trained youths	Beginning of project	Under ICAR capacity building (component 1) for development of location specific package of practices)
High Temperature, Reduced Rainfall, variability	Demonstration of Drought Proofing techniques / Conservation Agriculture, Identify existing/ongoing programs for co-benefit	Training, Advocacy, Communication material, People trained	Need to hire Advocacy groups who know the local settings/situation atleast initially. Also require good communication specialist for designing	To be prepared in advance of project interventions	As per above (training and capacity building on climate change)

Key Requirements	Actions	Indicator	Responsibility	Time Frame	Budget Source
			appropriate local language simple hand outs		
Presence of Tribal people	Training on safe use of pesticides in agriculture/NTFP		Local Universities/PIU/Forest Department/Legal expert (rights of tribals and their land holding)		Under component 1 for development of location specific package of practices
Farmer – female (small and marginal lands)	Trainings/extension to be tailored to their time availability	Analysis of effect of technology adoption on their workload	KVKS/Locally trained CSP, Women SHG/Health inspector- Health impacts	To be prepared in advance of project interventions and implementation to be monitored throughout project implementation period	Under component 2, third party assessment of training and demonstrations
NTFP Gatherers	Knowledge of local plants/trees and traditional techniques and Understand and support for sustainable management of the resource		Local universities (compendium/compilation of traditional methods)/KVKs/Forest department	To be prepared in advance of project interventions	Under component 1 for development of location specific package of practices

Investing in rural people

India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

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

Document Date: 25/07/2019

Project No. 2000001941

Asia and the Pacific Division
Programme Management Department

Annex 6 - First Annual Work Plan and Budget

ANNEX-6: FIRST ANNUAL WORK PLAN AND BUDGET (2019/20)

Summary

Component/ Sub-component/Item	Unit	Appraisal targets		Annual Financial Targets (000 INR)					Financing by financiers (000 INR)						Prev. year achivement	
		Physical	Financial	Q1	Q2	Q3	Q4	Total	GOI	ICAR	IFAD	IFAD Grant	Banks	Bene	Physical	Financial
Component 1: Participatory technology development																
1.1 *Need assessment*			32,899	0	2,000	6,800	1,950	10,750	0	1,075	9,675	0	0	0		
1.2 *ICAR capacity building*			88,433	0	0	1,022	500	1,522	0	152	900	469	0	0		
1.3 *Innovation platform*			41,388	0	7,200	450	8,400	16,050	0	1,605	14,445	0	0	0		
Total component 1			*1,62,720*	*0*	*9,200*	*8,272*	*10,850*	*28,322*	*0*	*2,832*	*25,020*	*469*	*0*	*0*		
Component 2: Demonstrations and scaling up of AET																
2.1 *Demonstration of AE technologies*			15,52,805	22,320	3,32,520	31,400	30,900	4,17,140	64,392	92,080	2,60,668	0	0	0		
2.2 *Support services development*			26,394	10,000	0	0	0	10,000	1,000	0	9,000	0	0	0		
2.3 *Scaling up AE technologies*			3,54,989	23,700	1,000	0	0	24,700	3,440	0	21,260	0	0	0		
Total component 2			*19,34,188*	56,020	3,33,520	31,400	30,900	4,51,840	*68,832*	*92,080*	*2,90,928*	*0*	*0*	*0*		
Component 3 Project Management																
3.1 *Project management*			*9,74,437*	1,624	21,770	12,505	18,774	54,673	5,283	0	49,390	0	0	0		
3.2 *Project M&E and KM*			*51,402*	0	0	4,070	5,000	9,070	1,814	0	7,256	0	0	0		
Total component 3			10,25,839	1,624	21,770	16,575	23,774	63,743	7,097	0	56,646	0	0	0		
Project Total			*31,22,747*	*57,644*	*3,64,490*	*56,246*	*65,524*	*5,43,905*	*75,929*	*94,912*	*3,72,594*	*469*	*0*	*0*		

ANNEX-6: FIRST ANNUAL WORK PLAN AND BUDGET (2019/20)

COMPONENT 1

Component/ Sub-component/Item	Unit	Appraisal targets		Annual Physical targets					Unit cost	Annual Financial Targets (000 INR)					Financing by financiers (000 INR)						Prev. year achivement	
		Physical	Financial	Q1	Q2	Q3	Q4	Total	(000 INR)	Q1	Q2	Q3	Q4	Total	GOI	ICAR	IFAD	IFAD Grant	Banks	Bene	Physical	Financial
Comp: 1.1: Need assessment																						
1.1.0 Inventory preparation																						
1.1.1 Study team	study	1	2,562.5	0.0	0.0	1.0	0.0	1	2,500.0	0.0	0.0	2,500.0	0.0	2,500.0	0.0	250.0	2,250.0	0.0	0.0	0.0		
1.1.2 District level consultation	district	1	17,557.0	0.0	0.0	1.0	0.0	1	100.0	0.0	0.0	100.0	0.0	100.0	0.0	10.0	90.0	0.0	0.0	0.0		
1.1.3 State level validation	state	155	5,663.0	0.0	10.0	21.0		31	200.0	0.0	2,000.0	4,200.0	0.0	6,200.0	0.0	620.0	5,580.0	0.0	0.0	0.0		
1.1.3 National level finalisation	Central	25	1,415.9	0.0	0.0	0.0	5.0	5	250.0	0.0	0.0	0.0	1,250.0	1,250.0	0.0	125.0	1,125.0	0.0	0.0	0.0		
1.1.4 Inventory publication	LS	5	512.5	0.0	0.0	0.0	1.0	1	500.0	0.0	0.0	0.0	500.0	500.0	0.0	50.0	450.0	0.0	0.0	0.0		
1.1.5 Inventory updating		1	1,189.4	0.0	0.0	0.0	1.0	1	200.0	0.0	0.0	0.0	200.0	200.0	0.0	20.0	180.0	0.0	0.0	0.0		
1.2.0 Database management																						
1.2.1	State		3,998.7	0.0	0.0	0.0	0.0	0	2,500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Sub-total Component 1.1			*32,899.0*							*0.0*	*2,000.0*	*6,800.0*	*1,950.0*	*10,750.0*	*0.0*	*1,075.0*	*9,675.0*	*0.0*	*0.0*	*0.0*		
Comp 1.2 ICAR capacity building																						
1.2.1 Training and capacity building																						
Techno-economic assessment of AET	LS	1	807.0	0.0	0.0	0.0	0.0	0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Training in techno-economic protocol	batch	6	6,785.0	0.0	0.0	0.0	0.0	0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Technoly manual for demonstrations	LS	50	4,078.0	0.0	10.0	0.0	0.0	10	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Package of practices for state specific crops	LS	30	2,423.0	0.0	0.0	0.0	0.0	0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Training in technical manuals & POP	LS	50	19,983.0	0.0	0.0	0.0	0.0	0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Exposure visits	LS	120	27,833.0					0	200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Climate risk analysis	LS	1	20,860.0	0.0	0.0	0.025	0.0	0	20,860.0	0.0	0.0	521.5	0.0	521.5	0.0	52.2	0.0	469.4	0.0	0.0		
Consultation with AMMA	per-month	10	5,664.0	0.0	0.0	1.00	1.0	2	500.0	0.0	0.0	500.0	500.0	1,000.0	0.0	100.0	900.0	0.0	0.0	0.0		
Sub-total Component 1.2			88,433.0							0.0	0.0	1,021.5	500.0	1,521.5	0.0	152.2	900.0	469.4	0.0	0.0		
Comp 1.3 Innovation platform																						
1.3.0 Technology development																						
Concept to protypes	module			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		
Request for proposals	persons	5	850.0	0	1	0	0	1	150.0	0.0	150.0	0.0	0.0	150.0	0.0	15.0	135.0	0.0	0.0	0.0		
Evaluation committee meeting	persons	15	2,459.0	0	0	3	0	3	150.0	0.0	0.0	450.0	0.0	450.0	0.0	45.0	405.0	0.0	0.0	0.0		
	persons									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Adaptation & modification								0														
Request for proposals	FPO	5	850.0	0	1	0	0	1	150.0	0.0	150.0	0.0	0.0	150.0	0.0	15.0	135.0	0.0	0.0	0.0		
Evaluation proposals	persons	85	14,933.0	0	0	0	1	1	150.0	0.0	0.0	0.0	150.0	150.0	0.0	15.0	135.0	0.0	0.0	0.0		
Prototype to commercialisation								0														
Technology challenges- Central	batch	3	3,231.0	0	1	0	0	1	1,000.0	0.0	1,000.0	0.0	0.0	1,000.0	0.0	100.0	900.0	0.0	0.0	0.0		
Technology challenges- State	batch	15	16,157.0	0	5	0	0	5	1,000.0	0.0	5,000.0	0.0	0.0	5,000.0	0.0	500.0	4,500.0	0.0	0.0	0.0		
Evaluation committee	pers_year	18	2,908.0	0	6	0	55	61	150.0	0.0	900.0	0.0	8,250.0	9,150.0	0.0	915.0	8,235.0	0.0	0.0	0.0		
Sub-total Component 1.3			41,388.0							0.0	7,200.0	450.0	8,400.0	16,050.0	0.0	1,605.0	14,445.0	0.0	0.0	0.0		
Total Component 1			*1,62,720.0*							*0.0*	*9,200.0*	*8,271.5*	*10,850.0*	*28,321.5*	*0.0*	*2,832.2*	*25,020.0*	*469.4*	*0.0*	*0.0*		

ANNEX-6: FIRST ANNUAL WORK PLAN AND BUDGET (2019/20)

COMPONENT 2

Component/ Sub-component/Item	Unit	Appraisal targets		Annual Physical targets					Unit cost	Annual Financial Targets (000 INR)					Financing by financiers (000 INR)						Prev. year achivement	
		Physical	Financial	Q1	Q2	Q3	Q4	Total	(000 INR)	Q1	Q2	Q3	Q4	Total	GOI	ICAR CONVER	IFAD	IFAD Grant	Banks	Bene	Physical	Financial
Comp: 2.1: Demonstration of AE of technologies																						
2.1.1																						
Lead farmer identification	Block	135	28,444.0		65.0			65	200.0	0.0	13,000.0	0.0	0.0	13,000.0	2,600.0	0.0	10,400.0	0.0	0.0	0.0		
Lead farmer training	batch	200	10,927.0		20.0			20	50.0	0.0	1,000.0	0.0	0.0	1,000.0	200.0	0.0	800.0	0.0	0.0	0.0		
Third party assessment of training	VO	6,000	16,828.0			200		200	2.5	0.0	0.0	500.0	0.0	500.0	100.0	0.0	400.0	0.0	0.0	0.0		
Demo machinery to KVK by SMAM	set	31	25,369.0	0.0	6.0	0	0	6	1,500.0	0.0	9,000.0	0.0	0.0	9,000.0	0.0	9,000	0.0	0.0	0.0	0.0		
Demo machinery to KVK by IFAD	set	31	23,831.0	0.0	6.0	0	0	6	1,500.0	0.0	9,000.0	0.0	0.0	9,000.0	1,800.0	0.0	7,200.0	0.0	0.0	0.0		
Low cost AET machineries to KVK fromtraining	set	31	19,660.0	0.0	17.0	0	0	17	600.0	0.0	10,200.0	0.0	0.0	10,200.0	2,040.0	0.0	8,160.0	0.0	0.0	0.0		
Field days by lead farmers	batch	2,000	26,266.0	0.0	1,000.0	0	0	1,000	12.5	0.0	12,500.0	0.0	0.0	12,500.0	2,500.0	0.0	10,000.0	0.0	0.0	0.0		
Prime mover rentals	batch	2,000	5,25,313.0	0.0	1,000.0	0	0	1,000	250.0	0.0	2,50,000.0	0.0	0.0	2,50,000.0	50,000.0	0.0	2,00,000	0.0	0.0	0.0		
Incremental staff to KVK								0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Agri engineer	pers_year	126	70,378.0	0.0	0.0	5.5	5.5	11	480.0	0.0	0.0	2,640.0	2,640.0	5,280.0	1,056.0	0.0	4,224.0	0.0	0.0	0.0		
Agri extension officer	pers_year	126	70,378.0	0.0	0.0	5.5	5.5	11	480.0	0.0	0.0	2,640.0	2,640.0	5,280.0	1,056.0	0.0	4,224.0	0.0	0.0	0.0		
Accounts assistants	pers_year	126	43,986.0	0.0	0.0	5.5	5.5	11	300.0	0.0	0.0	1,650.0	1,650.0	3,300.0	660.0	0.0	2,640.0	0.0	0.0	0.0		
Multi purpose assistants	pers_year	126	43,986.0	0.0	0.0	5.5	5.5	11	300.0	0.0	0.0	1,650.0	1,650.0	3,300.0	660.0	0.0	2,640.0	0.0	0.0	0.0		
Office equipment and materials	KVK	31	16,400.0	0.0	11.0	0	0	11	500.0	0.0	5,500.0	0.0	0.0	5,500.0	1,100.0	0.0	4,400.0	0.0	0.0	0.0		
KVK salary and allowances																						
Staff salaries	pers_year	181	4,38,221.0	7.8	7.8	8	8	31	2,000.0	15,500.0	15,500.0	15,500.0	15,500.0	62,000.0	0.0	62,000	0.0	0.0	0.0	0.0		
Staff salaries	pers_year	181	96,409.0	7.8	7.8	8	8	31	440.0	3,410.0	3,410.0	3,410.0	3,410.0	13,640.0	0.0	13,640	0.0	0.0	0.0	0.0		
Office expenses	Year	181	52,587.0	7.8	7.8	8	8	31	240.0	1,860.0	1,860.0	1,860.0	1,860.0	7,440.0	0.0	7,440	0.0	0.0	0.0	0.0		
Vehicle hiring	Year	181	43,822.0	7.8	7.8	8	8	31	200.0	1,550.0	1,550.0	1,550.0	1,550.0	6,200.0	620.0		5,580.0					
Sub-total Component 2.1			15,52,805.0							22,320.0	3,32,520.0	31,400.0	30,900.0	4,17,140.0	64,392.0	92,080	2,60,668.0	0.0	0.0	0.0		
2.2 ***Support services deployment***																						
Support to State Agro-industries	state	5	26,394.0	2.0				2.0	5,000.0	10,000.0	0.0	0.0	0.0	10,000.0	1,000.0	0.0	9,000.0	0.0	0.0	0.0		
Sub-total Component 2.2			26,394.0					0.0		10,000.0	0.0	0.0	0.0	10,000.0	1,000.0	0.0	9,000.0	0.0	0.0	0.0		
2.3 ***Scaling up AE technologies***																						
2.3 Scaling up partnership																						
Preparation of guidelines	LS	1	1,000.0		1.0			1.0	1,000.0	0.0	1,000.0	0.0	0.0	1,000.0	200.0	0.0	800.0	0.0	0.0	0.0		
Consultation workshops at district level	district	186	43,226.0	31.0				31.0	200.0	6,200.0	0.0	0.0	0.0	6,200.0	1,240.0	0.0	4,960.0	0.0	0.0	0.0		
Consultation workshops at state level	state	5	17,430.0	5.0				5.0	500.0	2,500.0	0.0	0.0	0.0	2,500.0	500.0	0.0	2,000.0	0.0	0.0	0.0		
Management support																						
Capacity building support to SRLM	state	5	52,290.0	5.0				5.0	1,500.0	7,500.0	0.0	0.0	0.0	7,500.0	750.0	0.0	6,750.0	0.0	0.0	0.0		
Block level staff support for SRLM	LS/year		1,88,753.0	0.0				0.0	240.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Capacity building support to other partners	State		52,290.0	5.0				5.0	1,500.0	7,500.0	0.0	0.0	0.0	7,500.0	750.0	0.0	6,750.0	0.0	0.0	0.0		
Sub-total Component 2.3			3,54,989.0					0.0		23,700.0	1,000.0	0.0	0.0	24,700.0	3,440.0	0.0	21,260.0	0.0	0.0	0.0		
Total Component 2			*19,34,188.0*							*56,020.0*	*3,33,520.0*	*31,400.0*	*30,900.0*	*4,51,840.0*	*68,832.0*	*92,080.0*	*2,90,928.0*	*0.0*	*0.0*	*0.0*		

ANNEX-6: FIRST ANNUAL WORK PLAN AND BUDGET (2019/20)

PROJECT MANAGEMENT

	Component/ Sub-component/Item	Unit	Appraisal targets		Annual Physical targets					Unit cost	Annual Financial Targets (000 INR)					Financing by financiers (000 INR)					
			Physical	Financial	Q1	Q2	Q3	Q4	Total	(000 INR)	Q1	Q2	Q3	Q4	Total	GOI	ICAR	IFAD	IFAD Grant	Banks	Bene
	Comp 3 Project management																				
3.1.1	Office equipment PIU																				
	Laptops	#	15	1050.0		15			15	70.0	0.0	1,050.0	0.0	0.0	1,050.0	210.0		840.0			
	Desktops	#	7	525.0		7			7	100.0	0.0	700.0	0.0	0.0	700.0	140.0		560.0			
	Printers	#	2	200.0		2			2	200.0	0.0	400.0	0.0	0.0	400.0	80.0		320.0			
	Xerox mechines	#	3	800.0		3			3	200.0	0.0	600.0	0.0	0.0	600.0	120.0		480.0			
	UPS	#	7	105.0		7			7	15.0	0.0	105.0	0.0	0.0	105.0	21.0		84.0			
	LCD projectors	#	2	400.0		2			2	200.0	0.0	400.0	0.0	0.0	400.0	80.0		320.0			
	Digital camera	#	3	78.8		3			3	25.0	0.0	75.0	0.0	0.0	75.0	15.0		60.0			
	Video camera	#	3	315.0		3			3	100.0	0.0	300.0	0.0	0.0	300.0	60.0		240.0			
	Tablets or smartphones	#	15	378.0		15			15	30.0	0.0	450.0	0.0	0.0	450.0	90.0		360.0			
	Office Furniture	#	1	2250.0		1			1	150.0	0.0	150.0	0.0	0.0	150.0	30.0		120.0			
	Office equipment SPMU																				
	Laptops	#	5	350.0		5			5	70.0	0.0	350.0	0.0	0.0	350.0	70.0		280.0			
	Desktops	#	5	375.0		5			5	75.0	0.0	375.0	0.0	0.0	375.0	75.0		300.0			
	Printers	#	5	500.0		5			5	100.0	0.0	500.0	0.0	0.0	500.0	100.0		400.0			
	Xerox mechines	#	5	1000.0		5			5	200.0	0.0	1,000.0	0.0	0.0	1,000.0	200.0		800.0			
	UPS	#	5	78.8		5			5	15.0	0.0	75.0	0.0	0.0	75.0	15.0		60.0			
	LCD projectors	#	5	1000.0		5			5	200.0	0.0	1,000.0	0.0	0.0	1,000.0	200.0		800.0			
	Digital camera	#	5	125.0		5			5	25.0	0.0	125.0	0.0	0.0	125.0	25.0		100.0			
	Video camera	#	5	500.0		5			5	100.0	0.0	500.0	0.0	0.0	500.0	100.0		400.0			
	Tablets or smartphones	#	12	378.0		12			12	30.0	0.0	360.0	0.0	0.0	360.0	72.0		288.0			
	Office Furniture	#	5	500.0		5			5	150.0	0.0	750.0	0.0	0.0	750.0	150.0		600.0			
3.1.3	Technical assistance	pers_month	132	66000.0						500.0	0.0		0.0	0.0							
	Internal audits	year	36	3846.2				6	6	1,000.0	0.0	0.0	0.0	6,000.0	6,000.0	1,200.0		4,800.0			
	External audit	year	5	6410.4				1	1	1,000.0	0.0	0.0	0.0	1,000.0	1,000.0	200.0		800.0			
	Account software	set	30	6300.0				30	30	200.0	0.0	0.0	0.0	6,000.0	6,000.0	1,200.0		4,800.0			
	Account software maintenance	Year	5	6410.4				1	1	500.0	0.0	0.0	0.0	500.0	500.0	100.0		400.0			
	Software training	year	150	4807.8				30	30	25.0	0.0	0.0	0.0	750.0	750.0	150.0		600.0			
	Annual finance reports	year	5	641.0				1	1	100.0	0.0	0.0	0.0	100.0	100.0	20.0		80.0			
3.1.5	Coordination meetings																				
	PSC meetings	year	12	3600.0				2	2	300.0	0.0	0.0	0.0	600.0	600.0	120.0		480.0			
	PMC meeeting	year	12	3000.0			1		1	250.0	0.0	0.0									
	State level meetings	year	54	28901.8					0	500.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	District level meetings	year	332	96984.0				22	22	100.0	0.0	0.0	0.0	2,200.0	2,200.0	440.0		1,760.0			
3.1.6	Incremental staff salary (PIU and SPMU)																				
	Staff salary, PIU	LS	6	2,34,000.00		0.5	0.5		1.0	16,208.0	0.0	8,104.0	8,104.0	0.0	16,208.0	0.0	0.0	16,208.0	0.0	0.0	0.0
	Staff salary, SPMU	LS	6	1,30,027.00		0.5	0.5		1.0	5,553.0	0.0	2,776.5	2,776.5	0.0	5,553.0	0.0	0.0	5,553.0	0.0	0.0	0.0
3.1.8	Office operating costs																				
	Office op costs, PIU	year	6	2,60,700.00	0.25	0.25	0.25	0.25	1.0	5,747.0	1,436.8	1,436.8	1,436.8	1,436.8	5,747.0	0.0	0.0	5,747.0	0.0	0.0	0.0
	Office op costs, SPMU	year	6	1,11,900.00	0.25	0.25	0.25	0.25	1.0	750.0	187.5	187.5	187.5	187.5	750.0	0.0	0.0	750.0	0.0	0.0	0.0
	Total Component 3.1			*9,74,437.0*							1,624.3	21,769.8	12,504.8	18,774.3	54,673.0	5,283.0	0.0	49,390.0	0.0	0.0	0.0

ANNEX-6: FIRST ANNUAL WORK PLAN AND BUDGET (2019/20)

PROJECT MONITORING AND EVALUATION AND KM

	Component/ Sub-component/Item	Unit	Appraisal targets		Annual Physical targets					Unit cost	Annual Financial Targets (000 INR)					Financing by financiers (000 INR)					
			Physical	Financial	Q1	Q2	Q3	Q4	Total	(000 INR)	Q1	Q2	Q3	Q4	Total	GOI	ICAR	IFAD	IFAD Grant	Banks	Bene
	Comp 3 Project management																				
3.2.1	Office equipment																				
	Laptops	#	9	646.0			9		9	70.0	0.0	0.0	630.0	0.0	630.0	126.0		504.0			
	Desktops /a	#	5	384.0			5		5	75.0	0.0	0.0	375.0	0.0	375.0	75.0		300.0			
	Printers /b	#	5	41.0			5		5	8.0	0.0	0.0	40.0	0.0	40.0	8.0		32.0			
	Digital camera /c	#	5	128.0			5		5	25.0	0.0	0.0	125.0	0.0	125.0	25.0		100.0			
	Tablets or smartphones	#	236	3904.0			70		70	15.0	0.0	0.0	1,050.0	0.0	1,050.0	210.0		840.0			
	Office Furniture	set	5	769.0			5		5	150.0	0.0	0.0	750.0	0.0	750.0	150.0		600.0			
	MIS software & installation	LS	1	1050.0			1		1	1,000.0	0.0	0.0	1,000.0	0.0	1,000.0	200.0		800.0			
	Purchase of books & periodicals	LS	1	566.0			1		1	100.0	0.0	0.0	100.0	0.0	100.0	20.0		80.0			
3.2.2	Studies, surveys and reports								0		0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Annual outcome surveys	surveys	22	11000.0				2	2	500.0	0.0	0.0	0.0	1,000.0	1,000.0	200.0		800.0			
	Imapct assessment surveys	surveys	1	0.0					0		0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Baseline survey	study	2	5000.0				2	2	1,000.0	0.0	0.0	0.0	2,000.0	2,000.0	400.0		1,600.0			
	Endline survey	surveys	1	5000.0					0	1,000.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Thematic surveys	surveys	10	5,000.0					0	500.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	MIS report	reports	5	2,832.0				2	2	500.0	0.0	0.0	0.0	1,000.0	1,000.0	200.0		800.0			
	Annual progress reports	reports	5	2,832.0				2	2	500.0	0.0	0.0	0.0	1,000.0	1,000.0	200.0		800.0			
3.2.3	Knowledge management															0.0		0.0			
	New technology adoptation	LS	3	3000.0						1,000.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Market demand for new technologies	LS	3	2250.0						750.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Drudgery reduction	LS	2	1500.0						750.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Feasibility of CHC model	LS	1	750.0						750.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Renewable energy-based equipment	LS	1	750.0						750.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Gender aspects in farm mechanisation	LS	2	1000.0						500.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Success stories	LS	4	3000.0						750.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			
	Total Component 3.2 M&E and KM			*51,402.0*							*0.0*	*0.0*	*4,070.0*	*5,000.0*	*9,070.0*	*1,814.0*	*0.0*	*7,256.0*	*0.0*	*0.0*	*0.0*

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Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

Annex 7: Procurement Plan for first 18 months

Document Date:	25/07/2019
Project No.	2000001941

Asia and the Pacific Division
Programme Management Department

CONSULTANTS
Country/Organization: India
Project/Programme: SCATE
Loan #:

Drafter of this PP: Design Mission2

Procurement Method
QCBS
QBS
FBS
LCS
CQS
SSS
SIC

IFAD prior review is required for procurement value with more than US 50000

							Request for expression of interest		Terms of Reference		Shortlist			Request for Proposal		Bid Proposal		Bid evaluations technical (T) and financial (F)						Contract Finalisation		
Description	AWPB Ref.	Selection method	Lump-sum or time-based	Estimated amount in US$	Pre/Post-review	Plan vs. Actual	Date published	Closing date	Date proposed	Date no-objection	Date proposed	Date no-objection	Plan vs. Actual	Date prepared	Date no-objection	Invitation date	Submission/ opening date	Submission evaluation report (T)	no-objection evaluation report (T)	Opening Financial Proposal	Submission eval. Report (T) and (F)	no-objection eval. Report (T) and (F)	Plan vs. Actual	Contract amount in US$	Contract award	Contract signature
Preparation of guidelines for scaling up		CQS	Lumpsum	14 286	Prior	Plan	19-Nov-19	30-Nov-19	10-Nov-19	17-Nov-19	10-Dec-19	17-Dec-19	Plan	20-Dec-19	27-Dec-19	N/A	05-Jan-20	N/A	N/A	N/A	10-Jan-20	15-Jan-20	Plan		30-Jan-20	
						Actual							Actual										Actual			
Individual consultants for Technical Assistance for 36 person months each @500000/person month		IC	Time based	257 143	Prior	Plan			15-Dec-19	20-Dec-19	05-Jan-20	10-Jan-20	Plan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Plan		30-Jan-20	
						Actual							Actual										Actual			
Engagement of internal auditor (CA firm)		QCBS	Lumpsum	14 286	Prior	Plan	N/A	N/A	15-Mar-20	20-Mar-20	N/A	N/A	Plan	25-Mar-20	30-Mar-20	2-Apr-20	02-May-20	10-May-20	15-May-20	20-May-20	23-May-20	30-May-20	Plan		05-Jun-20	
						Actual							Actual										Actual			
Exernal independent auditor (CA firm)		QCBS	Lumpsum	14 286	Prior	Plan	N/A	N/A	15-Mar-20	20-Mar-20	N/A	N/A	Plan	25-Mar-20	30-Mar-20	2-Apr-20	02-May-20	10-May-20	15-May-20	20-May-20	23-May-20	30-May-20	Plan		05-Jun-20	
						Actual							Actual										Actual			
Accounting software customisation including licenses and training		CQS	Lumpsum	7 143	Post	Plan	19/11/2019	30/11/2019	10-Nov-19	17-Nov-19	10-Dec-19	17-Dec-19	Plan	20-Dec-19	27-Dec-19	N/A	05-Jan-20	N/A	N/A	N/A	10-Jan-20	15-Jan-20	Plan		30-Jan-20	
						Actual							Actual										Actual			
Conducting baseline survey including data collection, analysis and report		QCBS	Lumpsum	71 429	Prior	Plan	15-Oct-19	25-Oct-19	04-Oct-19	10-Oct-19	05-Nov-19	10-Nov-19	Plan	15-Nov-19	20-Nov-19	22-Nov-19	21-Dec-19	10-Jan-20	15-Jan-20	17-Jan-20	22-Jan-20	27-Jan-20	Plan		30-Jan-20	
						Actual							Actual										Actual			
Thematic surveys		CQS	Lumpsum	14 286	Post	Plan	19/11/2020	30/11/2020	10-Nov-20	17-Nov-20	10-Dec-20	17-Dec-20	Plan	20-Dec-20	27-Dec-20	N/A	05-Jan-21	N/A	N/A	N/A	10-Jan-21	15-Jan-21	Plan		30-Jan-21	
						Actual							Actual										Actual			
Annual Outcome Surveys in 5 States		QCBS	Lumpsum	35 714	Post	Plan	19/11/2020	30/11/2020	10-Nov-20	17-Nov-20	10-Dec-20	17-Dec-20	Plan	20-Dec-20	27-Dec-20	N/A	05-Jan-21	N/A	N/A	N/A	10-Jan-21	15-Jan-21	Plan		30-Jan-21	
						Actual							Actual										Actual			
Procurement of MIS Software including development and installation		QCBS	Lumpsum	14 286	Prior	Plan	19/11/2019	30/11/2019	10-Nov-19	17-Nov-19	10-Dec-19	17-Dec-19	Plan	20-Dec-19	27-Dec-19	N/A	05-Jan-20	N/A	N/A	N/A	10-Jan-20	15-Jan-20	Plan		30-Jan-20	
						Actual							Actual										Actual			
Third party assessment of lead farmer training		QCBS	Lumpsum	214 286	Prior	Plan	02-Apr-20	12-Apr-20	20-Mar-20	26-Mar-20	20-Apr-20	25-Apr-20	Plan	27-Apr-20	3-May-20	5-May-20	04-Jun-20	10-Jun-20	15-Jun-20	17-Jun-20	22-Jun-20	24-Jun-20	Plan		26-Jun-20	
						Actual							Actual										Actual			
																							Plan			
																							Actual			

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India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

Annex 8: Project Implementation Manual (PIM)

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Annex 8- Project Implementation Manual

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Chapter I: Introduction and background

1. Project Implementation Manuals (PIM) are prepared for all IFAD-funded projects. The aim of a PIM is to facilitate implementation by providing a comprehensive set of guidelines for project implementation. These include IFAD and Government requirements and procedures along with a description of processes involved in implementation. The PIM is designed for circulation to project management and senior technical staff as well as to partner agencies and to act as a basic guide to project implementation.

2. The PIM contains information about the project concept, its design and implementation modalities. It will enhance the overall understanding of staff (both government and partner agency) and other stakeholders the deign details of SCATE, its various components and the process of its implementation. It is also intended to provide guidance with regards to the management of finances, systems of budgeting and accounting and the procurement procedures. The PIM will help in improving monitoring processes, and overall management information and reporting systems.

3. The PIM is a dynamic document that will be updated by the Project Implementation Unit (PIU) as the project progresses. Changes to key elements of the PIM that impinge on IFAD requirements should be agreed with IFAD.

Chapter II: Project Description

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

1. **Project objectives**: The goal of the project is to enable poor rural households to increase farm income through adoption of affordable and efficient agricultural engineering technologies. The goal of the project is to enable poor rural households to increase farm income through adoption of affordable and efficient AE technologies. The goal will be achieved through the development objective of Increased labour and farm productivity through adoption of AE technologies. The project will contribute to AED-ICAR's capacity to collaborate with public and private sector institutions, to develop, acquire, and support women, youth and hill farmer centric and climate change adaptation focussed technologies. In addition, the project will also promote and scale up AE technologies by addressing the gaps in technology adoption in collaboration, largely with CIs in rain-fed areas wherein the need for climate change adaptations is high.

2. Key combined indicators at the goal level will include: (i) 25 percent increase in farm income; and (ii) 50 percent of the households reporting more than 25 percent increase in income. Development objective level indicators to be measured include: (i) 20 percent increase in farm power use; (ii) 50 percent reduction in labour costs for households adopting mechanization; (iii) 15 percent increase in farm productivity; (iv) 40 percent of women reporting decrease in drudgery related workload.

3. **Geographic areas of intervention:** This project will be implemented in the states with relatively higher levels of poverty, low levels of farm power availability and low levels of appropriate technology development and diffusion. Based on these parameters, two states in the north-eastern region (Assam and Nagaland) and three eastern states (Chhattisgarh, Odisha and Jharkhand) have been selected. Of these five states, Chhattisgarh, Jharkhand, Assam and Odisha are amongst the top 10 poorest states in India.[1] Assam and Nagaland are Category IV states with less than 1.00 KW/ha farm power and Odisha, Jharkhand and Chhattisgarh are Category II states with farm power of 1.726 to 1.000 Kilowatt/ha (KW/ha)[2]. Nagaland, Jharkhand and Chhattisgarh states have a large area under hill agriculture and with low levels of appropriate technology diffusion and adoption.[2] All the states have significant tribal population where exposure to and adoption of technology is even less than national and state average.

4. The project would be implemented in 31 selected districts in these five states. The criteria used for district selection include: (i) districts with well performing KVKs; (ii) aspirational districts with varying agro-climatic zone[3]; (iii) availability of community institutions (SHGs, VOs, FPOs, Watershed committees (WSCs), Jhum resource management committees (JRMCs), etc.) with higher levels of maturity; (iv) districts with intensive blocks of SRLM; and (iv)

[1] World Bank. 2016. India's poverty profile snapshot 2012 (English). Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/919041468188362394/India-s-poverty-profile-snapshot-2012

[2] Susheela, K., Chandrasekharan M, Technology Adoption in Dryland Crops of Andhra Pradesh, International Journal of Agricultural Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 10, 2018, pp.-6081-6086.

[3] Final Report on Monitoring, concurrent Evaluation and Impact Assessment of Sub-mission on Agriculture Mechanization, Ministry of Agriculture and Farmer Welfare, 2018

contiguity of districts for ease of operation.[4] About 50 percent of the districts selected are aspirational districts. The project would be implemented in about 4 blocks in each selected district covering about 30-35 villages per block. In total, the project would cover 135 blocks comprising 4,000 villages. The criteria for selection of project villages include: (i) high potential for agriculture mechanization based on a consultation between SDAs and SRLMs; (ii) availability of community institutions (SHGs, VOs, Cluster level Federations (CLF), Watershed Committees, FPOs) that are in operation for at least 2 years; (iii) contiguity of villages for ease of management; (iv) not part of the ecologically sensitive area and also not part of the protected area and buffer zone under GoI Forest Classification Mapping; and (v) villages from the similar agro-ecology within the district.

5. In respect of all villages including those with tribal population, this project intends to work with the existing affinity based CIs. These are built by various agencies adopting participatory and consultative approaches requiring active and free will based participation of the communities to empower them socially and economically. Community consultations, full orientation, feedback from the community and other participatory approaches will be the guiding elements in technology testing, demonstration and scaling up. The project will provide demand driven support to the CIs with no imposition from any technology provider. This project's activities do not envisage changes to either land ownership or land use. Hence, no separate free prior informed consent (FPIC) is being proposed.

6. The districts selected include: (i) Baksa, Nalbari, Golaghat, Morigaon, Barpeta and Sonitpur in Assam; (ii) Raipur, Rajnandgaon, Kanker, Jagdalpur and Gariaband in Chhattisgarh; (iii) Ranchi, Khunti, Latehar, West Singhbhum, Hazaribagh and Gumla in Jharkhand; (iv) Bolangir, Kandhamal, Dhenkanal, Gajapati, Sundargarh and Mayurbhanj in Odisha; and (v) Mon, Longleng, Zunheboto, Wokha, Kiphire, Phek, Mokokchung and Kohima in Nagaland. The project will sign a Memorandum of Understanding (MoU) with each participating state government to stating criteria for district selection and the list of districts selected.

7. **Poverty targeting:** The project would adopt: (i) geographic targeting to select states and districts based on high levels of poverty, low availability of farm power and low level of AE technology diffusion and adoption; (ii) direct targeting to address the needs of smallholders with women, hill farmer and climate change adaptation specificity; and (iii) self-targeting for demonstration and promotion of technology. Technology promotion and adoption will be undertaken through existing SHGs/VO/CIs comprising socio-economically disadvantaged households largely below the poverty line. These households would constitute the target group and comprise : small and marginal farmers practising low input low output agriculture and allied activities under rainfed and hilly conditions; within these households, tribal households and women; and youth. As SHGs/VO/CIs will be the main entry points to the target group, the risk of elite capture and gender inequality is minimized for the following reasons: these grassroots organizations have a higher representation of poor households with SHG/VO having more than 90% of their membership as poor. It is worth

[4] based on a Composite Index developed by examining the published sources of district-wise data available in the core sectors of poverty, health & nutrition, education and basic infrastructure: Aspiration districts – Unlocking potentials, Chapter IV- Selection of districts, Niti Ayog, 2018

noting as well that the State Rural Livelihood Mission follows a saturation approach and ensures that no poor household is excluded from SHG and VO membership.

8. The livelihoods of the target group are briefly described here and will be further elaborated upon during the baseline survey and the technology inventory.

9. The small and marginal farmers practice low input low output agriculture, and generate limited surplus. They rely on kharif cultivation as the main crop; and the main crops cultivated are rainfed crops and include rice, maize, millets, pulses and oilseeds. In addition to crop cultivation, these households also have small ruminants and backyard poultry to supplement incomes. Agricultural practices are mostly manual or use animal draught implements, with many of the operations executed by women members of the household. As the income from agriculture is insufficient to meet the household requirements, these households also engage in wage labour. It is estimated that the total share of income derived from agriculture and allied sectors represents about 50-70 percent of the total household income and 30-50% of the income would be derived from wage labour opportunities. The estimated average income of these households is about 60,000 INR/year which is below the poverty line (estimated at 44 INR/person/day in 2017-18). Machinery requirement for these households relate to facilitating crop establishment, harvest and threshing, to mitigate against the vagaries of the climate and taking up of a second crop provided the residual soil moisture is well managed and the harvesting is completed promptly. Given the hilly terrain, it was felt that the machine should be portable, easy to assemble and dis-assemble, and reduce women drudgery.

10. In the hilly areas and among small and marginal farmers, the main livestock rearing is goat, pig and backyard poultry, through extensive husbandry where the animals graze/browse in open areas and village lands. It was observed that with intensification of rice systems, and planting a rabi crop in rice fallows, livestock can no longer freely graze and stall or semi-stall feeding practices would need to be introduced. Machinery and equipment like chaffers and feed mixes could be appropriately introduced and disseminated by the Pashu Sakhi (community animal health workers). With available veterinary care by the Pashu Sakhi, the improved feeding practices can contribute to improve fertility of the animals.

11. *Tribal households*. The share of the tribal population in the project area varies from 15% to 65%. The forest is central to the livelihoods of tribal peoples. In states such as Chattisgarh, Jharkhand and Odisha, they practice subsistence farming on less than 1 Ha, and supplement incomes through NTFP gathering and livestock rearing. Preferred livestock rearing activities are goat, pig and poultry and the average herd size is 5 heads. For close to 50% of the tribal households, income is about 36,000 Rs/ year/ HH or less. Given their production practices, tribal households can gain from primary value addition of NTFP produce in terms of decortication, de-seeding, drying, and oil extractors. There has been limited research in developing new machinery and equipment for NTFP and this situation stands to change through the project. In the State of Nagaland, the tribal households represent 93% of the population and combine shifting cultivation (jhum) and terrace cultivation. Majority of jhum cultivators are marginal farmers in the proposed districts that range from 97% in Kohima to 58% in Phek. There are no large farmers. The reason for selection of acreage of the farm is

determined by the land availability and the family needs. Likewise, in general, the terrace farms are mostly comprised of marginal and small sized farms. The main crop is rice, cultivated with a range of other crops such as maize, millet, root crops such as colocasia, cassava and potatoes, spices such as ginger, chilli, onion and garlic, and vegetables such as pumpkins, gourds.

12. *Women in the target households*. The women targeted by the project would be for the majority members of Self Help Groups. Within the Self-Help Groups, women learn savings and credit discipline and have access to small loan amounts at a rate of 2%/ month. The loans are mostly used to finance agriculture and allied activities, especially agriculture operations of the household as well as purchase and expansion of the herd of small ruminants (goats). Participation in self-help groups also allows women to access formal loans at lower interest rates (8-12%/year) from banks through the SHG-bank linkage. In addition to having their own income generating activities, members of self-help groups also invest in social enterprises like common facility centres, processing units, agriculture tool banks, etc… Experience from the IFAD supported projects and the State Rural Livelihood Missions show that women members of SHGs have higher self-confidence and participate more actively in decision-making at household level for both domestic affairs and productive activities. Women members of SHGs also value their time and are interested in drudgery reducing and labour efficient machinery, as well as improving and diversifying the machinery they have for the social enterprises they manage as a group.

13. *Youth*. Youth in the age group 15-29 years constitute approx. 28% of the rural population. The project targets educated youth completing primary, secondary and graduate studies. The project has designed activities for youth in form of fellowships, research grants to innovators, and training of youth as lead farmers and as managers of service centres. As mechanization and value addition services expand in the project area, new job opportunities are likely to be created for youth as employees of community institutions responsible for the management of these enterprises.

14. **Gender Mainstreaming**. The project gender mainstreaming strategy will be based on the following 4 main principles : (i) address women requirements to ease the drudgery of agricultural work and this will be examined from the viewpoint of women as unpaid family labour and as wage labourers, during the baseline survey and inventory of AE technologies, as well as during the techno-commercial assessment of the AE technologies; (ii) build the capacity and competencies of women in non-conventional jobs such as driving tractors and power tillers, managing FMUs (women members of SHG already manage CFC and ATB), and service centres ; (iii) set quota of 50% for women participation in training of lead farmers and in fellowship programmes; (iv) build the capacity building of project staff and implementing partners in gender mainstreaming and on the project gender strategy so that project implementation is aligned with expected results. The project gender strategy (combined with the poverty gender strategy) will be developed, taking into consideration the findings of the baseline study and the inventory of AE technologies. It is worth mentioning that the project will be working with the State Rural Livelihoods Missions who have organized women into about 10 million self-help groups, federated into village organizations (100 SHG make 1 village organization). The SHGs and VOs will constitute the majority of Community Institutions the project will be working

with and it is for this reason that women are expected to represent 75% of the households participating in this project.

15. **Youth participation**. The project has dedicated activities for young women and men. the project would provide fellowships for youth to work on research and innovations in agri-engineering technologies; would prioritize youth in the selection for lead farmers and in the training as mechanics to establish service centres. In addition, and as the scaling-up of AETs takes place, it is expected that youth will be engaged as managers of FMUs/CFCs/AIBs and as drivers of prime movers.

II. Components/outcomes and activities

16. AED-ICAR's current efforts of AE technology development are largely focussed on its in-house development, and the dissemination through KVKs.[5] In order for AED-ICAR to enlarge its role as a key player, it needs to draw on research from a wide spectrum of stakeholders, both in the public and private sector realm and be at the forefront as the technology contributor to the government's mechanization scaling up efforts. In line with this strategy, the project would strengthen the capacity of AED-ICAR to: (i) develop and promote AE technologies (including agriculture, horticulture, animal husbandry and allied activities) with focus on smallholders (women, youth and hill/tribal farmers) with geographic and climate change adaptation specificity; and (ii) test new institutional and incentive models for the expansion of mechanization to enable farmers to increase overall income from farming.

17. The major outcomes will include: (i) reduction in labour costs, and improved labour efficiency; (ii) increase in farm productivity; (iii) reduction in post-harvest losses, higher produce recovery; (iv) increase in price realization on account of quality improvement and value addition; (v) reduced mismatch between the needs and availability of smallholder centric AE technologies with focus on smallholders (hill/tribal farmers, women, youth) and geographic and climate change adaptation specificity; and (vi) adoption of participatory models of technology generation and new scaling up protocols. These outcomes will contribute to achieving the overall goal of increasing income of smallholders and reducing drudgery.

18. The project will have two components: (i) Participatory technology development; and (ii) Business models for scaling up of appropriate AE technologies.

Component 1: Participatory Technology Development

19. This component will have two sub-components: (i) Assessment and capacity building; and (ii) Innovation platform. The total budget allocated to this component is USD 16.32 million.

Sub-component 1.1: Assessment and capacity building

20. **Assessment:** Efforts by the government for promotion of AE technologies for tillage operations have yielded substantial results but remain limited in respect of other aspects of farming and post-harvest. A directory of such technologies is required to document the geography and climate change

[5] KVKs are under the administrative control of ICAR-ATARI however hosted and managed by ICAR institutions, SAUs and Civil Society Organizations.

adaptation specific technologies and to specify: (i) new AE technology development requirements; (ii) adaptation/customization required for the existing technology; (iii) prototypes that are ready for commercialization; and (iv) existing commercialized technologies with low levels of diffusion. In addition, state specific list of needed technologies will be prepared and updated every year based on technology assessments conducted in a participatory manner with the users. An initial list containing prioritized technologies relevant to smallholders (hill/tribal farmers and women) with low diffusion and for starting demonstration related activities have been identified which include: (i) Rice Direct seeders / row planters; (ii) pulses and oil seed row seeders; (iii) rice transplanters; (iv) rice field mechanical weeders; (v) Reapers (motorized); (vi) motorized mechanical threshers; (vii) Grain dryers; (viii) small rice mill with rubber boots; (ix) daal mills; (x) oil expellers; (xi) tamarind brick maker; (xii) mahua flower processor; and (xii) mahua kernel processors..

21. **Capacity building:** ICAR's capacity as an umbrella organization for AE technology development for smallholders with focus on hill farmers, women, youth and adaptation to climate change will be strengthened. This will enable AED-ICAR to set the AE research agenda across both, the public and private sector research agencies, develop knowledge sharing platforms, avoid duplication in research and development (R&D), and disseminate lessons from R&D and scaling up models to the policy makers.

22. The project will support establishment of national technology forums, technology import and export (including machinery and equipment), licencing and IPR protection, and participation in agri-expos. The project will create AE research interest in the young professionals through fellowships and awards for best AE research.

23. The project includes a grant from IFAD which will be used for enhancing the capacity of ICAR and its institutions through engagement of national and international expertise/ technical assistance. These would include, but not be limited to (i) techno-economic assessment protocols for AE technologies; (ii) target specific technology manuals for conducting demonstrations; international and national exposures; environment and climate related studies. ICAR will engage with Consultative Group for International Agricultural Research (CGIAR) and/or other globally renowned institutions to implement these activities. ..The reason these activities are funded by the IFAD grant is that GoI does not allocate resources for building capacity of ICAR staff as ICAR itself is a technical arm of the Ministry of Agriculture and it is expected that the required technical capacity exists within ICAR. This project is expected to drive ICAR into accelerated technology development and intensive field demonstrations and this will require building capacity of ICAR staff at central and state levels. Due to the difficulty in getting GoI resources for this activity, grant funding has been proposed to address this gap

Sub-component 1.2: Innovation Platform

24. Several institutions, both in the public (Institutions of Department of Science and Technology (DST), Indian Institutes of Technology (IITs), State Agriculture Universities (SAUs) and private sector develop AE technologies apart from institutions directly under ICAR fold. However, technology development in general has been innovator centric with limited focus on identifying the needs of smallholders and seeking feedback from a large number of users. This requires

strategic direction setting for AE technology development, and this project intends to facilitate ICAR to evolve as the agency to set AE technology research agenda relevant to smallholders (hill farmer, women and youth) to adapt to climate change events and also to reduce labour costs and drudgery. The project will establish an innovation platform to promote: (i) new technology development from concepts to prototypes; (ii) adaptation/ customization of existing technologies; and (iii) existing prototypes to move into commercial production.

25. The project will call for proposals from all interested research institutions, including the private sector for: (i) development of new technologies; and (ii) adaptations/customization of existing technologies. These proposals will be evaluated from smallholder and climate change adaptation perspective and the project will support selected proposals. The project will also conduct technology challenges[6], both at the state and central level to showcase AE technology prototypes that need to be fine-tuned to take them to commercial development. Selected prototypes will be supported for demonstration in the project area to seek farmer and service personnel feedback, customizing technology and for involving machine manufacturers in the development of design blue prints. The project will establish a third party assessment to concurrently evaluate the performance of activities under the innovation platform and make recommendations for improvement.

Component 2: Business models for scaling up of appropriate AE technologies

26. This component will have two sub-components: (i) Demonstrations and support service development; and (ii) Scaling up partnerships. The total budget allocated to this component is USD 97.0 million.

Sub-component 2.1: Demonstrations and support service development

27. **Demonstrations:** Demonstrations serve as an effective instrument for rapid dissemination of technology. The effectiveness of demonstrations increases with the organization of field days around demonstrations. In line with this strategy, the project will mainly support KVKs (other training institutions not excluded) to develop a two stage demonstration model comprising: (i) training of lead farmers; and (ii) lead farmer led training of farmers through field days. The project will provide AE machinery and equipment to KVKs to conduct lead farmer training within their campus or on their existing demonstration fields. KVKs will create 3-4 hubs in collaboration with SHGs/VOs/CIs at the block level to manage the AE machinery and equipment (excluding prime mover). The lead farmers selected in consultation with SHG/VOs/CIs will be trained using the technology manuals prepared by the project and after training will be allowed to borrow machinery from the KVKs and/or rent prime mover (tractor/tiller), if required, and conduct village field days. The lead farmers will be incentivised to conduct the field days and a third party verification through SHG/VOs/CIs will be set up to ensure that the field days have been conducted with required participation. In total 4,000 lead farmers will be trained and each lead farmer will conduct 10 field days covering 100 farmers. Total number of field days will be split into 3-4 events covering different aspects of farming. The project will

[6] This will be a public display of prototypes from various innovators wherein the public comprising manufacturers and users are able to understand and appreciate the technology. This will be a competitive and transparent platform for selection of prototypes for project support and also to pursue manufacturers' interest in collaboration with the innovators.

also support training and exposure visits particularly for promoting processing technologies.

28. **Support service development:** One of the main reasons for limited diffusion of the smallholder AE technology is the inability of the small scale manufacturers to develop sales and service centres which are essential to raise confidence level of farmers to procure AE machinery. It is also not a viable proposition to establish separate service centres for these machineries individually, and therefore, they need to be linked up to the existing state agro-corporations and also to existing agriculture machinery service centres of the prime movers (tractors and tillers). The project will create platforms for consultation between manufacturers and local area dealers involved in sales and services by creating platforms for consultation. The project will support: (i) the State Agro Corporations to include the identified AE machinery and equipment in their existing sales and service centres, or establish new sales and service centres; (ii) existing Agriculture Machinery Service Centres, and Agriculture Input Centres; and (iii) train youth in after–sales service of the AE machinery and support them to set up repair and maintenance units. These service centres can also graduate to become FMUs and CFCs with support from scaling up partnerships. SDAs will be the main partner for implementing this activity.

Sub-component 2.2: Scaling up partnerships

29. Scaling up of AE technologies is currently driven by high level of incentives by the government which has resulted in increased ownership of prime movers; tractors to a large extent, and power tillers. Experience of International Rice Research Institute (IRRI) in promoting AE technologies for paddy cultivation in Assam indicates skewed relationship between availability and actual use of AE technologies as the owners use it only for their personal use instead of optimally using them for both own use and renting to other farmers. This project will largely use CI led modalities of scaling up, building on the existing capacity of SHG/VOs/CIs (including cluster level federations, WSCs, JRMCs and FPOs) in the project area as delivery vehicles for smallholders mobilized and being supported by various agencies such as the SRLMs, Watershed Missions (WSMs), SDAs, IFAD funded projects and other agencies.

30. The project will develop partnerships with SRLMs, WSMs, SDAs and other agencies to support the SHG/VOs/CIs for establishing FMUs, CFCs and Agricultural Tool Banks (ATBs) on a collective ownership basis. The project will also support individual ownership of AE machinery (other than prime movers) by smallholders. The project will implement: (i) a differential technology incentive modality with higher levels of technology incentives for auxiliary AE technologies, support for CFCs, ATBs and renewable energy powered AE technologies; and (ii) an innovative user expansion support to incentivize users so that the existing AE machines and equipment are used optimally by triggering demand.

31. The project will provide technology incentives for AE machineries and equipment required for establishing FMUs, CFCs and ATBs, additional AE machineries and equipment to existing CHCs, and for farmers' private use. The technology incentives will be shared between the project, convergence with SMAM and beneficiary contribution. In case of individually owned AE machinery, beneficiaries will be required to mobilize about 50 percent of the total cost, which may require support from banks. The project will also facilitate access to finance for the smallholders to acquire AE machineries and equipment by

establishing Finance Facilitation Platforms at the block level and district level grouping bankers, beneficiaries and project partners involved in scaling up.

32. The project design team acknowledges that there is considerable interest in new institutional models for CHC. These resolve around the use of mobile phone apps to link machine owners to farmers who want to hire the machinery, on the pattern of Uber[7]. The design mission approached these agri-businesses dealing in uberization of agriculture machinery and rental systems and they did not evince interest for direct involvement in the geographies covered by the project (hill areas, remote and poor locations). As the project aims to aggregate demand by working through CIs and expand adoption of AE technologies in project area, it is foreseen that such agri-businesses would be involved once they assess it as a potentially viable market. The project design has kept this option open for these agri-businesses to become scaling-up partners.

[7] Start-ups in this field include JFarm Services, Hello Tractor, TRRINGO, EM3, AgriServices and Gold Farm, etc...

Chapter III: Implementation Responsibilities and sequence of activities

I. Participatory Technology Development

A. Assessment and capacity building

1. Assessment

1. PIU shall engage a team of six consultants to prepare a directory of geography and climate change adaptation specific AE technologies which include : (i) new AE technology development requirements; (ii) adaptation/customization required for the existing technology; (iii) prototypes that are ready for commercialization; and (iv) existing commercialized technologies with low levels of diffusion. The directory prepared will be disseminated by the PIU to the states and also to the agencies engaged in AE research and development. The activities proposed and the implementation responsibility are provided below and sequence of activties is provided in Appendix 1.

Activity	Partners and their implementation responsibility		
	Primary	**Secondary**	**Collabo-rative**
Assessment and database development			
Engagement of a team of consultants	National Coordinator, PIU (AED-ICAR)		
Conduct field level assessments	Consultants	SPMUs/SDAs	KVKs and SRLMs
Conduct state level consultation	State Project Manager, SPMUs/SDAs and Consultants	KVKs and SRLMs/PAs	
Preparation of a directory	Consultants	PIU (AED-ICAR)	
Publishing the directory	National Coordinator and Manager KM, PIU (AED-ICAR)		
Engagement of an agency to develop a database	Manager KM, PIU (AED-ICAR)		
Hosting the database	Manager KM, PIU (AED-ICAR)		

2. Capacity Building of ICAR

a) National AE Technology Forum establishment

2. National AE Technology Forum related activities will be implemented by PIU (AED-ICAR). This activity is proposed to mainly develop ICAR's capacity to act as an umbrella organization for AE technology development for smallholders by enabling AED-ICAR to set the AE research agenda across both, the public and private sector research agencies, develop knowledge sharing platforms, avoid duplication in research and development (R&D), and disseminate lessons from R&D and scaling up models to the policy makers. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	Partners and their implementation responsibility		
	Primary	**Secondary**	**Collabo-rative**
National Technology Forum			
Establishment of a National Technology Forum	Additional Project Director, National Coordinator, KM Manager of PIU (AED-ICAR)		
Conducting National Technology Forum meetings annually	Additional Project Director, National Coordinator, KM Manager of PIU (AED-ICAR)		

b) Best AE machinery development awards

3. PIU (AED-ICAR) will implement activities related to instituting best AE machinery award. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	Partners and their implementation responsibility		
	Primary	**Secondary**	**Collabo-rative**
Best AE machinery development award			
Developing procedures for providing best AE development award	National Coordinator, Manager KM, Procurement specialist PIU (AED-ICAR)		
Calling for nominations for best AE development award	Manager KM PIU (AED-ICAR)		
Establishing an evaluation committee for evaluating nominations	Project Director PIU (AED-ICAR)		
Selection of best AE machinery development	Project Director PIU (AED-ICAR), based on recommendation of the committee		
Giving awards at the National Technology Forum meetings	Project Director PIU (AED-ICAR)		

c) Fellowships

4. PIU (AED-ICAR) will implement activities related to awarding fellowships to support AE research. The following individuals are eligible for the fellowshios : postgraduate

students; students from any state in India with an interest and robust research proposal for AE technologies; at least 50% of the fellows would be women. The criteria for the selection of fellows will be based on the research synopsis they would submit and would include : the topic of the research is relevant to hill farmers and women; provides a relevant response to climate change adaptation; responds to the requirements for new AE technologies; has potential to generate employment for youth. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	**Partners and their implementation responsibility**		
	Primary	**Secondary**	**Collabo-rative**
Fellowships			
Calling for applications for fellowships in AE research	National Coordinator, Manager KM, Procurement specialist PIU (AED-ICAR)		
Select best research synopsis for providing fellowships	Project Director PIU (AED-ICAR) based on recommendation of National Coordinator		
Provide fellowships	Project Director PIU (AED-ICAR)		
Submission of dissertation to PIU-AED. ICAR	Selected fellows	PIU (AED-ICAR)	

d) CGIAR/institutions of global repute for capacity building – IFAD Grant

5. The project includes a grant which will be used for enhancing the capacity of ICAR and its institutions through engagement of national and international expertise/ technical assistance. Two main activities are proposed for capacity building:

a) **Techno-economic assessment** : In preparation of the design of this project, IFAD and ICAR carried out a technology screening exercise that relied on a financial cost benefit analysis as well as an environmental analysis. Technologies were compared based on gains in energy efficiency, gains in labour cost savings, and an assessment that technologies that cost less than 2,000 USD would be considered affordable by smallholders. The exercise revealed that there are no benchmarks for assessment of adequacy of AE technologies for smallholders. The exercise did not take into consideration other pararmeters that are important for this project such as reduction in women drudgery, adaptation to climate change. Given these considerations, there is a very good scope for: developing a standard methodolgy for the techno-commercial assessment of AE technologies, using appropriate industry benchmarks in relation to energy efficiency, affordability, adaptation to climate change, women drudgery, GHG emission/ Carbon sequestration; developing a digital application/ programme that would carry the techno-commercial assessment for all types of AE technologies; training and dissemination of the methodology and digital tool to innovators and researchers in the public and private sector. The techno-commercial assessment can be conducted ex ante, to select research concepts as well as to assess commercial readiness of prototypes. It can also be conducted ex post to assess the techno-commercial

viability of the AE technologies based on the results of the field demonstrations and assessment by smallholder producers, the majority of whom will be women (75% of beneficiaries are expected to be women).

b) **Demonstrations**: The technologies developed by ICAR and its institutions do not have operational manuals for the AE technology along with the package of practice that accompanies the use of the machinery. Given vulnerability to climate change in the project area, the proposed package of practices accompanying the AE technologies would need to build producers' capacity to adapt to climat change, and would need to promote sustainable use of land and water (rational and safe use of chemical fertilizers and pesticides). For example, the manual of the rice transplanter needs to include how to operate the transplanter and how to prepare the nursery for rice seedlings in the system of rice intensification. This needs to be done in a systematic manner for all the AE technologies that will undergo demonstration in the project. It is expected that the manuals would require a multi-disciplnary team to develop these composed of the innovator along with a specialist in the production domain depending on the commodity.

6. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	**Partners and their implementation responsibility**		
	Primary	**Secondary**	**Collabo-rative**
ICAR Capacity building			
Selection and engagement of agencies for providing technical assistance	Additional Project Director, National Coordinator, Capacity Building & Training Specialist, Procurement Specialist PIU (AED-ICAR)		
Preparation of techno-economic assessment protocols	Technical Service Agency	Additional Project Director, National Coordinator, Capacity Building & Training Specialist PIU (AED-ICAR)	
Training of staff of ICAR and its institutions in techno-economic assessments	Technical Service Agency	Capacity Building & Training Specialist PIU (AED-ICAR)	
Preparation of technology manuals	Technical Service Agency	National Coordinator and Capacity Building & Training Specialist PIU (AED-ICAR)	
Preparation of package of practices for major crops in the project area	Technical Service Agency	National Coordinator and Capacity Building & Training Specialist PIU (AED-ICAR)	
Training of KVK and SDA staff in the use of technology manuals	Technical Service Agency	Capacity Building & Training Specialist PIU (AED-ICAR)	

e) Climate Change Adaptation

7. The environment and social management plan proposed a number of activities to ensure compliance with environmental considerations and climate change adaptation. These activities fall into four categories : (i) improved agricultural practices that promote sustainable use of resources and that help producers adapt to climate change (these are captured in the demonstration manuals and package of practices described in section above); (ii) hazard, risk, vulnerability assessment of proposed villages where the project will be implemented and exclusion villages that are located in close proximity/adjacent to protected areas and this information will be useful to tailor the AE technologies to specific climate risks in the selected villages/ blocks; (iii) incorporating the following 2 topics in the lead farmers training, Soil health card and Leaf colour chart for real-time or crop-need-based Nitrogen management in Rice, Maize and Wheat, the latter developed by IRRI and Philippines Rice Research Institute; (iv) developing a cadre of women who are able to provide IT based advisory services. The latter is currently part of the SRLM training of community resource persons (CRP) where women are trained on digital extension and hence the project will build on this cadre of local women who already operate with the SHGs and VOs.

8. The activities proposed and the implementation responsibility are provided below.

Activity	**Partners and their implementation responsibility**		
	Primary	**Secondary**	**Collabo-rative**
Climate Change Adaptation			
Incorporate Climate Change Adaptation in the demonstration manuals and package of practices developed by the project	Technical Service Agency (as per above)	Additional Project Director, National Coordinator, Capacity Building & Training Specialist PIU (AED-ICAR)	
Hazard, risk, vulnerability assessment of proposed villages: Drafting TOR, and entering into MoU with SAUs/IITs in the State with relevant experience	State Agricultural Universities (SAUs) and Indian Institutes of Technology in the State (IITs)	Additional Project Director, National Coordinator, Capacity Building & Training Specialist PIU (AED-ICAR)	
Training of lead farmers on soil health card and leaf colour chart (LCC) for real-time or crop-need-based Nitrogen management in Rice, Maize and Wheat	Technical Service Agency (as per above)	Additional Project Director, National Coordinator, Capacity Building & Training Specialist PIU (AED-ICAR)	IRRI for LCC

f) Capacity Building of ICAR in other areas

9. Other capacity building activities are : participation in agri-expos (to showcase innovative machinery developed by ICAR and its network of institutions, as well as to familiarize with new machinery and propose these for import and customization); purchase of technology including machinery and equipment from abroad; technical support; certification support ; and export of technology. The project will provide certification support in terms of specialized consultants who will assist the manufacturers with the certification and IPR process, in terms of documents to fill, procedures to comply with, and search that no patent already exists for the given AE technology. The

project support for export of AE technologies consists in : (i) cost of travel and stay of members from the research fraternity and manufacturers from other developing countries to India ; and (ii) facilitation of required paper work and logistics including freight and insurance for the export of the technologies to the developing countries. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	**Partners and their implementation responsibility**		
	Primary	**Secondary**	**Collabo-rative**
Agri-Expos			
Selection expos for participation	Additional Project Director PIU (AED-ICAR)		
Selection of staff for domestic and international (overseas) agri-expos participation from state level officers, and ICAR Officers	Project Director PIU (AED-ICAR)	SPMUs/SDAs	
Organize participation in expos	Additional Project Director, Capacity Building & Training Specialist and Manager KM PIU (AED-ICAR)		
AE Machinery Import			
Seek proposals from ICAR institutions, SAUs, DSTs and IITs to import AE machinery and equipment	Project Director PIU (AED-ICAR)		
Evaluate and prioritize the requested machineries	Additional Project Director and National Coordinators PIU (AED-ICAR)	SPMUs/SDAs	
Procure the prioritized machinery and equipment	Procurement specialist PIU (AED-ICAR)		
Display of machinery and invite innovators for learning about imported machinery and equipment during the technology challenges.	Additionl Project Director and Manager KM PIU (AED-ICAR)	SPMUs/SDAs	
Technical support			
Identify the emerging technical assistance needs of ICAR and its agencies.	Capacity Building & Training Specialist PIU (AED-ICAR)		
Prepare terms of reference for the technical assistance	Capacity Building & Training Specialist PIU (AED-ICAR)		
Identify consultants required for technical assistance and engage	Capacity Building & Training Specialist and Procurement Specialist		

them	PIU (AED-ICAR)		
Certification support			
Conduct meetings with AMMA to identify the small manufacturers requiring certification support, and innovators requiring IPR support.	Additional Project Director PIU (AED-ICAR)	AMMA	
Seek proposals from the manufacturers interested in getting support for certification and also innovators requiring IPR support.	Additional Project Director PIU (AED-ICAR)		
Evaluate the proposals regarding certification and IPR and provide support.	Additional Project Director, National Coordinators, Manager KM PIU (AED-ICAR)		
Technology Export			
Identify agencies involved in export of technology.	Additional Project Director, Manager KM PIU (AED-ICAR)	AMMA	
Seek proposals from the interested agencies for export of technology	Additional Project Director PIU (AED-ICAR)	AMMA	
Evaluate the proposals and provide project support.	Project Director, Additional Project Director, Manager KM PIU (AED-ICAR)		

B. Innovation Platform

10. An innovation platform will be established to support institutions, both in the public and private sector to develop AE technologies. Public sector organizations include, in addition to ICAR and institutions directly under ICAR fold, institutions of Department of Science and Technology, Indian Institutes of Technology, State Agriculture Universities. It is worth mentioning here that joint public-private sector proposals are also eligible to apply to the innovation platform. This support will focus on identifying the needs of smallholders and seeking feedback from the users. The project's innovation platform will promote: (i) new technology development from concepts to prototypes; (ii) adaptation/ customization of existing technologies; and (iii) existing prototypes to move into commercial production. A third party verification of the innovation platform's efficacy to address the smallholders' needs will be established. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	**Partners and their implementation responsibility**		
	Primary	**Secondary**	**Collabo-rative**
Concept to prototype			
Constitute a committee for evaluation of concepts to prototype development	Project Director PIU (AED-ICAR)		
Call for concept notes from all agencies (public and private)	Project Director PIU (AED-ICAR)	SPMUs/SDAs and KVKs	

and individual innovators			
Evaluate and select the best proposals	Additional Project Director and National Coordinators PIU (AED-ICAR)		
Sign MoUs with selected agencies/ individual innovators	Project Director PIU (AED-ICAR)		
Adaptation/Modifications to existing technology			
Constitute a committee for evaluation of proposals for adaptation/modification to existing technology	Project Director PIU (AED-ICAR)		
Call for proposals from all agencies (public and private) and individual innovators	Project Director PIU (AED-ICAR)	SPMUs/SDAs and KVKs	
Evaluate and select the best proposals	Additional Project Director, National Coordinators PIU (AED-ICAR)		
Sign MoUs with selected agencies/individual innovators	Project Director PIU (AED-ICAR)		
Prototypes to commercial development			
Constitute a committee for selection of prototypes ready for commercial development	Project Director PIU (AED-ICAR)		
Organize central level technology challenges	Project Director PIU (AED-ICAR)	SPMUs/SDAs and KVKs	
Organize state level technology challenges	SPMUs/SDAs	KVKs	
Evaluate and select the best technologies for commercialization	Additional Project Director, National Coordinators PIU (AED-ICAR)	SPMUs/SDAs and KVKs	
Sign MoUs with selected agencies and individual innovators	Project Director PIU (AED-ICAR)		
Mid term Assessment			
Select an agency outside the ICAR institutions to conduct third party assessment of innovation framework	M&E Specialist and Procurement Specialist PIU (AED-ICAR)		
Undertake third party assessment	Selected agency/Consultants	M&E Specialist PIU (AED-ICAR)	

II. Business models for scaling up of appropriate AE technologies

A. Preparatory Activities

11. PIU (AED-ICAR) and the SPMUs/SDAs will have to undertake several preparatory activities to start implementation of activities related to demonstrations and scaling up.

This includes signing of MOUs with the SRLMs/PAs. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	Partners and their implementation responsibility		
	Primary	**Secondary**	**Collabo-rative**
SRLM/PA engagement			
Identification of partner agencies such as SRLMs, Watershed Missions and other agencies interested in partnering with the project by conducting a central level meetings. Sign a tripartite agreement between PIU (AED-ICAR), SDA and SRLM/selected PA on scaling up.	Project Director and Additional Project Director PIU (AED-ICAR) and SDAs		
Conduct a state level meeting with partner agencies and workout a modality of district/block allocation to these agencies	State Project Director and State Project Manager SDAs	KVKs	
Sign a tripartite agreement between SPMU, SRLM/PAs and KVKs/ATARI on demonstration.	State Project Director SPMUs/SDAs	ATARI/KVKs	SRLM/Pas

B. Demonstrations and support service development

1. Demonstrations

12. The activities related to demonstrations will be carried out by the KVKs. KVKs will be supported by PIU (AED-ICAR) in sourcing demonstration equipment, staff engagement and staff capacity building. Similarly the SRLMs/Watershed missions/IFAD projects will assist KVKs in selection of lead farmers and VOs to conduct demonstrations. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	Partners and their implementation responsibility		
	Primary	**Secondary**	**Collabo-rative**
Demonstration equipment			
Prepare a KVK-wise list of AE machinery with quantity required for demonstrations	National Coordinators PIU (AED-ICAR)	KVKs	
Prepare a proposal to SMAM for procurement of prime movers and machinery for demonstrations	Additional Project Director PIU (AED-ICAR)		
Obtain funding from SMAM and allocate funds to KVKs to procure AE machinery for demonstrations as per SMAM guidelines	Project Director PIU (AED-ICAR)	KVKs	
Call for quotations from auxiliary equipment (not in SMAM list) manufacturers and submit the same to PIU (AED-ICAR)	Coordinators KVKs		

Evaluate the proposals and sign a state specific rate contract with the selected suppliers after getting IFAD approval.	Project Director PIU (AED-ICAR)	KVKs	
Place an order for these auxiliary equipment	Coordinators KVKs	PIU (AED-ICAR)	
Create 3-4 hubs with VOs/CIs in each district for keeping the auxiliary AE machinery	Coordinators KVKs	SRLMs/PAs	VOs/CIs
Staff engagement			
Provide terms of reference and advise KVKs to advertise for positions	Additional Project Director PIU (AED-ICAR)		
Selection of staff	Coordinators KVKs		
Training of staff in the use of technology manuals and package of practices	Coordinators KVKs	PIU (AED-ICAR)	SAUs
Lead Farmer Training and Field Days			
Identify Lead Farmers	Agri-extension officers KVKs	SRLMs/PAs	VOs/CIs
Training of Lead Farmers	Agriengineer and Agri-extension officer KVKs		
Signing of a tripartite agreement between Lead Farmer, VO/CI concerned and the KVKs for conducting field days	Coordinator KVKs and Lead Farmer	SRLMs/PAs	VOs/CIs
Conduct of field days	Lead Farmer and KVKs	SRLMs/PAs	VOs/CIs
Release of funds for conducting field days	Accountant KVKs	SRLMs/PAs	
Submission of SOE for field days	VOs/CIs	SRLMs/PAs	
Third party verification of field days	VOs/CIs	SRLMs/PAs	
Training and Exposure Visit			
Select training institutions and locations for exposure visits particularly for post-harvest processing	SRLMs/PAs		
Select beneficiaries and train them in selected institutions	SRLMs/PAs	VOs/CIs	

2. Support Service Development

13. The project plans to address the inability of the small scale manufacturers to develop sales and service centres which are essential to raise farmers' confidence level to procure AE machinery. It is also not a viable proposition to establish separate service centres for these machineries individually, and therefore, they need to be linked up to the existing state agro-corporations and also to existing agriculture machinery service centres of the prime movers (tractors and tillers). In addition, the project will support local manufacturers to manufacture low cost tools and implements. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	**Partners and their implementation responsibility**		
	Primary	**Secondary**	**Collabo-rative**
Support for local manufacture			

Identification of local manufacturers interested in manufacturing improved tools and implements	State Project Managers SPMUs/SDAs	KVKs	
Seeking proposals to local manufacture of improved tools and implements	State Project Managers SPMUs/SDAs	KVKs	
Approving and providing support to local manufacturers	State Project Director SPMUs/SDAs	KVKs	
Support for after sales service development			
Identifying and providing support to State Agro-Industries	State Project Managers SPMUs/SDAs	KVKs	
Identifying and supporting existing agri-machinery and inputs supply centres for servicing AE machineries	State Project Managers SPMUs/SDAs	KVKs	
Identifying youth for training in AE machinery servicing	State Project Managers SPMUs/SDAs	KVKs and SRLMs/Pas	VOs/CIs
Training and providing support for establishment of service centres	State Project Managers SPMUs/SDAs	KVKs and SRLMs/Pas	VOs/CIs

C. Sub-component 2.2: Scaling up partnerships

1. Scaling up

14. The project will implement scaling up activities in collaboration with SRLMs/PAs. The project support will be in line with SMAM guidelines. The project support will enable the state governments to prioritize support to SHGs/VOs/FPOs/CIs. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	**Partners and their implementation responsibility**		
	Primary	**Secondary**	**Collabo-rative**
Scaling up support			
Identify SHGs/VOs/FPOs/CIs interested in establishing FMUs and ATBs	State Project Managers and Young Professionals SRLMs/Pas	SPMUs/SDAs	SHGs/VOs/CIs
Identify SHGs/VOs/FPOs/CIs interested in establishing CFCs	State Project Managers and Young Professionals SRLMs/PAs	SPMUs/SDAs	SHGs/VOs/CIs
Identify existing CHCs that require additional support	State Project Managers and Young Professionals SRLMs/PAs	SPMUs/SDAs	SHGs/VOs/CIs
Identify individuals interested in purchasing AE machinery and equipment(excl prime movers)	State Project Managers and Young Professionals SRLMs/PAs	SPMUs/SDAs	SHGs/VOs/CIs

Establish Block and district level finance facilitation platforms for facilitating acess to credit	State Project Managers and Young Professionals SRLMs/PAs	SPMUs/SDAs	SHGs/VOs/CIs
Provide support for establishment of FMUs/ATBs/CFCs and to procure AE machinery and equipment by existing CHCs and individuals	State Project Managers and Young Professionals SPMUs/SDAs	SRLMs/Pas	SHGs/VOs/CIs
Supervise for establishment of FMUs/ATBs/CFCs and procurement AE machinery and equipment by existing CHCs and individuals	SHGs/VOs/CIs	SRLMs/Pas	SPMUs/SDAs

2. User expansion support

15. The project intends to set up a system of user expansion support so that the smallholders will be able to take AE machinery and equipment on a lower rent and experience the benefits. The activities proposed and the implementation responsibility are provided below and sequence of activities is provided in Appendix 1.

Activity	**Partners and their implementation responsibility**		
	Primary	**Secondary**	**Collabo-rative**
User expansion support			
Identify VOs/CIs in the vicinity of FMUs/ATBs/CFCs established under the project	SRLMs/PAs	SPMUs/SDAs	
Sign a MOU with the VOs/CIs on the use of user expansion support	SRLMs/PAs	SPMUs/SDAs	
Provide user expansion support to VOs/CIs	State Project Director SPMUs/SDAs	SRLMs/Pas	
Supervise utilization of user expansion support	VOs/CIs	SRLMs/Pas	
Conduct a thematic study on user expansion support	M&E Officers SPMUs/SDAs	SRLMs/Pas	VOs/CIs

Chapter IV: Implementation Responsibilities and Arrangements

I. Participatory Technology Development

A. Assessment and capacity building

1. Assessment

i) General requirements

Identify a team of six consultants comprising a Team Leader and five consultants to undertake state level assessments. All consultants to have an advance degree in Agriculture Engineering with about 15-20 years of experience in agriculture technology development and dissemination.

ii) Information required in the inventory

- The inventory of the AE technologies would include the following information:
    - General information on agricultural technologies (machinery/equipment/ tools), technology type (purpose of technology, type of energy used) that are relevant to the project states and different agro-climatic zones and climate risks in the project area.
    - Present status of technology (commercial, demonstration, prototype)
    - Operational capacity
    - Technical specification (height, weight, working width)
    - If the agricultural machinery is self-propelled (motorized), or need to be attached to prime movers.
    - Technology certification status
    - Capital cost, operational cost and maintenance and repair cost during its life cycle
    - Savings in terms of labour/energy per day/batch of production.
- The inventory of technologies should also provide information about the manufacturers such as:
    - Name of company/agency/innovator and address details (corporate office address, manufacturing location)
    - Contact details: telephone and email
    - Length of time in the manufacturing business
    - Geographical Presence
    - Name of specific machinery/equipment
    - Availability of R & D facility
    - Existing partnership (ICAR/Govt./FIs)
    - Membership of AMMA or any industry association
- The main tasks of the team include to:
    - Identify AE technologies covering four stages of technology development comprising: i) new AE technology development requirements; (ii) adaptation/customization required for the existing technology; (iii) prototypes that are ready for commercialization; and (iv) existing commercialized technologies with low levels of diffusion.
    - Identify AE technologies from all sources (ICAR and its institutions, SAUs, IITs, CSIR, civil society and private sector). This will be through desk review of literature and visits to institutional and private innovators.

- Identify renewable energy technologies (RETs) available for use in agriculture, livestock and NTFP sector, particularly in processing and value addition part in both cases.
- Undertake desk reviews to identify state specific AE technologies and their manufacturers.
- Undertake field visits and consultations, including with the smallholders in the project area to understand their needs related to: (i) new technology requirements; (ii) adaptation/customization required for the existing technologies, and the problems with the existing machinery ; iii) prototypes currently available that can be fine-tuned and commercialized; and (iv) existing technology with limited diffusion.
- Conduct consultation at the state level to fine tune the AE technology inventory of existing and proposed technologies including adaptations/ modifications.
- Finalize a state specific lists of priority technologies for: (i) new technology development; (ii) adaptation/customization proposed for the existing technologies; (iii) prototypes currently available that can be fine-tuned and commercialized; and (iv) existing technology with limited diffusion that can be scaled up. Prioritization, in addition to the geographic specificity, should also take into account technologies that address the needs of women, hill farmers, climate change adaptation, energy efficiency and conservation agriculture.
- Publish an inventory of all AE technologies and priority lists with names and contact details of manufacturers and innovators in Formal Reports.
- Conduct a national level consultation to disseminate the list of priority technologies to DoAC & FW, ICAR institutions, DST institutions, SAUs, IITs, civil society institutions and private sector.

iii) Technology Database Development:

- The project will develop a database of all technologies in the inventory.
- Identify a consultant or a service provider by the PIU.
- Main tasks of the consultant/service provider would include: Develop a web-page within the KM portal of ICAR to host the inventory data base with provisions to download the information for public purpose. Develop the database of technologies and manufacturers/innovators with an interactive page allowing the potential manufacturers/innovators to register and fill up details regarding their entity, technology and updated address and contact details. Develop a database with provisions for searching the information using key words and the results of search may be made available to the user in a downloadable format.
- The database could also have a dedicated page for user rating.

2. Capacity Building of ICAR

i) National AE Technology Forum establishment

- Need for the forum establishment: this activity is proposed to mainly develop ICAR's capacity to act as an umbrella organization for AE technology development for smallholders by enabling AED-ICAR to set the AE research agenda across both, the public and private sector research agencies, develop knowledge sharing platforms, avoid duplication in research and development (R&D), and disseminate lessons from R&D and scaling up models to the policy makers. The AE Technology Forum also serves an additional purpose of setting in particular the research agenda for the hill and upland farming areas under rainfed agriculture with special focus on women, youth, and climate change adaptation.

- Activities of this forum: The main activities of this forum will be to discuss progress in AE research for smallholder farmers in rainfed areas and with special focus on upland farming. The Forum will set the agenda for new research with special focus on needs of women, youth and climate change adaptation. In addition the forum will be the location where the fellowships will be offered on competitive basis to young researchers for developing the technologies in key new areas, and to reward the best performing researches for developing such technologies.
- Selection of 5 top researches for award. This would include the announcement procedures, develop criteria to be used in the selection process of the researches, and composition of a committee for evaluation of research outputs, as well as organizing an event for bestowing the awards. This can be dovetailed with the existing procedures in ICAR for other awards.
- Select candidates for AE research fellowships with field work in the project area. The selection of candidates for fellowships would involve making announcements (opening of fellowships), developing criteria to be used in the fellowship selection process, as well as composition of a committee for the evaluation of the candidates and award of fellowships. This can also be dovetailed with the existing procedures in ICAR, DST, IITs, etc.
- Suggested invitees to this forum; ICAR and its institutions, DST institutions, IITs, other public and private sector agencies and individual innovators involved in AE research.
- Frequency of meeting: The forum meeting may be organized twice a year.
- Outcomes from this forum meeting: The outcomes from the forum will be: (i) the list of AE Technology (machinery) research in key identified new priority areas (non-existing technologies), and (ii) Encouragement for the women and young researchers to come forward for dealing with the development of agricultural technologies in the identified key new areas.

ii) Best AE machinery development awards

- PIU to call for nominations from all agencies (public and private sector) for the Best AE machinery development award.
- PIU to constitute a committee for evaluating the nominations.
- The nominations are evaluated from the following perspective, using specific criteria. The perspectives are the following:
    - Increasing smallholders' ability to adapt to climate change events.
    - Decreasing women's drudgery in agriculture.
    - Reduction in GHG emissions.
    - Addressing hill farmers' technology needs.
- PIU to give awards during the National Technology Forum Meetings

iii) Fellowships

- PIU will call for applications with research synopsis from postgraduate AE students from SAUs and Central Universities, IITs, DST institutions and other research institutions in the project states.
- The fellowship will be for two years as undertaking post-graduate or doctoral research work
- PIU to evaluate the research synopsis from the following perspective.

- Increasing smallholders' ability to adapt to climate change events.
- Decreasing women's drudgery in agriculture.
- Reduction in GHG emissions.
- Addressing hill farmers' technology needs.

- Select the best research synopsis and provide fellowships.
- Fellows to submit a copy of the final research dissertation to PIU.

iv) CGIAR/ Institutions of global repute – IFAD Grant

- Engage a CGIAR/ of global repute with experience in promotion of AE technology to undertake these activities.
- Seek a proposal from the selected CGIAR/ institution of global repute to undertake the following tasks:
- Prepare protocols for conducting techno-economic assessment of AE technologies.
  - The Techno-Economic Assessment Protocol should be generic (applicable to any technology), and should focus and include criteria and practically measurable parameters with respect to technical, economic, and social context of the technology and the geographic (agro-ecological) specificity of the location where the technology is intended to be recommended, or applied in.
  - The outsourced agency for the development of the protocol should be familiar and have experience in developing protocols for techno-economic assessment (technological and economic, including the social aspects) of technology, preferably of agriculture machinery for small holder farming systems. Their experience in the rain-fed situations, particularly in India will be an advantage.
  - Training of persons from ICAR and its affiliate institutions engaged in techno-economic assessments.
  - The agency should develop a software/ application for ease of use of the techno-economic assessment.
- Develop technology manuals with simple technology description, dos and don'ts and farm level prerequisites for technology use.
  - The Manual for Demonstrations of AE technologies should be a Generic Manual, however, should occasionally include references to specific technologies. The manual should include not only the how to operate a given machinery, but also include the prerequisites of applying that technology. For example, the use of a mechanical rice trans-planter requires specifically produced rice seedlings in a nursery.
  - The Manual should include all the needed steps for demonstration of any AE technology, including the socio-economic, educational, ethnicity, etc. profile of the targeted clientele, such as the small holder farmers, women, hill farmers, for whom and where the demonstrations are to be made. The manual for demonstrations should also include aspects of transportation of the machineries, energy and other requirements for operating, maintenance and wear and tear of the machinery.
  - The outsourced agency to be engaged for developing the Demonstration Manual should have experience in preparing demonstration manuals (step by step items) as well as in conducting field demonstrations, preferably of agriculture

machinery for small holder farms. Their experience in the rain-fed situations, particularly in India will be an advantage.

- Prepare package of practices for important crops in the project area.
    - The package of practices should include for any crop , all agronomic aspects of growing that crop, beginning from the land, or seedbed preparation (nursery for some crops), sowing, varieties to be used, fertilizer application, weed, pest and insect management, etc. to the harvesting, produce storage aspects. In some cases, e.g. vegetables, their immediate packing, transport and marketing should also be included in the PoP.
    - There will be distinctly separate PoPs for different crops, however, some of the agronomic aspects, e.g. pest management may be similar to all.
    - The outsourced agency should have experience in preparing simple and complete package of practices (all agronomic practices) in a sequential manner applied in farming, covering from land preparation to threshing for major crops grown in the project states.
    - All the specified above activities are to be carried out as the requirements and relevant documents to be prepared and submit to the PIU with room for improvement / modifications by incorporating the feedback from PIU. The medication will be taken up by the out sourced agency / individuals.
    - The Package of Practices should incorporate guidelines for climate change adaptation.
- Training of KVK, SDA and other training institution staff as trainers in the user of technology manuals and package of practices.
- Enter into a MOU with the CGIAR/Specialist International Institution for undertaking the above mentioned tasks.
- Provide funding to the selected CGIAR/Specialist International Institution institutions.
- Review the progress in implementation and reporting

v) Other capacity building

a) Participation in Agri-expos (domestic and international)

- Selection of staff for domestic and international (overseas) agri-expos participation from state level officers, and ICAR Officers.
- Provide funding for participation.

b) Purchase of technology including machinery and equipment from abroad

- Seek proposals from ICAR institutions, SAUs, DSTs and IITs to import AE machinery and equipment
- Evaluate and prioritize the requested machineries
- Procure the prioritized machinery and equipment
- Display of machinery and inviting innovators for learning about imported machinery and equipment during the technology challenges.

c) Technical support

- Identify the emerging technical assistance needs of ICAR and its agencies.

- Prepare terms of reference for the technical assistance
- Identify consultants required for technical assistance and engage them

d) Certification Support

- Conduct meetings with AMMA to identify the small manufacturers requiring certification support, and innovators requiring IPR support.
- Seek proposals from the manufacturers interested in getting support for certification and also innovators requiring IPR support.
- Evaluate the proposals regarding certification and IPR and provide support.

e) Technology Export

- Identify agencies involved in export of technology.
- Seek proposals from the interested agencies for export of technology under this project
- Evaluate the proposals and provide project support.

B. Innovation Platform

1. Concept to Prototype development

- Constitution for a committee for evaluation of proposals for concept to prototype development.
- Call for concept notes from all agencies (public and private) for concept to prototype development with detailed cost of development and timelines for completion.
- Evaluate the proposals from the following perspective:
  - Increasing smallholders' ability to adapt to climate change events.
  - Decreasing women's drudgery in agriculture.
  - Reduction in GHG emissions.
  - Addressing hill farmers' technology needs.
  - Total cost of development not to exceed Rs 40 lakhs.
- Select best proposals and provide funding.
- Sign a MOU with the selected innovator for development of the technology to provide funding.
- Innovator to agree to display the prototype in the technology challenges of the project (this will be part of the MoU).
- Funding to be released based on the quarterly progress report (this will be part of the MoU).
- AED to conduct verification visits to the site of the innovator to ascertain the progress (this will be part of the MoU).
- Innovator supported under this project to submit details of expenditure made to match the same with the amount granted (this will be part of the MoU).

2. Adaptation/Modifications to existing technology

- Constitution of a committee for evaluation of proposals for funding adaptations/modifications of existing technology. The committee constituted for

evaluation of proposals for concept to prototype development can be also engaged for this purpose.

- Call for concept notes from all agencies (public and private) and also individual innovators for concept to modified prototype development with detailed cost of development and timelines for completion.
- This call for proposals can also be circulated to the State Agriculture Departments of project states to get wider publicity
- Evaluate the proposals from the following perspective:
  - Increasing smallholders' ability to adapt to climate change events.
  - Decreasing women's drudgery in agriculture.
  - Reduction in GHG emissions.
  - Addressing hill farmers' technology needs.
  - Total cost of development not to exceed Rs 15 lakhs.
- Select best proposals and provide funding.
- Sign a MOU with the selected innovator for development of the technology to provide funding.
- Innovator to agree to display the prototype in the technology challenges of the project (this will be part of the MoU).
- Funding to be released based on the quarterly progress report (this will be part of the MoU).
- AED to conduct verification visits to the site of the innovator to ascertain the progress (this will be part of the MoU).
- Innovator supported under this project to submit details of expenditure made to match the same with the amount granted (this will be part of the MoU).

3. Prototypes to commercial development

- Constitution of a committee for selection of prototypes for commercial development. – The committee constituted for evaluation of proposals for concepts to prototype development and adaptations/modifications development can also be used for this purpose.
- PIU to identify prototype developers based on the inventory of technologies conducted by the project and also based on the additional information available in the public space.
- Invite the prototype developers to the annual technology challenges at the central and state level.
- Conduct technology challenges at both, the state and central level, and select promising prototypes evaluated from the following perspective:
  - Increasing smallholders' ability to adapt to climate change events.
  - Decreasing women's drudgery in agriculture.
  - Reduction in GHG emissions.
  - Addressing hill farmers' technology needs.
  - Total cost of development not to exceed Rs 50 lakhs.
- Select best prototypes and provide funding.

- Sign a MOU with the selected innovator for development of the technology to provide funding.
- Identify manufacturers interested in commercializing the selected prototypes for project support and work out a collaboration agreement between the prototype developer and the manufacturer so that the designs can be developed in consultation with the manufacturer.
- Funding to be released based on the quarterly progress report (Built in MoU).
- AED to conduct verification visits to the site of the innovator to ascertain the progress (MoU).

4. Third party assessment of Innovation Platform Support

- This activity will have to be undertaken by the institutions outside ICAR, or by an agency involved in development and screening of technology development proposals, release of funds and their utilization for producing outputs as specified in the proposals in a time bound manner. The agency hired for the verification should have a track record on conducting technical and financial audits according to the specified and acceptable norms. Some of the outsourced agencies may include Agribusiness School, Management institutions, Indian Institute of Technologies, etc. The main functions include:
    - Check the call for proposals indicating the specific requirements for New Technology Development, Customization of the technology, and existing prototypes to move into commercial production, along with the eligibility criteria for application in both cases (who are eligible to apply for) and the criteria for screening the proposals. Validate and confirm whether the specificity for new technology development, Customization, and Prototypes to move into commercial production, and the eligibility criteria for application to these areas were adhered to, or not.
    - Carry out a technical audit on the adherence for proposal screening criteria (screening done by a committee composed by the PIU) with regards to what was in the call for proposals and what was complied with.
    - Carry out a financial and output delivery audit as per the call for proposals, and release and utilization of funds for each of the three windows, the new technology development, customization of the technologies, and the prototypes to move to commercial production in light of the specificity of the call for proposals.
    - Check the IPR issues, plagiarism fraud, etc. if any, with respect to the outputs (results) of the research through proposal mechanism.
    - Report the findings

II. Business models for scaling up of appropriate AE technologies

A. Demonstrations and support service development

1. Partnership agreements with scaling up partners

- SPMU to conduct a state level meeting with partner agencies (SRLMs, WSD mission, and agencies implementing IFAD funded projects in the states) and map the availability of community institutions (SHGs, VOs, Cluster level Federations, Watershed Committees, FPOs) and also their maturity levels in the selected villages.
- The Key characteristics of community institutions include:

Type of Community Institutions	Self-help groups	Village organisations /cluster level federations of SHGs	Farmer producer organisations
Mobilised by	SRLM/ NGOs/ CSR foundations	SRLM/ NGOs/ CSR foundations	POPIs with funding support from NABARD, SFAC, Government agriculture/horticulture departments, Recently SRLMs are also forming FPOs out of SHG members.
Members	Poor women (10 to 20) SRLMs have the strategy and target of including poorest of poor into SHGs especially from marginalised sections like SC/ST. Youth are members.	SHGs/Members of SHGs VO – 5 to 15 SHGs Cluster federations – upto 300 SHGs	Both men and women farmers (Minimum 50). Youth are members of FPOs.
Livelihoods of members	Members have varied livelihoods and in rural areas members largely grow crops and animal husbandry and undertake value addition.	Members have varied livelihoods and in rural areas largely crops, animal husbandry and value addition.	Farmers are involved in crops, horticulture, animal husbandry. In tribal areas NTFP gathering is a major livelihood.
Core functions	Savings and credit Facilitation of livelihoods of members with support from federations	SHG maintenance services Facilitating access to finance Livelihood support services Aggregation of outputs (selectively) Custom hiring centres (selectively)	One or more of following; Aggregation of inputs and output marketing. Extension services Information services – weather, crop planning etc., Facilitating access to finance for members Primary processing/value addition Machinery leasing
Legal registration	Unregistered and informal groups	Usually VOs unregistered and cluster federations registered as societies.	Registered under Company/ Cooperative Act.

- Apart from the above, Watershed missions have promoted watershed committees; the IFAD funded projects also have promoted VDCs. In the north-east states of Assam and Nagaland various forms of community based traditional organisations are functional such as Jhum resource management committees, Village development councils, etc. They will also be eligible for project support.
- Based on the mapping of the community institutions and after a preliminary assessment of maturity levels to move into agriculture mechanization for farming

as well as processing, the selected partner agencies will be requested to submit a proposal to SMPU.

- The main functions of the scaling up partners will be to:
    - Identify lead farmers in consultation with VOs/CIs and other similar community institutions and provide the names of lead farmers to KVKs for training.
    - Facilitate the VOs/CIs from villages where lead farmers will operate to become focal points for managing and supervising field days and to ensure the conduct of field days and link the lead farmers to KVKs.
    - Identify VOs/CIs interested in establishing FMUs/CHCs/CFCs/ATBs and also members of SHGs/VOs/CIs interested in purchasing agriculture machinery and equipment.
    - Prepare applications for getting project assistance and submit it to SPMU.
    - Assist the VOs/CIs and its members to access bank credit for purchase of agriculture machinery.
    - Assist the VOs/CIs in procuring the agriculture machinery and equipment and facilitate VOs/CIs in entering into a service contract with the manufacturers.
    - Assist the VOs/CIs to manage the FMUs/**CHCs/CFCs/ATBs** efficiently and profitably to put in place management guidelines and also to work out business plans.
    - Assist the VOs/CIs to establish a user expansion support fund and assist the VOs/CIs to seek funds from the project.
    - Provide MIS data as per the formats prescribed by SPMU.
    - Participate in the district level and state level review meetings.
    - Facilitate SPMU in conducting annual outcome survey and other thematic studies.
    - Provide statement of expenditures on a quarterly basis and also an audited statement of expenditure within two months from the end of financial year.
- SPMU to review and approve the proposal of partner agencies. All funds related to demonstrations to flow from KVKs and funds related to technology incentives and user expansion support to flow from SPMU. Only management costs to flow directly to the partner agency from SPMU.
- SPMU to sign a tripartite agreement (involving PIU) with the partner agencies, which shall detail the outcomes, activities, budgets, fund release and settlement procedure, monitoring and reporting requirements.

2. Preparatory activities by KVKs

- KVKs to prepare year-wise work plan and budget which involves activities related to staff engagement, demonstration machinery and equipment procurement, lead farmer training, organizing lead farmer led field days and third party verification of field days.
- Preparation of the first year AWPB for each KVK and submission to SPMU.

- Identifying and recruiting additional staff proposed under the project for conducting lead farmer training and lead farmer led field days.
- Preparatory activities include preparation of technology manuals, package of practices and training of staff of KVKs and under the IFAD grant activities through a selected CGIAR institutionor institution of global repute[8].
- Translation of technology manuals and package of practices into local languages and printing of these technology manuals and package of practices.

3. Demonstrations by KVKs

i) Demonstration machinery and equipment purchase for KVKs

- Preparation of a proposal by PIU seeking funding from SMAM for procurement of machinery for demonstrations. Get the proposal approved and fund released and place the funds in the bank account of the project.
- PIU through SPMU to circulate to all the KVKs the list of technologies to be promoted and suggested quantities (provided in Appendix 2) Request KVKs to prepare a list of district specific technologies with broad specifications, manufacturers (maximum 3 manufacturers), quantity of machinery and equipment required for conducting demonstrations and costs (cost, insurance and freight) for delivery of equipment to the KVKs.
- KVKs to submit the list of technologies with manufacturers and costs to SPMU. SPMU to place it before the SPD for approval and forward the same to PIU.
- PIU to make an analysis of the list to verify the appropriateness of the technologies proposed, adequacy of the quantity of machinery and equipment proposed, appropriateness of the cost norms suggested.
- PIU to approve the agriculture machinery and equipment list and budget for each KVK and authorize KVKs to procure these machinery and equipment and transfer required funding to KVKs.
- KVKs to procure the machineries based on the approved list.
- KVKs to submit SoE to PIU along with relevant documents related to purchase.
- These activities will be undertaken every year during the first three years to add new machinery and equipment into the bouquet of technologies for demonstration by KVKs.

ii) Preparatory activities for Lead farmer training and Lead farmer field days

- SPMU to conduct a joint meeting of all KVKs and partner agencies (SRLMs, WSD mission, and agencies implementing IFAD funded projects in the states) with whom partnership agreements would have been signed.
- KVKs to request selected partner agencies (SRLMs, WSD mission, and agencies implementing IFAD funded projects in the states) to collect information related to VO/CI mapping in the project blocks and to select lead farmers for training by KVKs.
- Block Coordinator funded by the project and positioned with SRLM/other partners will be the focal point for all field level activities.

[8] As rice will be the main crop in the project area, it is expected that the project will address mechanization in rice based production systems. Among CGIAR organizations, IRRI is well placed to support AED in developing the techno-economic assessment, the demonstration manuals, and the Package of Practices.

- Selection criteria for lead farmers:
    - Selection shall be undertaken by the VOs/CIs.
    - Preference for youth with minimum 10^{th} grade pass. In case youth with 10^{th} grade pass are not available, then youths with 7^{th} grade pass could be considered.
    - Experience in driving tractors/power tillers preferred. If not VOs/CIs to send the Lead Farmer for driving training.
    - Interested in conducting field days in farmer fields covering 20 farmers every day for about 5 days under the supervision of VOs/CIs.
    - Preference for persons interested in managing CHC/CFC/FIB to be established by the VOs/CIs.
- KVKs to conduct block level meetings with the partner agencies and VO/CI representatives to brief the community on the modalities of lead farmer training and lead farmer led field days.
    - KVK to conduct lead farmer training.
    - One lead farmer to cover about 2-3 villages depending on the number of households.
    - Lead farmer to conduct farmer field days – A lead farmer will train one batch of 20 farmers to attend a day long field day. In total 5 field days covering 100 farmers to be completed during first year (concurrent with kharif/rabi) and another 100 farmers during the next season (kharif/rabi). These field days will be spread across cultivation seasons covering land preparation, transplanting, weeding, harvesting, storage and processing.
    - AE machinery and equipment required for field days will be provided by KVKs to lead farmers on a returnable basis.
    - All costs for conducting field days to be provided by KVK to the Supervisory VO/CI. Cost required for hiring prime mover and transportation of machinery included in the costs.
    - VO/CI to provide daily allowance to the lead farmer. An allocation has been made for conducting 5 field days covering 100 farmers which will be repeated during the next year.
    - VO/CI to certify conduct of field days, upload photographs of field days, prepare a list of participants and submit expenditure claim to KVKs countersigned by the Block Coordinator of SRLMs.
- Select VOs/CIs near the block headquarters in a central location of the block to create block level hubs of AE machinery and equipment (except prime mover) for demonstration. This will reduce the transportation cost and also time required for transport.
- KVK to enter into an agreement with the selected VOs/CIs to manage the hubs with the condition that these AE machinery and equipment will be provided to the lead farmers for conducting field days and during the other days can be rented out.
- Partner agencies to provide a list of lead farmers (Name, address and telephone number) and their supervisory VOs/CIs (Name of the VO/CI, names of the two office bearers of the VO responsible with telephone number and bank account details of VOs/CIs).

iii) Lead farmer training

- KVKs based on the list provided by the partner agencies select lead farmers and conduct lead farmer training on their own farm or in the villages adopted by KVKs.

- KVK staff trained in the use of technology manuals and package of practices will anchor the lead farmer training with support from other KVK staff.
    - KVK to conduct Lead farmer training in two phases of 5 days each (or in four to five phases of 2/3 days). KVKs will have the flexibility to change the number of days of training to suit the seasonal requirements. The training will cover the following aspects.
    - Advantages of Agriculture machinery and equipment being demonstrated.
    - Agriculture machinery and equipment operation and upkeep.
    - Dos and Don'ts of Agriculture machinery and equipment use.
    - Farm level prerequisites for Agriculture machinery and equipment use
    - Primary Operation and Maintenance (O & M) methods and techniques
    - Package of practices for important crops.
    - Methodology for conducting field days for demonstration on the farmers' field.
    - Training on soil health card and Lead colored chart.
- At least three technologies should be demonstrated in each phase of lead farmer training.
- KVKs have allocation for conducting these training which includes daily allowance to the lead farmers, lunch, resource person costs (if required) and other expenses.
- KVKs to submit reports related to completion of lead farmer training to SPMU and PIU and submit the statement of expenditure.

iv) Demonstration through Lead Farmer led Field days.

- The supervising VOs/CIs along with the selected lead farmer to conduct village level meetings (in their own village as well as in the nearby villages) for mobilizing interest of farmers for field days. Prepare a list of interested persons for participation, divide them into batches of 20 persons and plan for conducting field days.
- Submit the plan to KVK and receive funding for conducting field days.
- Field day shall be for 1 day covering technology demonstration of at least 2-3 agriculture machinery and equipment which will be repeated over 5 days covering 5 batch of participants. In the second phase again, field days for an additional 2-3 technologies will be conducted.
- Field days to cover:
    - Advantages of the Agriculture machinery and equipment.
    - Agriculture Machinery and equipment operation and upkeep.
    - Dos and Don'ts of Agriculture machinery and equipment use.
    - Farm level prerequisites for AE machinery and equipment use
    - Package of practices for important crops, inclusing soil health cards and lead colored chart.
- A completion report to be submitted by Lead farmer to VO after completion of field days for claiming honorarium and other costs need to be prepared.

v) Training and Exposure visits by partner agencies

- Partner agencies will be responsible for implementing activities related to training and exposure visits.
- Demonstrations with field days model of dissemination can be used only for movable agriculture machinery and equipment. In case of processing machinery

and other equipment that need installation, the project will identify suitable training institutions and conduct training in these institutions. Exposure visits will also be organized to enable the VO/CI members and farmers to get an insight into the working of these machineries and equipment.

- Funds related to this will be allocated to the respective partner agency and the partner agency shall be responsible for all activities including settlement of expenditure claims.

vi) Training – Implementation steps

- Partner agencies to make an assessment of training requirements of the VOs/CIs and their members and also demand for post-harvest processing AE machinery and equipment.
- Partner agencies shall select persons nominated by the VOs/CIs to start CFCs and also persons interested in purchasing processing machinery and equipment.
- Partner agencies to prepare a list of persons interested in training and also the type of processing machinery and equipment of interest to them.
- Partner agencies to identify training centres in processing as demanded by the interested beneficiaries. SPMUs will also support in identification of suitable training centers.
- Training shall be minimum for 5 days residential training.

vii) Exposure visit – Implementation steps

- Partner agency to identify places for visit particularly to small processing enterprises and also areas with high levels of processing technology adoption.
- Number of exposure visit participants to be selected depending on the ability of place of visit to accommodate the beneficiaries.
- Exposure visit duration - 5 days visit

4. Support service development

- Technology adoption is constrained by inadequate support service development for providing local level sales and service support for machinery and equipment manufacturers.
- Many low cost implements and equipment available in developed states are not used in project states due to lack of local manufacturing.

i) Support to local manufacturers

- This activity will be anchored by SPMU/SDA at the state level.
- SPMU to identify local manufacturers interested in manufacturing improved tools and implements.
- SPMU provide a list of improved tools and implements that are already available with ICAR and other manufacturers outside the state.
- Discuss the support requirements for local manufacture and prepare proposals for support.
- Get the proposal approved and provide funding to the local manufacturer to manufacture and sell the same in the Kisan Melas organized by the KVKs.

- The average funding amount planned at design is 500,000 Rs/ manufacturer. This amount may be revised based on implementation results and lessons learned.

ii) Support to State Agro-Industries:

- Identify interested State Agro-industries Corporations to establish sales and service centres for Agriculture machinery and equipment in project districts. Obtain proposal for financial support in setting up a repair and service centre.
- Provide support to interested State Agro-Industries. The average financial assistance planned is 5,000,000 Rs/ state agro-indutry. This amount may be revised based on implementation results and lessons learned.

iii) Support to existing agriculture machinery and input supply centres

- Identify existing sales and service centres/dealers of tractors/power tillers/irrigation pumps to service other AE machinery and equipment. Obtain from them proposal to support establishment of repair and service centre.
- Support them to procure tools and other equipment required for servicing of AE machinery and equipment other than tractors/tillers. The average support is 500,000 Rs/centre. This amount may be revised based on implementation results and lessons learned.

iv) Agriculture Machinery Service Mechanic Training

- This intervention will be youth focussed.
- PIU to discuss with CIAE, Bhopal to identify training institutes for training youth as Agriculture Machinery Service Mechanics.
- PIU to circulate the list of training institutes to SPMU.
- SPMU to request SRLM and other partner agencies to select youth from the project villages with the active assistance of VOs/CIs.
- Selected youth should be interested in establishing a service centre after completion of the training.
- SPMU to send selected youth for training.
- SPMU to review the youth's capacity to establish service centres and provide support for establishment. The average amount of the financial support is 500,000 Rs. This amount may be revised based on implementation results and lessons learned

B Scaling up technology usage through partnerships

1. General

- Community institutions to be the focal point: SHGs, VOs, WSCs and FPOs.
- Individual members also supported for AE machinery and equipment other than tractors and tillers.
- This will be implemented largely by SRLMs. There will also be provision to work with other implementation partners such as civil society organisations, CSR foundations, etc., depending on the maturity levels of CIs promoted by them and ability to bring in required contribution. Potential partner agencies may also include the private sector, such as Unerlike rental platforms for agri-machinery that see a business opportunity in the project area.

- The project to support Farm Mechanization Units (FMUs), Common Facility Centres (CFCs) and Agriculture Tool Banks (ATBs), and additional machinery for existing Custom Hire Centres (CHCs)
- The project's technology incentive structure is as under:

Type of investment	Beneficiary	Technology Incentive structure		
		SCATE	Convergence – including SMAM	Bank loan and Beneficiary contribution
Farm Mechanization Units- Prime mover	SHGs, VOs, WSCs and other community institutions	40%	40%	20%
Farm Mechanization Units- Auxiliary AET machines	SHGs, VOs, WSCs and other community institutions	60%		40%
Common Facility Centres	SHGs, VOs, WSCs and other community institutions	50%	30%	20%
Common Facility Centres – RE based	SHGs, VOs, WSCs and other community institutions	80%		20%
Existing CHCs	Any existing owner	40%		60%
Agriculture Tool Banks	SHGs, VOs, WSCs and other community institutions	80%		20%
Individual AE machinery and equipment other than prime movers	Any interested household from the project villages	50%		50%

2. Implementation steps for scaling up

- SPMU to conduct a consultation with SRLM and other partner agencies such as Watershed missions, civil society organizations, District Agriculture Officers and IFAD funded projects in the state on the implementation modalities for scaling up.

- Three types of support is envisaged to VOs/CIs: (i) establishment of FMUs with prime mover and also support to these FMUs for auxiliary machinery; (ii) establishment of CFCs and also CFCs with renewable energy power source; and (iii) Agriculture tool banks.
- SPMU to sign a partnership agreement with SRLM and other partner agencies specifying area of operation, activities to be implemented, output targets, fund allocation, fund release systems, submission of statement of expenditure and monitoring data submission.
- SCATE funding can be used in convergence with SMAM funding. In respect of individual AE machinery and equipment, in the event SMAM convergence funding is available, can be used instead of bank finance. Bank finance is to be facilitated by the partner agencies.
- Technology incentives will follow the same modalities as SMAM. However, based on the field experience, KVKs will submit list of technologies and manufacturers and cost norms to SPMU for inclusion into SMAM guidelines. Detailed guidelines for establishment of FMUs, CFCs, ATBs are given in *Appendix 3*. The guidelines for providing support to Individual farmers is given in *Appendix 4.*
- SPMU to provide application forms for accessing technology incentives to SRLM and other partner agencies.
- SRLM and other partner agencies to submit the filled in application forms to SPMU.
- SRLM and other partner agencies to ensure deposit of beneficiary contribution including bank loan amount to the bank account of DAO/SDA.
- SDA/SPMU to process the payment to AE machinery and equipment manufacturer with intimation to SRLM and other partner agencies. Possibilities of paying 80% upfront payment and balance 20% upon satisfactory installation to be explored.
- SRLM and other partner agencies to report on Agriculture machinery and equipment delivery and installation and submit a report on satisfactory delivery.
- SRLM and other partner agencies to report on: (i) physical achievements; and (ii) operating performance of the project supported FMUs, CHCs, CFCs, ATBs and individual machineries for the duration of the project.

3. Implementation steps for user expansion support

- Project will provide Rs 10,000 to 50,000 per VO/CI to incentivise the members and other farmer especially poorer farmers who have doubts about the affordability of hiring AE machinery versus the benefits. The incentive will be provided to encourage smallholders to take agricultural equipment on rent from FMU, CHCs, CFCs and ATBs. The incentive will be determined based on the cost of the machinery.
- Block agri-enterprise promoters posted with SRLMs/partner institutions to map the number of VOs/CIs that can be linked to the FMU, CHCs, CFCs and ATBs promoted under the project.
- Block agri-enterprise promoters to explain the contours of user expansion support and generate their interest to participate.
- The broad contours include:
    - Support is for incentivising the farmers to take Agriculture machinery on rent.

- The project will provide a support of Rs 10,000 to 50,000 per VO/CI as initial grant.
- VOs/CIs to develop a system of providing this amount as interest free loan to members for the purpose of renting AE machinery,
- The loan provided to the members to be recovered after harvest.
- VOs/CIs to monitor utilization of the amount for the intended purpose and take remedial measures to address challenges.

- Based on this mapping partner institutions to prepare a request from each VO for provision use support grant, consolidate the same and submit it to SPMU.
- SPMU to release funds directly to VOs/CIs under intimation to the partner agency concerned.
- Partner agency to submit reports as required by SPMU to monitor the achievement in terms of achievement of physical and financial targets.
- Partner agency to assist SPMU to conduct thematic studies related to user expansion support.

4. Rural Finance – mobilising bank loans

- The project will facilitate bank loans FMUs/CFCs/FICs and individual farmers where ever needed. The project will host a state level finance platform and a block level finance platform for smooth flow of credit.
- At SPMU, the Agriculture Officer will have the responsibility (additional) for liaising with key banks, managing the state finance facilitation platform, monitoring the bank loan disbursements and repayments and ironing out any operational issues.
- Agri enterprise promoters of SRLM and other partner institutions will be primarily responsible for ensuring preparation of bank loan applications, follow up on the applications and ensuring timely disbursements. They will participate in the block level finance facilitation platforms and ensure regular interface between bankers and community institutions needing credit.
- **District finance Facilitation Platform**
  - SPMU will host District level Finance facilitation platform every six months in the first two years and yearly thereafter.
  - The major banks servicing the project area, specialised financial institutions financing FPOs such as Samunnati Value Chain Finance, Ananya Finance for Inclusive Growth, Friends' of Women's World Banking, NABKISSAN, etc., along with project partners will be invited.
  - SPMU and Project partners will enter into tri-partite MOUs with banks/financing institutions interested to partner with the project.
  - The credit needs will be assessed by the project partners every year and the block wise data will be shared with the financing institutions to develop broad agreements for financing. These plans will be monitored and policy/operational issues will be sorted out by the financing institutions and project partners.
- **Block Finance Facilitation platforms**
  - The platform will provide space for interface between the bankers and community institutions/individuals requiring credit for technology uptake.

- SRLM will host Block level Finance Facilitation platform every quarter in the initial three years and every half year in the later three years.
- The platform participants include: (i) major bankers operational in the block; (ii) SHGs/Village organisations/federations/FPOs/WSCs/JMRCs with ready business plans and credit proposals, (institutions promoted by all project partners and operational in the block will be invited to the platform interface meetings).
- Agribusiness promoter of both SRLM and civil society partners will be responsible for making ground level arrangements of assessing the credit needs SHGs/ Village organisations/ FPOs for running the FMUs/CFCs/ATBs and individual farmers to ensure these institutions attend the meetings.
- SPMU, DPM of SRLM, SRLM Rural finance in charge will coordinate with banks/ branches to ensure participation of bankers.
- The platform will be action oriented tracking the credit applications' sanctions and disbursements and also repayments.

Chapter V: Organizational Framework

A. Institutional arrangements

The proposed structure for project implementation is built around three key considerations: (i) integration with the existing institutions to facilitate seamless exit at the end of the project period; (ii) build on existing organization and institution rather than creating a new system; and (iii) the identified partner agencies should not only serve as a vehicle for programme delivery but should also benefit from capacity development and evolve into more robust entity or entities by the end of the project.

As the basis of above considerations, the Indian Council for Agriculture Research (ICAR), an independent society under the Department of Agriculture Research & Education (DARE) of MoA&FW will be the lead implementing agency for the project. The project implementation unit (PIU) will be established with the Agri-Engineering Division (AED) of the Indian Council of Agriculture Research (ICAR).

B. Project Management

1. Central level Project Management

ICAR will establish Centre for Technology Development and Promotion (CTDP) within AED and the **Project Implementation Unit** (PIU) will be housed within in this section. PIU will manage the day to day execution of the project. The organogram of the project implementation unit is presented in *Appendix 5.1.* PIU will be headed by DDG of AED who will be the Project Director (PD). The PD will be supported by an Additional Project Director (APD). ICAR will assign five National Coordinators with a National Coordinator responsible for Participatory Technology Development component and other four National Coordinators will have geographic responsibilities (one for Assam and Nagaland and one each for Orissa, Jharkhand and Chhattisgarh) and a Head of Finance to this project.

The project will engage five Asst Coordinators, a Planning and M&E Specialist, a Procurement Specialist, a Capacity building and Training Specialist, a Finance Manager, and a Manager - Knowledge Management, a Finance Asst, a MIS Asst, Project Executives and Administration staff. All these staff will be on a contract basis. All contract staff appointments will be on fixed term basis of at least two years and the candidates would be recruited on a competitive basis based on professional competence and experience. The PIU, while recruiting staff, will give preference to women candidates, subject to other eligibility and desirable qualification criteria being equal. The terms of reference of the staff are provided in Appendix 6.

The primary tasks of the PIU will be to: (i) overall conceptualization, supervision and monitoring of project activities and progress towards achieving physical, financial and outcome related targets; (ii) ensuring collaboration between SMAM and state level project implementation units; (iv) preparing and submitting AWP&B and procurement plan to IFAD for "No Objection"; (v) incorporating the budget requirements of the project into the overall budget of the ICAR and ensuring flow of funds to the project; (vi) operating Project Accounts and ensuring timely release of funds to the SPMUs and KVKs; (vii) receiving statement of expenditures and supporting documents related to fund release, and keeping an account of fund release and utilization, as well as preparing overall project financial statements; (viii) reviewing and supervising the performance of SPMUs; (ix) preparing and submitting Withdrawal Applications to GoI/CAAA for onward transmission to IFAD; (x) undertaking procurement, and execution of contracts with service providers and suppliers of goods and services for implementing project activities;

(xi) implementation of activities related to Participatory Technology Development; (xi) preparing and submitting progress reports quarterly and annually to IFAD; (xii) establishing an effective MIS and M&E system to track project progress; (xiii) undertaking knowledge management activities; (xiv) preparing M&E data for submission to IFAD; (xv) ensuring preparation and submission of annual audit reports and financial statements to IFAD and ensuring compliance to the audit observations; and (xvi) ensuring compliance to the provisions of the Financing Agreements signed between GoI and IFAD.

2. State level Project Management

The project will establish a State Project Management Unit (SPMU) within the State Department of Agriculture. The Director of Agriculture will be the State Project Director and the Joint Director responsible for SMAM will be the State Nodal Officer. The project will establish a SPMU with a State Project Manager, a Finance Officer, Agriculture Officer and Monitoring and Evaluation Officer. The State Project Manager will report to the Joint Director-SMAM in addition to the line reporting to Assistant Project Director at the PIU. The organogram of SPMU and also its linkages with various partners is provided in Appendix 5.2.

SPMU would be responsible for: (i) engaging state level partner agencies for implementing project activities in coordination with PIU and supervise their work; (ii) conducting State Project Co-ordination Committee (SPCC) meetings; (iii) reviewing the AWPB submitted by state level partner agencies and also reviewing the physical and financial achievements against AWPB targets; (iv) reviewing the shortlist of tools and implements and machinery and equipment and provide necessary feedback to the PIU on state specific inventory; (iv) reviewing and approving the list of manufacturers and prices for procurement of machinery and equipment by the project beneficiaries with project matching grant support; (v) providing project support to coordinate the activities of all partner agencies particularly with regard to demonstrations, convergence and scaling up; (iv) coordinating submission of the statement of expenditures by the partner agencies; and (vii) establishing a well-functioning MIS and the timely submission of M&E reports, and other relevant documents to the PIU.

C. Project Coordination

1. Central level Project Coordination

The project will have a four tier coordination mechanism comprising: (i) a central level Project Steering Committee; (ii) a central level Project management Committee; (iii) a state level State Project Coordination Committee; and (iv) a district level District Coordination Committee. The project's coordination mechanism is illustrated in Appendix 5.3.

Project Steering Committee: DARE will establish a **Project Steering Committee** (PSC) to provide policy level support to the project and would function as the apex Governing body. The Secretary DARE, who is also the Director General (DG) of ICAR, would be the Chairperson of the PSC. The PSC will have the following members: Additional Secretary, DARE; Financial Advisor, DARE; Joint Secretary-SMAM, DoAC&FW; Joint Secretary, MoRD/ Mission Director, NRLM –, DDG-Extension. DDG-AED/Project Director will be the Secretary. PSC could also invite the respective chairman of the State Steering Committees for its meeting for any specific purpose.

The PSC would meet every 6 months to review progress, provide overall guidance and policy support to the project. The primary tasks of the PSC are: (i) overall strategic guidance to the project implementation unit; (ii) review and approval of annual work

plan and budget (AWPB) or its revised version and Procurement Plan; (iii) policy guidance; (iv) inter-ministerial co-ordination and convergence for effective implementation; (v) ensure timely flow of funds to the project; (vi) review implementation performance of the project; (vii) address any emerging challenges faced by the project implementing unit (PIU). In case of necessity additional meetings of the PSC may be called by the Secretary DARE/ DG ICAR.

Project Management Committee (PMC): A PMC under the chair of the Additional Secretary, DARE/Secretary ICAR would be established to facilitate coordination with the SPMU housed within the State Agriculture Departments. The Financial Adviser, ICAR, Additional Project Director and Head of Finance of the project will be the members. The DDG AED/Project Director will be the Secretary. The Chairpersons of the State Project Coordination Committee may be invited on a rotational basis or as needed to address implementation bottlenecks.

The PMC would meet quarterly and would be responsible for: (i) reviewing and resolving any problems in the project implementation relating to coordination with the SPMU under SDA which require higher level of intervention; (ii) liaise with other large schemes of the government such as SMAM to ensure better co-ordination on the ground (iii) (v) provide a forum for dialogue between the state level policy makers and the field level implementers; and (vi) review issues arising out of the State level Coordinating Committee reports, monitoring reports, impact assessment studies and evaluation reports and give policy directions to resolve the issues.

2. State level Project Coordination

A State Project Co-ordination Committee (SPCC) chaired by the Agriculture Production Commissioner/Principal Secretary Agriculture to ensure co-ordination and overall supervision and strategic direction to the project implementation in the state will be established. PS/Secretary-Agriculture, PS/Secretary, Rural Development, District Collectors/Deputy Commissioners of project districts, Director – Agriculture, CEO and State Mission Director – SRLM, Director-ATARI; Director – Extension Education, State Nodal Officer – Joint Director-SMAM will be the members and the State Project Manager will be the Secretary of SPCC.

The SPCC will meet quarterly and will have the following broad functions: (i) reviewing implementation of project activities assigned to the partners related to demonstrations and scaling up; (ii) ensuring co-ordination and convergence with all relevant Line Departments and schemes of the government involved in agriculture mechanization; (iii) setting overall policy and providing strategic direction to project implementation in the state; (iv) resolving any policy and other bottle necks in project implementation; (v) reviewing and approving AWPB of partners; (vi) providing strategic inputs to the PSC on project implementation challenges and suggestions for improvement

3. District level Project Coordination

A District Project Co-ordination committee (DPCC) will be established in each project district and will be headed by the District Collector/Deputy Commissioner of the district. DPCC will have the following members. The Senior Scientist and Head -KVK/s, District Project Manager-SRLM will be the members. The District Agriculture Officer will be the Secretary of the DPCC. The Chairperson of DPCC will have the right to appoint new members on the DPCC. The DPCC will meet monthly and will have the following broad functions: (i) reviewing the project implementation progress against the AWPB targets; (ii) ensuring co-ordination and convergence with all relevant line departments and schemes of the government; (iii) reviewing and approving district specific AWPB of

partners; and (iv) providing strategic inputs to the SPCC on project implementation challenges and suggestions for improvement.

D. Implementation Partners

Krishi Vigyan Kendras (KVKs): These are agricultural extension centres created by ICAR and its affiliated institutions at district level to provide various types of farm support to the agricultural sector. KVKs provide several farm support activities like providing technology dissemination to farmers, training, awareness etc. To achieve the set objectives KVKs undertake following types of activities in the adopted villages: (i) Farm Advisory Service; (ii) Training programme for different categories of people; (iii) Training programme for the extension functionaries; (iv) Front Line Demonstrations; and (v) On Farm Testing of agriculture machinery. They play a vital role in conducting on farm testing to demonstrate location specific agricultural technologies. KVKs conduct demonstrations to prove the potential of various crops at farmers' fields. They also conduct need based training programmes for the benefit of farmers and farm women, rural youth.

Capacity of the KVKs will be used in this project to conduct Lead farmer training and Lead farmer led field demonstrations. The project will provide support in terms of development of technology manual and package of practices, KVK staff training, additional staff provision and also budgets for lead farmer training and for conducting Lead farmer led field days. KVKs will be required to coordinate with SRLMs and other partner agencies to leverage on the capacity of the existing VOs/CIs for selection of the Lead farmers and also to conduct field days in collaboration with VOs/CIs in the project area.

Sub-mission on Agriculture Mechanization (SMAM): This sub-mission was established by DoAC & FW, GoI with the objective of: (i) increasing the reach of farm mechanization to small and marginal farmers and to the regions where availability of farm power is low; (ii) promoting 'Custom Hiring Centres' to offset the adverse economies of scale arising due to small landholding and high cost of individual ownership; (ii) Creating hubs for hi-tech & high value farm equipment; (iii) creating awareness among stakeholders through demonstration and capacity building activities; and (iv) Ensuring performance testing and certification at designated testing centres located all over the country. SMAM has a country-wide programme to provide technology incentives for mechanization. SMAM provides 60% subsidy towards purchase of agri-machineries and equipment and balance 40% is contributed by the state government. In view of this normally the support to VOs/CIs gets least priority as the State Governments tend to look for Individual farmers for setting up CHCs and FMBs, while ignoring the community interest.

The project will converge with SMAM to get SMAM funding for procurement of demonstration machinery and equipment. In addition, the project's technology incentives will be converged with the technology incentives of SMAM. This will enable expediting farm mechanization particularly through the community institutions that comprise large number of smallholders.

SRLM and other scaling up partners: SRLMs have a strong network of grassroots institutions (SHGs, VOs and federations) that are at various levels of maturity. These institutions are being groomed by SRLM take up various livelihood activities. Farming being one of the main occupations of the rural households, mechanization support will enable these households to leverage the livelihoods support under SRLM with farm mechanization support of this project. Similarly there are other agencies such as the Watershed missions, IFAD funded projects such as FOCUS, OTELP and JTELP and civil

society organizations supporting various community institutions. The project intends to leverage on the community institutions built under these programmes.

The scaling up partners including SRLMs will: (i) facilitate the team of consultants engaged for technology needs assessment; (ii) support KVKs in selecting lead farmers for demonstration training and VOs for managing the field days; (iii) monitor the activities of VOs related to conduct of field days and settlement of expenditure related to field days; (iv) facilitate the VOs/CIs to access project support for establishing FMUs, CFCs and ATBs; (v) facilitate the existing CHCs to access project support to purchase additional machinery; (vi) facilitate individual households to acquire AE machinery and equipment; (vii) support the VOs/CIs in developing measures for profitable operation of the FMUs, CFCs and ATBs and also existing CHCs; (viii) establish finance facilitation platforms to bring together banks and beneficiaries for bank loans; (ix) establish user expansion support scheme and monitor its performance regularly; (x) prepare AWPB and submit to SPMU for approval; (xi) submission of statement of expenditure from VOs/CIs for the funds received from the project; (x) submission of quarterly statement of expenditure in respect of funds received from SPMU to the partner agency and submission of audited statement of expenditure within two months from the end of financial year; (xi) participation in the meetings of KVKs and SPMUs; (xii) submission of regular MIS data on physical and financial performance of the project activities.

E. Implementation Plans

Preparatory Phase Implementation Steps for project readiness

Pre-loan negotiation

IFAD

A. Obtain clarification from DEA on: (i) the process of project approval for the central sector projects; (ii) establishment of a delegation for loan negotiation; (iii) loan currency and loan maturity; (iv) agreement on whether GoI wants variable or fixed spread; (v) the name and address of an independent and competent national authority to be responsible for receiving, reviewing and investigating allegations of fraud and corruption relating to the project and the name, position and contact information of a focal point within that authority; and (vi) approval of signed minutes of negotiation.

ICAR

B. Prepare a report to Expenditure Finance Committee (EFC) and submit the same for approval – Normally EFCs are prepared in Indian Rupees and approved based on Indian Rupee estimates. This freezes the project costs in Indian Rupees terms and in the event of Indian Rupee devaluation against USD, the project will not be able to use entire IFAD loan and grant resources. Therefore, EFC should have a provision to clearly indicate that the IFAD loan and grant are denominated in US Dollars and the cost estimates in Indian Rupees are based on the exchange rate prevailing at the time design and that any additional funds in Indian Rupees terms on account devaluation will be considered automatically approved.

C. Prepare a list of the expenditures by expense categories (ies) for retroactive financing covering project expenditure between 1 August 2019 until the project's entry-into-force and submit to IFAD for approval (maximum USD 1 million equivalent).

D. In principle and written agreement with SMAM to: (i) provide funding for purchase of demonstration machinery with modalities of procurement; and (ii) nominate an officer within the Mechanisation and Technology Division, preferably of the rank of Joint Commissioner, as the nodal officer for this project.

E. Exchange of letters between the 5 State Governments and ICAR indicating their in principle agreement to participate in the project. This letter to include list of districts to be and expected role of State Agriculture Departments.

F. Exchange of letters between ICAR and the 5 State Governments on identification of partner agencies (SRLM and others) for scaling up. This letter to include list of districts to be covered by the partner agencies and expected roles of SRLM/partner agency, State Agriculture Department and ICAR.

G. Finalization of draft MoUs to be signed between (i) the project and the State Departments of Agriculture (ii) the tripartite MoU between ICAR, State Agriculture Departments and SRLM/partner agencies; and (iii) AED-ICAR and ATARI/KVKs.

H. Request DARE to release Rs 25 crore as advance for project start-up costs.

I. Finalizing procurement procedures and documents for AE technologies to be procured using SMAM funds in consultation with SMAM for demonstrations –

J. Finalizing procurement documents for procurement of AE technologies for demonstration using IFAD funds - Obtaining IFAD no-objection for procurement technologies.

K. Finalize ToR and advertise for recruiting contract staff for PIU.

L. Finalize ToR for recruiting contract staff for SPMUs.

M. Finalize ToR and advertise for recruiting contract staff engagement for KVKs.

Post Loan Negotiation and before effectiveness (assuming this is post EB approval of the project and post EFC approval)

a. Overall steps

- Finalization of PIM and inclusion of :
    a. State level budgets with break-up of allocation for each partner for implementation from out of the current overall cost tables.
    b. Finalization of KVK specific list of technologies for procurement of AE machinery and equipment for demonstration comprising technologies: (i) to be funded using SMAM resources; and (ii) to be funded using IFAD resources.
    c. Finalization of activities, costs, outputs and reporting requirements for KVK engagement.
    d. Review the implementation manual and get the same approved by the PSC.
- Establish PSC and PMC at the central level and SPCC and DPCC at the state and district level by issuing a notification/circular.
- Issuance of a notification/circular nominating DDG-AED as the Project Director, Directors of each State Agriculture Departments as the State Project Director and the Joint Directors –SMAM of each state as the state nodal officer.
- Assigning an ADG level officer as the Additional Project Director and five Senior Scientist level officers as the National Coordinators.
- Nominate an officer not below the rank of Joint Commissioner from SMAM as the nodal officer of SCATE on an additional charge basis.
- Establish PIU and engage contract staff for PIU.

N. Sing MoUs between (i) ICAR and the State Agriculture Departments; (ii) the tripartite MoU between ICAR, State Agriculture Departments and SRLM/partner agencies; and (iii) AED-ICAR and ATARI/KVKs.

- Undertake procurement of AE machinery – KVKs to procure based on a rate contract approved by PIU for IFAD supported AE machinery.

- Undertake procurement of AE Machinery to be procured using SMAM funds.
- Establish SPMU in the State Agriculture Department of each state.
- Delegate the task related to staff engagement and establishment of SPMU to the Agriculture Production Commissioner/Principal Secretary-Agriculture and engage contract staff for SPMU.
- Engage contract staff for SRLM – delegate this task for SRLM or to a joint committee of State Agriculture Department and SRLM.
- Coordinate with CGIAR institutions or any other competent international agency to develop a work plan for implementing activities under IFAD grant.

b. Financial Management

- CAAA to open the designated accounts for the loan and grant as per agreement during negotiations of financing agreement
- DARE/ICAR to place a qualified and experienced Head of Finance to PIU as well as Procurement Specialist.
- Open a project bank account for PIU.
- Appoint a Finance and Accounts Manager on contract basis.
- Advise the APC/PS-Agriculture to open bank account for the project at the state level and designate signatories to this bank account.
- Establish an accounting system using Tally.
- PIU and SPMUs to purchase furniture and equipment.
- Release funds to SPMU and KVKs as per AWP&B. SPMU to release funds to SRLMs/partner agencies.

c. Village Selection

- SPMUs to conduct a state level orientation workshop of KVKs, SDA, SRLM, WSM and IFAD funded projects to familiarize SDAs with the project and identify the project blocks and villages.
- SPMU to provide a list village and blocks to be covered under the project as per the format provided below to PIU. PIU to provide a consolidated list to IFAD.

District	Block	Village	Total number of households (Disaagregated by BPL and SC/ST)	No. of households linked to the partner institution	
				Partner 1: SRLM	Partner 2: WSM, SCRAN, JTDS, OTELP, etc.
Total					

Post Loan Effectiveness

a. Start up

- Conduct a start-up workshop at state level to launch the project.
- Prepare AWP&B for the Financial Year 2020-21 and share draft with IFAD for review before obtaining approval from the PSC. Include the same in the budget of the AED as grant-in-aid to ICAR.

F. Project Management

a. Supervision

- PIU and SPMU to undertake supervision of the field level activities and ensure implementation of project activities as planned.
- PIU to submit regular reports to PMC and PSC.
- Action taken report to be submitted on the recommendations of IFAD's Supervision Mission reports within 30 days from the date of receipt of management letter.

b. Preparation of AWP&B

- PIU to provide indicative budget for each KVK and SPMU based on the state level and partner agency level budgets.
- Based on the yearly plans of the partner agencies and indicative budget, AWP&B for each year to be prepared by the partner agencies and submitted to SPMU for approval.
- PIU to consolidate these AWPBs and send the same to IFAD for comments and no-objection by 30 January every year.
- Based on comments of IFAD, PIU to rework AWP&B and present it to PSC for approval.
- Based on this, include the AWP&B into the budget of DARE.

c. Fund flow

- As per the AWP&B seek release of funds from DARE to ICAR and thereafter to PIU.
- Fund to flow from PIU to SPMU and KVKs through ATARI, while Funds to flow from SPMU to partner agencies. The fund recipients to submit statement of expenditure every month certified by the authorised signatory of partner agency.

d. Monitoring and Evaluation

- PIU to engage an Agency specialized in M&E for conducting Baseline and impact assessment survey. Baseline survey to be undertaken during the first year of the project.
- PIU to engage an agency for developing computerised management information system.
- PIU to conduct annual outcome survey in collaboration with SPMUs every year starting from second project year and submit a report by end January every year.
- PIU to develop a system for web based uploading of photographs/videos related to demonstrations and field days with geo-tagging

e. Knowledge Management

- Identify emerging best practices and contribute to knowledge management related activities of the project.
- Prepare documentation of best practices and lessons for knowledge sharing and also place it on the web site of the project.

- Undertake impact of project interventions on effectiveness of government programmes that have been converged with the project.
- Develop knowledge sharing platforms for knowledge dissemination amongst SPMUs and ICAR affiliates.
- Document replications resulting from such knowledge dissemination exercise.

f. Reporting

- Submit half yearly and annual progress reports to IFAD within 45 days of end of the reporting period.
- Submit half yearly financial statements to IFAD within 45 days of end of the reporting period.
- Submit ORMS (RIMS) report to IFAD by end march every year.
- Submit Audited annual report with financial statements and management letter to IFAD by 30 September every year

g. Project Closing

- Conduct a project completion impact assessment survey during the last quarter of the last project year
- Prepare a Project Completion Report and submit it to IFAD- end of last project year.
- Make only committed expenditure during the period between project closing date and loan closing date.
- Reconcile and submit all withdrawal applications.

G. Planning, M&E, Learning Framework

Planning: Preparation of the Annual Work Plan and Budget

The project will prepare an annual work plan and budget (AWPB) each year and will submit it to the Project Steering Committee for endorsement and IFAD for no objection no later than 31 January of each year. While preparing the AWPB, the PIU will refer to these documents: (a) overall project cost tables; (b) logical framework and progress to date against the project outputs and outcomes; (c) Financing Agreement; (d) Letter to the Borrower; and (e) the Financial Management and Procurement sections of this PIM.

The Annual Work Plan and Budget (AWPB) document consists of two parts: Part A & Part B. Part A is a narrative section, briefly discussing previous implementation experiences, providing the justification of the proposed AWBP and highlighting objectives and required resources. It also indicates how the Project activities reflect government, IFAD and beneficiary priorities. Part B consists of a set of Tables, which present the detailed budget for the forthcoming fiscal year as well as indicators for previous period and cumulative achievements. The outlines for Part A (Narrative) as per IFAD's guidelines and Part B are presented as *Appendix 7.*

M&E Framework

SCATE will set up its M&E system following IFAD's M&E guidelines[9]. The basic M&E framework to support in development of M&E system is the systematic collection, analysis and reporting of information/data at three different levels of project implementation results: **(i) outputs** (from inputs and activities)**; (ii) outcomes;** and **(iii) impact,** encompasses result-chain approach**.** The M&E framework which is an expanded version of the logframe which, identifies exactly when information will need to be collected and the methods of collection will be prepared by the project. The overall M&E framework will also include other M&E tasks annually or during the course of project

[9]See Managing for Impacts in Rural Development – A Guide for Project M&E, IFAD.

implementation. These include reporting on progress against logframe indicators annually, annual outcome surveys, and baseline & impact assessments.

Output monitoring will measure the progress of activities and achievement of outputs against annual targets in the annual work plan & budget (AWP&B) for each project component. AWP&B outlines the inputs and activities to be undertaken and data on outputs would be collected or measured for each indicator at the end of each month/quarter/year. This can be linked to the financial expenditure on the concerned activities, and data will be stored and report via a computerised Management Information System (MIS). The type of output data to be collected and monitored will be carefully dovetailed with the project logical framework indicators**.** The computerised MIS will also record profiles for VO/CI the project is working with, which will be drawn up before work starts to collect basic socio-economic data (membership disaggregated by gender, year of establishment, main activities, turn over, and performance grading by promoting entity). The technology needs assessment and the directory of SHGs, VOs, FPOs, etc., will form part of this benchmark information and the MIS will record the implementation of the demonstrations. Physical and financial progress data and reports for the demonstrations, their evaluation, the operation of the FMUs, CFCs and ATBs, etc will be fed into the computerised MIS.

Although output monitoring would appear to be a straightforward process, the experience of a number of IFAD projects in India and elsewhere have highlighted the need to pay adequate attention to the details of how data is collected (formats used, frequency of data collection, etc.) and reported. These problems can be overcome by training of staff responsible for progress reporting to use a common reporting format and carefully defining how participating households will be counted. The PIU M&E Unit will take the lead in harmonizing the different formats for data collection and reporting, and it at all possible a list of all households in each organization and village be maintained in the MIS - referenced by village geocode numbers and the head of household's national identify card (Aadhar card) number.

Outcome monitoring

This measures the immediate changes coming about as a result of project interventions. A few outcome indicators are shown in the project logical framework, but others will need to be added to create a results chain of evidence of change linking project outputs to the objective and goal. The project will conduct Annual Outcome Surveys (AOS) as per IFAD's guidelines [10] . An AOS involves interviewing a sample of 400 to 800 farmers/households with a short questionnaire. Outcomes for innovation sub-projects would be reported by the grantees and technical agency using indicators related to agronomy, affordability, energy efficiency, GHG emissions, use of renewable energy, labour productivity, increased production, reduced post-harvest losses, reduced drudgery for women.

AOS is a short and quick household survey that is undertaken annually by project staff. This aims to provide regular or timely information about results that can be used to take corrective action during project implementation. In particular, the AOS is intended to set out to identify positive and negative changes taking place at the household level, provide early evidence of project success or failure, and also assess targeting efficiency. These changes are measured relative to non-project households.

Related to outcome monitoring is **process monitoring**, which involves monitoring the processes leading to outputs and outcomes. Examples of specific areas where progress

[10] See Designing and Implementing ANNUAL OUTCOME SURVEYS -- a guide for practitioners –IFAD, 2016.

monitoring will be useful in SCATE may include adoption and effectiveness of the machinery and equipment introduced through the demonstrations and rate of replication outside the participating VOs/ FPOs. Information on these may be gathered via Participatory M&E or PME as well as from the records of VOs/CIs from SRLM and other partners and other producer organizations promoting institutions (POPI). In addition, the project can undertake specific studies related to social inclusion, youth entrepreneurship and employment, effectiveness and social equity of various business models for availing machinery to smallholders.

Impact monitoring or evaluation

This process will assess the contribution of project activities in achieving the overall goal of the project. The main tool for impact evaluation will be baseline and end-of-project surveys of project households. These surveys will be coordinated by the PIU M&E unit and an external agency can be contracted to carry out such assessments. The indicator data to be collected by these surveys include those shown at objective and goal levels in the project logframe, as well as on outcomes and outputs in order to show evidence of a results chain from project activities, through outputs and outcomes to objectives and goals. This helps relate changes in impact indicators to participation in project activities and delivery of project outputs, and also to other logframe.

The indicator on the increase in farm income and income for farm households could be included in a household survey (or data collected in the survey on farm inputs and outputs), yet experience shows that this is unlikely to yield useful data. Farm households are rarely able to report input and output data for individual crops with any degree of accuracy. This is made even more difficult for projects in upland area where households are rarely able to report on crop areas (land areas are not measured or known) and volumes of inputs and outputs. It is therefore proposed that this data be collected by a small team of agricultural economists using a range of tools such as focus group discussions and case studies. The validity of key information from these sources will be confirmed using data from AOS and other surveys. Such key information could include the mix of crops grown, input use and overall production levels.

Participatory Monitoring and Evaluation (PME)

This tool will be used particularly for outcome monitoring. At project level, one of the strategies could be to organise an annual workshop in which the participating VOs and FPOs would be given the opportunity for sharing their views about the project and identify mechanisms for improvement. In PME, the primary stakeholders - the project target communities – are active participants in all stages of project cycle, not just sources of information. PME will also focus on building the capacity of the local communities to analyse, reflect and take decisions and actions. PME attempts to provide opportunities for joint learning of various stakeholders at various levels of the project cycle. PME facilitates greater stakeholder commitment and ownership on the project activities, in turn empowering them to take corrective actions to help themselves. PME is but the building block for successful M&E system and the specific case of SCATE, it can be used to further customize the technologies demonstrated, fine tune the businesses of the FMUs, CFCs and ATBs and the processing enterprises, promote larger market for the tested technologies.

Special thematic/diagnostic studies

The project may carry out, or commission, a number of relevant thematic special studies. The project will allocate budget in its AWP&B and some of the thematic studies

could include, for example, gender aspects in mechanization, detailed cost benefit analysis of FMUs, CFCs, ATB, etc.

Second Year Supervision Mission

A second year Supervision Mission is proposed in month 24 of project implementation. This review will assess the effectiveness of the implementation modalities and likelihood of achieving project outcomes. The findings and recommendations from the second supervision mission will be used to inform course correction in project implementation and the modifications required to improve the implementation of the project.

Mid Term Review (MTR)

IFAD in cooperation with the GoI will undertake a mid-term review by the end of the third year of the project to review project achievements and implementation constraints. In particular, it will review the following: (i) adoption of technologies; (ii) effect of technologies on costs of production, labour costs, energy use efficiency, returns to farmers, adaptation to climate change and women drudgery; (iii) profitability of the FMUs, CFCs, ATBs, etc.; (iv) performance of manufacturers and after sales services; (v) management and fiduciary performance of the project. The findings and recommendations of the MTR will be used to improve the exit strategy and sustainability of the project.

Project Completion Review

As the project reaches completion point, the PIU will be required to prepare a draft Project Completion Report. IFAD and the Government will then carry out a Project Completion Review based on the information in the Project Completion Report and other data.

Management Information System (MIS)

The project will establish an MIS system in the first year of project implementation. The MIS would generate, monthly, quarterly and annual progress reports on physical and financial progress and on project outputs and outcomes - and would have a GIS interface so that key data can be shown on maps. The MIS may, if feasible, be developed including information on individual farmers owning and managing CHCs and VOs/CIs managing the CHCs/CFCs/FMUs and so track their participation in different project activities. However experience shows that it would be wise to be cautious in developing a very comprehensive MIS system. Attempting to gather and record a large amount of detailed information can result in data overload, with no time to check to accuracy and validity of data entered, and no time to properly analyse and interpret the information in the MIS. The MIS would integrate the information on the progress of the project, the inventory of technologies and manufacturers, the directory of VOs/CIs supported by the project, the findings of the innovation platform, the demonstration of AE technologies and their scaling-up. The resulting database will be public and displayed on the ICAR websites.

Reporting: The project will produce the following reports:

- ***Monthly Progress Reports*** (MPR) will be prepared from the project MIS developed to generate information at the VO/CI levels for reporting to the SPMU and onward to the PIU. Information in the report will contain component/sub-component wise physical and financial progress against annual targets. This report will form the basis for monthly progress reviews at all levels and subsequently feed to the quarterly progress report.

Quarterly Progress Reports (QPR) will have physical and financial progress with information on challenges encountered in implementation and corrective actions and solutions to address constraints as well as communities response to project initiated activities. QPR would also be useful for consolidating the Annual Report each year to be carried out for a calendar year (1st April to 31st March).

- ***Half yearly and Annual Progress Reports*** (HR/APR) will be prepared from information compiled by the PIU on component/sub-component wise physical and financial progress, and loan category wise financial progress. The information will be generated via the project MIS and could contain summarised information and data from VOs/CIs and findings from PME and annual outcome surveys, showing progress towards development objectives, usefulness of training, benefits from component/sub-component interventions, gender issues and knowledge management. The reports could be dovetailed with case studies of successful interventions. The PMU will prepare the half-yearly progress report by the end of October (primarily progress against the AWP&B) and a more detailed annual progress report by April end to mid-May every year and send to IFAD India Country Office and other stakeholders.
- ***Annually updated logframe***. The key indicators corresponding to the project outputs and outcomes by components included in the project's Logical Framework will be reported annually in a table format by the end of January every year.
- ***Annual Outcome Survey (AOS) Report***: Each year the project will undertake AOS and report to IFAD. The first AOS will be done in the second year of project implementation after completing a full first year of project implementation. The AOS would be for a calendar year of January to December. Each year the project will submit the AOS report by February.
- ***Mid-Term Review Report (MTR)***: IFAD in cooperation with the ICAR and DARE would undertake a mid-term review by the end of the third year of the project lifecycle (or as would be specified in financing agreement) to review project achievements and implementation constraints including issues relating to loan administration and financial management. Any corrective measure would be addressed at MTR. A mutually agreed action plan will be prepared based on the MTR findings.
- ***Project Completion Report (PCR)***: As the project reaches completion point, the PIU would prepare a draft Project Completion Report based on IFAD's Guidelines for Project Completion. IFAD and the Government will then carry out a Project Completion Review and validation based on the information in the Project Completion Report and other data. This review is usually done during the intervening period of project completion date and loan closing date.
- ***Case studies on project innovations and success stories***: The project will undertake case studies of project innovations and success stories on regular basis and report them through Annual Progress Report and in newsletters published by IFAD and other agencies. The project will also report them and communicate through its IFAD Asia webpage managed by IFAD and on the project's own webpage.

Learning

The project **learning system** would comprise of various activities relating to M&E and knowledge management functions. Some of these would include monthly, quarterly and annual review meetings at district, state and central levels; capturing information on progress, lessons and finding solutions for implementation constraints.

Enhancing Use of Knowledge from M&E. The project would use its M&E data and information for improved learning, and for project planning, implementation and improved monitoring, and document innovations and success stories so as to contribute in the overall local, national and global knowledge pool in development particularly in the areas of agricultural mechanization and its contribution to making farming a more remunerative and resilient economic activity.

Knowledge Products, Dissemination and Communication. SCATE will generate various knowledge products such as digital directories and inventories, techno-commercial evaluation of technologies, business plans, training manuals on the use and maintenance of agricultural technologies, user manuals on the management of FMUs, CFCs, ATBs, etc. However, for meaningful learning and knowledge sharing, knowledge products should be of quality with clearly identified audience and purpose. An initial list of thematic studies was also identified such as : drivers for adoption of new AE technologies in the project area; market demand for new AE technologies; feasibility of various CHC models; gender aspects in farm mechanization. The topics may be further expanded based on implementation results, lessons learned and proposals to improve project overall performance.

The characteristics of good knowledge products[11] have the following elements:

- Based on an assessment of needs and demand for the product among targeted users to ensure relevance, effectiveness, usefulness and value of the knowledge product.
- Designed for a specific audience, taking into consideration functional needs and technical levels.
- Relevant for decision-making needs.
- Knowledge products brought out timely.
- Written in clear and easily understandable language.
- Data is presented in a clear and coherent manner; all data and information being from project M&E without any bias, both successful and failure cases.
- Knowledge products developed through participatory process and validated through quality assurance processes with relevant stakeholders or peer reviewed appropriately.
- The knowledge products should be easily accessible to the target audience in a timely manner by using the most effective and efficient means.
- Consistency in presentation of products to enhance visibility and learning.

Practical tips for developing knowledge products from project M&E and dissemination of the products could include the following steps:

- Identify the target audiences and their information needs.
- Collect and keep at hand the contact information of all key stakeholders.
- Identify and determine the types of knowledge products to be developed (keep in mind the availability of project resources for this purpose as also the capacity of the project to develop the knowledge products, directly or through outsourced).
- Select and determine types of knowledge products that meet the target audience's information needs.
- Identify language requirements per product and audience.
- Determine most likely efficient forms and dissemination methods for each knowledge product.
- Monitor feedback and measure results of dissemination efforts as also quality of knowledge products.

[11]Adopted from the "Handbook on Planning, Monitoring and Evaluating for Development Results", UNDP, 2009

Chapter VI: Financial Management

A. Introduction and financing

This chapter lays down the basic principles of financial management of the project. It lays down the system of funds flow to the project and within the project, the disbursement systems, submission of withdrawal application for reimbursement of funds, the financial procedures for approval and system of recording transactions, reporting the same and the audit requirements.

Country Inherent Risk: The overall inherent risk is assessed as medium. India was ranked 78th out of 180 countries in the 2018 TI Corruption Perception Index, with a medium score of 41. The 2018 RSP score of 4.40 is also in the medium risk bracket. The last publicly disclosed PEFA was in 2010.

Debt Analysis: The last IMF Article IV consultation in India dated August 2018 noted that there is limited fiscal space as debt is close to thresholds that increase the likelihood of debt distress among emerging market economies. India's debt is high with a debt-to-GDP ratio at around 70 percent of GDP, but favourable debt dynamics and financial repression make the debt path sustainable. Risks are further mitigated because public debt is denominated in domestic currency and predominantly held by residents. Public debt accounted for 89.5 per cent of total outstanding liabilities at end-December 2018, with internal debt and external debt having shares of 83.3 per cent and 6.2 per cent, respectively. Roll-over risk in debt portfolio continues to be low.

Financial Management: PIU within the new TDPS section in AED of ICAR will be responsible to DARE and IFAD for the effective use of project funds, timely preparation of Withdrawal Applications (WAs) and financial reports, and to safeguard project assets and resources. The overall financial management risk assessment for the SCATE project is high due to multiplicity of implementing agencies with varying financial management capacities (5 States, 31 Districts, 200 KVKs and 4,000 villages). However, the implementation of mitigating measures is expected to soon reduce this risk to medium. In particular, the World Bank has been working with ICAR for many years with reliance on their FM systems and many SCATE expenditures can be centralised. Further indirect FM assurance can be gained from the performance assessment planned on the Innovation Facility [by an external service provider, not by the external auditor.

Project costs and financing arrangements: The total indicative project cost is estimated at USD 122.89 million equivalent to 8.60 billion INR including contingencies over a six-year period. The cost breakdown among components is as follows: (i) Participatory technology development (13.2% of total costs); (ii) Demonstrations and Scaling up AE Technologies (78.2% of total costs); and (iii) Project management (8.6% of totals costs). These Project costs by financiers, expense categories and components are summarised in the tables below.

B. Detailed Cost Tables of SCATE Project

Summary Tables

Components by Financiers

India
SCATE

(US$ '000)

Components by Financiers	Govt		ICAR		IFAD		IFAD Grant		Banks		Convergence		Beneficiaries		Total		Duties &
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Taxes
A. Component 1: Participatory technology development																	
1. Need assessment	47.0	10.0	-	-	423.0	90.0	-	-	-	-	-	-	-	-	470.0	0.4	47.0
2. ICAR capacity building	683.7	11.3	111.7	1.8	4,271.8	70.3	1,005.6	16.6	-	-	-	-	-	-	6,072.8	4.9	469.6
3. Innovation platform	978.1	10.0	2,914.6	29.8	5,888.6	60.2	-	-	-	-	-	-	-	-	9,781.4	7.9	978.1
Subtotal	1,708.8	10.5	3,026.3	18.5	10,583.4	64.8	1,005.6	6.2	-	-	-	-	-	-	16,324.2	13.1	1,494.8
B. Component 2: Demonstrations and Scaling up AE Technologies																	
1. Demonstrations of AE technologies	2,840.0	11.1	8,274.7	32.3	13,804.2	53.9	-	-	-	-	702.9	2.7	-	-	25,621.7	20.6	1,878.0
2. Support service development	431.3	11.1	-	-	3,151.0	80.9	-	-	-	-	-	-	313.0	8.0	3,895.3	3.1	389.5
3. Scaling up AE technologies	11,537.2	17.1	-	-	31,935.9	47.3	-	-	5,726.0	8.5	8,700.4	12.9	9,589.8	14.2	67,489.3	54.3	11,424.9
Subtotal	14,808.5	15.3	8,274.7	8.5	48,891.0	50.4	-	-	5,726.0	5.9	9,403.2	9.7	9,902.8	10.2	97,006.3	78.1	13,692.4
C. Component 3: Project Management																	
1. PIU and SPMUs	1,656.3	16.7	2,520.4	25.5	5,720.9	57.8	-	-	-	-	-	-	-	-	9,897.5	8.0	990.7
2. Project M&E and knowledge management	152.3	14.6	-	-	891.5	85.4	-	-	-	-	-	-	-	-	1,043.8	0.8	102.5
Subtotal	1,808.6	16.5	2,520.4	23.0	6,612.4	60.4	-	-	-	-	-	-	-	-	10,941.4	8.8	1,093.2
Total PROJECT COSTS	18,325.9	14.7	13,821.4	11.1	66,086.9	53.2	1,005.6	0.8	5,726.0	4.6	9,403.2	7.6	9,902.8	8.0	1,24,271.9	100.0	16,280.4

Expenditure accounts by financiers

India
SCATE

(US$ '000)

Expenditure Accounts by Financiers	Govt		ICAR		IFAD		IFAD Grant		Banks		Convergence		Beneficiaries		Total		Duties &
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Taxes
I. Investment Costs																	
A. Technical assistance /a	2,605.4	10.2	3,026.3	11.9	18,811.8	73.9	1,005.6	4.0	-	-	-	-	-	-	25,449.1	20.5	2,205.3
B. Equipment & materials /b	10,620.6	17.8	-	-	24,445.9	41.0	-	-	5,726.0	9.6	9,403.2	15.8	9,400.7	15.8	59,596.4	48.0	10,474.3
C. Training and workshop	3,393.6	19.5	-	-	13,981.4	80.5	-	-	-	-	-	-	-	-	17,375.0	14.0	2,432.2
D. Grants and subsidies	347.7	6.5	-	-	4,518.8	84.2	-	-	-	-	-	-	502.1	9.4	5,368.6	4.3	347.7
E. Goods, services and inputs	80.8	10.0	-	-	726.9	90.0	-	-	-	-	-	-	-	-	807.7	0.6	80.8
Total Investment Costs	17,048.0	15.7	3,026.3	2.8	62,484.8	57.5	1,005.6	0.9	5,726.0	5.3	9,403.2	8.7	9,902.8	9.1	1,08,596.8	87.4	15,540.3
II. Recurrent Costs																	
A. Salaries and allowances	-	-	8,274.7	100.0	-	-	-	-	-	-	-	-	-	-	8,274.7	6.7	-
B. Incremental operating costs	1,277.9	17.3	2,520.4	34.1	3,602.1	48.7	-	-	-	-	-	-	-	-	7,400.3	6.0	740.0
Total Recurrent Costs	1,277.9	8.2	10,795.1	68.9	3,602.1	23.0	-	-	-	-	-	-	-	-	15,675.1	12.6	740.0
Total PROJECT COSTS	18,325.9	14.7	13,821.4	11.1	66,086.9	53.2	1,005.6	0.8	5,726.0	4.6	9,403.2	7.6	9,902.8	8.0	1,24,271.9	100.0	16,280.4

\a includes studies etc
\b Farm and processing equipment plus office equipment

Expenditure accounts by components

India
SCATE

Expenditure Accounts by Componen (US$ '000)	Component 1: Participatory technology development			Component 2: Demonstrations and Scaling up AE Technologies			Component 3: Project Management		
	Need assessment	ICAR capacity building	Innovation platform	Demonstrations of AE technologies	Support service development	Scaling up AE technologies	PIU and SPMUs	Project M&E and knowledge management	Total
I. Investment Costs									
A. Technical assistance /a	416.4	4,416.9	8,217.1	3,046.1	-	4,113.1	942.9	603.6	21,756.2
B. Equipment & materials /b	-	500.0	-	1,328.6	-	49,142.9	159.7	109.7	51,240.9
C. Training and workshop	-	250.0	-	10,985.7	364.3	3,011.4	954.3	196.4	15,762.1
D. Grants and subsidies	-	-	-	-	3,042.9	1,714.3	-	-	4,757.1
E. Goods, services and inputs	-	-	-	-	-	-	696.4	-	696.4
Total Investment Costs	416.4	5,166.9	8,217.1	15,360.4	3,407.1	57,981.7	2,753.3	909.7	94,212.8
II. Recurrent Costs									
A. Salaries and allowances	-	-	-	7,121.1	-	-	-	-	7,121.1
B. Incremental operating costs	-	-	-	531.4	-	-	5,834.6	-	6,366.0
Total Recurrent Costs	-	-	-	7,652.6	-	-	5,834.6	-	13,487.1
Total BASELINE COSTS	416.4	5,166.9	8,217.1	23,013.0	3,407.1	57,981.7	8,587.9	909.7	1,07,699.9
Physical Contingencies	-	-	-	-	-	-	-	-	-
Price Contingencies									
Subtotal Price Contingencies	53.6	905.9	1,564.2	2,608.7	488.2	9,507.6	1,309.7	134.1	16,572.0
Total PROJECT COSTS	470.0	6,072.8	9,781.4	25,621.7	3,895.3	67,489.3	9,897.5	1,043.8	1,24,271.9
Taxes	47.0	469.6	978.1	1,878.0	389.5	11,424.9	990.7	102.5	16,280.4
Foreign Exchange	-	-	-	-	-	-	-	-	-

Lending terms: the loan will be on ordinary terms, denominated in USD, with a variable spread, 18 year maturity with a three year grace period (average maturity in the 10-12 year bracket). There is no front-end fee or commitment charge. The loan component grant is free of any charge.

Retroactive Financing: In accordance with Section 4.07 of the General Conditions (GC), expenditures shall be eligible for financing if they are incurred during the Implementation Period. With the approval of the Executive Board, project expenditures may be incurred before entry into force, known as retroactive financing. Expenditures must meet the criteria of reasonable cost of goods, works and services required for the project and shall be procured in conformity with the Fund's Procurement Guidelines.

The proposed amount of retroactive financing for SCATE will be limited to USD 1 million equivalent and only activities performed after 1 August 2019 will be eligible. The expenditures need to be specifically identified as retroactive financing in the project Work Plan and Budget, including the related Procurement Plan that will provide a detailed description of planned activities, related methods of procurement, quantities, estimated costs and the expected dates of finalization of Procurement activities. Both the specific WPB and Procurement Plan is subject to prior review by IFAD. Expenditures should be related to investment costs or studies (e.g. baseline surveys). Financing of vehicles, office equipment and recurrent costs is not allowed under retroactive financing.

Upon entry into force and fulfilment of disbursement conditions, eligible expenditures are reimbursed into the nominated Borrower bank account. Retroactive expenditures are pre-financed by the prospective Borrower at its own risk. If the financing is not approved, or does not enter into force, expenditures will not be reimbursed. Retroactive expenditures should be claimed in a separate Withdrawal Application and be included in the first financial statements of the project and audited, with appropriate separate disclosure of the amount in the Notes to the Accounts.

Start-up Advance: An advance for suitably approved start-up activities is permissible as soon as the Project has Entered into Force. This will provide liquidity if required until the conditions precedent to first withdrawal have been met.

Conditions precedent to First Withdrawal: No withdrawal can be made in respect of expenditures until:

(i) PSC, PMC, PIU and SPMU have been duly established and finance staff recruited;

(ii) PIM has been approved by the PSC and IFAD;

(iii) Memorandum of understanding is entered between the ICAR and state governments;

(iv) GoI shall have duly opened the Designated Accounts for IFAD loan and IFAD grant and authorized signatories for operating designated accounts;

(v) the Project shall have duly opened the project accounts; and

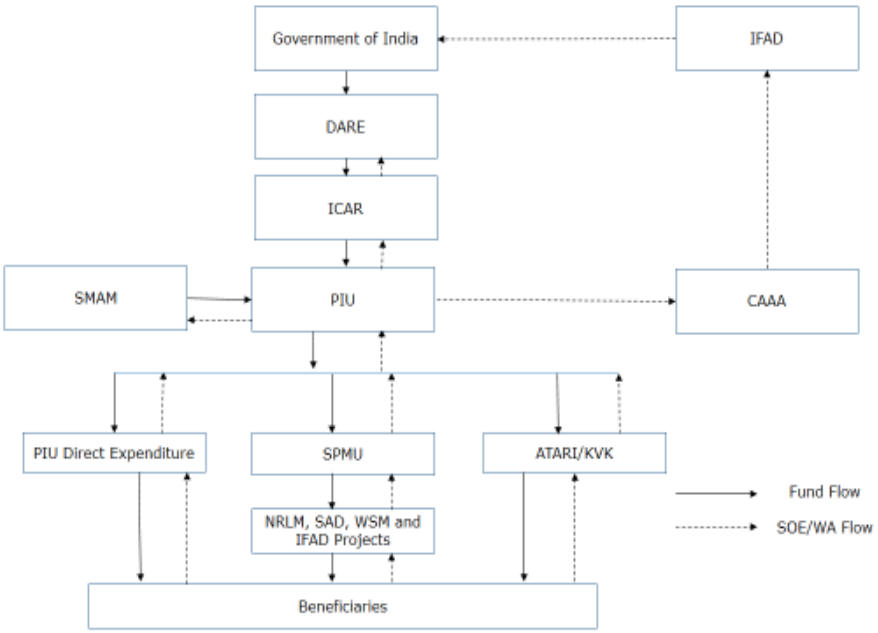
(vi) the first AWPB, including the procurement plan for the initial 18 months of Project implementation, shall have been submitted to, and approved by IFAD.

C. Disbursement and Fund Flow Mechanism

Financing: The project expenditures will be financed from IFAD Loan, IFAD Gant, GoI contribution, ICAR contribution, bank loans and beneficiaries' contribution. Government contribution will be by way of taxes, salaries and allowances of government staff and cash contribution for various activities. The commercial banks participating in this project will provide loans to the various community institutions and farmers. The contribution of ICAR will be payment of salaries and allowances of the KVK staff. The beneficiaries contribution will be in cash.

Bank accounts: The loan and grant accounts will be designated in USD and two Designated Accounts (for loan and grant separately) will be opened by GoI with the Reserve Bank of India to which funds will flow from IFAD. All expenditure will be pre-financed from the budget released by ICAR to the project and reimbursed by IFAD based on submission of claims. There are not expected to be any direct payments by IFAD to third parties. The IFAD Loan Disbursement Handbook and the Letter to the Borrower will detail the disbursement arrangements. ICAR will release funds quarterly as per the approved AWPB, and the funds will be transferred to the bank account of PIU which will in turn provide budget on quarterly basis to the bank accounts of the implementing and partner agencies. The release of funds by PIU to the implementing and partner agencies will be based on AWPB and receipt of requisition for funds, fund utilization certificate and statement of expenditures for the funds already released and cash forecast of the next quarter. PIU and the SPMUs shall be obliged through a Financing Agreement covenant to open a separate bank account for the purposes of the project in a scheduled commercial bank acceptable to ICAR and DARE. SRLMs and KVKs will only be receiving limited costs for salaries and operating costs and do not need to open separate bank accounts as long as the Project funds can be specifically identified in their accounting system. The use of regular banking channels will be mandatory. Government will monitor cash-flows between Central, State Governments and the agencies of State Governments through the Public Financial Management System (PFMS).

Flow of Funds: the following diagram visualises the fund flow arrangements.



Note: PIU Direct Beneficiaries refer to the beneficiaries of the innovation platforms, fellowships, AE research awards

Disbursements: The Loan Disbursement Handbook for Directly Supervised Projects[12] (LDH) in conjunction with the Financing Agreement and the Letter to the Borrower (LtB) set out the disbursement procedures. The funds from IFAD loan and grant will be disbursed using one of the following three methods:

a. Procedure I: Advance withdrawals or replenishments to a bank account(s) designated to receive loan/grant resources
b. Procedure II: Direct payment
c. Procedure III: Reimbursement

The designated account is replenished through the submission of a Withdrawal Application (WA) to IFAD. The Form 100 summary of the WA will be prepared by CAAA (based on financial data prepared by the Project) and submitted to IFAD through the IFAD Client Portal (ICP). Unlike NAHEP, IFAD is not using report-based disbursement and so WAs will need to list the expenditures being claimed. The amount to be replenished is to be requested in the currency of denomination of the designated account as described in the LTB. A WA should be submitted at least every 90 days, or in the case where an advance from IFAD has been provided then when 30% of it has been utilised (should this be earlier than the 90 day normal requirement).

CAAA will also submit a Designated Account Reconciliation Statement Form 104 with each WA for replenishment to the designated account for the same reporting period in which the eligible expenditures are being claimed. This form shall be accompanied by bank statement of the designated account ensuring that the closing bank balance for the bank account corresponds to the balance at the end of the same reporting period as indicated in the WA period. Sample templates for the reconciliations, as applicable, are provided in Appendix 8 - Designated Account Reconciliation Statement.

A Checklist Form 105 is used to assist with the compilation of the WA. It is in the LDH and a sample is provided in Appendix 9. **Procedure I - Advance withdrawals or**

[12] https://www.ifad.org/documents/38711624/39633845/Loan+Disbursement+Handbook+%28for+projects+approved+under+GCs+effective_e.pdf/af446750-29c5-49e2-a514-85132173fbf8

replenishments to a bank account(s) designated to receive loan/grant resources: The design foresees the possibility of a designated account for the project, although it can be expected that all expenditures will be pre-financed from the budget released by ICAR to the project and reimbursed by IFAD based on submission of claims. Hence this disbursement procedure may eventually be used in the event that an injection of liquidity is required.

This procedure is a mechanism to provide an advance to the government from the IFAD loan and grant account using an imprest mechanism to replenish eligible expenditures incurred for the project. The ceiling of the advance is specified in the LtB. The project can make payments to contractors, suppliers and others to cover IFAD's share of eligible expenses. The designated account can be maintained in a freely convertible currency agreed by the government and IFAD and specified in the LTB.

Expenditures above the "Statement of Expenditure" (SoE) threshold stipulated in the Letter to the Borrower shall be documented on a Form 101 and the supporting evidence as stipulated in section 3.1d) of the LDH needs to be submitted to IFAD. Expenditures below the threshold should be listed on a Form 102 and will be examined substantively on a sample basis during supervision and implementation support missions. All original documentation is to be retained by the project/borrower and securely located to enable inspection by IFAD representatives and auditors for a period of at least 10 years after the project completion date (PCD), in accordance with article VIII of the General Conditions.

Towards project completion, IFAD initiates procedures to ensure recovery of advances by project closure. Recovery of the advance shall start either six months before completion date or when the undisbursed balance of the financing (including outstanding special commitments) is equal to twice the amount of the advance. The project shall submit advance recovery plan to the IFAD with an information of WA No., date and amount of authorized initial advance in INR, USD & SDR if IFAD loan/grant is in SDR, estimated amounts in INR & USD of each WA No., date and period of WA, amounts in USD and proposed percentage of each WA and cumulative amounts to be recovered and cumulative unjustified balance.

The gradual recovery of the advance is achieved by applying part of the amount documented in each replenishment application to reduce the outstanding advance either on receipt of advance recovery plan or even before receipt of advance recovery plan if the advance outstanding is estimated to be more than estimated eligible expenditures for the remaining project period. Gradual recovery offers the most effective means of ensuring that some funds in designated account remain available to finance eligible expenditures to be incurred in the remaining project period. For example, recovery may be made on a 2 to 1 ratio; that is, for each US$3 of documented eligible expenditure, IFAD replenishes the imprest account of the borrower with US$2 and applies documentation for US$1 towards the recovery of the outstanding advance, thus ultimately ensuring that full documentation is gradually submitted to cover the entire advance. If some further withdrawals are projected to be made from other than the designated account, the recovery ratio for subsequent applications is appropriately increased to ensure that recovery is completed in good time before the financing is fully disbursed or before the financing closing date. A recovery plan is provided in Appendix 10.

Procedure II - Direct Payment. Direct payments are not foreseen for SCATE but are explained here in the unlikely case that the need should arise during the project life.

Under this procedure, the government requests IFAD to pay suppliers directly from the loan/grant account indicating in the WA the date on which payment becomes due to the supplier. The procedure is similar to Procedure I described above but the payment is made directly to the supplier as advised and instructed by the Government.

This procedure is generally suitable for payment of large civil works progress and retention payments, consultant fees (when these are of substantial magnitude), importation of goods The threshold of direct payment is specified in the LTB.

Under the direct payment procedure, payment is requested by completing separate Form 100 - Application for Withdrawal for each supplier and currency in which the payment is requested. The WA for direct payment should be received by IFAD at least two weeks before the payment to the supplier becomes due. The WA should be submitted along with the corresponding Application Summary Sheet(s) Form(s) 101 for direct payment, together with complete supporting documentation as per the instructions provided in section 2.1 of the LDH.

Procedure III - Reimbursement. This method is the base scenario for SCATE.

The method is used to claim reimbursement of eligible expenditures pre-financed by the government to the government treasury submitting separate Application for Withdrawal – Form 100, Application Summary Sheets Form 101 & Statement of Expenditure Form 102 as with Procedure I above. This type of disbursement will only be used for payment to government from IFAD loan/grant accounts. WA for reimbursement is to be submitted to the IFAD within ninety calendar days from the dates of payments or the period as specified in the LTB.

This procedure is followed when expenditures have already been incurred, that is, the supplier of goods, works, consulting or other services and incremental operating costs have already been paid by the Government from its own funds. Reimbursement will be made to the government in the currency of payment made for eligible expenditures. Nevertheless, reimbursement may be made in another currency on request of the government. The amount reimbursed in the requested currency will be calculated in USD and currency of financing agreement by the IFAD, using the IMF rate of exchange on the date of payment by the IFAD Treasury.

The reimbursement procedure has the same Forms (100, 101 and 102) and documentary evidence requirements as described above.

Project completion: Withdrawal Applications may be continued to be submitted up to the Loan Closing date i.e. six months after the project completion date. Submission of the Project Completion Report making reference to financial management and the final audit report are requirements in order to close the loan and grant accounts. Only payments made, or payments due for goods, works and services, which have been provided prior to the project completion date, qualify for disbursement. The only additional expenditures allowed are for winding up activities (salaries, audit fees, impact assessment study, project completion report and other activities as agreed with IFAD). No replenishment will be made after the project completion date. Care should be taken that costs are eligible only if services have been rendered and goods delivered by the completion date, except that costs for winding up activities are eligible until closing date. No disbursements can be made after closing date.

Beneficiary Contribution: The beneficiaries will make cash contributions for construction of sheds and running costs for the demonstration. The partner agencies involved shall develop a system to collect information of beneficiary cash contribution to the project on a regular and ongoing basis. The in-kind contribution for labour provided by the beneficiaries is not material and will not be recorded.

D. Budgeting, processing of payments, accounting systems, policies, procedures and financial reporting

Finance unit organization: The job description of the HofF, Finance and Admin Manager and FAOs shall be as specified in the PIM. FAO of the SPMU will be responsible for accounting and record keeping of all financial transactions, and preparation and submission of financial statements to PIU. The Chief of Finance of the partner agencies shall be responsible for review of the financial statements, getting approval of the

financial statements from the competent authority for submission to SPMU and submission of audited Statement of Expenditures report to SPMU. SPMU shall be responsible for aggregating all SOEs to reconcile the funds released and submission of financial statements to PIU on a quarterly basis.

Budget: The annual Work Plan and Budget (AWPB) shall be prepared based on project design report, cost table, financing agreement, annual action plan and memorandum of understanding entered with various implementing agencies. The implementing and partner agencies will follow their budgeting process of the activities specified in annual action plan and to be implemented by them following bottom-up approach and submit budget approved by them to SPMU which shall be submitted to PIU. The PIU shall prepare annual budget of each fiscal year on receipt of budget from the implementing agencies incorporating the activities to be implemented by PIU and project management expenses linking with the annual plan in the format specified by the IFAD showing cost categories outlined in the Schedule II of the Financing Agreement, along with the component, financier and percentage of funding by each financier in the format given in Appendix 11. The annual budget of the project will be submitted to DARE/ICAR for inclusion of budget in the central government's budget creating a separate budget line to identify the project budget and for monitoring the budget utilization. The PIU on receipt of approved budget shall allocate the funds to SPMUs who will allocated funds various implementing and partner agencies based on their budgetary requirements for approved annual work plan.

If the AWPB is required to be revised within the approved budget allocation, a request for budget revision with justification should be submitted by the implementing and partner agencies to SPMU which shall be reviewed and approved by the SPCC. Requests for supplementary budget over and above the approved budget will have to be submitted by SPMU to PIU and the same needs to approved by DARE. The PIU will monitor the monthly budget execution in the format given in Appendix 12 and fund utilization status of each implementing partner agency on a monthly and quarterly basis based on funds utilization certificates and audited statement of expenditure. If the implementing agency confirms that it will not be able to spend allocated funds for the specified activities due to certain reasons, the surplus funds may be reallocated to another activities requiring more funds or implementing agency after obtaining the approval from the competent authority.

GoI will release quarterly budget of the project to the ICAR through DARE and ICAR will release funds on quarterly basis as per the annual budget to bank account of PIU opened for the project and PIU will provide budget on quarterly basis to the bank accounts of the implementing agencies. The PIU will release first and second quarter budget to the bank account of the implementing agency online based on sanctioned budget of the financial year and receipt of requisition of funds, funds utilization certificates which is given in the *Appendix 13*, statement of expenditures of the previous quarter and cash forecast of the next quarter which are given in *Appendix 14* of financial reporting table. The PIU will release budget of the third and fourth quarter to the implementing agency on receipt of requisition of funds, statement of expenditures, cash forecast of the next quarter and audited fund utilization certificate in the format given in *Appendix 15*.

The requisition of funds of each quarter year will be submitted on-line through an electronically signed mail along with the required documents but a hard copy shall also be submitted to PIU. The unspent funds of each quarter will be adjusted against the budget of the next quarter in the cash forecast. The PIU will either release quarterly budget to the implementing agencies (SAUs, SRLM and others) directly or through the SPMUs and the SAUs will release quarterly budget to KVKs under their jurisdiction based on sanctioned budget, requisition of funds, statement of expenditures and fund utilization certificate. The counterpart funds for expenses to be incurred by the implementing agencies and ICAR except salaries of the staff to be paid directly by the implementing agencies and government will also be released. The implementing agencies and the government will provide the details of expenditure incurred for salaries

and allowances of the staff working for the project and any other expenditures incurred for the project for accounting and reporting of total expenditure of the project.

Processing of payments: The expenditures are to be incurred for the project related activities as specified in the financing agreement, project design report, and cost table. The payments of such expenditures are to be made as per financial procedures of the PIU and respective implementing agencies with due care of internal check and internal control to avoid ineligible expenditures and unauthorized payments. There should be segregation of duties in processing the payments and supporting documents of expenditures checked by one staff should be checked, recommended and approved by other staff. All the financial transactions are to be performed only upon approval by the Project Director at PIU and authorized staff of the implementing agencies as per their financial procedure manual. Before processing the payment of expenditures, the availability of budget and eligibility of expenditures should be checked in addition to the supporting documents of expenditures. The staff assigned, Finance and Account Officer in PIU and SPMU and finance staff in the concerned implementing partner agencies, should check all the supporting documents related to expenditures based on nature of expenditures and forward to the senior finance staff for review and recommendation for payment. In case of procurement, the procurement staff should check the related documents to ensure quality, specification and price of the goods supplied or services provided. The HofF in PIU and FAO in the SPMU and Finance Chief of the implementing agencies have to review the completeness of supporting documents, correctness of the amounts, and eligibility of expenditures and recommend for approval to the Project Director in PIU or SPCC Chairman in SPMU or authorized person of the implementing partner agencies. If any discrepancy is identified, the payment should be withheld till required explanation/justification is provided for the requested payment.

For all payments, the HofF in PIU, FAO in SPMU and Finance Chief in the implementing partner agencies should ensure that the following steps are performed:

- A payment voucher should be prepared for each payment,
- The availability of sufficient supporting documents to justify the expenditures,
- The supporting documents (original copies of invoice, receipt, quotations, purchase order, goods received note, inspection report of the technical committee or specialist, contract, travel order, travel claim, travel report, participants attendance, distribution list, photographs, etc) should be checked to validate the amount and nature of expenditure,
- Arithmetic correctness of expenditures, and
- Cross verification of all supporting documents to ensure correctness of the amount of expenditures.

Consultants' Services: The payment to the consultants should be made based on payment terms and other terms and conditions of the contract. The consultants may be individual or consulting firm. The consultants may be hired either based on a lump sum contract or a time based contract. In case of a lump sum contract, payments will be made against the delivery of outputs as specified in the contracts while in case of time based contract, payments will be made against the submission of a time sheet and a summary of activities performed. The individual consultants will be hired on monthly basis or on the basis of number of days and they will be paid against the submission of a time sheet and a report of activities performed. The report submitted by the consultants is required to be reviewed and approved by the Supervisor of the concerned specialist to ensure quality of the expected report and compliance with the terms and conditions of the contract in case of lump sum contract. The payment will not be made unless the report is approved.

Training and capacity building: The expenditures incurred for training and capacity building of the project staff and beneficiaries will be made only on verification of all supporting documents related to such expenditures. The documents required are approval of the cost estimate & training by the Project Director/Coordinator and IFAD if

required, invoices and receipts of the expenditures, invitations to the participants, participants' attendance, payees, signatures for payment of allowances, distribution list of materials, photographs of training, completion report, etc.

Incremental operating costs: The expenditures will be incurred for the incremental operating expenses as provisioned and incurred for the project management. Such expenditures must be incurred for the project management during implementation of the project and eligible for funding. All the required supporting documents are to be made available for processing payments and the concerned finance staff should check the sufficiency, correctness and eligibility of the expenditures and availability of budget before recommending the payment. The project management expenditures should be correctly classified to the respective component and category.

Travel Expenditures: Staff need to travel for implementation and monitoring of the project activities as well as for workshops, study tours and staff training. The person wishing to travel must get prior approval of the Project Director/Coordinator/SPCC Chairperson and IFAD if it is required. The approved travel request and No Objection are to be submitted to the HofF for travel advance if required. The staff has to submit all the necessary supporting documents and travel report within one week from the date of return from travel. The finance staff will check accuracy and completeness of travel expenses with the supporting documents and submit through the Head Finance in PIU and Chief Finance Officer/Finance Head in the implementing agencies for approval of the Project Director/Coordinator/SPCC Chairperson. Upon approval of the travel expense, the advance if provided will be settled or amount due to the staff will be reimbursed.

Innovation Platform Support: The grants for technology development is to be paid to researchers/innovators for developing new technologies, modification to existing technologies and prototypes to commercial development after entering an agreement on compliance with the terms and conditions of the said agreement. The concerned specialist in the PIU responsible for monitoring the progress of the innovation grant is required to recommend the payment of instalment amount. The concerned finance staff will check the supporting documents, recommendation of the specialist, and amount to be paid to the researcher. The Project Director will approve payment of innovation grant on recommendation of the Head Finance. The record of an innovation grant provided by the project to the researchers for developing new technologies will be maintained by the PIU in the format given in Appendix 16. The record should include name of grantee, grant agreement date, period of grant agreement, total amount of the equipment development, grantee contribution and project grant amount, instalments of grant payment, detail of equipment to be developed, milestone to be achieved to be eligible for instalment payment, date and amount of each instalment payment, completion date, and remarks. All supporting documents related to the expenditures should be marked with "PAID" stamp immediately after approval of payment voucher to avoid double payment of same expenditures.

Accounting: The PIU and all implementing agencies will maintain accounts of the project separately, following double entry book-keeping and in accordance with the Accounting Standards adopted by ICAR, accounting for expenditures category-wise, component-wise, funding source and activity-wise. The implementing agencies shall maintain all required records of financial transactions. The contribution made in cash by the implementing agencies, beneficiaries and participating organizations shall be recorded as expenses only when expenses will be incurred. All related calculations and documents shall be retained and made available for verification during supervision mission of IFAD and audit. The accounts and records are to be maintained consistently to reflect the operations, resources and expenditures related to the project until the financing closing date, and shall retain such accounts and records for at least ten (10) years thereafter.

The accounts shall be computerized at all levels of the implementing agencies. The books of accounts will be maintained by PIU and SPMUs and all implementing partner

agencies (SAUs, SRLMs, KVKs, and others). A uniform chart of accounts shall be developed as given in Appendix 17 indicating state, district, implementing agency, types of accounts, source of funds, component, sub-component, activities, category and expenditure heads. The HofF at the PIU will provide code to the chart of accounts and instruct to all implementing agencies to maintain accounts using this chart of accounts or chart of accounts being used by the implementing agencies having these information. The chart of accounts will help to identify nature of expenditures incurred by each implementing agency (cost center) in each geographical area for each activity of the component and category so that software can generate consolidated statement of expenditures by component, category, and financiers, expenditure heads, and financial statements. The accounting software to be purchased shall have features of maintaining books of accounts viz. cash book, bank book, journal, edger, trial balance, bank reconciliation statement, expenditure by components, categories, and financiers in each cost center and consolidation at PIU. The sample of the terms of reference of accounting software is given in Appendix 18**.** Software vendor should provide training to operate and understand the various features of the software. The accounting software available is to be required to customize to meet accounting and reporting requirement of IFAD, the vendor shall be requested for required customization.

The PIU, SPMU and implementing agencies will maintain petty cash on imprest system for incurring petty expenses. The formats of petty cash voucher, statement of petty cash and request form and petty cash reconciliation are given in Appendix 19.

PIU and all implementing agencies shall maintain accounts of financial transactions on the same day so that updated information can be generated as required for submission to the management and PIU. Besides the books of accounts, the PIU, SPMU, SAUs, SRLMs, KVKs, and others shall maintain the following registers/ records (i) register of procurements (ii) register of fixed assets (iii) register of advances (iv) register of contract monitoring forms (vi) vehicle record forms (vii) tax register (viii) salary register (ix) cheque issued register (x) stock book (xi) tour register etc. PIU, SPMU and all implementing partner agencies maintaining accounts using accounting software shall take back up of the data daily or weekly depending on volume of transactions and stored off site.

Asset Management: The detail record of fixed assets purchased from the project funds shall be maintained at the PIU and all implementing agencies in the fixed assets register provided in Appendix 20**.** The fixed assets register shall include the description of fixed assets, identification number, manufacture serial No., supplier, date of purchase, invoice No. & date, source of funding, cost, date of receipt, the location, user if the asset is allocated to any staff, verification date, signature of verifier, date and amount of transfer or disposal, and remarks if any. The producers' organizations shall also maintain register of fixed assets purchased from project funds and the register shall be submitted to the concerned implementing agencies within 15 days of the year-end. All fixed assets shall be physically verified at least once in a year and the evidence thereof shall be recorded in the asset register and physical verification report reconciling with the fixed assets register shall be prepared by the team of physical verification mentioning the condition of assets and any shortage. The statement of fixed assets together and the physical verification reports shall be submitted to PIU together with the financial statements. All assets procured by the project shall be adequately insured.

KVKs and other demonstration partners will own the equipment procured from IFAD fund for the effective utilization of the machinery/ equipment for the intended productive purpose. The concerned agencies will maintain fixed assets register of such equipment, a log book for the use of equipment and income earned from use and expenses incurred for running of the equipment so that they can know surplus or deficit from use of the equipment.

Internal controls: The internal control system relating to financial procedures, accounting, procurement, record maintenance, preparation of financial statements and

reporting will be based on internal control system of the respective implementing agencies and GoI procedures for PIU. There shall be segregation of duties for accounting, payment, bank reconciliation, procurement, inventory management and approval of financial transactions at all levels of implementation. HofF of PIU shall be responsible for the effective implementation of the overall internal control system. The PIU, SPMU and all implementing partner agencies shall maintain vehicle record form for recording movement of vehicle in the vehicle log and vehicle history with regard to repair and insurance in the format given in Appendix 21.

Reporting: Implementing partner agencies shall submit to SPMU and SPMU to PIU monthly and quarterly financial statements in the agreed format with the statement of outstanding expenses to be paid and expenses incurred in the previous month and quarter if accounts are maintained based on cash basis showing the expenditure by components, categories, and financiers, comparative statement of actual and budgeted expenditure, bank reconciliation statements, funds utilization certificate, trial balance etc. by the 7th of the month. The PIU will adjust the outstanding expenses of the quarter and expenses paid for the previous quarter to financial report prepared based on cash basis financial statements to prepare accrual basis financial statements.

Support will be provided to the implementing partners maintaining accounts on cash basis for additional reporting required for adjustment in modified cash basis financial statements. The expenditures showing cumulative expenditures by component and financiers, AWPB, actual and percentage of each component and financiers, appraisal, disbursement and percent of each financiers, financial performance by component and financiers, and disbursement status of IFAD loan/grant against allocation should also be reported in the formats given in Appendix 22. These financial statements and funds utilization certificate should be signed by the Project Director/Coordinator. The PIU shall consolidate the financial statements of all implementing agencies and prepare quarterly interim financial reports in the format given Appendix 23 and submit these to IFAD within 45 days of the end of each quarter. The implementing partner agencies shall prepare audited statement of expenditure and submit the same to SPMU to PIU within two months. The PIU shall will prepare annual project financial statements in the format given in Appendix 24 based on the IFAD Handbook, on accrual basis in line with IPSAS, within four months of the end of each financial year.

E. Audit procedures and arrangements

The office of C&AG shall conduct transaction audit of the project's consolidated financial statements. In addition to the C&AG transaction audit, in order to meet the deadline for submission of the audit reports (within six months of the closing of fiscal year) the project shall also hire, based on a competitive process, one among the chartered accountant firms empanelled with C&AG, to carry out the annual audit. The financial statements for audit shall be prepared by PIU in accordance with the IFAD Handbook for Financial Reporting and Auditing of IFAD-financed Projects[13] ("the Handbook") which, inter alia, require public disclosure of the audited financial statements. The appointment of auditors shall follow a fair, transparent and competitive process and the terms of reference of the auditors shall be in accordance with the IFAD approved Audit Terms of Reference.

Preparation of project financial statements is dependent on the submission of audited and certified statement of expenditures (SOEs) by the state level implementing and partner agencies. The audited SOEs shall be submitted within 2 months of end of fiscal year in order to enable the project to complete and submit the audit report within 6 months (before 30 September) of end of fiscal year. The audit report submitted by the project shall contain a clear expression of the auditor's opinion regarding the financial statements. It should include a financial statement's audit, a compliance audit and

[13] https://www.ifad.org/en/document-detail/asset/39641638

should include a Management Letter. It should also include a section on the project's compliance to loan covenants particularly those dealing with the financial matters. The auditor shall review the financial statement and SOEs and give an opinion on the same. The audit of the Designated Account shall be conducted by Office of C&AG. The project will explore with office of C&AG to conduct performance audit at the stage of the mid-term review to highlight particular areas strength and weakness.

The standard ToR for the auditors is provided in Appendix 25. The appointment of the auditor shall be through a fair, transparent and competitive process within 90 days after loan effectiveness for the first year and also for each of the subsequent fiscal years of the project period. The ToR should be sent to IFAD for review and "No-objection". The implementing agencies/PIU shall start procurement process after obtaining approved ToR from IFAD using the agreed ToR subject to IFAD prior review and inform IFAD the name of the proposed auditor and the procurement process followed for the selection. The PIU/implementing agencies shall appoint the auditor on receipt of "No-objection" from the IFAD on the selection of proposed auditors. The auditors so appointed shall issue a formal engagement letter confirming their acceptance of the appointment and outlining the methodology, scope and responsibilities under the audit. The representatives of the concerned implementing agencies/PIU will sign and return a copy of the engagement letter to the auditor. A sample audit engagement letter is given in Appendix 26 to this chapter. At least 30 days before the end of the fiscal year, the PIU confirms to IFAD that an auditors of PIU/each implementing agencies have been appointed. In the case of C&AG, national procedures will be followed, provided they are acceptable to the Fund.

Auditors should not be appointed as consultants responsible for designing accounting and control systems on which they would be required to comment during tenure of audit. Such appointments would create a conflict of interest and increase the risk that auditors might not report shortcomings in the project. In general, and in accordance with international best practice and as recommended by IESBA, contracted audit firms cannot provide consultancy services to the project or have done so in the previous two years.

In making a proposal for appointment of a private auditor, the project should provide IFAD with relevant supporting documentation and should address the following questions:

- Does the firm adhere to internationally accepted auditing standards or standards on auditing agreed by the IFAD? The firm's audit procedures and methods should ensure compliance with such standards.
- Is the firm independent of the project entity to be audited and of the people appointing the auditor?
- What is the legal status of the firm? This includes such aspects as partners' status and any limited liability provision in the firm's articles.
- Are any of the assigned audit staff employed by or closely linked to the project entity to be audited, or to any government body or public agency?
- Can the auditor confirm that there is no conflict of interest or lack of independence implicit in accepting the appointment?
- Is the auditor committed to providing qualified and experienced staff that can ensure timely submission of audit reports? In particular:
    - What is the staffing plan for the audit?
    - What are the qualifications of the assigned staff?
    - Do the assigned staff belong to professional audit or accounting body, the Institute of Chartered Accountants India?

The auditors shall conduct audit of the project accounts and statement of expenditures following the applicable Standards on Auditing as specified in the ToR acceptable to IFAD. In reviewing the project accounts and financial statements, the auditor will:

- verify that acceptable accounting standards have been consistently applied and indicate any material deviation from these standards, and the effect of such deviation on the annual financial statements;
- assess the adequacy of accounting and internal control systems (procedures and responsibilities) for monitoring expenditures and other financial transactions (commitment, review, approval, payment and accounting) and ensuring safe custody of project-financed assets, and document any instances where controls are lacking or need strengthening;
- determine whether the PIU/implementing agencies have maintained adequate documentation for all transactions; e.g. procurement documents, contracts, suppliers. invoices, letters of credit and evidence of payment, and ascertain that expenditures were properly authorized and in compliance with legal requirements;
- verify SOEs, accounting records and supporting documentation;
- establish that expenditures claimed for reimbursement under this procedure are eligible for financing in accordance with the provisions of the financing agreement;
- verify the numerical accuracy of statements and accounts;
- verify that disbursement requests for expenditures submitted to IFAD are eligible for financing under the loan agreement, and identify clearly any ineligible expenditures;
- verify the correctness of transactions
- carry out a physical verification of any significant assets purchased and confirm their existence and use for project purposes;
- from the second year audit onwards, follow up and on the remedial actions taken by the concerned implementing agencies/PIU in response to previous audit findings and recommendations, and report on the status of implementation of recommendations issued in the previous years.

The auditors have to issue a management letter describing any weaknesses identified in the project accounting and internal control systems and non-compliance with financing agreement, prevailing Laws, policies, directives and decisions of the management and the recommendation to resolve them or for improvement after discussion with the finance and accounts department and the Project Director of the concerned implementing agencies/PIU. The concerned implementing agencies/PIU have to submit the management letter to the respective Audit Committee or Executive Committee or Board as applicable for discussion together with management response. The management responses shall be provided to the auditor and IFAD for clarification and corrective actions to be taken to avoid such audit observations within one month of receipt thereof. The auditors shall include the management responses in the final version of the management letter and submit along with the audit report.

The auditors of the partner agencies shall provide an audited Statement of Expenditure to SPMU within two months from the end of each financial year. The PIU has to prepare consolidated project financial statements and statement of expenditures (SOEs) incorporating the SOEs from all implementing parent agencies in accordance with the IFAD Handbook on an accrual basis in line with the International Public Sector Accounting Standards-cash (IPSAS) and obtain single audit opinion from

The audited consolidated project financial statements together with the audit report, management letter and response to the management letter have to be submitted to the IFAD within six months of the end of each financial year during the project period and by the project closing date for the last year of the project. In accordance with the IFAD Handbook, the audited financial statements and audit report will be disclosed publicly.

SPMU and PIU shall maintain a Log of Audit Observations reported in the management letter by the auditors and also a Table of Summary Status of Audit Observations of each

year separately and get the settlement of audit observations validated by the auditor during the subsequent fiscal year at the time of audit of next fiscal year or earlier. The format of Table of Summary Status of Audit Observations and Log of Audit Observations is given in Appendix 25 to this chapter. PMU and PIU shall submit the updated status of settlement of audit observations to SPCC and PMC respectively. SPMU and PIU will maintain consolidated Log of Audit Observations and a Table of Summary Status of Audit Observations which will be made available to the IFAD missions upon request.

Internal Audit: The PIU and SPMU will engage a firm of Chartered Accountants to conduct internal audit of the project related financial transactions under terms of reference agreed with the IFAD. The internal auditors (IAs) shall conduct quarterly internal audit in accordance with the Standards on Internal Audit (SIA) prescribed by the Institute of Chartered Accountants of India (ICAI) and will include such tests and controls, as the auditor considers necessary under the circumstances. According to the SIA, internal audit is defined as ""Internal audit is an independent management function, which involves a continuous and critical appraisal of the functioning of an entity with a view to suggest improvements thereto and add value to and strengthen the overall governance mechanism of the entity, including the entity's risk management and internal control system." The IAs will assess the effectiveness of operation of the project's financial management system and review of internal control mechanisms. The IAs shall check the maintenance of required records for the financial transactions of the project, eligibility of expenditure for intended purposes, supporting documents to substantiate the nature and amounts of expenditures, proper authorizations, reliability of financial reports and timely reporting to PIU, compliance with the prevailing Laws, financial rules and procedures, financial agreement, letter to the borrower/recipient, IFAD's general conditions, and procurement guidelines, and review the internal controls.

The IAs shall prepare and submit quarterly internal audit reports covering deficiencies noted during the course of internal audit and validation of corrective actions taken by the management for audit deficiencies reported in the previous quarter and status of outstanding audit observations to the SPCC-Chairpersons and PD-PIU in respect of SPMUs and PIU respectively. The internal audit will help the management to identify weaknesses in the financial management system and internal control system and take corrective actions in a timely manner. The management of the SPMUs and PIU have to take immediate corrective measures to avoid reoccurrence of issues and strengthen the internal control system and revise the financial procedures. The internal audit reports are to be submitted to the respective authorities of the implementing agencies and a copy to the PIU along with the actions taken to resolve audit observations. The internal audit reports should also be made available to IFAD missions upon request. The ToR of the Internal Auditor is provided in Appendix 25**.**

Ineligible Expenses. The auditors are required to identify clearly any ineligible expenditures and report them regardless of their materiality. If the ineligible expenditures are identified which have already been included in withdrawal applications and reimbursed, the auditors will report these expenditures separately and GoI has to refund the amounts of ineligible expenditures to IFAD.

Financial Reporting: PIU and SPMUs will maintain accounts of the project separately, following double entry accounting system. Accounting shall record transactions by category, component, funding source and activity, identifiable as pertaining to the Project. ICAR maintains accounts on a modified cash basis whereas other implementing State Governments and their departments, SRLMs and KVKs maintain their accounts on a cash basis. The FM systems of SCATE would largely rely on and be aligned with the systems already established within ICAR, however, a recognized off-the-shelf accounting software such as Tally will be implemented for the Project until the ICAR Enterprise Resource Planning system is able to produce the required reports.

The implementing and partner agencies shall maintain all required records of financial transactions for 10 years after project closing date. The contribution made in cash by the

implementing agencies, beneficiaries and participating organizations shall be recorded as expenditure when they are actually incurred. In-kind contributions are not material and need not be quantified or disclosed in the Notes to the Financial Statements. All related documents shall be retained for verification during supervision mission of IFAD and audit.

The financial statements of the project for each fiscal year should consist of:

- Yearly and cumulative statements of sources and application of funds by category disclosing separately IFAD"s funds, other donors funds and beneficiaries funds;
- Yearly and cumulative statements of sources and application of funds by category disclosing separately IFAD"s funds, other donors funds and beneficiaries funds;
- Statement of financial position;
- Statement of cash flows;
- A statement of comparison of budget and actual expenditures by category and component;
- Yearly and cumulative SOEs by withdrawal application and category of expenditures;
- Full disclosure of cash balances; and
- Notes to the project financial statements with respect to accounting standards, basis of accounting, foreign currency transactions, budget, government counterpart funds, other donor funds, other receipts, yearly procurement; statement of fixed assets, cumulative status of funds by category, reconciliation between the amounts shown as received by the GoI and those shown as being disbursed by IFAD.
- The formats of the PFS are provided in Appendix 24 to this chapter.

Taxes: Section 11.01 of the General Conditions stipulates that the Loan and all Loan Service Payments shall be exempt from all Taxes, and all loan service payments shall be made free and clear of taxes. Taxes on signature, delivery or registration shall also be exempted. It is the policy of the Fund that Loan proceeds are not to be used to pay Taxes, including (but not limited to) any taxes levied on the imports, procurement or supply of any good, civil work or services financed by the Loan but excluding income taxes on the overall income. If taxes are not exempted to the project, they shall be paid from the government fund. If taxes are exempted by the Government, they will be recorded under the counterpart contributions maintaining a separate record.

Materiality: Misstatements, including omissions, are considered to be material if they, individually or in the aggregate, could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements. Materiality depends on the nature or size of the item or nature of misstatement, or a combination of both which is judged in the light of surrounding circumstances and the auditor's perception of the financial information needs of users of the financial statements. In the public sector, materiality includes compliance with authorities, legislative concern or public interest. In the context of IFAD-financed operation will include compliance with the Project Financing Agreement and in particular the requirement that IFAD funds may only be used for the purpose stated therein.

Preventing Fraud and Corruption: The project will promote and adhere to the highest standards of probity and accountability in the use of its financing and implementation of project activities to achieve intended objectives. Consequently it will take appropriate action to prevent, mitigate and combat Prohibited Practices through compliance with the IFAD Policy on Preventing Fraud and Corruption in its Activities and Operations. IFADs policy requires that the staff of IFAD, beneficiaries of IFAD loans, as well as all bidders, suppliers, contractors and consultants under IFAD-financed contracts observe the highest standard of ethics and integrity during the procurement and execution of such contracts. Mechanisms for whistle-blowers to access IFAD systems are provided at the following link: http://www.ifad.org/governance/anticorruption/how.htm.

Particular attention will be paid to: including clauses in procurement documents and contracts that would establish an obligation for bidders and contractors to disclose information; encouraging the dissemination of government confidential reporting channels and whistle-blower protection measures; and procurement documents and contracts would inform implementing partners of IFAD's jurisdiction to conduct investigations and impose sanctions for prohibited practices.

Investigative Authority: Under IFAD's Revised Policy on Preventing Fraud and Corruption [14], the independent and competent authority responsible for receiving, reviewing and investigating allegations of fraud and corruption relating to IFAD-financed activities and operations will be the ICAR Chief Vigilance Officer, who reports directly to the Director-General.

[14] https://www.ifad.org/en/document-detail/asset/40189695

Chapter VII: Procurement Arrangements under SCATE

Applicable Guidelines and Procedures

Procurement of goods, works and services under the project financed from resources provided or administered by IFAD will be undertaken in accordance with IFAD's Procurement Guidelines and Handbook (dated September 2010) and as amended from time to time. (The IFAD Procurement Guidelines can be accessed from https://www.ifad.org/documents/38711624/39421027/procure_e.pdf/e1a99511-d57d-4695-a05b-3d9b597d0149 and the IFAD Procurement Handbook can be accessed from https://www.ifad.org/documents/38711624/39421018/proc_handbook_e.pdf/2febc53a-4244-4447-a788-d06a632fd3b5). In the absence of national law which safeguards the interests of transparency, fairness, and grievance redressal of the participating bidders/suppliers, IFAD Procurement Guidelines shall be followed both at the central level and at the decentralised level by all implementing entities.

The implementation responsibility of the proposed Project lies with the Project Implementation Unit to be established in the Agricultural Engineering Division of ICAR at the central level and State Programme Management Unit in each of the programme States. The activities will be implemented by different entities like State Rural Livelihood Mission Societies in the selected States, participating Agricultural Universities, the Krishi Vigyan Kendras (KVK), other service providers and Agricultural Innovation hubs/networks. The project will engage with private sector manufacturers of farm machineries for licensing, contracts for supply of machineries, etc. In addition, the project will engage other consultancy service providers and partners.

Guiding principles

Transparency, Competition, Fairness and Elimination of Arbitrariness

Public buying should be conducted in a transparent manner to bring competition, fairness and elimination of arbitrariness in the system. This will enable the prospective bidders to formulate competitive bids with confidence. The following are some important measures to achieve the same and, thus, secure best value for money:

(a) The text of the bid document/Request for Proposals (RFP) should be user-friendly, self-contained, comprehensive, unambiguous, and relevant to the objective of the procurement. The use of terminology used in common parlance in the industry should be preferred.

(b) The specifications of the required goods should be framed giving sufficient details in such a manner that it is neither too elaborately restrictive as to deter potential bidders or increase the cost of purchase nor too sketchy to leave scope for sub-standard supply. The specifications must meet the essential requirements of the project. Efforts should also be made to use standard specifications, which are widely known to the industry.

(c) The bid document/Request for Proposals should clearly mention the eligibility criteria to be met by the bidders such as minimum level of experience, past performance, technical capability, manufacturing facilities, financial position, ownership or any legal restriction etc.

(d) Restrictions on who is qualified to bid should conform to extant Government policies and be judiciously chosen so as not to stifle competition amongst potential bidders.

(e) The procedure for preparing and submitting the bids/RFP; deadline for submission of bids/proposals; date, time & place of public opening of bids/proposals; requirement of earnest money and performance security; parameters for determining responsiveness of bids; evaluating and ranking of bids and criteria for full or partial acceptance of bid and conclusion of contract should be incorporated in the bid enquiry in clear terms.

(f) Bids should be evaluated in terms of the criteria already incorporated in the bid document, based on which bids have been received. Any new condition, which was not incorporated in the bid document, should not be brought into consideration while evaluating the bids.

(g) Sufficient time should be allowed to the bidders to prepare and submit their bids.

(h) Suitable provisions should be kept in the bid document allowing the bidders reasonable opportunity to question the bid conditions, bidding process, and/or rejection of its bid and the settlement of disputes, if any, emanating from the resultant contract.

(i) It should be made clear in the bid document that bidders are not permitted to alter or modify their bids after expiry of the deadline for receipt of bid till the date of validity of bids.

(j) Negotiations with the bidders for procurement of goods and works must be avoided. In case of consultancy services negotiations should be conducted with the highest combined ranked consultant, to clarify certain aspects and to confirm the team of experts proposed. For negotiations with the consultants, please refer to the Guidelines for negotiations.

(k) The name of the successful bidder to whom the contract is awarded should be appropriately notified by the PIU for the information of general public, including display at notice board, periodical bulletins, website etc.

Efficiency, Economy and Accountability:

Public procurement procedures must conform to exemplary norms of best practices to ensure efficiency, economy and accountability in the system. To achieve this objective, the following key areas should be taken care of:

(i) To reduce delays, PIU should prescribe appropriate time frame for each stage of procurement; delineate the responsibility of different officials and agencies involved in the purchase process and delegate, wherever necessary, appropriate purchase powers to the lower functionaries with due approval of the competent authority.

(ii) PIU should ensure conclusion of contract within the original validity of the bids. Extension of bid validity must be discouraged and resorted to only in absolutely unavoidable, exceptional circumstances with the approval of the competent authority after duly recording the reasons for such extension.

Eligibility

Firms/entities/individuals from any country are eligible to participate in this SCATE Project, except: (i) as a matter of law or official regulation, India prohibits commercial relations with that country, or (ii) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, India prohibits any import of goods from, or payments to, a particular country, person, or entity. Where India prohibits payments to a particular firm or for particular goods by such an act of compliance, that firm may be excluded; and (iii) those who are included in the IFAD's debarred list.

Misprocurement

IFAD shall have the right not to finance contracts which are not procured strictly following the procedures as set forth in the Procurement Guidelines and Procurement Handbook, IFAD Letter to the Borrower, and will cancel such portion of the Financing. If misprocurement continues, IFAD may suspend the Financing or even go up to the cancellation of the Financing.

Good Governance and Accountability Policies

The IFAD Procurement Guidelines and Anti Corruption Policy, which are adapted to this Project through the Financing Agreement and IFAD General Conditions for Agricultural Development Financing, require zero tolerance to prohibited practices. Therefore, the procurement process also requires a strict adherence to these Guidelines and Policy.

Prohibited Practices

The Borrower (including the Department of Agricultural Research and Education (DARE) and Indian Council of Agricultural Research (ICAR) and oversight committees), as well as bidders, potential bidders, suppliers, grant recipients, contractors and consultants financed through the proceeds of this Project, shall observe the highest standard of ethics during the selection and execution of such contracts/grants.

Pursuant to this policy, the following provisions shall be applied throughout the project implementation:

(a) For the purpose of this provision, the terms set forth below are defined:

(i) "Corrupt Practices" mean the offering, giving, receiving, or soliciting directly or indirectly of anything of value to influence improperly the actions of another party.

(ii) "Fraudulent Practices" is any act or omission including a misrepresentation that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation. ;

(iii) "Collusive Practices" is an arrangement between two or more parties, designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iv) "Coercive Practices" is 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.

(v) "Obstructive Practices" mean: deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede an IFAD investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or acts intended to materially impede the exercise of the IFAD's inspection and audit rights provided for under sub-clause (e) below.

(b) The Borrower and IFAD will reject a proposal for award if it determines that the bidder or consultant recommended for award, or any of its personnel. Or its agents, or its sub-consultants, subcontractors, service providers, suppliers and/or their employees has directly or indirectly engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;

(c) IFAD will declare mis-procurement and cancel the portion of the loan allocated to the contract if it determines at any time that representatives of the borrower or of a recipient of any part of the proceeds of the loan

engaged in corrupt, fraudulent, coercive, collusive or obstructive practices during the procurement or implementation of the contract in question without the borrower having taken timely and appropriate action satisfactory to the DP to address such practices when they occur, including failing to inform the DP in a timely manner at the time they knew of the practices.

(d) IFAD will declare a consultant or firm ineligible, either indefinitely or for a stated period of time, to be awarded a future IFAD financed contract if it at any time determines that the bidder, supplier, contractor, service provider or consultant has engaged in corrupt, fraudulent, coercive, collusive or obstructive practices in competing for, or in executing, an IFAD-financed contract; and

(e) All contracts financed out of the proceeds of SCATE Project has a provision requiring supplier, contractor or consultants to permit both the Borrower and IFAD to jointly or separately inspect their accounts and records relating to the performance of the contract and to have them audited by auditors appointed by the Borrower and/or IFAD.

All staff involved in the procurement process has a duty to report to the National Project Director and IFAD (i.e. through its Country Program Manager) for any suspected instances of prohibitive practices when identified.

In the case of collusive behavior, if the evidence suggests that all or some of the bidders or consultants are involved, the evidence should be reviewed by the National Project Director, SCATE, and if necessary the procurement process is cancelled and all of the involved firms or individuals are sanctioned which could be up to the debarment. If the procurement is still in process, then the procurement must be cancelled and reinitiated only after the matters have been addressed properly.

Complaint Handling Mechanisms (CHM)

There are three distinct types of complaints that are typically found in a Project; i.e., (a) complaints concerning bid protest from aggrieved contractors, suppliers, service providers and consultants, which are addressed during or immediately after the bid process, (b) performance disputes, which are governed by the General Conditions of Contract (GCC) and Special Conditions of Contract (SCC), and, (c) non procurement related complaints from any parties, which are addressed in the PIM.

A complaint is any notification regarding an alleged illegal or improper procurement action and/or conduct of procurement officials, consultants, and/or sub-contractors directly or indirectly supporting a project or associated with its implementation, which the complainant believes is wrong, either under the law or on the grounds of unacceptable behavior.

The PIU shall ensure the confidentiality of any complainant and shall hold harmless any person reporting a complaint, oftentimes referred to as a "whistle blower", with provisions to shield complainant(s) or public official(s) from retaliation when they provide information that they reasonably believe to be a violation of the provisions of the agreed procedures.

All procurement related complaints shall be addressed to the National Project Director, to which the PIU shall respond within 7 business days. If PIU needs more time due to complex investigation related to the complaints, then it shall state so in writing to the complainants, but in any case a complaint shall be put into closure within 30 business days.

The complainant need not be personally aggrieved or impacted, and may be acting merely in accordance with a sense of civic duty, such as an NGO or private citizen, in bringing an occurrence to the attention of project authorities.

All complaints, whether notified by persons who feel personally aggrieved or acting out of a sense of civic duty, will be acknowledged and acted upon by responsible authorities in accordance with the procedures specified in this section.

Concerning bid protests, from time to time, with and without justification bidders, suppliers, contractors, service providers and consultants may choose to lodge a complaint concerning some aspect of the contract award process. In the event the contract has been awarded and a contractual relationship exists between the parties, there are established dispute mechanisms in the GCC that shall be followed, up to and including judicial review.

A formal mechanism to satisfactorily respond to bid protest complaints must be followed, consistent with this Manual and the steps to be followed by aggrieved bidders, suppliers, contractors and consultants in the complaints procedure will be specified in the Bid/Request for Proposal documents

Complaints may also be addressed directly to IFAD, to which IFAD will resolve the complaints within its service standard.

Conflicts of Interest

A firm/entity/individuals participating in a procurement process under this Project shall not have a conflict of interest. Any firm/entity/individuals found to have a conflict of interest shall be ineligible for award of a contract.

A conflict of interest is a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations, and that such conflict of interest is not acceptable under the Project. The Borrower will take appropriate actions to manage such conflicts of interest which may include rejecting a proposal for award if it determines that a conflict of interest has flawed the integrity of any procurement process.

A firm shall be considered to have a conflict of interest in a procurement process if:

(a) such firm is providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of a project that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm.; or

(b) such firm submits more than one bid, either individually or as a joint venture partner in another bid, except for permitted alternative bids. This will result in the disqualification of all bids in which the Bidder is involved; or

(c) such firm (including its personnel) has a close business or family relationship with a professional staff of the Borrower (or of the project implementing agency, or of a recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the bidding documents or specifications of the contract, and/or the bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unless the conflict stemming from such relationship has been resolved acceptable to IFAD throughout the procurement process and execution of the contract; or

(d) such firm does not comply with any other conflict of interest situation as specified in the Bidding Documents relevant to the specific procurement process.

It is the duty of all project staff and any other public employee directly or indirectly involved with the procurement process and particularly the preparation of bid documents, bid evaluation, contract negotiations, contract management and payments to avoid any potential conflicts of interest. A conflict of interest arises when the individual has a direct or indirect relationship with a bidder, consultant, contractor, service provider or supplier.

In the event that a project staff or a member of the PC or an employee who is directly involved with the procurement process feels that there is the potential for a conflict of interest they shall declare it to the PC and remove themselves from the procurement process.

Standard of Business Ethics

All Borrower staff and consultants involved in procurement activities shall observe the Code of Business Ethics as outlined below.

No individual shall use his/her authority or office for personal gain. Personal gain includes accepting or requesting anything of material value from bidders, prospective bidders or suppliers for the individual, his or her spouse, parents, children or other close relatives, or for other persons from whom the individual might gain direct or indirect benefit of the gift.

An individual shall seek to maintain and enhance the reputation of the Government by:

(a) Maintaining the highest standards of honesty and integrity in all relationships both inside and outside the Entity in which he works;

(b) Developing the highest standards of professional competence; and

(c) Using funds and other resources for which he/she is responsible to provide the maximum benefit to the Government

Conflict of interest - An individual shall declare any personal interest that may affect or might reasonably be deemed by others to affect impartiality in any matter relevant to their duties.

Disclosure of personal relationships – an individual shall declare any relationship with a bidder, supplier, contractor, service provider or consultant and shall take no part in either the decision making process or the implementation of any contract where such a relationship exists. A personal relationship is defined as consanguinity or affinity up to the third civil degree.

Confidentiality and accuracy of information - An individual shall respect the confidentiality of information gained in the course of duty and shall not use such information for personal gain or for the unfair benefit of any bidder, supplier, contractor or consultant.

Information given by an individual in the course of their duty shall be true, fair and not designed to mislead.

Competition - All bidders, suppliers, contractors and consultants shall be treated with fairness and impartiality, and avoid any business arrangement that might prevent the effective operation of fair competition.

Business gifts - No business gifts will be accepted from current or potential Government suppliers unless such gifts are of very small intrinsic value (normally below USD 50 equivalent).

Hospitality - An individual shall avoid any business hospitality would be viewed by others as having an influence in making a government business decision as a result of accepting that hospitality.

Reporting - All individuals have a moral and ethical responsibility to report any unethical conduct by a colleague, a bidder or a supplier to their superiors, oversight agencies, IFAD or to the auditors.

Examples of Unethical Conduct - The following are examples of the type of conduct prohibited by this Code of Ethics:

(a) Revealing confidential or "inside information" either directly or indirectly to any bidder or prospective bidder;

(b) Discussing a procurement with any bidder or prospective bidder outside the official rules and procedures for conducting procurements;

(c) Favoring or discriminating against any bidder, prospective bidder or consultant in the Preparing of technical specifications, terms of reference or standards or the evaluation of bids and proposals;

(d) Destroying, damaging, hiding, removing, or improperly changing any formal procurement document;

(e) Accepting or requesting money, travel, meals, entertainment, gifts, favors, discounts or anything of material value from bidders or prospective bidders, suppliers, contractors or consultants;

(f) Discussing or accepting future employment with a bidder or prospective bidder, suppliers, contractors or consultants;

(g) Requesting any other person to violate the public procurement rules or procedures;

(h) Ignoring evidence that the Code of Ethics has been violated; and

(i) Ignoring illegal or unethical activity by bidders or prospective bidders, suppliers, contractors, service providers or consultants, including any offer of personal inducements or rewards or otherwise.

Debriefing

All bidders and consultants whose offers are unsuccessful have the right to request a de-briefing from the Project Manager, however no debriefing will be delivered until after the contract has been signed. The debriefing will be limited to the content of the bidder's bid or consultants' proposal and in no way will cover the content of any other firms offer or provide any information on the details of such other than information in the public domain such as minutes of opening and the Summary of Evaluation. The reasons for this are four-fold:

(a) It increases the levels of transparency in the procurement process,

(b) It will provide essential guidance (especially to local firms) on the relative strengths and weaknesses in their offers. Local firms will be able to take the opportunity to strengthen their bids and proposals in the future leading to a more competitive local market.

(c) The more equitable potential bidders and consultants feel the process to be, the more likely they are to submit bids or pursue shortlisting again increasing the overall levels of competition.

(d) It will provide a benchmark for unsuccessful bidders and/or consultants, i.e. they will become aware of the quality and pricing levels required to win contract awards.

The overall goal of this debriefing process is to improve competition both from international and national sources. The primary benefit of increasing both national and international competition as stated above is increasing the level and quality of competition.

When de-briefing bidders and consultants care should be taken to ensure that no commercial confidences are breached, i.e. it is acceptable to give an indication of where a bid or proposal was weak but not acceptable to disclose details of other bids and proposals received. Debriefing's should be requested in writing and may either be delivered in writing or in a meeting chaired by the Project Manager at the Project Manager's option. If a meeting is held it must be minuted and signed by both parties and a copy of the minutes of the meeting placed on the relevant contract file.

To facilitate the de-briefing process simultaneously to the notice of award or award of contract (services) being sent to the successful bidder or consultant, all un-successful bidders and consultants will be sent a in a Notice of an Awarded Contract, the following details:

- The name of each bidder or consultant submitting an offer
- Bid prices as read out at bid opening[15]
- When services the technical points score of each consultant
- The name and evaluated price of each bid or proposal and in the case of services the financial score
- The name of bidders or consultants whose bids or proposals were rejected and the grounds for the rejection
- Name of the winning bidder or consultant, the amount of the contact, the duration and final scope of the contract.
- Details of how to request a de-briefing from the Project.
- The following wording will also be contained in the covering letter

*"An unsuccessful bidder or consultant may request a de-briefing from [*insert name and address of the Project Manager]*. Who will either respond in writing within five working days or schedule a de-briefing meeting.*

In the event that the response from the Project Manager does not satisfy the unsuccessful bidder or consultant or there is no response within 14 calendar days the issue should be referred to Department of Agricultural Research & Education (DARE) with a copy sent to the IFAD Country Director, IFAD India Country Office, UN House, 55, Lodi Estate, New Delhi.

In addition to the above an unsuccessful bidder or consultant feels that is has valid grounds for a complaint regarding the procurement process, may lodge a complaint in accordance with the process outlined in the Bidding Document or Request for Proposals as the case may be.

[15] Except in Quality Based Selection of Services where only the highest ranked firm's financial proposal is opened.

Procurement Planning

It is a requirement of the IFAD Procurement Guidelines that at the outset of each project, the Borrower/recipient, in conjunction with IFAD, establishes a procurement plan covering the first 18-months of the project followed by 12 month successive plans synchronised with the Annual Work Plans and Budget during implementation.

Planning is a critical part of the procurement process to enable objectives and priorities to be set, workloads to be estimated and resources allocated. It enables the procuring entity to plan, organise, forecast and schedule its procurement activities and to identify potential areas for aggregation of needs. For IFAD, it provides a tool by which it can monitor project implementation.

As far as possible, procurement planning should be integrated with financial planning of a project so that budgets and procurement needs are synchronised as far as is practical.

As a minimum, each procurement plan must contain the following information:

A brief description of each procurement activity to be undertaken during the period or the plan;

The plan should be divided into goods, works and services and a brief description of each individual activity given. A 'brief description' is one which is sufficient to be clearly identifiable as an individual procurement activity but not so detailed that it becomes a specification.

The estimated value of each activity;

To ensure that the plan and budget are, as far as possible, harmonised, it is necessary to include the estimated expenditure for each procurement activity.

Estimated prices can be obtained from a number of sources, including but not limited to:

- previous similar purchases (these could be from a previous/existing project or recent projects in an adjoining country);
- published prices available from potential suppliers;
- any national price lists which exist;
- the internet.

The key is having a realistic budget based on informed data as the estimated value of a procurement activity may have a direct influence on the method of procurement to be adopted and the IFAD method of review for that activity.

It is the Borrower/recipient that is required to complete this information in the draft procurement plan.

The method of procurement to be adopted for each activity;

The plan should state the procurement method to be adopted for each separate procurement activity.

The method of review IFAD will undertake for each activity;

The plan must contain the agreed method of review which IFAD will adopt for each individual procurement activity. This will need to be determined by IFAD during its review of the plan.

Other data

In addition to the minimum information above it is considered good practice for a procurement plan to capture additional information such as:

- planned timing of the procurement activities[16] (or at least the commencement and completion dates);
- procurement by project component;
- dates for IFAD prior review;
- the responsible entity, in case different entities are carrying out project procurement (such as the Project Coordination Unit, District A, Implementing partners).

Whilst this is not compulsory data, this information aids the management of the project by making the procurement plan more of an active tracking and monitoring tool as opposed to just an initial list of procurement activities.

Updating a plan

As already stated above, the initial 18-month project procurement plan is required to be prepared at the outset of each project with successive 12 month procurement plans to follow during the course of implementation.

Once this initial plan receives a 'no objection' from IFAD the plan should form the basis of the procurement activity for the project.

It is important however that procurement plans are not static documents. They should be considered as 'live' documents and updated on a regular basis. Any major adjustments or amendments should be done promptly, but in any event plans should be reviewed and updated at least annually but ideally every six months. Any major adjustment or amendments would require IFAD no objection.

Procurement plan (samples)

Goods

Country/Organisation:
Project/Programme:

PROCUREMENT PLAN (GOODS)

Loan #:		BASIC DATA						Bid Documents		Bidding Period		Bid Evaluation		Contract Finalization		
Description*	Lot Number	Issue # of Invitation for Bids	Estimated Amount in US $	Procurement Method	Pre-or Post Qualification	Prior or Post Review	Plan vs. Actual	Date Proposed	Date No-objection	Bid Invitation Date	Bid Closing-Opening	Bid Evaluation Report	No-objection	Contract Amount in US $	Date Contract Award	Date Contract Signature
							Plan									
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							Actual									
							Plan									
							Actual									
Total Cost			0.00				Plan							0.00		
			0.00				Actual							0.00		

Fill gray cells only!

[16] When plans are updated or amended, it is good practice to retain the original planned dates as a point of reference.

Works

Country/Organisation:
Project/Programme:
Loan #:

Description*	Lot Number	Issue # of Invitation for Bids	Lumpsum or Bill of Quantities	Procurement Method	Estimated Amount in US $	Pre-or Post Qualification	Prior or Post Review	Plan vs. Actual	Date Proposed	Date No-objection	Bid Invitation Date	Bid Closing-Opening	Bid Evaluation Report	No-objection	Contract Amount in US $	Date Contract Award	Date Contract Signature
	Basic Data								Bid Documents		Bidding Period		Bid Evaluation		Contract Finalization		
								Plan									
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Total Cost					0.00			Plan							0.00		
					0.00			Actual							0.00		

Consultants

Country/Organisation:
Project/Programme:
Loan #:

Description*	Selection Method	Lumpsum or Time-Based	Estimated Amount in US $	Prior/Post Review	Plan vs. Actual	Date Published	Closing Date	Date Proposed	Date No-objection	Date Proposed	Date No-objection	Plan vs. Actual	Date Prepared	Date No-objection	Invitation Date	Submission/ Opening Date	Submission Evaluation Report (T)	No-objection Evaluation Report (T)	Opening Financial Proposals	Submission Eval Report (T) & (F)	No-objection Eval Report (T) & (F)	Plan vs. Actual	Contract Amount in US $	Contract Award	Contract Signature
						Request for Expression of Interest		Terms of Reference		Short List			Request for Proposal		Bid Proposals		Bid Evaluation Technical (T) & Financial (F)						Contract Finalization		
					Plan							Plan										Plan			
					Actual							Actual										Actual			
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Total Cost			0.00		Plan							Plan										Plan	0.00		
			0.00		Actual							Actual										Actual	0.00		

Procurement methods for Goods

Procurement of goods under SCATE will be done using any of the following methods:

i. National Competitive Bidding
ii. National Shopping
iii. Direct Contracting
iv. Force Account

International Competitive Bidding, though a valid procurement method, do not apply to SCATE due to availability of large number of suppliers within the country. In case agricultural machinery from other countries are identified for using in the country, these will be procured either as Government-to-Government mode or International Shopping.

Demonstration equipments or machineries will be sourced in the following ways:

1. SMAM fully funded machineries – The machineries will be selected from the SMAM portal. Any of the manufacturer listed may be selected so long

as the unit price and the specifications confirm to the SMAM certification. The concerned KVK will identify these and send the proposal through SPMU to SMAM. After the approval/concurrence, the KVK will place the request to the manufacturer and after the machineries are delivered, SMAM will either make direct payment or payment through ICAR/KVks to the manufacturers.

2. IFAD funded machineries - The machineries will be selected from the SMAM portal. Any of the manufacturer listed may be selected so long as the unit price and the specifications confirm to the SMAM certification. The concerned KVK will identify these and send the proposal through SPMU to PIU. After the approval/concurrence, the KVK will place the request to the manufacturer and after the machineries are delivered, PIU will make direct payment to the manufacturers.
3. Auxiliary machineries for demonstration – If these machineries are not in SMAM list, but are locally manufactured, these may be procured under Rate Contract system (refer below) in each of the State. Rate contract agreement will be signed by PIU.

Procurement of Office equipment

Procurement of office equipments both at PIU and each of the SPMU will follow the procedures of Government E-market Place system. Using GEM is considered as national shopping method. If GEM procedures are not used, the equipments will have to be aggregated on lot basis and competitively procured. Direct contracting will be restricted only to low value procurement of below Rs.100,000 in each instance.

Rate contract

Auxiliary machineries for demonstration, not listed in SMAM portal but required in local context, may be procured using Rate Contract. KVK will identify the requirement, specifications and availability of source of supply within the State and send the proposal to PIU through SPMU. PIU will evaluate the proposals and enter into a rate contract with the supplier. The rate contract will be initially valid for one year and could be extended with the consent of both the parties. Once the rate contract is signed, KVK can place the indent for the number of units and PIU will make the direct payment. Participating community organizations, during scale up phase, may also take advantage of the Rate contract available.

Civil Works

There are no civil works foreseen or proposed in the project. Minor renovations of offices, if at all required will be done using local shopping procedures.

Selection methods for Consultancy Services

Procurement of consultancy services under SCATE will be done by selecting any one of the following selection methods:

i. QCBS
ii. Quality based Selection (Normally this method is not advisable for Rural Development projects. Before selecting this particular method, IFAD's concurrence to be obtained)
iii. Fixed Budget Selection
iv. Least Cost Selection
v. Consultants' Qualification Selection
vi. Single Source Selection

vii. Selection of Individual Consultants

The Letter to the Borrower will provide the recommended threshold limits for the procurement methods and selection methods.

IFAD Prior review

IFAD will review arrangements for procurement of goods, works and services proposed by the project, to review that the procurement process is carried out in conformity with IFAD Procurement Guidelines and with the agreed Procurement Plan. The extent to which these review procedures will be applied will be contained in the Letter to the Borrower and the Procurement Plan. The prior review will involve the detailed review of the following:

i) Contract packaging
ii) Applicable procedures and procurement methods
iii) Bidding documentation
iv) Composition of bid evaluation committees
v) Bid evaluations and award recommendations; and
vi) Draft contracts and contract amendments

All procurement, which were not subject to prior review, will be reviewed during IFAD Implementation Support Missions/Supervision Missions for the compliance to the Guidelines and agreed procurement plan. Any procurement, which is not in compliance to the Procurement Guidelines and Procurement Plan, will not be eligible for IFAD financing.

IFAD Prior Review Portal – NOTUS

IFAD has introduced a new system to manage 'No Objections' for project procurement and non-procurement related activities requiring prior review. The system, known as NOTUS (No Objection Tracking Utility System), has been rolled out across IFAD-financed projects/programmes.

NOTUS is a user-friendly tool that will systematize the submission, monitoring, review, commenting, and archiving of documents sent by projects to IFAD for 'No Objection'. It will significantly mitigate risks (e.g. data loss) from use of different and often manual methods of document naming, versioning, submission and archiving, as well as streamline the no-objection process. Ultimately, NOTUS will ensure better organization and efficiency in these processes, and in turn help project implementing agencies and IFAD realize important productivity gains.

All actions, which require IFAD prior review, will only be uploaded in NOTUS portal by the project team. PIU, SCATE will nominate 3-4 staff members to IFAD for providing access to the portal. This access requires a two factor authentication. Only the staff members who have been granted access will be able to upload the documents/comments/replies. PIU, SCATE will inform IFAD about the changes in the nominations forthwith during implementation.

Contract Management

Good contract management is necessary for all contracts therefore the guidelines below applies equally to goods, works, consulting and non-consulting services. Effective contract administration is critical to successful contract implementation and meeting the objectives of the procurement requirement. Contract administration procedures are designed to ensure that:

i. the supplier performs the contract in accordance with the terms and conditions specified in the contract;

ii. the procuring entity fulfils its obligations and duties under the contract; and

iii. swift remedial or preventative action is taken when problems arise or are foreseen.

The procuring entity has the overall responsibility for contract management, but will draw on other resources, such as technical expertise, payment services, legal services and supply management systems, as required. Where such other services and systems are used, the procuring entity will remain responsible for monitoring their performance and ensuring that their activities, in relation to the contract, are completed on time and in accordance with procurement rules. Day-to-day contract management/administration will often be assigned to an end user or technical expert.

Contract management responsibility

The procuring entity will always retain overall responsibility for contract management but not necessarily the day-to-day functional activity which can often be undertaken from outside the procuring entity if deemed to be appropriate.

For example, the procuring entity will normally retain control of contract amendments, payments and dispute resolution, but may allocate day-to-day liaison with the supplier, contractor or consultant to the end user.

When considering the most appropriate person or team to manage/administer the contract the procuring entity should take into account:

a) whether supervision needs to be conducted by a person with appropriate technical skills, such as for construction contracts or the installation of complex plant and machinery. If so, contract administration is best allocated to the end user or an external consultant;

b) where contract administration is likely to be time-consuming or require skills not available within the procuring entity, an external contract administrator should be appointed, such as a project manager for a major construction contract;

c) where goods are to be delivered directly to the end user, contract administration is best allocated to either the end user or procurement staff;

d) where a consultant is required to work with the end user in conducting a study, providing advice or building capacity, contract administration is best allocated to the end user and particular counterpart staff may need to be designated to work with the consultant.

Where services are provided in support of the general management or administration of the procuring entity, contract administration is best allocated to the member of staff responsible for that function.

The nominated Contracts Manager or Contracts Management Team should:

a. carry out a review of the contract to assimilate the details of the requirements and the program for fulfilling them;

b. ensure that a signed copy of the contract is received from the supplier, contractor or consultant;

c. ensure that any required performance security or advance payment security is received from the supplier, contractor or consultant;

d. ensure that the procuring entity meets any immediate obligations, such as payment of an advance payment, opening of a letter of credit or assistance with obtaining visas for the supplier's foreign staff;

e. for larger contracts, prepare a contract implementation plan, showing key milestones, such as dates for mobilisation, deliveries or completion of certain deliverables or sections of work, and the procuring entity's obligations, such as providing access to a works site, payment or approval of reports.

The contract implementation plan is a key management tool to ensuring that the contract is performed as intended and within the obligations undertaken in the contract by both parties. It enables the Contract Manager to formulate an expediting plan for the contract to proactively ensure that deliverables are received on time.

Monitor implementation of contracts

The task of contract monitoring is to ensure that both parties to the contract perform in accordance with that contract and to take action as required to address any problems or delays, whether actual or anticipated.

For goods contracts, this goods focuses on ensuring that goods are delivered on time, that the goods are acceptable to the procuring entity, in terms of quantity, quality and supporting documentation, and that the procuring entity meets its obligations to pay for the goods delivered.

Contracts administration for works is often complex and time-consuming, as it involves supervision of the progress of the works, ordering variations where unforeseen conditions are encountered and measuring the work completed for payment purposes. For major contracts, the procuring entity will normally use a full-time supervising engineer or project manager, who will exercise control and supervision of the contact on behalf of the procuring entity.

When managing services contracts, the focus is on ensuring that services are delivered on time and to an acceptable quality. This can be difficult, as the quality of services, particularly consultancy services, can be subjective and difficult to measure. A good working relationship with the consultant and ongoing monitoring of services is therefore important, to ensure successful contract performance. The procuring entity must also ensure that it meets its obligations, particularly where the performance of consultancy services is dependent on certain inputs or information from the procuring entity or where staff must be made available to benefit from capacity building initiatives.

Documents/Records Required:

All correspondence and documentation relating to contract administration must be kept on the procurement file. In particular, records are required of:

i. all invoices and other payment documents;

ii. all documentation relating to contract performance, such as delivery notes, progress reports and other deliverables;

iii. all contract variations;

iv. all contract amendments;

v. all documents relating to claims under the contract, including warranty claims;

vi. all documents relating to contract disputes and dispute resolution.

Procurement Manual

PIU, SCATE will develop a detailed Procurement Manual, which will contain the processes, procedures and standard document templates for the use of the project team. Procurement Manual, will be prior reviewed by IFAD.

Appendix

Appendix1 – Sequence of acticities and phasing

S. No.	Activity	2019-20			2020-21				2021-22				2022-23				2023-24				2024-25				2025-26				Project Closing	
	Preparatory Activities																													
1	**i Central level**																													
	Establishment of PIU																													
	Seek funding from ICAR/DARE for project start-up activities																													
	Issuance of notification regarding PD and APD																													
	Issuance of notification regarding coordination committees																													
	Sign participation agreements with SDAs																													
	Sign tripratite ageeements with SDAs and SRLMs/PAs																													
	Staff enaggement for PIU																													
	Prepare a KVK-wise list of AE machinery with quantity required																													
	Proposal to SMAM to procure machinery for demonstrations																													
	Prepare 2020-21 AWPB and submit to DARE and IFAD for approval																													
	ii State level																													
	Establishment of SPMU																													
	Issuance of notification regarding SPD																													
	Establish state level and district level coordination commitees																													
	Staff engagement for SPMU																													
	Conduct mapping of SRLMs/PAs and their SHGs/VOs/CIs and KVKs																													
2	**Participatory Technology Development**																													
	i Assessment and database development																													
	Engagement of a team of consultants																													
	Conduct field level assessments																													
	Conduct district level consultation																													
	Conduct state level consultation																													
	Conduct national level consultation																													
	Preparation of a directory																													
	Publishing the directory																													
	Engagement of an agency to develop a database																													
	Hosting the database																													
	Inventory updating																													
	ii National Technology Forum																													
	Establishment of a National Technology Forum																													
	Conducting National Technology Forum meetings annually																													
	iii Best AE machinery development award																													
	Developing procedures for providing best AE development award																													
	Calling for nominations for best AE machinery development award																													
	Establishing an evaluation committee for evaluating nominations																													
	Selection of best AE machinery development																													
	Giving awards at the National Technology Forum meetings																													
	iv Fellowships																													
	Calling for applications for fellowships in AE research																													
	Select best research synopsis for providing fellowships																													
	Provide fellowships																													

S. No.	Activity			2019-20			2020-21				2021-22				2022-23				2023-24				2024-25				2025-26				Project Closing	
3	i		**ICAR Capacity building**																													
			Engagement of agencies for providing technical assistance																													
			Preparation of techno-economic assessment protocols																													
			Training of staff in techno-economic assessments																													
			Preparation of technology manuals																													
			Preparation of POPs for major crops in the project area																													
			Training of KVK and SDA staff in the use of technology manuals																													
	ii		**Agri-Expos**																													
			Selection expos for participation																													
			Selection of staff for domestic and international agri-expos																													
			Organize participation in expos																													
	iii		**AE Machinery Import**																													
			Seek proposals from to import AEMs																													
			Evaluate and prioritize the requested AEMs																													
			Procure the prioritized machinery and equipment																													
			Display of machinery during the technology challenges.																													
	iv		**Technical support**																													
			Identify technical assistance needs of ICAR and its agencies.																													
			Prepare terms of reference for the technical assistance																													
			Identify and engage consultants required for technical assistance																													
	v		**Certification support**																													
			Meetings with AMMA to support small manufacturers																													
			Seek proposals from the manufacturers for support																													
			Evaluate the proposals and provide support																													
	vi		**Technology Export**																													
			Identify agencies involved in export of technology																													
			Seek proposals from interested agencies for export of technology																													
			Evaluate the proposals and provide project support.																													
	vii		**Concept to prototype**																													
			Constitute a committee for evaluation of concepts																													
			Call for concept notes from all agencies and individual innovators																													
			Evaluate and select the best proposals																													
			Sign MoUs with selected agencies/ individual innovators																													
	viii		**Adaptation/Modifications to existing technology**																													
			Constitute a committee for evaluation of proposals																													
			Call for proposals from all agencies and individual innovators																													
			Evaluate and select the best proposals																													
			Sign MoUs with selected agencies/individual innovators																													
	ix		**Prototypes to commercial development**																													
			Constitute a committee for selection of prototypes																													
			Organize central level technology challenges																													
			Organize state level technology challenges																													
			Evaluate and select the best technologies for commercialization																													
			Sign MoUs with selected agencies and individual innovators																													
	x		**Mid Term Assessment**																													
			Select an agency to conduct third party assessment																													
			Undertake third party assessment																													

S. No.	Activity	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	Project Closing
4	**Business models for scaling up of appropriate AE technologies**								
	i SRLM/PA engagement								
	Identification of partner agencies (SRLMs, Watershed Missions, etc.)								
	Conduct a state level meeting with partner agencies								
	Sign a tripartite agreement (SPMU, KVK and SRLM/PA)								
	ii Demonstration equipment								
	Obtain SMAM funds and KVKs to procure demonstartion machinery								
	Call quotations from auxiliary equipment (non-SMAM) manufacturers								
	Evaluate the proposals and sign a state specific rate contract								
	Place an order for these auxiliary equipment								
	Create 3-4 hubs with VOs/CIs in each district								
	iii Staff engagement								
	Provide ToRs and advice KVKs to advertise for positions								
	Selection of staff								
	Training of staff in the use of technology manuals and POPs								
	iv Lead Farmer Training and Field Days								
	Identify Lead Farmers								
	Training of Lead Farmers								
	Sign a tripartite agreement between Lead Farmer, VO/CI and KVKs								
	Conduct of field days								
	Release of funds for conducting field days								
	Submission of SOE for field days								
	Third party verification of field days								
	v Training and Exposure Visit								
	Select training institutions and locations for exposure visits								
	Select beneficiaries and train them in selected institutions								
	vi Support for local manufacture								
	Identification of local manufacturers interested in manufacturing								
	Seeking proposals to local manufacture of tools and implements								
	Approving and providing support to local manufacturers								
	vii Support for after sales service development								
	Identifying and providing support to State Agro-Industries								
	Support existing AEM and inputs supply centres for servicing AEMs								
	Identifying youth for training in AE machinery servicing								
	Training and providing support for establishment of service centres								
	viii Scaling up support								
	Identify SHGs/VOs/FPOs/CIs for establishing FMUs and ATBs								
	Identify SHGs/VOs/FPOs/CIs interested in establishing CFCs								
	Identify existing CHCs that require additional support								
	Identify individuals for purchasing AE machinery(excl prime movers)								
	Conduct block and district level finance facilitation platforms								
	Provide support for establishment of FMUs/ATBs/CFCs								
	Support procurement of AEM by existing CHCs and individuals								
	Supervise for establishment of FMUs/ATBs/CFCs								
	Supervise procurement AEMs by existing CHCs and individuals								

S. No.	Activity	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	Project Closing
	ix User expansion support								
	Identify VOs/CIs in the vicinity of FMUs/ATBs/CFCs								
	Sign a MOU with the VOs/CIs on the use of user expansion support								
	Provide user expansion support								
	Supervise utilization of user expansion support								
	Conduct a performance asessment								
5	**Knowledge Generation and Dissemination**								
	Conducting studies to generate knowledge								
	Preparation of success stories								
	Knowledge sharing through social media								
6	**Planning, MIS and M&E**								
	Engagement of an agency for MIS development								
	Development of MIS software								
	Baseline survey								
	AWPB and Procurement Plan submission								
	Annual outcome survey								
	Submisssion of ORMS								
	Midterm review								
	Endline survey								
	Project Completion Report								

Appendix 2 –List of technologies and number of equipment suggested

Amount allocated under the project to each KVK: Rs 15 lakhs – mostly for equipment other than prime movers.

Amount allocated under SMAM funding to each KVK: Rs 15 lakhs – mostly for prime movers.

Production Technology	Assam	Chhattisgarh	Jharkhand	Nagaland	Odisha
Self Propelled Rotary Weeder	18	15	18	24	18
Wheel and Hoe	24	20	24	32	24
Women Friendly Cono weeder for Rice	30	25	30	40	30
Vegetable Transplanter	12	0	12	16	18
Solar tripple nozzle Knapsack sprayer	30	25	30	40	30
Paddy Transplantor*	18	15	18	16	18
Solar Pump	12	10	12	16	12
Mulch Spreading Machine	12	10	12	16	12
Seed cum fertilizer drill	18	15	18	16	18
Madwa weeder	0	15	12	0	18
GraIn storage bags	30	25	30	40	30
Direct Rice Seeders	30	25	30	40	30
Pulese & Oil seed row seeders	18	20	24	8	24
Two row chisel plough	0	0	24	32	24
Dutch Hoe Grubber	0	0	24	32	24
Micro (Drip Irrigation)	0	0	6	8	6
Harvest Technology	**Assam**	**Chhattisgarh**	**Jharkhand**	**Nagaland**	**Odisha**
Vegatable Digger (Onion & Potato)	6	12	18	16	18
Paddy Thresher (Pedalled & Motorized)*	24	20	24	16	24
Maize Threhser	0	15	18	0	18
Motorized Reaper*	24	20	24	24	24

Processing Technology	Assam	Chhattisgarh	Jharkhand	Nagaland	Odisha
Groundnut Decorticator	0	0	0	0	18
Tamarind Briquetting Machine	0	15	18	0	18
Manual Mahua seed decorticator	0	15	18	0	18
Honey heating cum filtration system	12	10	12	0	12
CIAE Millet flaking machine	0	15	0	0	18
Portable briquetting machine	12	10	12	0	12
Tamarind de-huller	0	5	0	0	6

cum de-seeder					
Minor Millet Processing	**0**	**15**	**0**	**0**	**18**
NTFP (Mahua Oil Extraction Machine)	**0**	**10**	**0**	**0**	**12**
Low cost onion storage structure	**0**	**0**	**0**	**0**	**12**
Tapioca Chopper	**0**	**0**	**0**	**24**	**0**
Mini Hatchery	**6**	**0**	**0**	**16**	**0**
Small rice mill with rubber boots	**18**	**15**	**18**	**16**	**18**
Dal Mills	**18**	**15**	**18**	**0**	**18**
Oil expeller	**18**	**15**	**15**	**0**	**18**
Prime Movers*	**30**	**25**	**30**	**24**	**30**
Combined Harvestors*	**18**	**15**	**18**	**24**	**30**

***To be co-funded by SMAM**

Appendix 3 - Guidelines for establishment of Farm Mechanization Units (FMUs), Existing Custom Hire Centres (CHCs) Common Facility Centres (CFCs), Renewable energy CFCs and Agriculture Tool Banks (ATBs)

1. General

This guideline covers the essential contours, while each state will be required to develop their own guideline with state specificity. However the contribution of the project towards this activity will remain constant and states will be able to make changes in the requirement of convergence, banks and beneficiaries share of financing. States will be able to use the SMAM funds or its own funds as part of convergence funding.

2. Eligible activities, financing limits and financing

Type of investment	Maximum Financing limits (Rs)	Technology Incentive structure		
		SCATE	Convergence – including SMAM	Bank loan and Beneficiary contribution
Farm Mechanization Units/CHCs prime mover	900,000	40%	40%	20%
Auxillary AET machines	500,000	60%		40%
Common Facility Centres	500,000	50%	30%	20%
Common Facility Centres – AE based	1,000,000	80%		20%
Existing CHCs	400,000	40%		60%
Agriculture Tool Banks	200,000	80%		20%

The rationale for the project to support the prime movers is the following : currently the prime movers under SMAM scheme are taken up by individuals. With the project partly subsidising the prime movers (at 40%) , this would signal to the State to start prioritizing Community Institutions for the acquisition of prime movers.

3. Eligibility criteria

- **Community Institutions such as SHGs, Village Organisations, Federations, FPOs, WSMs, Jhum Resource Management Committees will be eligible.**
- **Functional for at least two years.**
- **A/B graded, (grading as per NABARD/ SFAC norms for FPOs and as per SRLM norms for SHGs/VOs/federations).**
- **Proven track record of agriculture/horticulture initiatives undertaken for at least 6 months.**
- **Availability of trained persons to manage the FMUs/CHCs/CFCs proposed.**
- **Well functional governing body.**

- **Active and stable membership, 75% of the members have paid their membership fees.**
- **Express demand from members for these services.**
- **Proper accounting/ book keeping system.**
- **Good track record of managing community investment fund or such other facilities provided by the partner institution such as SRLM, WSMs, SDA, etc.**
- **Ability to contribute their share of finance from own resources/ bank loans.**
- **Place for storage and safe keeping of equipment.**
- **For availing facility under support to existing CHCs, the CHCs should have been operational for two years with good arrangements for storing, renting and management.**

4. Area of Operation & Composition of FMU, CFC and ATB

- **Villages having low farm power availability and large area under small and marginal holdings will be targeted.**
- **Each FMU will have crop specific machinery suitable for local requirement for mechanized farming under small and marginal holdings. This will cover machineries for land preparation, transplanting, harvesting and threshing.**
- **Each existing CHC will have additional machinery (excluding prime movers) required for improving mechanization in their command area.**
- **Each CFC will have processing equipment suitable for the local requirement. The machinery and implements will be broadly relating to; (i) Primary processing with minimal processing /value addition to make the produce more marketable, which includes washing, sorting, cleaning, grading, waxing, ripening, packaging, labelling, etc.; (ii) Processing of produce including NTFPs such as de-podding, de-cortication, de- husking, de-sheller, Grain cleaner, specific gravity separator, mini rice huller, drying equipment, Mini Oil expellers, dal mills, rice mills etc.; and (iii) Other post-harvest processing machinery/equipment that are locally relevant.**
- **Each ATB will have sets of small machinery, equipment and implements, which include irrigation pumps, weeders, ploughs, etc.**
- **Each FMU and CFC will have the capacity to cover about 2-3 villages. CFCs with smaller investment will cover one village.**
- **Existing CHC will operate in their existing command area.**
- **Each ATB will cover a village.**

5. Application Form

- **SPMU through project partners will identify/invite applications from community institutions to set up FMUs, CFCs and ATBs and to support existing CHCs.**
- **Filled in and complete applications will be submitted by the partner institutions to SPMU. A business plan will be submitted along with application form. The management of FMUs/CFCs/ATBs/existing CHCs will also be specified in the application form.**

6. **Identification of machinery, equipment and implements**

- **SMAM guidelines will be largely followed.**
- **A list of AE machinery, equipment and implements will be approved by SPMU in line with SMAM guidelines and also in consultation with KVKs will be used for selection by the VOs/CIs.**
- **Community institutions will select such machines and implements appropriate for the crops grown in the identified districts.**
- **Preference to machinery that facilitate climate change adaptation such as: conservation agriculture and renewable energy.**

7. **Procurement and after sale services of Machinery**

- **Procurement would be from the approved suppliers/manufacturers approved by the SPMU.**
- **SPMU while approving the list should take into account the after sales service availability and also on the quality of the AE machinery, equipment and tools based on the experience of SDA and KVKs.**
- **VOs/CIs will be facilitated to enter into MOU with the manufacturer for after sales services of the machinery wherever feasible.**

8. **Project technology incentive support**

- **The eligibility of technology incentives from the project, convergence, bank loan and beneficiary contribution is provided above.**
- **Convergence can be from SMAM and funds from other government schemes.**
- **Beneficiary contribution will be from both bank loans and own contribution.**

9. **Technology incentive approval process and release process**

- **The partner agency will collect the applications from the interested VOs/CIs, consolidate the same and submit it to SPMU.**
- **SPMU to place it before the appropriate sanctioning authority and intimate the partner agency with the amount of beneficiary contribution to be deposited and details of bank account into which this amount will have to be deposited.**
- **Partner agency to ensure that the VOs/CIs selected for provision of technology incentives deposit the beneficiary contribution into the designated bank account.**
- **SPMU will then issue release orders to the manufacturers who will deliver the machinery and equipment and also arrange for necessary initial trial runs and trainings.**
- **VOs/CIs will then provide proof of delivery and certify to the partner agency and also certify the working condition of machines and equipment.**
- **SPMU will directly release amount to the manufacturers including VO/CI contribution, project and convergence funding**
- **SPMU can set up a system wherein manufacturers can receive an advance and the final payment will be made within a month of delivery of AE machinery/ equipment.**

10. **Monitoring and reporting systems**

- **FMUs, CFCs and ATBs established under the project will be periodically supervised by the partner agency to ensure operational sustainability. In addition, the DAO will also conduct verification visits.**
- **FMUs, CFCs and ATBs CHCs will maintain books of accounts to track the usage of machinery and also the financials.**
- **The partner institutions will report periodically on the usage of machinery and equipment to SPMUs as per devised formats.**
- **M&E officer at SPMU will consolidate and place before policy makers and report to SPMU. A combination of periodic desk review, field visits and web-based mechanism will be adopted for releasing funds, monitoring physical and financial progress.**

11. Leasing the CI equipment to private entreperneurs

- **The CI may well opt to lease the operation of the FMU/CFC/ATB to a private entrepreneur and charge him/her rent for the lease. In exchange, the private entrepreneur will be fully responsible for the operation and maintenance of the machinery and for providing the CI with the required monitoring data.**

Appendix 4 - Guidelines for acquisition of individual machinery

1. General

This guideline covers the essential contours, while each state will be required to develop their own guideline with state specificity. However the contribution of the project towards this activity will remain constant and states will be able to make changes in the requirement of convergence, banks and beneficiaries share of financing. States will be able to use the SMAM funds or its own funds as a part of convergence funding.

2. Eligible activities, financing limits and financing

Type of investment	Maximum Financing limit (Rs)	Technology Incentive structure		
		SCATE	Convergence – including SMAM	Bank loan and Beneficiary contribution
Individual machinery	100,000	50%		50%

3. Eligibility criteria

- **Any household from the project village interested in procuring Agriculture machinery, equipment and implement.**
- **The household interested should be recommended by the VO/CI of the village.**
- **The household should be able to meet the eligibility criteria of the bank loan and beneficiary contribution requirements.**

4. Application Form

- **SPMU through project partners identify/invite applications from individual farmers to acquire AE machinery, equipment and implements.**
- **Filled in and completed applications will be submitted by the partner institutions to SPMU.**

6. Identification of machinery, equipment and implements

- **SMAM guidelines will be largely followed.**
- **A list of AE machinery, equipment and implements approved by SPMU in line with SMAM guidelines and also in consultation with KVKs will be used for selection by the farmers.**
- **Farmers will select such machines and implements appropriate for the crops grown in the identified districts.**
- **Preference to machinery that facilitate climate change adaptation such as: conservation agriculture and renewable energy.**

7. Procurement and after sale services of Machinery

- **Procurement would be from the approved suppliers/manufacturers approved by the SPMU.**
- **SPMU while approving the list should take into account the after sales service availability and also on the quality of the AE machinery, equipment and implements based on the experience of SDA and KVKs.**
- **Farmers will be facilitated to enter into MOU with the manufacturer for after sales services of the machinery wherever feasible.**

8. Project technology incentive support

- **The eligibility of technology incentives from the project, convergence, bank loan and beneficiary contribution is provided in above paragraph.**
- **Convergence can be from SMAM and funds from other government schemes.**
- **Beneficiary contribution will be from both bank loans and own contribution.**

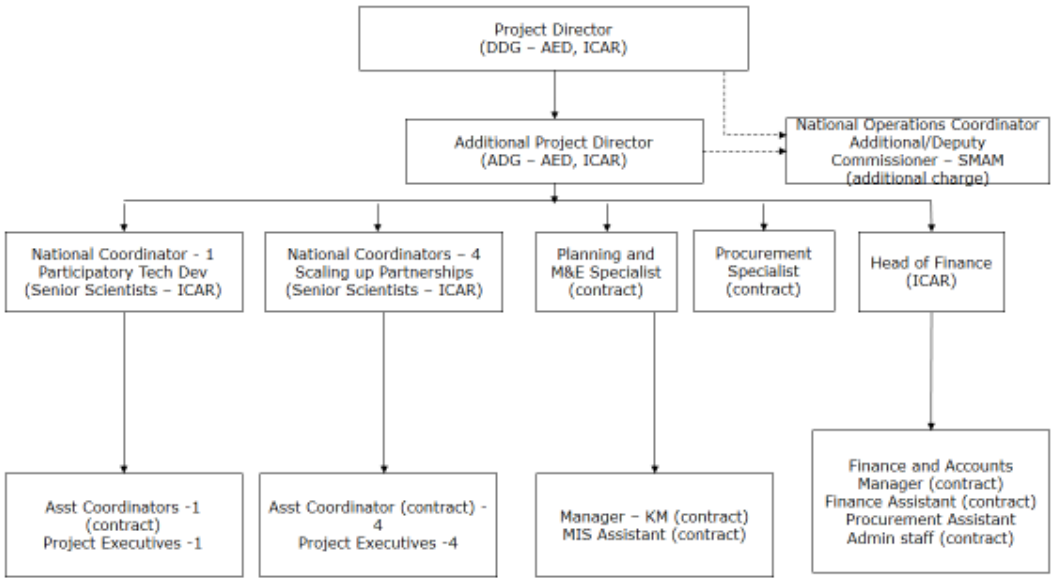
9. Technology incentive approval process and release process

- **The partner agency will collect the applications from the interested farmers, consolidate the same and submit it to SPMU.**
- **SPMU to place it before the appropriate sanctioning authority and intimate the partner agency with the amount of beneficiary contribution to be deposited and details of bank account into which this amount will have to be deposited.**
- **Partner agency to ensure that the farmers selected for provision of technology incentives deposit the beneficiary contribution into the designated bank account.**
- **SPMU will then issue release orders to the manufacturers who will deliver the machinery and equipment and also arrange for necessary initial trial runs and trainings.**
- **Farmers will then provide proof of delivery and certify to the partner agency and also certify the working condition of machines and equipment.**
- **SPMU will directly release amount to the manufacturers including beneficiary contribution, project and convergence funding.**
- **SPMU can set up a system wherein manufacturers can receive an advance and the final payment will be made within a month of delivery of AE machinery/ equipment.**

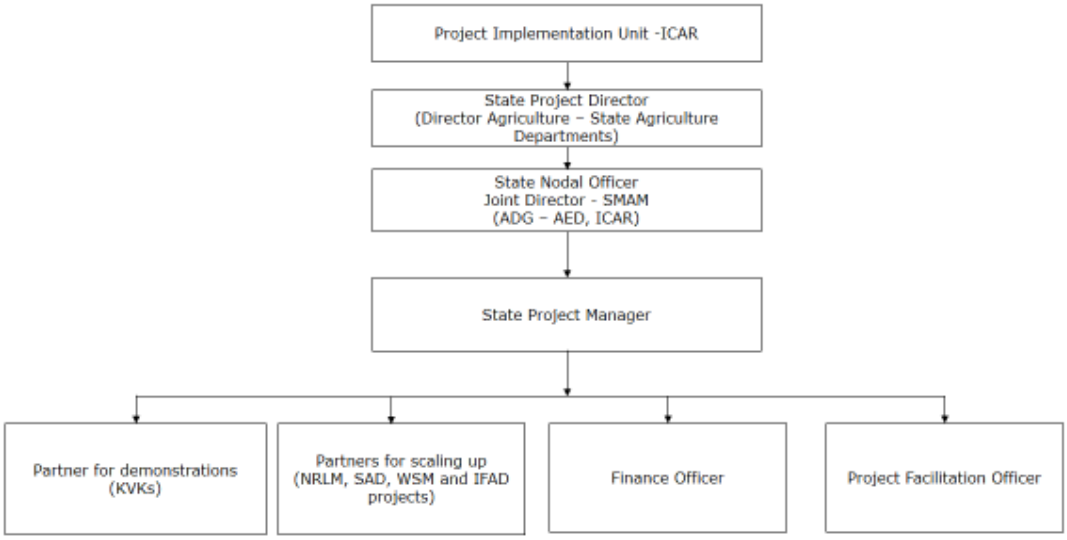
10. Monitoring and reporting systems

- **The partner agencies will be periodically supervised to ensure operational sustainability. In addition, the DAO will also conduct verification visits.**
- **The partner institutions will report periodically on the usage of machinery and equipment to SPMUs as per devised formats.**
- **M&E officer at SPMU will consolidate and place before policy makers and report to SPMU. A combination of periodic desk review, field visits and web-based mechanism will be adopted for releasing funds, monitoring physical and financial progress.**

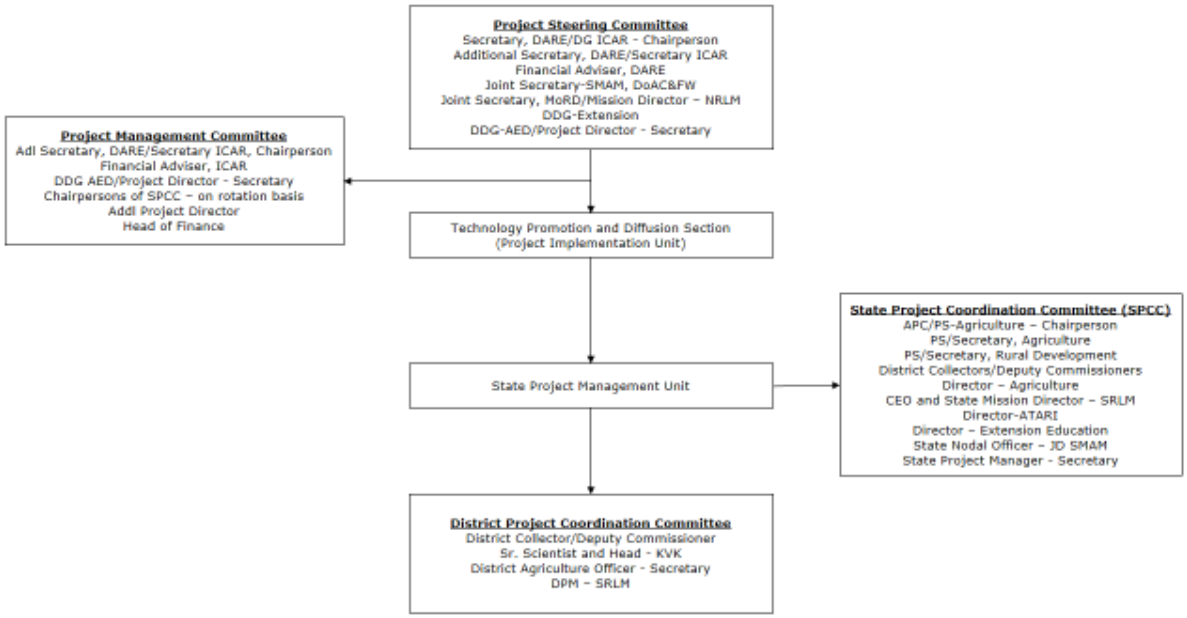
Appendix 5 Project Organogram
Appendix 5.1 - Central level



Appendix 5.2 - State level



Appendix 5.3 - Project Coordination structure



Appendix 6 - Terms of Reference

1. Project Director (PD)

Functions of the Project Director

The Deputy Director General-AED shall be the PD. Functions of PD include:

- **Implementing all the policies laid down by the PSC and PMC.**
- **Ensuring compliance to statutory requirements imposed on the functioning of the PIU.**
- **Ensuring that all project activities are being implemented in a timely manner.**
- **Exercising powers related to the financial approvals, procurement and staff engagement as approved by the PSC.**
- **Maintaining close coordination with DARE, IFAD and the state level partners.**
- **Ensuring compliance to the terms and conditions set out in the programme financing agreement.**
- **Functioning as the member secretary of the PSC and PMC**
- **Performing such functions as may be delegated to him by the Chairman of the Project Steering Committee from time to time.**

2. Additional Project Director (APD)

An Assistant Director General level office will be nominated as the APD on a full time basis. The function of APD include:

- **Undertaking day-to-day management of the Project Implementation Unit (PIU).**
- **Planning and executing project activities.**
- **Supervising AWPB preparation at the PIU level and also coordination with SPMUs for submission of the state level AWPBs.**
- **Supervising all project activities and ensuring that all project activities are being implemented in a timely manner.**
- **Ensuring that the project poverty targeting, gender mainstreaming and youth inclusion strategies are effectively implemented and monitored, and appropriate corrective actions taken.**
- **Exercising powers related to the financial approvals, procurement and staff engagement as approved by the Project Director.**
- **Undertaking regular staff meeting to review the progress and to mitigate implementation challenges.**
- **Maintaining close coordination with DARE, IFAD and the state level partners.**
- **Undertaking regular review of the compliance to the terms and conditions set out in the programme financing agreement.**
- **Performing such functions as may be delegated to him by the Project Director.**

3. National Coordinator-Participatory Technology Development

A Principal Scientist level officer will be nominated as the National Coordinator – Participatory Technology Development (NC-PTD) on a full time basis. The functions of NC-PDT include:

- **Anchoring all activities related to the component 1- Participatory technology development (PTD).**
- **Undertaking preparation of AWPB and providing administrative approvals for fund release.**
- **Supporting the Asst Coordinator in preparing implementation plans and setting timelines for completion of activities and allocating tasks to the Asst Coordinator and other junior staff.**
- **Conducting internal reviews of the implementation and seeking advice from PD/APD to address bottlenecks.**
- **Engage team of consultants to conduct need assessment study and supervise the study.**
- **Monitoring the progress in implementation of activities by the innovators funded under innovation framework.**
- **Coordinating with CGIAR institutions for the development of protocols, manuals and package of practices and also training of KVK and other ICAR staff.**
- **Ensuring that poverty targeting, gender mainstreaming and youth inclusion are mainstreamed in the participatory technology development and that these are monitored and appropriate corrective actions taken.**
- **Developing progress reports related to progress of implementation in respect of PTD activities.**
- **Any other task assigned by the APD/PD**

4. National Coordinator- Scaling up partnerships – Four positions

Four Principal Scientist level officers will be nominated as the National Coordinators – Scaling up partnerships (NC-BST) on a full time basis. State-wise work allocation will be made. NC-SP handling Assam will also be responsible for Nagaland. The functions of NC-SP include:

- **Anchoring all activities related to the component 2- Business models for scaling up AE technologies (BST).**
- **Undertaking preparation of AWPB and providing administrative approvals for fund release.**
- **Making implementation plans and setting timelines for completion of activities and allocating tasks to the Asst Coordinator and other junior staff.**
- **Implementing and monitoring the strategy for poverty targeting, gender mainstreaming and youth participation and taking appropriate corrective action.**
- **Conducting internal reviews of the implementation and seeking advice from PD/APD to address bottlenecks.**
- **Monitoring the progress in implementation of demonstrations with KVKs and scaling up with SPMUs and partner agencies.**
- **Developing progress reports related to progress of implementation in respect of PTD activities.**
- **Any other task assigned by the APD/PD**

5. Head of Finance

An Officer from the Finance Division of ICAR will be nominated as the Head of Finance (HoF) for this project. The functions of HoF include:

- **Budgeting and accounting of the project**
- **Expediting the release of funds for timely implementation of different activities by the PMU**
- **Consolidating accounts of the PMU**
- **Monitoring fund utilization at the PMU**
- **Maintaining records of all financial matters related to the project.**
- **Preparing periodical financial statements and submission of half yearly and annual financial statements to IFAD**
- **Preparing requests for release of funds from the ICAR as well as the Central Government and preparation and submission of withdrawal requests to IFAD**
- **Reviewing, supervising and inspecting the finance section of SAUs, KVKs & DPIT and provide the required guidance to them.**
- **Ensuring that the expenditure is within approved budgets and seek amendments to the AWPB and prepare supplementary budgets, if needed.**
- **Ensuring internal and statutory audit and preparation of statements for the purpose.**
- **Ensuring timely settlement of advances.**
- **Ensuring procurement guidelines of IFAD are being followed.**
- **Keeping proper record of procurements made, fixed assets and carrying out periodical physical verification of the assets**
- **Ensuring compliance with legal and statutory requirements such as filing of TDS and income tax returns and filing of annual audited accounts, etc.**
- **Any other task assigned by the APD/PD**

6. Asst Coordinator – Participatory Technology Development

Qualification:

Basic degree in Agriculture/ Agriculture Engineering and post Graduate degree in Agriculture / Agriculture Engineering/Business Management in Agribusiness.

Experience:

He/She would have at least 10 years experience in agriculture engineering technology promotion and agri business development. Prior experience of working with bilateral and multilateral institution funded projects would be an advantage.

Location of Job: PIU, New Delhi.

Reporting Line: National Coordinator-PTD

Job Description:

- **Support the NC-PTD to implement all activities related to the component 1- Participatory technology development (PTD).**
- **Supporting NC-PTD in undertaking preparation of AWPB and providing administrative approvals for fund release.**
- **Making implementation plans and setting timelines for completion of activities and allocating tasks to other junior staff.**
- **Assisting the NC-PDT in conducting internal reviews of the implementation and seeking advice from PD/APD to address bottlenecks.**
- **Implement and monitor the strategy for poverty targeting, gender mainstreaming and youth participation in the participatory development of technologies and take corrective actions as appropriate.**
- **Monitoring the progress in implementation of innovators funded under innovation framework.**
- **Coordinating with CGIAR institutions for the development of protocols, manuals and package of practices and also training of KVK and other ICAR staff.**
- **Developing progress reports related to progress of implementation in respect of PTD activities.**
- **Any other task assigned by the NC-PDT**

7. Asst Coordinators – Scaling up Partnerships – 4 positions

Qualification:

Basic degree in Agriculture/ Agriculture Engineering and post Graduate degree in Agriculture / Agriculture Engineering/Business Management in Agribusiness.

Experience:

He/She would have at least 10 years experience in livelihoods promotion/agriculture engineering technology promotion and agri business development. Prior experience of working with SRLMs, bilateral and multilateral institution funded projects would be an advantage.

Location of Job: PIU, New Delhi.

Reporting Line: National Coordinator-BST

Job Description:

- **Support the NC-BST to implement all activities related to the component 2- Business models for scaling up AE technologies (BST).**
- **Supporting NC-BST in undertaking preparation of AWPB and providing administrative approvals for fund release.**
- **Making implementation plans and setting timelines for completion of activities and allocating tasks to other junior staff.**

- **Assisting the NC-BST in conducting internal reviews of the implementation and seeking advice from PD/APD to address bottlenecks.**
- **Implement and monitor the strategy for poverty targeting, gender mainstreaming and youth participation and take corrective action as appropriate.**
- **Monitoring the progress in implementation of demonstrations with KVKs and scaling up with SPMUs and partner agencies such as SRLM, WSMs and IFAD funded projects.**
- **Developing progress reports related to progress of implementation in respect of BST activities.**
- **Any other task assigned by the NC-BST**

8. Finance and Accounts Manager

Qualification:

- **Post-graduate Degree in Commerce/ Member of the ICAI (Chartered Accountant)**

Experience:

- **Minimum 8 years of experience in financial accounting of project/ company for candidates with post-graduation in commerce and minimum 3 years experience for Chartered Accountants.**
- **Computer literacy and proficiency in Tally and use of spread sheets**
- **Good knowledge of accounting**
- **Working knowledge of audit requirements for financial compliances.**

Location of Job: PIU, New Delhi

Reporting Line: Head of Finance

Job Description:

- **Maintaining the project accounts of the PIU**
- **Preparing Bank Reconciliation Statements of the PIU every month**
- **Preparing monthly progress report every month with the actual and budgeted figures for each activity and the variance thereof**
- **Facilitating timely disbursal of project funds to Implementation partners, TSA and State Units**
- **Following up with the Implementation partners, TSA and State Implementation Teams to ensure that they submit their monthly statements within the stipulated time.**
- **Assisting the Head of Finance in preparation of the financial statements and the withdrawal application.**
- **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.**
- **Providing support and assisting the Head of Finance in all other duties as may be assigned by the Head of Finance or the Project Director.**

9. Planning and M&E Specialist

Qualification:

- **Postgraduate degree in Statistics/Economics.**

Experience:

- **About 8-10 years of experience in rural development projects specifically in developing M&E frameworks, training module development, data analysis and report preparation, experience in establishing systems for preparation of AWPB, experience in undertaking research/studies related to impact assessment to evaluate project performance. Prior experience of working in and/or familiarity with development issues in eastern India and the North East will be an advantage.**

Location of Job: PIU – New Delhi

Reporting Line: Additional Project Director (APD)

Job Description:

- **Assist the APD in framing guidelines for project planning exercise and guide state Planning and M & E Coordinator in development of state specific plans.**
- **Develop the layout for project planning and identify resources to assist the State Planning and M & E Coordinator and his subordinates for development of demonstration and upscaling plans.**
- **Integrate in the planning and M&E systems , indicators related to tracking outreach and participation of the rural poor, women/ men and youth, and indicators that allow to assess empowerment of the beneficiaries namely women and youth.**
- **Develop outcome indicators for village, block, district and state to contribute to guidelines for training of staff members.**
- **Identify relevant resources from government, financial institutions, civil society institutions and build an interface for the project staff to help them in programme delivery.**
- **Guide the State Planning and M & E Coordinator in setting up procedures for day-to-day operations and train the project staff in delivery of responsibilities.**
- **Develop timeframe for delivery of key assignments by the State, district and block project staff.**
- **Make periodic assessment of implementation system and recommend improvement and course correction.**
- **Support the State Planning and M & E coordinator to monitor delivery of training activities at village, block, district and state level guide in preparing templates for feedback sharing leading to improvement in training.**
- **Guide the State Planning and M & E coordinator to prepare separate monitoring framework for technology demonstration, supply chain development, CHC management, technology adoption etc.**
- **Contribute to baseline, mid term, endline and impact assessment surveys by handholding the district and block staff.**
- **Plan the implementation, execution, analysis and reporting of the annual outcome surveys in all participating districts as of 2nd year of the project.**
- **Contribute to the annual monitoring report and guide the state coordinators in developing annual project plan.**
- **Collate and analyse data from the State Project Implementation Units and providing inputs to APD on project performance and preparing semi-annual and annual progress reports for submission to IFAD.**
- **Any other tasks assigned by the Additional Project Director.**

10. Planning and M&E Assistant

Qualification:

- **Postgraduate degree Postgraduate degree in Statistics/Economics/Agriculture Economics.**

Experience:

- **About 2-3 years of experience in rural development projects specifically in developing M&E frameworks, training module development, data analysis and report preparation. Prior experience of working in and/or familiarity with development issues in eastern India and the North East will be an advantage.**

Location of Job: PIU – New Delhi

Reporting Line: Planning and M&E Specialist

Job Description:

- **Assist the P and M & E Specialist to collect background information about the project area through the project staff.**
- **Carry out consistent review and take corrective measure as required to ensure that the data collected at state level for outputs and outcomes, is disaggregated by women, men, and age groups (to capture youth participation).**
- **Provide support to the specialist in developing frameworks, modules, templates for use in the project villages, blocks and districts.**
- **Support the specialist in identifying resources to execute monitoring related activities in the project area and also of the activities undertaken by the technical agencies, implementation partners etc.**
- **Provide research support in developing outcome, process and progress indicators to be used in the project monitoring.**
- **Assist the Specialist in undertaking periodic assessment of project implementation system and guide the district and block staff to undertake evaluation of specific activity.**
- **Assist the Specialist in planning the implementation, analysis and reporting of the annual outcome surveys in all participating districts as of 2nd year of the project.**
- **Play an active role in the baseline, mid-term and end line assessment surveys and contribute to the development of report and its dissemination among stakeholders and implementation partners.**
- **Assist the Specialist in collation and analysis of monitoring data and contribute to development of dashboard for faster dissemination of project information.**
- **Any other task assigned by the Planning and M & E Specialist.**

11. Procurement Specialist

Qualifications:

- **Post graduate in commerce, business, finance or management / Post Graduate Diploma in Material/Supply Management /MBA from any recognised university or institute.**

Experience:

- **Minimum 10 years of professional experience in international and national bidding procedure, procurement procedure, especially preparation of Expression of Interest, Notice Inviting Tender, Terms of Reference, Request for Proposal and bidding document for procurement of consultant services, goods and works.**

- **Preference will be given for experience in handling World Bank/International Financial Institution procurement procedures.**
- **Good written and verbal communication skills, proficient in English, computer literacy general MS package, proficient in computer based spread sheets for data analysis, proactive, work with minimum supervision, and as a team builder**

Location of Job: PIU – New Delhi

Reporting Line: Additional Project Director (APD)

Job Description:

- **Prepare and include relevant Project Procurement Guidelines and formats according to the PIM. It should include IFAD procurement guidelines and Procurement Handbook, draw up draft project procurement manual for the project for approval by PSC and no objection by IFAD.**
- **Update the 18-month Procurement Plan prepared during design and ensure that the Plan is updated in accordance with the procedure and procurement plan agreed with IFAD.**
- **Liaise with IFAD procurement staff on applicable guidelines.**
- **Co-ordinate with concerned subject matter specialist on procurement matters, especially preparation of ToR, technical specification etc.**
- **Collaborate closely with APD and others for preparing advertisements, short listing, bidding documents, evaluation, letters of awards, draft contracts etc. in the procurement of good/works and services including consultancies.**
- **Co-ordinate with APD regarding submission of advertisements bidding documents, letters of invitation, evaluation reports, contracts, etc. to IFAD for those items subject to prior review.**
- **Facilitate/assist in getting no objection certificate (NOC) from IFAD wherever required.**
- **Co-ordinate with project team, organize and support evaluation committees for prompt evaluation.**
- **Make necessary arrangement for contract signatures.**
- **Maintain Contract Management forms as per the formats of IFAD and prepare amendment letters to the contracts. As part of the contract management, in coordination with the concerned officials monitor the contractual provisions for compliance.**
- **Monitor the progress of procurement activities against procurement timetables, highlight variations in progress, record reasons and identify remedial actions, if any.**
- **Assist the APD for placement of various documents/papers before Project Steering Committee for review and approval, all types of audits of procurement activities, post review of IFAD etc.**
- **Liaison with any other appropriate authority for any dispute among the parties relating to procurement.**
- **Provide documentations and data to IFAD fielded Supervision Mission and Implementation Support Missions.**
- **Perform any other relevant work related to the project assigned by the Project Director.**

12 State Project Manager - State Project Management Unit

Qualification:

- **Basic degree in agriculture with post Graduate degree in Agriculture/Agriculture Engineering /Agriculture Economics/Rural Management**

Experience:

- **About 8-10 years of experience in rural development, livelihood promotion with experience in working with SRLMs or other development projects.**

Location of Job: State Project Implementation Unit – State Agriculture Department

Reporting Line: State nodal Officer and National Coordinators-PIU

Job Description:

- **Collaboration and partnership management with particular focus on district and state government agencies and financial institutions.**
- **Lead annual activity planning and strategy development for implementation of programme at the state level.**
- **Lead the implementation of the strategy for poverty targeting, gender mainstreaming and youth participation of the project, and take corrective action as required based on field observations and M&E data as well as recommendations of supervision missions and guidance of the PIU.**
- **Prepare and submit AWPB approved by SPCC to PIU within the indicative budget provided.**
- **Execution of all state level project activities involving: management of day-to-day affairs, coordination with implementation partners, meeting the requirements of stakeholders under the supervision of the state nodal officer.**
- **Coordinate activities with KVKs and partner institutions such as SRLM and WSMs and IFAD funded projects for conducting demonstrations and field days**
- **Facilitate signing of partnership agreement with the state level partners such as SRLM and WSMs and IFAD funded projects.**
- **Monitor implementation progress at the KVKs and partner institutions and report to the State Project Director and the Additional Project Director.**
- **Support activities relating to technology need assessment, survey (baseline, mid-term and end-line), techno commercial evaluation and other project documentation studies.**
- **Provide input on quarterly progress report and annual reports.**
- **Submit MIS data as required by the PIU.**
- **Submit statement of expenditure periodically to PIU and also ensure flow of funds to the partner agencies.**
- **Organize half yearly State Project Coordination Committee meetings and submit the minutes of the meeting to PIU.**
- **Any other task assigned by the State Project Director and the Additional Project Director.**

13. Finance and Accounts Manager

Qualification:

- **Post-graduate Degree in Commerce/ Inter-pass Accountant**

Experience:

- **Minimum 5 years of experience in financial accounting of project/ company**
- **Computer literacy and proficiency in Tally and use of spread sheets**
- **Good knowledge of accounting**
- **Working knowledge of audit requirements for financial compliances.**

Location of Job: SPMU – State Agriculture Department

Reporting Line: State Nodal Officer and State Project Manager

Job Description:

- **Maintaining the project accounts of the SPMU**
- **Preparing Bank Reconciliation Statements of the SPMU every month.**
- **Preparing monthly progress report every month with the actual and budgeted figures for each activity and the variance thereof**
- **Facilitating timely disbursal of project funds to Implementation partners.**
- **Following up with the Implementation partners to ensure that they submit their monthly statements within the stipulated time.**
- **Preparation of the financial statements and the withdrawal application.**
- **Preparing and submitting audited statement of expenditure and submitting the same to PIU in a timely manner.**
- **Maintaining the record of fixed assets, contract register and contract monitoring forms.**
- **Providing support and assisting the Head of Finance in all other duties as may be assigned by the Head of Finance or the Project Director.**

13. M&E Officer – State Project Management Unit

Qualification:

- **Post Graduate degree in Agriculture Economics/Economics/Statistics**

Experience:

- **About 5 years of experience in programme planning, monitoring and evaluation activities. Experience in field research, agricultural and rural planning, impact assessment, project evaluation activities in a lead position.**

Location of Job: State Project Implementation Unit – State Agriculture Department

Reporting Line: State Project Manager

Job Description:

- **Initiate the project planning exercise to assist the State Project Manager to prepare AWPB.**
- **Ensure submission of MIS as required by PIU by collecting data from the partners.**
- **Ensure that the data collected is disaggregated by poverty, gender and age; and recommend corrective action based on project performance.**
- **Make periodic assessment based of the data collected and recommend improvement and course correction.**
- **Contribute to baseline, mid-term, end-line and impact assessment surveys by providing data and inputs.**

- **Assist the Manager - Knowledge Management in planning the documentation and outreach activities in the project state.**
- **Contribute to the annual monitoring report and work with Planning and M & E Specialist in developing annual project plan.**
- **Provide support to Planning and M & E Specialist in the evaluation of state level project activities.**
- **Work closely with the PIU to improve the project monitoring system.**
- **Any other tasks assigned by the Planning & M & E Specialist.**

14. Agriculture Enterprise Promoter - SRLM

Qualification:

- **University degree in agriculture, agriculture engineering, agri business, or other specialties related to agriculture.**

Experience:

- **About 2-3 years of experience in implementation of agricultural development projects. Experience in rural marketing, facilitating agri-business activities, enterprise management activities etc is an advantage.**

Location of Job: Block Office of SRLM

Reporting Line: SRLM Block Manager

Job Description:

- **Along with block level team of SRLM and district project team select the VO and Lead Farmers for demonstration of technology.**
- **Provide on the job training to the producer groups and federations to manage the units and operation of the machinery.**
- **Provide mentoring support to VOs/CIs to ensure uptake of technology by the processing enterprises/CHCs and ensure that CHCs and processing units are professionally managed.**
- **Ensure the quality checking of the processing units and keeping the records through periodic visits;**
- **Participate in periodic program review and planning meetings and external meetings.**
- **Implement and monitor the strategy for poverty targeting, gender mainstreaming and youth participation and recommend appropriate action as required.**
- **Coordinate field reporting: prepare any technical and external reports;**
- **Attend regular meetings with block SRLM staff, KVK and SPMU to plan and address any concerns and share feedback.**
- **Monitor and provide objective feedback related to enterprise performance.**

15. Agriculture Engineer, KVK

Qualification:

- **Postgraduate degree in Agriculture Engineering (MSc/MTech, in farm machinery, post-harvest, agri-engineering)**

Experience:

- **A minimum of 2 years of experience is desirable in agri technology research, design, and demonstration. Prior association with state agricultural university or ICAR networked institution would be an advantage. Experience in conducting front line demonstration, organizing training of farmers and field experience in execution of package of practices.**

Location of Job: Krishi Vigyan Kendra

Reporting Line: Principal Coordinator, KVK

Job Description:

- **Develop the technology demonstration plan and implement the plan in collaboration with SRLMs and other partner agencies.**
- **Mainstream, in the training curricula , considerations related to poverty, gender and youth in the training module as well as aspects related to climate change adaptation.**
- **Train the lead farmers in technology demonstrations.**
- **Participate in lead farmer led field days.**
- **Develop a template for collection of demonstration data.**
- **Participate in State level technology exhibitions and Krishi Unnati Mela organized annually.**
- **Support the development of inventory of AE technologies at district level.**
- **Support the identification of potential entities for the development of service centres, manufacturers, youth.**
- **Support the SRLMs and other Partner Agencies in the identification of VOs/CIs in project area, for th stablishment of FMUs, CFC, ATB, etc..**
- **Supervise the operation and maintenance of the AE technologies procured in context of project for demonstration purposes, whether these are stationed in KVKs or with CIs.**
- **Any other activity assigned by Head, KVK.**

16. Agri-Extension Officer, KVK

Qualification:

- **Postgraduate degree in Agriculture and allied sciences (animal husbandry, fishery, forestry)**

Experience:

- **A minimum of 2 years of experience is desirable in training of farmers, developing advisories, and conducting farmers' field days.**

Location of Job: Krishi Vigyan Kendra

Reporting Line: Principal Coordinator, KVK

Job Description:

- **Participate in the training of the lead farmers in technology demonstrations, with special focus on skills related to extension and communication.**
- **Participate in lead farmer led field days, and provide feedback to the lead farmers on the conduct of the field days, effectiveness of communication and soundness of information provided.**
- **Participate in the development of a template for collection of demonstration data.**

- **Participate in State level technology exhibitions and Krishi Unnati Mela organized annually.**
- **Follow-up on the adoption of the AE technologies and the related package of practices by farmers and report accordingly for fine tuning the demonstration and scaling-up process of AE technologies.**
- **Implement the strategy for poverty targeting and gender mainstreaming as it relates to training of lead farmers, organization of field days, and implementation and monitoring of the demonstrations.**
- **Any other activity assigned by Head, KVK.**

Appendix 7 - Template of the Annual Work Plan and Budget

Part A: Narrative Template

COUNTRY: India

NAME OF PROJECT: SCTE

ANNUAL WORK PLAN AND BUDGET: PART-A

PERIOD from April 20XX to March 20XX+1

Font sizes

Text 10 Arial; Tables within Text, Arial 9

Spacing 1.1

Table of Contents (Modify, if required)

Fiscal Year

Currency Exchange Rates, historical trends

Weights and measures

Abbreviations and acronyms

Project Area Map

Executive Summary

I. CONCEPT OF AWP&B

II. CONTEXT

III. ACHIEVEMENTS

IV. SUMMARY PRESENTATION AWPB

V. DESCRIPTION OF AWPB BY COMPONENTS

VI. AWP&B COSTS AND FINANCING PLAN

VII. STRATEGIC FRAMEWORK

VIII. PROJECT MANAGEMENT

IX. ANNEXURES: AWP&B TABLES

I. CONCEPTS (Maximum 2 paragraphs)

Previous period: In this Section, some of the basic planning parameters should be defined and explained. Preparation of AWPB begins, usually between October and November[17]. To put the proposed AWPB in perspective, results obtained in the previous year should be highlighted.

Currency: The AWPB should use INR as the unit for costs and values. The current exchange rate at the time of writing the AWPB should be indicated and compared with the rate(s) used in Costab tables. Its evolution since the previous AWPB has to be analysed and the effect of devaluations or appreciations on required external financing should be stated.

[17] In countries where the fiscal year runs from March to April such as in India

Prices: The current 12-months inflation or deflation rate for goods and services similar to project inputs should be stated and compared to the rate used in Costab tables for local inflation and the impact on project cost and financing analysed.

II. CONTEXT (Maximum 2 paragraphs)

This Section provides briefly the most important developments in the previous period in the project implementation environment and the expected evolution for the planning period. The following elements may be discussed.

- **Government policies: Indicate any change or new policies and their effect on project implementation;**
- **Institutional framework: Discuss any constraints, changes in the organization and/or staffing in the Implementing Agencies and the project management units. Evaluate the impact on implementation capacities.**
- **Any other major determining factor of the implementation environment**

III. ACHIEVEMENTS (Maximum 2 pages)

The Section presents the main achievements, issues and constraints of the previous period, including the main recommendations of supervision missions, as well as an appreciation of the impact of the project on the poverty and gender situation. Discussions should include:

Physical results Highlight the implementation strategy and describe the main physical results obtained so far, indicate positive results as well as implementation problems and the reasons for them, and the latter's impact on next year's plan and implementation. Refer to detailed and summary AWPB tables.

Financial results Analyse the level of expenditures of the year to date for the main components, compare with the previous budget and indicate any reasons for higher or lower expenditures than expected. Indicate whether these issues will have an impact on the plan for the next year; refer to the detailed and summary AWPB tables.

Supervision issues: Highlight the main recommendations of the previous supervision mission and the manner they are being implemented, discuss any other supervision issue.

Poverty situation Provide a qualitative appreciation of the implementation to date on the poverty situation in the project villages and households. Use some information from the Baseline survey and any other available indicators to underline the statements. Also review any new Government and/or donor initiatives.

Gender Discuss the role of women in project planning and implementation and the project impact on their situation, results and constraints. Analyse both the economic and the social aspects (income generation, agriculture, credit, literacy, education, health, etc…)

IV. SUMMARY PRESENTATION AWPB (maximum one page)

In this Section, present the main characteristics of the Annual Work Plan and Budget, in terms of programming and implementation strategy, physical and

financial objectives and expected outputs and impact. Indicate if there are any major changes compared to last year's AWP&B.

V. DETAILED PRESENTATION OF AWPB (maximum 4 pages)

In this Section, a detailed discussion of the programming and implementation strategy of each component of the SCATE is presented as well as a discussion of the expected results and how the implementation modalities eventually differ from the previous year(s)' practices. For each component, present the following:

- **Objectives and targets. Indicate the component objective and physical targets for the AWPB period and compare with the whole project duration, discuss any trends;**
- **Implementation strategy: Indicate how the activities of the component will be programmed and implemented, discuss participatory approaches and any institutional problems and their required solutions;**
- **Results: Indicate the expected results in terms of quantitative indicators and in terms of qualitative aspects. Indicate the expected number of beneficiaries (women, men) and households. Compare with the overall target of the project and with last year's results;**
- **Changes: Discuss and justify any changes compared to the initial design and previous experiences, in targets, implementation strategy or expected results. Indicate reasons.**

VI. COSTS AND FINANCING (maximum one page)

In this Section discuss issues relating to costs and financing of AWP&B.

- **Unit Costs: Any major changes in unit costs due to inflation/deflation and to changes in design compared to previous years and to the Appraisal Report should be discussed and the manner how these changes will be tacked and by whom should be indicated.**
- **Financing: Issues relating to the flow of funds, the timeliness of funds availability, of approval and disbursement procedures for all financiers will be highlighted, and ways to improve or overcome constraints indicated.**

VII. STRATEGIC FRAMEWORK (maximum 2 or 3 paragraphs)

This Section deals with how the AWPB objectives and expected results and impact correspond to Government and IFAD objectives. It will be based on concrete experiences and examples and avoid non-committal broad statements. Issues to be included are:

- **Government objectives: State which project activities contribute to Government's rural development and/or poverty alleviation objectives and indicate the project's incidence in the project area.**
- **IFAD Strategic framework: Discuss if and how AWPB results and impact contribute to:**
    - **empowerment and strengthening of beneficiary organisations, including gender and participation aspects;**
    - **access to productive natural resources and technology;**

- **Access to financial services and markets.**

- **Co-financier: If the project is co-financed, indicate the expected impact of the AWPB on the Co-financier's objectives and strategy.**

VIII. PROJECT MANAGEMENT (maximum 3 or 4 paragraphs)

This Section deals with the PIU status, staff positions, staff vacancies, key issues in staff deployment and ways to handle them. Highlight staff training and orientation and exposure visits. Provide a list of current staff as against original plan.

IX. ANNEXURES (AWPB TABLES)

The outline of AWPB Tables consists of two parts: a) the annual budget and b) indicators for achievements so far and cumulative achievements. The latter are required to put the annual budget in perspective and to help justify it. The outline of the AWP&B tables has been derived from the format of the Costab detailed tables. In principle, annual programming and budgeting concepts used should be identical to those in the Costab tables.

Each project component has separate a table and unique number corresponding to table numbers used in Cost Tables. [For example, Table 1.1, 1.2, 1.3 etc]

All currency input values are in INR. Unit costs are in INR and summary costs in 000 INR.

Summary table: The summary table aggregates all financial values by component from the individual AWPB tables. The outline has been so designed that the individual rows in the summary table is linked to the different "Total" bottom lines of in each individual AWBP table. In this manner, corrections and adjustments in the data in the individual tables are automatically re-calculated in the summary tables.

Appendix 8: Designated Account Reconciliation Statement
(only if advance is provided to designated account); - to be prepared by CAAA
For the Year ended _____
IFAD Financing Agreement Number:_____
Designated Account Number:_____

Section 1					**Denomination currency**	**Local currency (if applicable)**
1	**Total advanced by IFAD**					
2	**Less Total amount recovered by IFAD**					
3	**Equal present outstanding amount advanced by IFAD**					
Section 2						
4	**Balance of Designated Account as per attached bank statement as of …….(date, Month & Year)**					
5	**Plus balance of operating accounts**					
	Plus cash on hand					
	= Total bank balances as of …….(date, Month & Year)					
6	**Plus amount claimed in this application**					
	WA No.					
7	**Plus amounts withdrawn from Designated Account and not yet claimed**					
	WA No.					
	WA No.					
	Provide reasons for not yet claimed.					
8	**Plus amounts claimed in previous applications and not yet credited at the bank statement date, or claimed after the bank statement date**					
	W. A. No.	**Date**	**US$**	**Amount**		
9	**Less: interest earned (to be completed. If zero, please enter zero)**					
10	**Total advance accounted for (Line 5 through line 9)**					
11	**Explanation of any difference between total outstanding advance (line 3) and advance accounted for (line 10)**					
	Insert explanations: e.g.					
	Non eligible amount to be refunded to the designated account					
	calculation errors in application of percentage financing					
	counterpart financial resources to be reimbursed					
	cheques not yet cleared/presented to Bank					

Date: **Signature:**
Name in Full:
Title in Full:

Key Check:

Opening and closing balances of the designated and project account should match with corresponding figures reported in the Sources and Uses of funds report (report 1).

Explanatory Notes:

The projects should prepare the report using the same accounting basis/standard that they use when they prepare the annual financial statements

The currency of the report, should be the same currency as the project annual financial statements.

The financial information presented in the report should always be generated by a proper accounting software. Excel is not an acceptable accounting software and it should only be used to edit and combine data to fit the agreed format

"Reporting period" refers to transactions occurred in the quarterly/semi-annual reporting period as agreed with IFAD, "cumulative annual" refers to the occurred transactions from the beginning of the fiscal year until the end of the reporting period and "cumulatively" refers to the occurred transactions from the beginning of the project life until the end of the reporting period

The sources of funds for each individual financier should include all income and all disbursement methods (replenishments, direct payments, special commitments and reimbursements)

Note that an exchange gain / loss is not an eligible expenditure by itself, and should not be reported as a separate expenditure item. Instead, if there are realized gains / losses these should be booked to specific approved expenditures/expenditure categories

Only cash Beneficiary contribution should be reported. Not in-kind

The rows for "receivables and payables" are designed to fit the report to modified cash and accrual basis of accounting. Under 100% pure cash basis these rows should be 0.

"Opening cash balances" reflect the opening balances of each bank account opened and maintained by the project including the (petty) cashbook.

"Closing cash balances" reflect the closing balances of each bank account opened and maintained by the project including the (petty) cashbook.

Appendix 9: Checklist for a Withdrawal Application

IFAD Financing No. _____ WA No. _____ Reporting period [from date/to date]

Form 100 **1. Sequential numbering of WA**	**Yes or No**
2. WA amount tallies with sequentially numbered summary sheets	
3. Categories/sub-categories charged as per Schedule 2 of Financing Agreement	
4. % of financing applicable for each category or sub-category	
5. Availability of funds in categories and the overall financing amount	
6. Currency of payment	
7. Completeness and accuracy of banking instructions	
8. Complete name and address of correspondent bank	
9. WA is signed by Authorized Representative	
Statement of Expenditure **1. Eligibility of expenditures claimed** **a) Within SOE financial ceiling**	
b) Expenditures under specific Category [_____] eligibility	
2. Form 102 signed by designated Project Accountant, Project Director, Authorized Representative	
3. Form 102 supported by signed Form 101 (for items reported in 2. but above over the financial ceiling)	
Designated account - Replenishment Requests **1. Amount within ceiling figure agreed as a reasonable limit (____ USD or ____])**	
2. Amount at least equal to 20% of the agreed reasonable limit	
3. Exchange rate used	
4. Completeness of designated account banking and account details	
5. Enclosed designated account Reconciliation and Bank Statements	
Supporting Documentation (attached if required) **1. Copy of contract**	
2. Copy of invoice, certified by Project Director	
3. Copy of bank guarantee and performance guarantee (for advance payment)	
4. Copy of delivery receipt	
5. Copy of evidence of payment	
6. Completed Form 101 (A or B)	
7. Completed Form 102 (A or B)	
Procurement **1. Copy of "No objection/s" provided by IFAD** **2. Copy of Contract Monitoring Record/s Form/s**	
Compliance with Condition/s for Disbursement **1. In accordance with terms in Section E. para --- of the Financing Agreement** **2. In accordance with terms in Section ____ of the Letter to the Borrower**	
Expenditure incurred/committed before Project Completion Date (PCD) **1. Expenditure verified as eligible:** **a) contract signed before PCD** **b) goods delivered before PCD** **c) services completed and/or rendered before PCD**	

Remarks:

_____

_____

Prepared by Finance Manager **Certified by Project Director**

Dated: _____ **Dated:**

_____

Appendix 10: Recovery Plan

(only if advance is provided to designated account);

RECOVERY PLAN

Designated Account No.			
IFAD Loan/Grant No.:		**IFAD Loan/Grant Amount (SDR)**	**0.00**
Borrower:		**Loan Completion Date:**	
Loan Effective Date		**Loan Closing Date**	
Today) Date:		**Remaining # of months to closing date**	

	WA No.	Date	INR	USD	SDR	Unjustified balance	
						USD	SDR
Authorized Initial Payment(s)							

JUSTIFICATION:								
Period covered by WA	**WA No.**	**(Expected) Date of WA**	**Estimated value (INR)**	**Estimated value (USD)**	**Proposed Recovery %**	**Recovery Amount (USD)**	**Cumulative (USD)**	**Cumulative Unjustified Balance (USD)**
Month, Year								
Month, Year								
Month, Year								
Month, Year								
Month, Year								
Month, Year								
TOTAL								
Note: Unjustified balance at the time of loan closing will be refunded to IFAD								
Prepared by:		**(Project title)**				**Date**		
Certified by:		**(Project title)**				**Date**		
Approved by:		**(Project title)**				**Date**		

Appendix 11: Annual Work Plan and Budget

1. Sample Annual workplan and budget

Results #	Objectives/ Expected Results	Indicators		Quarterly Planned Budget				Responsible Unit/ Staff	Implementation targets										Budget ('000)													Remarks
																							Financier									
		Project	RIMS	Q1	Q2	Q3	Q4		Unit	Appraisal (Total)	Revised (Total)	Planned (Annual)	Unit Cost (Constab)	Achieved (Cumulative)	%	Achieved (Annual)	%	Appraisal (Total)	Revised (Total)	Planned (Annual)	Budget Category	%	GoI	IFAD Loan	IFAD Grant	Ben.	Spent (Cumulative)	%	Spent (Annual)	%	
	Component - 1																														
	Sub-Comp																														
	Activity 1																														
	Activity 2																														
	Sub-total																														
	Component - 2																														
	Sub-Comp																														
	Activity 1																														
	Activity 2																														
	Sub-total																														
	Component - 3																														
	Sub-Comp																														
	Activity 1																														
	Activity 2																														
	Sub-total																														
	Total																														

2: Summary Annual Work Plan and Budget by component and by financier

Components	IFAD Loan	IFAD Grant	GoI	ICAR	Banks	Beneficiaries	Total
Component 1							
Sub Component							
Sub Component							
Sub Component							
Sub Component							
Sub-total							
Component 2							
Sub Component							
Sub Component							
Sub Component							
Sub Component							
Sub-total							
Component 3							
Sub Component							
Sub Component							
Sub-total							
Total							

3: Summary Annual Work Plan and Budget by category and by financier

Categories	IFAD Loan	IFAD Grant	GoI	ICAR	Banks	Beneficiaries	Total
Category I							
Category II							
Category III							
Category IV							
Category V							
Total							

4 : Summary Annual Work Plan and Budget by category and component

Category/Components	Comp 1	Comp 2	Comp 3	Total

Category I				
Category II				
Category III				
Category IV				
Category V				
Total				

Appendix 12: Sample Monthly Budget Execution Report
Project:_____
Fiscal year:_____
Month:_____

Description	Up to previous Month		Month		Year to Date			Commitments
	Budget	Actual	Budget	Actual	Budget	Actual	%	Yet to be paid
Component 1								
Sub-component 1.1								
Activity								
Activity								
Sub-component 1.2								
Activity								
Activity								
Sub-component 1.3								
Activity								
Activity								
Sub-component 1.4								
Activity								
Activity								
Component 2								
Sub-component 2.1								
Activity								
Activity								
Sub-component 2.2								
Activity								
Activity								
Sub-component 2.3								
Activity								
Activity								
Sub-component 2.4								
Activity								
Activity								
Component 3								
Sub-component 3.1								
Activity								
Activity								
Sub-component 3.2								
Activity								
Activity								

Sub-component 3.3								
Activity								
Activity								
Sub-component 3.4								
Activity								
Activity								
Total								

Appendix 13: Funds Utilization Certificate

Utilization Certificate for the year _____

Name of the Project _____

Project Number _____

Funds Position at the beginning of the fiscal year:

Description	Amount in INR
Cash in hand	
Cash at bank	
Advances	
Total	

Details of grants received, expenditures incurred and closing balances (actuals)

Unspent balances of funds received up to previous quarter/Year	Interest earned thereon	Interest deposited back to the PIU	Grant received during the year			Total available funds	Expenditures incurred	Clo ba
			Sanction No.	date	Amount			

Details of funds position at the end of the quarter/year

Description	Amount in INR
Cash in hand	
Cash at bank	
Advances	
Total	

Signature **Signature**

Name_____ **Name_____**

Chief Finance Officer **Head of the Implementing Agency**

(Head of Finance)

Appendix 14: Financial Reporting Tables
1: Statement of cash receipts and payments by category (Amount in INR)

Description	Upto Last Year	Upto Last Month	For the Month	Year to date	Cumulative to date	Fund Allocation	Closing Balance
Category 1							
Category 2							
Category 3							
Category 4							
Category 5							
Total							

2: Financial performance per expenditure category and financier (Amount in INR)

Category	Description	IFAD Loan		IFAD Grant		GoI		ICAR		Banks		Beneficiaries		Total	
		For the Period	Cumulative	For the Period	Cumulative	For the Period	Cumulative	For the Period	Cumulative	For the Period	Cumulative	For the Period	Cumulative	For the Period	Cumulative
I															
II															
III															
IV															
V															
VI															
VII															
Total															

3: Financial performance per component and financier (Amount in INR)

Component	Description	IFAD Loan		IFAD Grant		GoI		ICAR		Banks		Beneficiaries		T
		For the Period	Cumulative	For the Period	Cumulative	For the Period	Cumulative	For the Period	Cumulative	For the Period	Cumulative	For the Period	Cumulative	F t F
Component 1														
Sub com 1.1														
Sub com 1.2														
Sub com 1.3														
Sub com 1.4														
Component														

2													
Sub com 2.1													
Sub com 2.2													
Sub com 2.3													
Sub com 2.4													
Component 3													
Sub com 3.1													
Sub com 3.2													
Sub com 3.3													
Total													

4: Projected fund flow forecast

Source of Fund	Funds received	Expenditures up to last quarter	Fund Balance	Funds forecast for the quarter	Funds to be requested
IFAD Loan					
IFAD Grant					
Government of India					
ICAR					

Banks					
Beneficiaries					
Total					

5: SOE withdrawal application statement (Amount in INR)

WA No:	**Date**	**Cat 1 in INR**	**Cat 2 in INR**	**Total in INR**	**USD Equivalent**	**Rejected by IFAD**		**Net Reimbursed in USD**
						in INR	**In USD**	
Withdrawal Application submitted to IFAD								
W.A. No.								
W.A. No.								
W.A. No.								
Sub-total								
B. Direct Payment								
W.A. No.								
W.A. No.								
W.A. No.								
Sub-total								
Total								
WA Pending for Submission:								
A. Replenishment								
W.A. No.								
W.A. No.								
Sub-total								
B. Direct Payment								
W.A. No.								
W.A. No.								
Sub-total								
Total								

Grand Total								

6: Register of Contracts

Date:_____

IFAD Financing No.: **Page No._____ of___**

Project: ..... **Reporting Period: .....**

Contract Serial No.	Percentage of Financing	Type of Procurement	Date of Contract	Name and Address of Contractor/ Supplier	Description of Works, Goods, Consulting/Other Services	Country of Origin	Performance, Contract Duration and Delivery Period	Contract Amount (in NPR) Including tax	Category No. Per Schedule2 of IFAD Financing Agreement	Remarks and Date of IFAD 'No Objection'

7: Contract Payment Monitoring Form

Project _____

Contract Number: as per contract register

Description of Contract:

Procurement File No._____ Component_____ Contract Officer:_____

Date of "No Objection":_____

Name and Address of Supplier:_____ Bank Details:

Email:

Contract Summary
(In INR/USD)

Document	Contract Reference	No.	Amount (IN USD)	Amount (IN INR)	Dates (start/end)
Original Contract					
Amendment (AM-					
Amendment (AM-					
Total Amount					

Bank Securities or Bonds (in INR/USD)

Document	Name of Financial Institution	Date	Amount	Expiry Date	Extension
Advance Payment					
Performance Bond					
Other					

Monitoring of Payments (In INR/USD)

Payment Schedule		Progress Certificate		Payments Issued				Balance Due on Contract
Milestone	Expected Amount	No.	Date	Invoice No.	Payment Date	Amount Paid	Cheque or WA No.	
Total								

8: Physical progress report

Category	Project Activity by component/Sub-component	Original Plan			Physical Progress to date		Cost to date			Revised plan for completion	
		Physical	Cost	Completion date	Actual	Planned	Actual	Planned	% of Actual to plan	Total Cost	Completion date
	Component - 1										
	Sub-Comp 1.1										
	Activity 1										
	Activity 2										
	Sub-total										
	Component - 2										
	Sub-Comp 2.1										
	Activity 1										
	Activity 2										
	Sub-total										
	Component - 3										
	Sub-Comp 3.1										
	Activity 1										
	Activity 2										
	Sub-total										
	Total										

Appendix 15: Audit Utilization Certificate
Project Name _____
Project Number _____
For the year _____

Certified that the expenditure has been authenticated on the basis of accounts and other relevant documents presented by _____for the purpose.
Certified that an amount of Rs. _____ (Rupees_____) has been received under SCATE during the Year_____
Certified that Rs. _____ (Rs. _____) remaining unspent at the end of previous quarter/year was allowed to be brought forward for utilization during the year_____
Certified that Rs_____ (Rs. _____) was earned on account of revenue of the SCATE including interest on bank balance / FDRs.
Certified that out of total available funds Rs. _____ (Rs. _____) as shown in under SCATE, Rs. _____ (Rs._____) was utilized for the purpose for which it was sanctioned. It is also certified that the expenditure admitted has been incurred on approved items only after fulfilling the terms and conditions of sanction & other formalities and observance of procedure / guidelines prescribed by the IFAD / PIU.
Certified that excess expenditure of Rs. _____(Rs. _____) incurred over and above the sanctioned budget has been met by re-appropriation of savings under the remaining heads with the approval of the competent authority. Further, an excess expenditure of not covered by the re-appropriation as shown may be disallowed.
Certified that the opening balance of SCATE as on _____ agree with the closing balance on _____ as per the Funds Utilization Certificate for the year_____
A copy of Audit Report on the accounts of SCATE for the year _____ (up to_____) is also enclosed.
The UC as per the Form GFR 12-A is also enclosed.

Comptroller/Finance Officer Director/Head of Institution

Signature with seal of the
Chartered Accountant/Statutory Auditors

Appendix 16: Innovation Grant Register

Subproject	**(Mention the equipment to be developed)**			
Grantee				
Grant Agreement Date		**Grant completion date**		
Grantee Contribution		**Instalment**	**Milestone to be achieved**	
Project Contribution		**1st**		
Total Amount		**2nd**		
		Final		
Instalments	**As per Agreement**		**Paid**	
	Date	**Amount**	**Date**	**Amount**
1st				
2nd				
Final				
Total				
Remarks				

Appendix 17: Indicative chart of accounts

1. Number of code assigned to each group and sub-group

Group/Sub-group	State	District	Implementing Agencies		Assets/ Liabilities/ Income/Expenses	Source of Fund	Component	Sub-component	Activities	Category	Expenditure Heads
Number of Code	1	1	1		1	1	1	1	2	1	2

2. Example of code assigned to each group and sub-group

Group & Sub-group	Code Assigned for	Number of Code	Assigned code
State	Nagaland	1	1
	Assam	1	2
	Odisha	1	3
	Chhatitsgarh	1	4
	Jharkhand	1	5
District	Districts of each State	1	1 – 5
Implementing Agencies	SAU	1	1
	SRLM	1	2
	KVKs	1	3 – 8
Assets		1	1
Liabilities		1	2
Income		1	3
Expenses		1	4
Source of Fund		1	1 to 4
	GOI	1	1
	IFAD Loan	1	2
	IFAD Grant	1	3
	ICAR	1	4
	Banks	1	5
	Beneficiaries	1	6
Component		1	1 to 3
Sub-component		1	1 to 5
Activities		2	1 to 99
Categories		1	1 to 7

Account Heads	**Assets**	**2**	**1 to 99**
	Liabilities	**2**	**1 to 99**
	Income	**2**	**1 to 99**
	Expenses	**2**	**1 to 99**

3. Example of account code of account head for Vehicle purchase

Group & Sub-group	**Assam**	**Baksa**	**AAU**	**Assets**	**IFAD**	**Augmenting demand for new technologies among smallholder farmers**	**Selection of producer organisations and Assessment of the smallholders' technology needs**	**Developing data base of producer organisations**	**Training**	**Vehicle**
Account Code	**2**	**1**	**1**	**1**	**2**	**1**	**1**	**1**	**3**	**01**

The account code for purchase of vehicle from IFAD source by Assam Agriculture University for sub-component 1 and category 3 of training 21112111301.

Appendix 18: Sample TORs for accounting software

1. Accounting Information System

A. Background

The Govt of India (GoI) is currently in the process of implementing an IFAD funded Project Scaling up Agricultural Technologies for Smallholder Farmers (SCATE). The project is implemented through a project implementation unit (PIU) under the Agri-Engineering Division (AED) of Indian Council of Agriculture Research (ICAR) which is a society under Department of Agriculture Research & Education (DARE) of MOAFW in the twenty seven districts of the states of Nagaland, Assam, Odisha, Chhattisgarh & Jharkhand. In order to comply with IFAD's reporting requirements the PIU will need to procure an Accounting Software to be used by the PIU and those implementing agencies not having accounting software to meet reporting requirement of the project for the following purposes:

- **to record all financial transactions to maintain books of accounts and required records and generate trail balance, periodic financial reports, balance sheet, income and expenditure account and receipts and payments accounts.**
- **to collect, analyze, store, and distribute information that is useful for decision making by comparison of budget and actual expenditure.**
- **to provide transparency and accountability of the project activities.**
- **to provide timely reports, help detect errors and deficits during project implementation and indicate necessary corrections.**
- **to prepare and present progress reports to the PSC, PIU, SPMU GoI and IFAD.**

The project will be managed from the PIU located in AED of ICAR and the SPMUs, SRLMs, SAUs, SDAs and KVks of the respective states where the project will be implemented. The accounts of expenses incurred by the respective implementing agencies will be maintained by the respective implementing agencies. The financial reports will be consolidated by the PIU for auditing, submitting withdrawal application to IFAD through CAAA, and reporting to IFAD.

.

B. Specifications of the Software

General features

1. The Accounting software should have features of a modular solution and the different modules should be suitably integrated, the following are the basic modules:

- **Chart of Account**
- **Accounting of expenditures based on chart of accounts**
- **Financial Reporting**
- **Budget accounting and Comparison of budget with actual expenditures**
- **Cost Centres**
- **Financial Reporting in accordance with IFAD requirements**
- **Consolidation of accounts at the PIU**
- **Preparation of Withdrawal Application**
- **Contract Management, and integrating other modules if needed.**

2. Classifying the levels of the Chart of account to enable generation of reports;

- **by State and district**
- **by implementing agency**
- **by components and sub-components**
- **by categories**
- **by expenditure**
- **by financiers**

3. Project financial reports including Balance sheet, income & expenditure, balance, receipts and payments account comparison of actual to budgets

4. Handling all the financial transactions of the Project according to the chart of account, that is used to:

- **Capture the financial data under the appropriate account headings**
- **Classify and group financial data for the various financial reports. The structure of the Chart of Accounts caters data to be captured by:**
- **the Project components and sub-components**
- **expenditure items under each component and sub-component**
- **The IFAD disbursement category for the Project**
- **Sources of funding**

5. All vouchers used in the system are based on double entry accounting system.

6. Ability to account under different bases of accounting (cash, modified accrual, Accrual)

7. Use of adjusting entry when needed through the Journal

8. Capacity to customize reports and also exporting data to excel.

Financial reporting

9. Produce the periodic Financial Reports as requested by IFAD:

- **Statement of Operating Performance per Project components showing quarterly, yearly and cumulative balances for the quarter and cumulative;**
- **Statement of Operating Performance per Project categories showing quarterly, yearly and cumulative balances for the quarter and cumulative;**
- **Statement of Financial Position (Balance Sheet);**
- **Statement of Cash Flows;**
- **Statement of Cash Receipts and Payments per Project components showing quarterly, yearly and cumulative balances for the quarter and cumulative;**
- **Statement of Cash Receipts and Payments per Project categories showing quarterly, yearly and cumulative balances for the quarter and cumulative;**
- **Statement of Comparison of Budget and Actual per Project categories showing quarterly, yearly and cumulative balances for the quarter and cumulative;**
- **Statement of Comparison of Budget and Actual per Project component showing quarterly, yearly and cumulative balances for the quarter and cumulative;**

- **Statement of Project commitments, i.e., the unpaid balances under the Project's signed contracts;**
- **Generation of bank reconciliation statements**
- **Statement of fixed assets,**
- **Statement of SOEs - Withdrawal Application Statement.**

10. Consolidated report (financial report) of all implementing agencies managed under the software.

11. Recording the budget of all the activities of the project, and enable comparison of the actual performance with budgets/targets (quarterly, annual, and cumulative for the Project).

12. Enhancement on the Withdrawal Application report to include the SOE and Summary sheet

Security

13. Handling the required security according to predefined system security and privileges.

14. The program has adequate security features including password protection, not possible to delete a posted transaction, controlled access and maker-checker system

15. Includes proper backup and system maintenance procedures.

Training and support

16. Training of the finance and accounts team at the PIU and the implementing agencies on all features of the software.

17. Provide a complete and a user friendly manual

18. Configuration and Full installation of the software in computers of PIU and respective implementing agencies.

C. Delivery time table

1. The commencement of services for this assignment is expected to be no later _____.

2. The main objective of the firm is to deliver a well designed software, that facilitates reflection of project needs and be designed to provide the financial information required by all interested parties (the PSC, PIU, SPCC, SPICT, SAUs, SRLMs, GoI and IFAD) and fulfil the legal and regulatory requirements of the GoN.

3. The firm is expected to deliver the system during the phase mentioned below:

Duration of Deliverables
Deliverable 1: install the present system 15 days
Deliverable 2: needed modifications should be applied on the system within 45 days
Deliverable 3: Training sessions on the system one week.

Appendix 19: Petty cash form

1: Petty Cash Disbursement Voucher

Petty Cash Voucher No.		**Date:**	
Payee: (Name)		**Rs.**	
Rupees in words: _____only			
Account Head		**Account Code**	**Activity Code**
Particulars:			
_____ Received by Date	**_____ Prepared by Designation Date**	**_____ _ Recommended by Designation Date**	**_____ Approved by Designation Date**

2: Statement of Petty cash & Request Form

Period From……to……

Date	PCDV. No.	Particulars	Account Code	Activity Code	Receipt	Payment	Closing Balance
Total							
Rupees in words: _____ **only.**							

It is requested to reimburse Rs. ……. spent from the petty cash as per above petty cash statement. The supporting documents of expenses incurred have been attached with this statement.

_____ _____ _____

Submitted By: **Recommended By:**
Approved By:

3: Petty Cash reconciliation Form

Part 1 - Petty Cash Reconciliation
Date_____

Description	**Amount (INR)**
Opening balance of Petty cash	
Received during the period	
Total petty cash balance	
Payments during the period	
Petty cash closing balance	
Physical petty cash balance as per Cash count	
Difference	
Explanation for difference, if any:	

Part 2 - Cash Count

Denomination	**Number**	**Amount (INR)**

_____
_____
Counted & Reconciled by **Reviewed by**

Appendix 20: Fixed assets register

S. No	Assets Description	Identification No.	Manufacturer Serial No.	Supplier	Date of Purchase	Invoice No. & Date	Source of funding	Cost	Date of Receipt	Location	User	Verified on	Verified by	Transfer/ Disposal date	Amount	Remarks

Appendix 21: Vehicle record form

1: Vehicle Log

Vehicle No._____ Assigned Driver _____

Date	Time		Place of Visit		Purpose of Visit	KM/Mileage		Mileage Driven	Fuel Purchase		Lubrication	User Name	User Signature
	Departure	Arrival	From	To		From	To		Mileage	Qty.	Qty.		

2: Vehicle History Record

Vehicle No._____ Assigned Driver _____

Date	Repairs			Service & Maintenance			Insurance			Fitness Test	
	Description	Garage	Cost	Description	Garage	Cost	Type	Period	Cost	Date	Cost

Appendix 22: Expenditure record forms

1: Cumulative expenditure by component as on ….

Component	IFD Loan	IFAD grant	Governme nt	ICAR	Banks	Beneficiari es	Total
Component 1							
Component 2							
Component 3							
Total							

2: Budgeted expenditure and performance against AWPB

Component	AWPB (INR)	Actual (INR)	Per cent of Actual to AWPB
Total			

3: Budgeted expenditure and performance against AWPB

Financier	AWPB (INR)	Actual (IN)	Per cent of Actual to AWPB
IFAD Loan			
IFAD grant			
Government			
ICAR			

Banks			
Beneficiaries			
Total			

4: Financial performance by financier (Amount in USD)

Financier	Appraisal (USD '000)	Disbursements (USD '000)	Per cent disbursed
IFAD Loan			
IFAD grant			
Government			
ICAR			
Banks			
Beneficiaries			
Total			

5: Financial performance by financier by component as on .....(Amount in USD)

Component	IFAD Loan			IFAD grant			Government			ICAR			Banks			Beneficiaries			Total		
	Appraisal	Actual	%	Appraisal	Actual	%	Appraisal	Actual	%	Appraisal	Actual	%	Appraisal	Actual	%	Appraisal	Actual	%	Appraisal	Actual	%
Component 1																					
Component 2																					
Component 3																					
Total																					

6: IFAD loan/grant disbursement as at ……(Amount in USD)

Category Code	Category Description	Original Allocation	Revised allocation	Disbursed	WA Pending	Available Balance	Percent Disbursed
	Total						

Appendix 23: Quarterly Interim Financial Reports

1. Quarterly financial reports

	Type of Report	The Focus/Scope of the report	Remarks
Quarterly Financial Reports		These reports are a formal requirement by IFAD and they are to be sent to IFAD and to be used by the management to monitor the project's medium term financial performance. The report must be submitted to IFAD within 45 after the end of the respective reporting period, The exact content and format is agreed between IFAD and the Borrower/ Recipient.	
1	Sources and Uses of Funds (all financiers)	This report discloses how much funds the project has received from different financiers how these funds have been spent by expenditure category during the reporting period as well as cumulative. This report also discloses the projects cash balances.	
2	Summary of Expenditures by Loan Categories and By Financiers (USD)	This report discloses how much funds the project has spent by expenditure category and by financier.	Variation of this report already part of the Project financial statements (sources and uses of funds)
3	Financial performance by financier by component	This report discloses how much funds the has project received from each financier and how these sources have been spent by project component during the reporting period and cumulatively. The report also compares these figures with the targets set in the Annual Workplan and Budget and the Project design report (PDR).	
4	Cash forecast by financier	This report discloses the breakdown of the project's cash forecast for the following two quarters by financier. The breakdown includes opening and closing balances of the different accounts as well as estimated income and from different financiers and estimated expenditures by category.	Required by IFAD only on adhoc basis. Should be part of the project's monthly internal reporting (for management use)
5	Progress report on Audit recommendations	This report summarises all the recommendations made by the external auditors of the project, the project management's action plan to address these recommendations and the current status of these planned actions.	

2: Sources and Use of Funds by Category (all financiers)

Project Name :_____
Lead Project Implementing Agency:_____
Reporting Period:_____

Description	Reporting Period (Quarterly)	Cumulative annual	Cumulative project life
	Amounts in INR		
Sources of Funds (income)			
IFAD Loan			
IFAD Grant			
Government Funds			
ICAR			
Banks			
Beneficiary			
Exchange rate differences (gain/loss)			
Total			
Use of Funds (expenditures) by Project Category			
Category 1			
Category 2			
Category 3			
Category 4			
Category 5			
Category 6			
Category 7			
Total expenditures			
Income less Expenditures			
Other			
Payables/commitments			
Receivables (including advances)			
Total			
Opening Cash Balance (Comprising of):			
IFAD Loan project Account			
IFAD Grant project Account			
Government Project Account			
Beneficiary Project Account			
cash book			
etc.			
Closing Cash Balances (comprising of):			
IFAD Loan project Account			
IFAD Grant project Account			
IFAD Loan Project Account			
Government Project Account			

Beneficiary Project Account			
cash book			
etc.			

Key checks:

- Opening cash balances the report should match with the closing balances of the same report for the previous reporting period.
- Sources of funds from the IFAD loan and grant for the reporting period should match with the totals of the WA-SOE schedule (report no. 5)
- The total uses of funds (expenditures) for the reporting period and cumulatively (from the start of the project until the end of the reporting period) should equal total the expenditures in report 2 and 3. and the report to the Government
- The total expenditures for the "cumulative" and "reporting period" should equal the corresponding figures reported to the national government.

Explanatory Notes:

The projects should prepare the Interim financial progress reports (IFPR) using the same accounting basis/standard that they use when they prepare the annual financial statements.

The currency of the IFPR, should be the same currency as the project annual financial statements.
The financial information presented in the IFPR should always be generated by a proper accounting software. Excel is not an acceptable accounting software and it should only be used to edit and combine data to fit the agreed format

"Reporting period" refers to transactions occurred in the quarterly/semi-annual reporting period as agreed with IFAD, "cumulative annual" refers to the occurred transactions from the beginning of the fiscal year until the end of the reporting period and "cumulatively" refers to the occurred transactions from the beginning of the project life until the end of the reporting period.

The sources of funds for each individual financier should include all income and all disbursement methods (replenishments, direct payments, special commitments and reimbursements).

Note that an exchange gain / loss is not an eligible expenditure by itself, and should not be reported as a separate expenditure item. Instead, if there are realized gains / losses these should be booked to specific approved expenditures/expenditure categories.

Only cash Beneficiary contribution should be reported. Not in-kind

The rows for "receivables and payables" are designed to fit the report to modified cash and accrual basis of accounting. Under 100% pure cash basis these rows should be 0.

"Opening cash balances" reflect the opening balances of each bank account opened and maintained by the project including the (petty) cashbook.

"Closing cash balances" reflect the closing balances of each bank account opened and maintained by the project including the (petty) cashbook.

3: Summary of Expenditures by Loan Categories and By Financiers

Project Name :_____
Lead Project Implementing Agency:_____
Reporting Period:_____

Category	Description of category	Financing Source (in currency of the financial statements)																			
		IFAD Loan				IFAD Grant				Government			ICAR			Beneficiaries			Total		
		Category allocation as per financing agreement	Cumu-lative	Reporting period	Cash forecast for Next reporting period	Category allocation as per financing agreement	Cumu-lative	Reporting period	Cash forecast for Next reporting period	Cumu-lative	Reporting period	Cash forecast for Next reporting period	Cumu-lative	Reporting period	Cash forecast for Next reporting period	Cumu-lative	Reporting period	Cash forecast for Next reporting period	Cumu-lative	Reporting period	Cash forecast for Next reporting period
I																					
II																					
III																					
IV																					
V																					
VI																					
VII																					
	Unallocated																				
Total																					

Key checks:
The total expenditures for the "cumulative" and "reporting period" should equal the corresponding figures disclosed in the sources and uses of funds report.
The total expenditures for the "cumulative" and "reporting period" by financier should equal the corresponding figures disclosed in the "Financial performance by financier by component" report.
Explanatory notes:

The financial information of the report should be based on the same accounting basis/standard as the project annual financial statements.
The currency of the report, should be the same currency as the project annual financial statements.
The financial information presented in the report should always have been generated by a proper accounting software. Excel is not an acceptable accounting software and it should only be used to edit and combine data to fit the agreed format
The categories of expenditure should mirror the categories of the Financing Agreement
"Reporting period" refers to transactions occurred in the quarter/semi-annual reporting period as agreed with IFAD period and "cumulative" refers to the occurred transactions from the beginning of the project until the end of the reporting period
An exchange loss should not be reported as a separate expenditure item. Instead, it should be linked to specific expenditures/expenditure categories
Only cash Beneficiary contribution should be reported. Not in-kind.
"Cash forecasts" refers to the estimated expenditures for the following reporting period.

4: Financial performance by financier by component

Project Name :_____
Lead Project Implementing Agency:_____
Reporting Period:_____

	IFAD Loan						IFAD Grant						Government (Budget & tax)						ICAR						Beneficiaries						Total					
	Reporting period			Cumulative			Reporting period			Cumulative			Reporting period			Cumulative			Reporting period			Cumulative			Reporting period			Cumulative			Reporting period			Cumulative		
Component	Planned (AWPB)	Actual	%	Planned (Design report)	Actual	%	Planned (AWPB)	Actual	%	Planned (Design report)	Actual	%	Planned (AWPB)	Actual	%	Planned (Design report)	Actual	%	Planned (AWPB)	Actual	%	Planned (Design report)	Actual	%	Planned (AWPB)	Actual	%	Planned (Design report)	Actual	%	Planned (AWPB)	Actual	%	Planned (Design report)	Actual	%
Component-1																																				
Sub Component 1.1																																				
Sub Component 1.2																																				
Sub Component 1.3																																				
Sub-Total																																				
Component-2																																				

Sub Component 2.1																																				
Sub Component 2.2																																				
Sub-Total																																				
Component-3																																				
Sub Component 3.1																																				
Sub Component 3.2																																				
Sub-Total																																				
Total																																				

Key checks:
The total expenditures for the "cumulative" and "reporting period" should equal the corresponding figures diclosed in the sources and uses of funds report
The total expenditures for the "cumulative" and "reporting period" by financier should equal the corresponding figures diclosed in the "Summary of Expenditures by Loan Categories and By Financiers" report
The Planned AWPB figures should match with the figures from the most recent approved AWPB
The Planned AWPB figures should match with the figures from the most recent approved cost tables/ Project Design Report (PDR)
The total expenditures for the "cumulative" and "reporting period" should equal the corresponding figures reported to the national government.
Explanatory notes:
The projects should prepare the report using the same accounting basis/standard that they use when they prepare the annual financial statements
The currency of the report, should be the same currency as the project annual financial statements.

The financial information presented in the report should always be generated by a proper accounting software. Excel is not an acceptable accounting software and it should only be used to edit and combine data to fit the agreed format
"Reporting period" refers to transactions occurred in the quarter/semi-annual reporting period as agreed with IFAD period and "cumulatively" refers to the occurred transactions from the beginning of the project until the end of the reporting period
Similar to the project annual statements, only cash Beneficiary contribution should be reported, not in-kind contributions
Planned (AWPB) refers to the total annual planned expenditures as expressed in the relevant annual workplan and budget (AWPB). The planned (AWPB) expenditures should be expressed in the same currency as the actual expenditures expenditure to enable comparison of budgeted expenditures against actual expenditures.
"Planned (design report)" refers to the total project expenditures as expressed in the project design report. The planned (design report) expenditures should be expressed in the same currency as the expenditures to enable comparison of expenditures at design against actual expenditures.
"Actual" refers to the actual expenditures already incurred in the specified time period.
% this column compares the planned (AWPB or design report) expenditures with the actual expenditures - actual expenditures are divided by the planned (AWPB or design report) expenditures.

5: Semi-annual cash flow forecast by financier (in currency of the DA)

Project Name :_____
Lead Project Implementing Agency:_____
Reporting Period:_____

Time period	Quarter 1					Quarter 2				
Financier Opening balances consisting of:	IFAD Loan	IFAD Grant	Govt	ICAR	Total (all financiers)	IFAD Loan	IFAD Grant	Govt	ICAR	Total (all financiers)
Operating account - IFAD grant										
Operating account - IFAD loan										
Government funding account										
ICAR										
Cash at hand										
Total										
Cash Inflow from										
IFAD Loan										
IFAD Grant										
Government										
ICAR										
Other Sources										
Total Cash Inflow										
Cash Outflow (expenditures)										
1- Civil works										
2- Goods, Equipment & vehicles										
3-Training and Studies										
4-Credit Line										
5-PIU Salaries and operating costs										
Total Cash Outflow										
Net Cash flow										
Closing balance										
Operating account - IFAD grant										
Operating account - IFAD loan										
Government funding account										
ICAR										
Cash at hand										
Total										
Total Funds Available										

Key Checks:

The opening balances should match with the closing balances of the sources and uses of funds report

The cash outflows in the different categories should match with the cash forecast outlined in the "Summary of Expenditures by Loan Categories and By Financiers" report.

Explanatory notes:

The currency of the report should be the currency of the Designated Account, usually in USD. When converting expenditures in to the Currency of the DA one should apply the prevailing exchange of the last day of the reporting period.

When reporting the opening and closing balance for accounts with pooled funds from different financiers such as the operating account, these funds should be attributed to the original financing source in the respective column.

6: Progress report on Audit recommendations

Project Name:_____
Lead Project Implementing Agency:_____
Reporting Period:_____

Recommendation	Date of the recommendation	Planned action to address the recommendation	Current Status of the planned action

7: Statement of Expenditures/ Withdrawal Application Statement by financing source and Disbursement Method

Project Name :_____
Lead Project Implementing Agency:_____
Reporting Period:_____

WA submitted to IFAD during the reporting period - IFAD Loan										
	WA no 1 (currency of the DA)	WA no. 1 (Currency of the PFS)	WA no 2 (currency of the DA)	WA no 2 (Currency of the PFS)	WA no 3 (currency of the DA)	WA no 3 (Currency of the PFS)	WA no 4 (currency of the DA)	WA no 4 (Currency of the PFS)	Total (currency of the DA)	Total (currency of the PFS)
Disbursement Method										
DA replenishments										
Direct payment										
Special commitments/letter of credit										
Reimbursements										
Total										
Rejected from IFAD										
Net Reimbursed										
WA submitted to IFAD during the reporting period - IFAD grant										
	WA no 1 (currency of the DA)	WA no. 1 (Currency of the PFS)	WA no 2 (currency of the DA)	WA no 2 (Currency of the PFS)	WA no 3 (currency of the DA)	WA no 3 (Currency of the PFS)	WA no 4 (currency of the DA)	WA no 4 (Currency of the PFS)	Total (currency of the DA)	Total (currency of the PFS)
Disbursement Method										
DA replenishments										
Direct payment										
Special commitments/letter of credit										
Reimbursements										
Total										
Rejected from IFAD										
Net Reimbursed										

WA pending submission to IFAD - IFAD Loan										
	WA no 1 (currency of the DA)	WA no. 1 (Currency of the PFS)	WA no 2 (currency of the DA)	WA no 2 (Currency of the PFS)	WA no 3 (currency of the DA)	WA no 3 (Currency of the PFS)	WA no 4 (currency of the DA)	WA no 4 (Currency of the PFS)	Total (currency of the DA)	Total (currency of the PFS)
Disbursement Method										
DA replenishments										
Direct payment										
Special commitments/letter of credit										
Reimbursements										
Total										
WA pending submission to IFAD - IFAD Grant										
	WA no 1 (currency of the DA)	WA no. 1 (Currency of the PFS)	WA no 2 (currency of the DA)	WA no 2 (Currency of the PFS)	WA no 3 (currency of the DA)	WA no 3 (Currency of the PFS)	WA no 4 (currency of the DA)	WA no 4 (Currency of the PFS)	Total (currency of the DA)	Total (currency of the PFS)
Disbursement Method										
DA replenishments										
Direct payment										
Special commitments/letter of credit										
Reimbursements										
Total										

Key checks:

The figures disclosed in the "WAs submitted to IFAD" -section should match with the corresponding figures of the historic transaction report of the IFAD Loans and Grant System (LGS).

The figures disclosed in the "WAs pending submission" -section should match with the corresponding figures in the "cash inflow"-section of the Cash forecast report (report no. 6).

Explanatory notes:

The "Currency of the DA" refers to the currency in which the Designated Account is maintained and the Withdrawal applications are submitted. In cases o` Direct payments, special commitments or reimbursements the currency of the WA might differ from the currency of the Designated Account. In these cases the sums should be converted to the currency of the Designated Account for the purpose of the report.

The "Currency of the PFS" refers to the currency in which the project financial statements (PSF) are prepared.

In addition to the IFAD loan and grant, other financing sources going through IFAD (e.g. OFID, GEF, Spanish Trust Fund et..) if applicable, should also be included in this report separately.

Appendix 24: Project Financial Statements

Sample of Project Audited Financial Statements

Project Name……

Implementing Agency……

IFAD Loan/ Grant Number (s)……

PROJECT FINANCIAL STATEMENTS

FOR THE YEAR ENDED March 31, 20XX

PROJECT NAME AND NUMBER
FINANCIAL STATEMENTS
FOR THE YEAR ENDED MARCH 31, 20XX

CONTENTS **PAGE**

Project Information and performance

Statement of project management responsibilities

Report of the independent auditor

Statement of Operating Performance (by category)

Statement of Operating Performance (by component)

Statement of Financial Position

Statement of Cash flows

Statement of Comparison of Budget and Actual by Category

Statement of Comparison of Budget and Actual by Component

Statement of Designated Account Activities (only if advance is provided to designated account)

Designated Account Reconciliation Statement (only if advance is provided to designated account)

SOEs -Withdrawal Application Statement

Notes to the Financial Statements

PROJECT NAME AND NUMBER

PROJECT INFORMATION AND PERFORMANCE

Institutional Details/Information: Implementing agency, status, location, names, account numbers and address of bankers (Special and Project accounts) name and address of independent auditors

Members of the Project Implementing Unit: Names and roles

Background Information on the Project: Source of financing: size of Loan/Grant(s), effective and closing date(s)

Project Objectives: As per Design Completion/Appraisal Report

Project Costs: By component and category of expenditures as per Financing Agreement and Design Completion/Appraisal Report

Summary of Performance: Physical progresses as per Progress/Supervision Reports

PROJECT NAME AND NUMBER

STATEMENT OF PROJECT COORDINATOR'S/ MANAGEMENT RESPONSIBILITIES

(INDEPENDENT AUDITOR'S LETTERHEAD)

REPORT OF THE INDEPENDENT AUDITORS

(Auditor's report on the Project Financial Statements and Statements of Expenditures)

PROJECT NAME AND NUMBER
STATEMENT OF OPERATING PERFORMANCE (BY CATEGORY OF EXPENDITURES)
FOR THE YEAR ENDED MARCH 31, 20XX

		Notes	20XX-XX	20XX-XX	Cumulative to date
			In INR	In INR	In INR
	Sources of Funds				
	IFAD Financing				
	Replenishments to Special Account		**XXX**	**XXX**	**XXX**
	IFAD Direct Payments	**5**	**XXX**	**XXX**	**XXX**
	Government Funds	**6**	**XXX**	**XXX**	**XXX**
	Other Donors	**7**	**XXX**	**XXX**	**XXX**
	Other Receipts	**8**	**XXX**	**XXX**	**XXX**
	TOTAL FINANCING		**XXX**	**XXX**	**XXX**
	Application of Funds				
	Project Expenditures: (By Category Of Expenditures)				
Cat	**IFAD Credit**				
1	**AAA**		**XXX**	**XXX**	**XXX**
2	**BBB**		**XXX**	**XXX**	**XXX**
3	**CCC**		**XXX**	**XXX**	**XXX**
4	**DDD**		**XXX**	**XXX**	**XXX**
5	**EEE**		**XXX**	**XXX**	**XXX**
	TOTAL		**XXX**	**XXX**	**XXX**
	IFAD Grant				
1	**AAA**		**XXX**	**XXX**	**XXX**
2	**BBB**		**XXX**	**XXX**	**XXX**
	TOTAL		**XXX**	**XXX**	**XXX**
	Government Funds				
1	**AAA**		**XXX**	**XXX**	**XXX**
2	**BBB**		**XXX**	**XXX**	**XXX**
3	**CCC**		**XXX**	**XXX**	**XXX**
4	**DDD**		**XXX**	**XXX**	**XXX**
5	**EEE**		**XXX**	**XXX**	**XXX**
	TOTAL		**XXX**	**XXX**	**XXX**
2	**TOTAL PROJECT EXPENDITURES**		**XXX**	**XXX**	**XXX**
	SURPLUS/DEFICIT		**XXX**	**XXX**	**XXX**

PROJECT NAME AND NUMBER
STATEMENT OF OPERATING PERFORMANCE (BY COMPONENT)
FOR THE YEAR ENDED MARCH 31, 20XX

		Notes	20XX-XX	20XX-XX	Cumulative to date
			In INR	In INR	In INR
	Sources of Funds				
	IFAD Financing				
	Replenishments to SA		XXX	XXX	XXX
	IFAD Direct Payments	5	XXX	XXX	XXX
	Government Funds	6	XXX	XXX	XXX
	Other Donors	7	XXX	XXX	XXX
	Other Receipts	8	XXX	XXX	XXX
	TOTAL FINANCING		XXX	XXX	XXX
	Application of Funds				
	Project Expenditures:				
	(By Component)				
Comp	**IFAD Credit**				
1	**AAA**		XXX	XXX	XXX
2	**BBB**		XXX	XXX	XXX
3	**CCC**		XXX	XXX	XXX
	TOTAL		XXX	XXX	XXX
	IFAD Grant				
1	**AAA**		XXX	XXX	XXX
2	**BBB**		XXX	XXX	XXX
	TOTAL		XXX	XXX	XXX
	Government Funds				
1	**AAA**		XXX	XXX	XXX
2	**BBB**		XXX	XXX	XXX
3	**CCC**		XXX	XXX	XXX
	TOTAL		XXX	XXX	XXX
	TOTAL PROJECT EXPENDITURES		XXX	XXX	XXX
	SURPLUS/DEFICIT		XXX	XXX	XXX

PROJECT NAME AND NUMBER
STATEMENT OF FINANCIAL POSITION
FOR THE YEAR ENDED MARCH 31, 20XX

Description	Notes	20XX-XX	20XX-XX
		In INR	In INR
ASSETS			
Current Assets			
Cash and Cash equivalents	4	XXX	XXX
Receivables		XXX	XXX
Prepayments		XXX	XXX
Total Current Assets		XXX	XXX
Non-Current Assets			
Infrastructure, plant and equipment	9	XXX	XXX
Motor Vehicles	9	XXX	XXX
Building	9	XXX	XXX
Total Assets		XXX	XXX
LIABILITIES			
Current Liabilities			
Payables		XXX	XXX
Other		XXX	XXX
Deferred Income (SA balance)		XXX	XXX
Total Current Liabilities		XXX	XXX
Non-Current Liabilities			
Payables		XXX	XXX
Net Assets		XXX	XXX
NET ASSETS/FUNDS		XXX	XXX
Accumulated Surplus/Deficit		XXX	XXX
Total Net assets/Funds		XXX	XXX

STATEMENT OF CASH FLOWS
FOR THE YEAR ENDED MARCH 31, 20XX

Description	Notes	20XX-XX	20XX-XX
		In INR	In INR
Cash Flow from Operating Activities:			
Adjustments to reconcile net income to net cash Provided by operating activities:			
Depreciation and amortization			
Changes in other accounts affecting operations:			
Increase/decrease in payables		XXX	XXX
Increase/decrease in receivables		XXX	XXX
Increase/decrease in prepaid expenses		XXX	XXX
Increase in Other current assets		XXX	XXX
Net cash flows from Operating activities		XXX	XXX
Cash Flows from Investing Activities:			
Purchase of project property and equipment		(XXX)	(XXX)
Sales of project property and equipment		XXXX	XXXX
Other		(XXX)	(XXX)
Net Cash Flows from Investing Activities		XXX	XXX
Cash Flows from Financing Activities:			
Proceeds from Grant/Loan not recognised as Income/Deferred		XXX	XXX
Proceeds from Counterpart financing not recognised as income		XXX	XXX
Other		XXX	XXX
Net Cash Flows from Financing Activities		XXX	XXX
Net Increase/(Decrease) in Cash and Cash Equivalents		XXX	XXX
Cash and Cash Equivalents at beginning of Period		XXX	XXX
Cash and Cash Equivalent at the end of Period		XXX	XXX

PROJECT NAME AND NUMBER
STATEMENT OF COMPARISON OF BUDGET AND ACTUAL AMOUNTS BY CATEGORY
FOR THE YEAR ENDED MARCH 31, 20XX

Cat	Description	Notes	20XX-XX Budget	20XX-XX Actual	Variance
			In INR	In INR	In INR
	FINANCING				
	IFAD Financing Replenishments to SA		XXX	XXX	XXX
	IFAD Direct Payments		XXX	XXX	XXX
	Government Funds		XXX	XXX	XXX
	Other Receipts		XXX	XXX	XXX
	TOTAL FINANCING		XXX	XXX	XXX
	Project Expenditures: (By Category Of Expenditures)				
	IFAD CREDIT				
1	AAA		XXX	XXX	XXX
2	BBB		XXX	XXX	XXX
3	CCC		XXX	XXX	XXX
4	DDD		XXX	XXX	XXX
5	EEE		XXX	XXX	XXX
	TOTAL		XXX	XXX	XXX
	IFAD Grant				
1	AAA		XXX	XXX	XXX
2	BBB		XXX	XXX	XXX
	TOTAL		XXX	XXX	XXX
	Government Funds				
1	AAA		XXX	XXX	XXX
2	BBB		XXX	XXX	XXX
3	CCC		XXX	XXX	XXX
4	DDD		XXX	XXX	XXX
5	EEE		XXX	XXX	XXX
	TOTAL		XXX	XXX	XXX
	TOTAL PROJECT EXPENDITURES		XXX	XXX	XXX
	Surplus/Deficit for the period		XXX	XXX	XXX

The excess/deficit of actual expenditures over the Budget of X% was due to….

PROJECT NAME AND NUMBER
STATEMENT OF COMPARISON OF BUDGET AND ACTUAL AMOUNTS BY COMPONENT
FOR THE YEAR ENDED MARCH 31, 20XX

Com	Description	Notes	20XX-XX Budget	20XX-XX Actual	Variance
		Notes	In INR	In INR	In INR
	FINANCING				
	IFAD Financing				
	Replenishments to SA		XXX	XXX	XXX
	IFAD Direct Payments		XXX	XXX	XXX
	Government Funds		XXX	XXX	XXX
	Other Receipts				
	TOTAL FINANCING		XXX	XXX	XXX
	Project Expenditures: (By Component Of Expenditures)				
	IFAD CREDIT				
1	AAA		XXX	XXX	XXX
2	BBB		XXX	XXX	XXX
3	CCC		XXX	XXX	XXX
	TOTAL		XXX	XXX	XXX
	IFAD Grant				
1	AAA		XXX	XXX	XXX
2	BBB		XXX	XXX	XXX
	TOTAL		XXX	XXX	XXX
	Government Funds				
1	AAA		XXX	XXX	XXX
2	BBB		XXX	XXX	XXX
3	CCC		XXX	XXX	XXX
	TOTAL		XXX	XXX	XXX
	TOTAL PROJECT EXPENDITURES		XXX	XXX	XXX
	Surplus/Deficit for the period		XXX	XXX	XXX

The excess/deficit of actual expenditures over the Budget of X% was due to….

PROJECT NAME AND NUMBER
STATEMENT OF DESIGNATED ACCOUNT ACTIVITIES – to be completed by CAAA
FOR THE YEAR ENDED MARCH 31, 20XX

Account No: _____
Bank: _____
Address: _____

				USD (or as otherwise denominated)	Local Currency Equivalent
1 Opening Balance			**Notes**		
				XXX	**XXX**
Add:					
2 IFAD Replenishments:					
Date	**WA No**	**XXX**			
Date	**WA No**	**XXX**			
		XXX		**XXX**	**XXX**
3 Bank Interest (If any)				**XXX**	**XXX**
Total				**XXX**	**XXX**
Deduct:					
4 Transfers to Operating Accounts:					
Date		**XXX**			
Date		**XXX**			
		XXX		**XXX**	**XXX**
5 Bank Charges				**XXX**	**XXX**
6 Exchange Rate Difference					**XXX**
7 Closing Balance as at 31/03/20XX (as per Bank Statement) (1+2+3-4-5-6)				**XXX**	**XXX**

Designated Account Reconciliation Statement – to be completed by CAAA
(only if advance is provided to designated account)

For the year ended March 31, 20XX

Project Title:
IFAD Loan/Grant No.:
Designated Account No.:
Bank: **Amount in (Currency of DA)**

	TOTAL ADVANCED BY		
1.	**IFAD**	**XXX**	**0.00**
	LESS: TOTAL AMOUNT RECOVERED		
2.	**BY IFAD**	**-XXX**	**0.00**
	EQUALS PRESENT OUSTANDING AMOUNT		
3.	**ADVANCED**		
	TO THE SPECIAL ACCOUNT (NUMBER 1 LESS NUMBER 2)	**XXX**	**0.00**
	BALANCE OF SPECIAL ACCOUNT PER		
4.	**ATTACHED**		
	BANK STATEMENT AS OF DATE: DATE, MONTH, YEAR	**XXX**	**0.00**
	PLUS BALANCE OF THE PROGRAMME		
5.	**ACCOUNT(S)**	**+XXX**	**0.00**
	PLUS BALANCE OF SUB-ACCOUNTS	**+XXX**	**0.00**
	PLUS CASH ON HAND	**+XXX**	**0.00**
	Sub-total of 5:		**0.00**
	TOTAL OF BANK BALANCES, PA, SUB-ACCOUNTS & CASH IN HAND BALANCE (4+5):	**=XXX**	**0.00**
	PLUS: TOTAL AMOUNT CLAIMED IN THIS		
6.	**APPL. No. XXX**	**+XXX**	**0.00**
	PLUS: TOTAL AMOUNT WITHDRAWN FROM		
7.	**THE**		
	SPECIAL ACCOUNT/PA AND NOT YET CLAIMED (=3-4-5-8-11)	**+XXX**	**0.00**
	REASON: Eligible amount for which disb. Appl. has not yet been prepared.		**0.00**

PLUS: AMOUNTS CLAIMED IN PREVIOUS APPLICATIONS NOT
8. YET CREDITED AT
DATE OF BANK STATEMENT AND CLAIMED AFTER DATE OF BANK STATEMENT

APPLICATION No.	**Date**	**USD**	**AMOUNT**
		USD	**0.00**

		USD		**0.00**
		USD		**0.00**
	SUBTOTAL OF PREVIOUS APPLICATIONS NOT YET CREDITED		**+XXX**	**0.00**
9.	**MINUS: INTEREST EARNED**		**-XXX**	**0.00**
10.	**TOTAL ADVANCE ACCOUNTED FOR (NO.4 THROUGH NO.9)**		**=XXX**	**0.00**
11.	**EXPLANATION OF ANY DIFFERENCE BETWEEN THE TOTALS APPEARING ON LINES 3 AND 10**		**+XXX**	**0.00**
	Non-eligible amount to be refunded to PA XXX			**0.00**
	Non-eligible amount to be refunded to PA XXX			**0.00**

12. DATE: _____ **SIGNATURE:** _____

Name in Full: **XXX**
Title in Full: **XXX**

PROJECT NAME AND NUMBER
SOEs-WITHDRAWAL APPLICATION STATEMENT
FOR THE YEAR ENDED MARCH 31, 20XX
by Category of Expenditures in Local Currency

WA No:	Date	Cat 1 In INR	Cat 2 in INR	Total in INR	USD Equivalent	Rejected by IFAD		Net Reimbursed in USD
						In INR	In USD	
A. Replenishment								
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Sub-total		XXX	XXX	XXX	XXX	XXX	XXX	XXX
B. Direct Payment								
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Sub-total		XXX	XXX	XXX	XXX	XXX	XXX	XXX
Total		XXX	XXX	XXX	XXX	XXX	XXX	XXX
WA Pending for Submission:								
A. Replenishment								
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Sub-total		XXX	XXX	XXX	XXX	XXX	XXX	XXX
B. Direct Payment								
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Sub-total		XXX	XXX	XXX	XXX	XXX	XXX	XXX
Total		XXX	XXX	XXX	XXX	XXX	XXX	XXX
Grand Total		XXX	XXX	XXX	XXX	XXX	XXX	XXX

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.

PROJECT NAME AND NUMBER

NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED March 31, 20XX

FINANCIAL REPORTING UNDER INTERNATIONAL PUBLIC SECTOR ACCOUNTING STANDARDS (IPSAS)/ INTERNATIONAL FINANCIAL REPORTING STANDARDS (IFRS)

In accordance with International Public Sector Accounting Standards (IPSAS)/ International Financial Reporting Standards (IFRS), notes to the financial statements of an entity should:

Present any information about the basis of preparation of the financial statements and the specific accounting policies selected and applied for significant transactions and other events, and

Provide additional information which is not presented on the face of the financial statements but is necessary for a fair presentation of the entity's cash receipts, cash payments, cash balances and other statements as statement of financial position

SIGNIFICANT ACCOUNTING POLICIES

The principle accounting policies adopted in the preparation of these financial statements are set out below:

A Basis of Preparation

The financial statements have been prepared in accordance with International Public Sector Accounting Standards (IPSAS)/ International Financial Reporting Standards (IFRS). – as above

B Basis of Accounting

The basis of accounting recognizes transactions and events when they occur rather than when cash is received or paid by the entity. Expenses are therefore recognised when incurred and income when earned.

C Foreign Currency Transactions

Foreign currency translation for the income and expenditure account items are converted using the actual historic exchange rate at the conversion from special to local account. Where part of the expenditures has to be met from the proceeds of subsequent draw downs from special to local account, this is done on First in First out (FIFO) basis. All local expenditures paid from the local accounts/currency are translated back to the USD at the actual rate used for the transfer from special to local account. Cash balances held in foreign currency are reported using the closing rate. Gains/Losses on foreign currency transactions/balances are dealt within the Statement of Special Account Activities.

BUDGET

The budget is developed on a cash basis, and with the same classification and for the same period as the financial statements, while the financial statements are prepared on an accruals basis. The approved budget covers the period from 1 April 20xx to 31 March 20xx. Material variances (above XXX) have been explained as notes to the financial statements.

CASH/FUND BALANCES

		20XX-XX In INR	20XX-XX In INR
A/c No_____ Project Operating Account		XXX	XXX
A/c No_____ Other Project Account		XXX	XXX
Petty cash		XXX	XXX
		XXX	XXX

GOVERNMENT COUNTERPART FUNDS

Details here. Cumulative contributions, yearly contributions (compared to budget). For information only Include details of tax treatment and counterpart contributions as tax exemption.

OTHER DONOR FUNDS

List of Donors	20XX-XX	20XX-XX
	In INR	In INR
1	XXX	XXX
2	XXX	XXX
3	XXX	XXX
Total	XXX	XXX

Add details of cumulative and expected contributions

OTHER RECEIPTS

Description	20XX-XX	20XX-XX
	In INR	In INR
Interest Income	XXX	XXX
other income (specify)	XXX	XXX
Total	XXX	XXX

NON-CURRENT ASSETS

Amount in INR

Description	Cat 1 -Infrastructure		Cat 2 Vehicles		Cat 3-Equipment	
	20XX-XX	20XX-XX	20XX-XX	20XX-XX	20XX-XX	20XX-XX
Costs						
Opening Balance	XXX	XXX	XXX	XXX	XXX	XXX

Additions (Statement of Receipts and Payments)	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
Disposals	**(XXX)**	**(XXX)**	**(XXX)**	**(XXX)**	**(XXX)**	**(XXX)**
Closing Balance	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**

Description	**Cat 1 - Infrastructure**		**Cat 2 Vehicles**		**Cat 3-Equipment**	
	20XX-XX	**20XX-XX**	**20XX-XX**	**20XX-XX**	**20XX-XX**	**20XX-XX**
Accumulated Depreciation						
Opening Balance	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
Additions (Statement of Receipts and Payments)	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
Disposals	**(XXX)**	**(XXX)**	**(XXX)**	**(XXX)**	**(XXX)**	**(XXX)**
Closing Balance	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**

Description	**Cat 1 - Infrastructure**		**Cat 2 Vehicles**		**Cat 3-Equipment**	
	20XX-XX	**20XX-XX**	**20XX-XX**	**20XX-XX**	**20XX-XX**	**20XX-XX**
Net Book Values						
Opening Balance	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
Additions	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
Disposals	**(XXX)**	**(XXX)**	**(XXX)**	**(XXX)**	**(XXX)**	**(XXX)**
Closing Balance	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**

This schedule includes all assets acquired from the commencement of the Project. These assets are stated at cost. Existence and beneficial ownership have been verified by the auditors. Apart from the summary schedule, detailed schedules for annual changes to be included.

YEARLY PROCUREMENTS

Include here a list of the yearly procurements including methods

ALLOCATION AND USE OF THE FUNDS OF THE LOAN

	Allocated	**Disbursed**	**Available Balance**

Category	Amount SDR	Equivalent USD (or otherwise)	Amount SDR	Equivalent USD (or otherwise)	Amount SDR	Equivalent USD (or otherwise)
AAA	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
BBB	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
CCC	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
DDD	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
EEE	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
Total	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**

RECONCILIATION OF FUNDS DISBURSED BY IFAD AND FUNDS RECEIVED BY THE PROGRAMME

Category	Disbursed by IFAD			Received by Project			Difference		
	Amount INR	Amount SDR	Equivalent USD (or otherwise)	Amount INR	Amount SDR	Equivalent USD (or otherwise)	INR	SDR	USD
AAA	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
BBB	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
CCC	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
DDD	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
EEE	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**
Total	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**	**XXX**

Appendix 25: Sample Terms of Reference for the Audit of Project SCATE
1: Terms of Reference for the Audit of Project SCATE

The template terms of reference (ToR) can be found in Annex 7 of the Handbook.

2 : Letter of Engagement of Auditor

To the Project Management (or appropriate Project Director/Coordinator):

You have requested that we audit [insert names of financial statements – e.g. sources and uses of funds for the year ending 31 March 20XX and balance sheet as of 31 March 20XX. We are pleased to confirm our acceptance and our understanding of this engagement by means of this letter. Our audit will be carried out in accordance with International Standards on Auditing (ISA) or International Standards of Supreme Audit Institutions (ISSAI) or national Standards on Auditing (NSA) promulgated by the ICAI, with the objective of our expressing an opinion on the financial statements, including the use of the statements of expenditure.

In forming our opinion on the financial statements, we will perform sufficient tests and reviews to obtain reasonable assurance as to whether the information contained in the underlying accounting records and other source data are reliable and sufficient as the basis for the preparation of the financial statements. We will also determine whether the information is properly communicated in the financial statements.

Because of the nature of the tests and other inherent limitations of an audit, and the inherent limitations of any system of internal control, there is an unavoidable risk that some material misstatements may remain undiscovered. However, we expect to provide you with a separate management letter concerning any material weaknesses in internal control that come to our notice.

May we remind you that project management is responsible for the preparation of financial statements, including adequate disclosure of relevant information. This includes maintenance of adequate accounting records and internal controls, selection and application of accounting policies, and safeguarding of assets. As part of our audit process, we will request from management written confirmation of representations made to us in connection with the audit.

We should be given access to all legal documents, correspondence, and any other information associated with the project and deemed necessary by us for the audit.

We look forward to receiving the full cooperation of your staff. We trust that they will make available to us whatever records, documentation and other information we may request in connection with our audit.

Our fees mutually agreed are based on the time required by the staff and other resources assigned to the audit, plus direct out-of-pocket expenses. Individual hourly rates are based on the degree of responsibility involved and the experience and skills that staff require for the audit.

Please sign and return the attached copy of this letter as confirmation that it is in agreement with your understanding of the arrangements for our audit of the financial statements.

Name of firm or company, (Chartered accountants)
NOTE: Additional items may be included in the engagement.

3: Audit log

(a) Summary Status of Audit Observations

Project Name: _____ Loan/Grant/Financing No. _____						
Financial Year	**Audit Observations according to Audit Report**		**Audit Observations Settled**		**Audit Observations Outstanding**	
	Numbers	**Value (INR) (INR)**	**Numbers**	**Value (INR) (INR)**	**Numbers**	**Value (INR) (INR)**
Total:						

(b) Detailed Log of Audit Observations

Audit Observations								
Project Name:								
Loan/Grant/Financing No.								
S. No.	**Financial year**	**Class: Serious/ general**	**Audit Ref.**	**Audit observations**	**Amount per Observation (INR)**	**Action taken by the project /PMU (Reply of Para wise)**	**Auditor's Validation Results Implemented/ Settled Partially Settled**	**Total amount not Implemented/ Pending (INR)**
		Total:						

Appendix 26: Terms of Reference of the Internal Auditor

The Internal Auditor shall be a member of the Institute of Chartered Accountants of India. The internal auditor will conduct internal audit on quarterly basis in accordance with Auditing & Assurance Standards prescribed by the Institute of Chartered Accountants of India, include such tests and controls as the auditor considers necessary under the circumstances and shall be responsible for the following:

- Check eligibility of expenditure with supporting documents to substantiate the nature and amounts of expenditures for intended purpose and compliance with the prevailing Laws, financial rules and procedures, financial agreement, letter to the borrower, general conditions, and procurement guidelines, and memorandum of understanding.
- Ensure that all project funds received under the project have been used with due attention to economy, efficiency and effectiveness and only for the purposes for which the financing was provided.
- Ensure that all required books of accounts for the financial transactions of the project are being maintained and updated, bank accounts are being reconciled and financial reports are being prepared correctly.
- Ensure that the accounting and financial management systems remain reliable and effective in design and assess the extent to which they are being followed.
- Review the efficacy, adequacy and application of accounting, financial and operating controls and thereby ensure the accuracy of the books of accounts.
- Verify that the system of internal check is effective in design and operation in order to ensure the prevention of and early detection of defalcations, frauds, misappropriations and misapplications.
- Assess the effectiveness of operation of the project's financial management system, review effectiveness of internal control mechanisms in project implementation, Identify areas of significant inefficiencies in existing systems and suggest necessary remedial measures for improvements if required.
- Review that accounting of the expenditure between IFAD and counterpart funding is in accordance with the IFAD financing agreement.
- Review statutory compliances as may be applicable such as proper deduction and filing of TDS, Income tax, PF returns and other applicable.
- Review the efficiency and timeliness of the funds flow mechanism at the PIU and implementing agencies and whether there are delays impacting the timely implementation of project. The auditor should also identify and report the reasons for such delays and possible remedial measures.
- Ensure that the records of all procurement, agreement, work / purchase orders, invoices, receipts, stock registers etc. are properly maintained and retained for the required period.
- Review the contract management and ensure compliance with the terms and conditions of the contract.

- Check that the Statements of Expenditure (SOE) submitted to PIU by the implementing agencies and by PIU to IFAD are reconciled with the expenditures reported in the financial reports on a quarterly basis.
- Ensure that the SOEs are submitted in timely manner to comply with the terms of MOU and release of funds.
- Check whether adequate records are maintained regarding the assets created and assets acquired by the project, including description, details of cost, identification and location of assets. Carry out physical verification of a sample of assets created out of the project and comment on its utilization and whether they are adequately safeguarded.
- Check that adequate records are maintained regarding the assets created and assets acquired by the project, including description, details of cost, identification and location of assets.
- Ensure whether the physical verification of assets is being carried out with due diligence by the PIU and implementing agencies at least once in a year. Conduct physical verification of assets created out of the project on sample basis and comment on its utilization and whether they are adequately safeguarded.
- Check the accounting for the advances to project implementing agencies, project staff, suppliers and service providers and monitoring of settlement of advances.
- Ensure that all necessary supporting documents and records have been separately maintained in respect of all project activities and that clear nexus exist between supporting documents, accounting books and records and the periodic financial reports of the implementing agencies and the PIU.
- Confirm that the agreed procurement procedures and arrangements have been followed for works, goods and services and basic principles of economy, efficiency and social equity have been followed.
- Check that the monthly/quarterly expenditure statements showing approved budget, expenditure during the month, and cumulative expenditure against the activity / sub activity during the period in accordance with the books of accounts, statement of outstanding advance and fund balance, requisition of funds, fund utilization certificate, and cash forecast of the next quarter are being submitted on time to PIU.
- Check that project accounts have been prepared in accordance with International Public Sector Accounting Standards (IPSAS)/ International Financial Reporting Standards (IFRS).
- Check corrective actions taken by the management for audit deficiencies reported in the previous quarter and status of outstanding audit observations.

The Internal Auditor shall visit each cost center of the implementing agencies and the PIU every quarter for conducting the internal audit and submit quarterly reports to the respective project implementing agencies and a copy to the PD and Head, Finance of PIU along with the actions taken to resolve audit observations.

Investing in rural people

India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

Annex 9: Integrated Risk Framework (IRF)

Document Date:	25/07/2019
Project No.	2000001941

Asia and the Pacific Division
Programme Management Department

Risk categories	Risk Probability	Risk Impact	Mitigations/comments
1. Political and governance	Low	Low	The political and governance risk is assessed as Low. Among the 5 States participating in the project, the State of Jharkhand will undergo elections in late 2019. The elected state government will be in place during the start-up period of the project and it is expected that given the high levels of rural poverty in Jharkhand, agriculture development and farmers' welfare will remain a priority for the state Government, in line with national priority given to sector.
2. Macroeconomic	Low	Low	The debt servicing track record of GoI remains excellent and project does not add substantial new burden on the debt servicing capability of the government. The GOI's agriculture budget increased by 45% (in nominal terms) in the last three years; the total share of agriculture in the 2018/19 budget reached 10%, reflecting the priority accorded to the sector. GOI will continue to support the agriculture sector with a focus on income support to farmers as well as improved productivity, resource use, and competitiveness in the sector.
3. Sector strategies and policies	Low	Low	The project’s goal and objectives are in sync with the agriculture sector strategies of GoI to double farmers’ income. Farm mechanization is expected to increase farmers’ income through reduction of labour costs and improved farm productivity. Improved farm productivity is achieved through timely agricultural operations, higher produce recovery during harvest, increased cropping intensity with reduction in time taken for harvesting as well as improved input use efficiency.
4. Technical aspects of project or program	Low	Low	The project has only two components with clear demarcation of activities between the implementing partners. Technology development focusses on the core strengths of ICAR and its institutions to develop technology. Demonstrations are designed to leverage the experience and competence of KVKs. Scaling up activities are in synergy with the implementation modalities and community institutions promoted by the state level partners.

Risk categories	Risk Probability	Risk Impact	Mitigations/comments
5. Institutional capacity for implementation and sustainability	Medium	Medium	Three risks were identified: 1) ability of ICAR to develop technologies needed by the smallholders with focus on women and hill farmers ; 2) ICAR's ability to scale up AE technology demonstrations from its KVKs to a large number of farmers; 3) risk of financing for CI managed FMUs, CHCs, ATBs, not materializing. The project has designed the following mitigation measures to address the identified risks: i) A need assessment study will be commissioned to prepare an inventory of technologies that will be location specific to address the requirements of smallholders with focus on women and hill farmers, energy efficiency and conservation agriculture. ii) All technology development efforts under the project will follow a participatory mode, having in-built consultation with the farmers, demonstrations in farmers' fields and fine tuning of technology in consultation with the farmers. iii) The project will enhance the capacity of KVK staff with respect to preparation of technology manuals and package of practices to effectively demonstrate technologies, and the project will undertake large scale field demonstrations to enhance adoption. iv) The project will engage with the state level government and partners , as well as the promoters of community institutions to scale up AE technologies. v) the project will engage with community institutions which are already involved in savings and credit activities and have bank linkages. Moreover, the existing CHCs that are already in business would have the required cash flows to invest. Finally, the block level staff assigned to the SRLMs will facilitate the block level financing platforms to further help CIs and individuals access bank loans where needed.
6. Financial management	High	High	The World Bank has been working with ICAR for many years and IFAD has direct experience of working with four of the five project states, however, the dispersed nature of SCATE may stress fund flow, reporting, audit and eligibility of expenditures. Mitigation strategy includes the detailing of financial management procedures building on ICAR systems, external and internal audit and the hiring of qualified staff. Costs have been built in to the design for training and implementation support to improve Financial Management, anticipating the difficulty in finding SPMU finance staff familiar with IFAD/SCATE requirements. Efforts have also been made to centralise processes to the PIU where feasible and adopt common/consistent reporting formats. Further, KVKs are part of ICAR. The very dispersion of activities across 4,000 village organisations and community institutions does to some extent mitigate the overall impact of sporadic local issues which may arise during implementation.

Risk categories	Risk Probability	Risk Impact	Mitigations/comments
7. Procurement	High	High	Using PRM assessment tool, the inherent risk rating is 1.99 (High). Main risks in procurement are : weaknesses in procurement planning, processes, standard documents for bidding and contracts, complaint redressal mechanism. The major risk mitigation measures recommended are adoption of (i) annual procurement plan with flexibility to review and revise as per requirement/ implementation; (ii) Standard Bidding Documents including contract templates embedding the bid process, clarifications, evaluation and complaint handling mechanism and policy on preventing fraud and corruption and dispute resolution; (iii) Procurement Specialist report directly to APD; and, (iv) preparation and adoption of procurement manual. After the mitigation measures are implemented with full compliance, the risk may be reduced to Medium. (Net risk rating of 2.85). The project design foresees the adoption of the IFAD procurement guidelines.
8. Stakeholders	Medium	High	The main risk identified here is that the scaling up process for the dissemination and adoption of AE technologies require substantial level of coordination between different line departments, KVKs and ICAR. The project will mitigate this risk by implementing coordination mechanisms at central, state and district levels to ensure inclusion of all the stakeholders, and convergence with existing schemes promoting mechanizations and community managed enterprises.
9. Environment and social	Medium	Medium	The main environmental and social risks are: (i) high variation in the length of the rainy season, the number of rainy days, and overall annual precipitation volume; (ii) existence of ecologically sensitive areas in the project states; (iii) existence of forest buffer zones; (iv) existence of large number of draft animals putting pressure on natural resources and their replacement by fossil fuel driven AE machinery increasing GHG emission; and (v) labour migration from farm to other service sectors leading to feminization of agriculture and associated workload increase and drudgery. Risk mitigation measures included in the project design are: (i) facilitating the smallholder to adapt to climate change events related to precipitation, water availability, soil moisture management and replacement of draught animals through introduction of appropriate AE technologies; and (ii) excluding districts/blocks/villages with ecologically sensitive and forest buffer zones areas from the project area. Introduction of fossil fuel driven AE technologies are expected to increase GHG emission as the Ex-ACT analysis indicates negative carbon balance. The project is supporting research for the development of renewable energy powered machinery which over the long term should reduce the contribution of agri-engineering technologies to GHG emissions.
Overall	Medium	Medium	

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Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

Annex 10: Exit Strategy

Document Date:	25/07/2019
Project No.	2000001941

Asia and the Pacific Division
Programme Management Department

Annex 10: Exit Strategy and Sustainability

This annex provides an overview of the key elements of the project exit strategy, how it will be implemented and how it will enhance the sustainability of the benefits.

It includes:

A. Description of the exit strategy as a clear plan with a realistic timeline and key milestones, as well as necessary resources and institutional arrangements for effective implementation.

The project is embedded in Agricultural Engineering Division (AED) of ICAR, which has the mandate to undertake AE technology and development. AED through 7 institutes operating across the country develop AE technologies. This project will expand the scope of AED to involve private sector and other public sector institutions in technology development, modification / customization and in technology challenges. In addition, research focus will be sharpened to address the needs of smallholders (including women and hill farmers) and technologies that help farmers to adapt to climate change events. AED being the lead agency in the country for AE technology development, the protocols developed will get mainstreamed to facilitate seamless exit.

AED of ICAR will take up the activities under innovation framework to develop technologies covering: (i) concept to prototypes; (ii) adaptations/modifications; and (iii) prototypes to commercial development. Project funding for these activities is allocated for the first five years, and during the last year the entire set of activities will be funded by ICAR resources. Similarly, other technology development efforts, such as the awards and fellowship for technology development will also be taken over and funded by ICAR during the last project years. ICAR has its own grant making mechanism restricted to its own affiliate institutions. The project will set out a competitive grant mechanism with third party assessment under innovation framework for both, public and private sector institutions and develop best practices. The competitive grant facility under the project will drive technology development to address the needs of smallholders in general and women and hill farmer centric= and adaptation to climate change events in particular. It is expected that the lessons from these interventions will be incorporated into the regular technology grant making activities of ICAR beyond project life.

ICAR has established KVKs in each district for technology dissemination through demonstrations. KVKs regularly conduct demonstrations in their own farm and in the fields of select progressive farmers. As a result, the outreach in general remains limited. This apart, the demonstration methodologies are supply driven with limited focus on content. In case of technology demonstrations, the focus is mainly on operating the machinery with limited focus on dos and don'ts of machinery operation and prerequisites for technology introduction and adoption. In order to address this issue, the project intends to develop technology manual and package of practices for important crops in the project and undertake training of trainers to build capacity of KVKs to conduct trainings. This capacity building effort will improve both content and quality of demonstrations by KVKs during the course of project implementation and beyond. The project will also introduce new outreach modalities with the involvement of VOs/CIs. The project intends to embed a system of demonstration, which includes lead farmer training and lead farmer led field level demonstrations. Experience from this modality will provide valuable lessons at the end of project life to KVKs for expansion of their core business, both in terms of area expansion and quality enhancement.

The project has put in technology incentives for facilitating technology adoption. These incentives are not designed as a standalone intervention which would have made project exit difficult as the technology incentives will end with project closure. The project design has harmonised the technology incentive, and also its delivery with SMAM, which has a large nation-wide programme on technology incentives. This will enable the project area farmers to access technology incentives beyond project life. At the community institution level, the project intends to support establishment of FMUs, CFCs and ATBs through

technology incentives. Profitable operations of these FMUs, CFCs and ATBs will be one of the key milestones for achievement as a part of the exit strategy. In order to hasten this process, the project has included a user expansion support facility to facilitate smallholders' renting AE machinery. This is expected to not only increase adoption of AE technology, but also increase demand for use of AE machinery, and thereby driving FMUs, CFCs and ATBs towards profitability.

The project intends to use community institutions developed by various government and civil society partner agencies. SRLMs with a major livelihood programme are expected to be the major partner agency. The project will leverage on the existing capacity of grassroots institutions instead of promoting new community institutions. This strategy will enable the project to fast track technology scaling up efforts. Since the project intends to use the existing institutions that are being nurtured under various government programmes, these grassroots institutions will continue to get support from their promoting organization. The government partner agencies such as SRLM, WSMs, being an entity of the State Government will continue to function beyond the project life and will continue to provide support to the community institutions, and as a result making it easy for the project coming to an end.

B. Expected approach for the exit strategy, e.g. programmatic approach, phasing down/out, scaling up, etc.

The project exit strategy combines 2 approaches: (i) a phasing down strategy whereby project gradually discontinues the funding for the contractual staff, the training and the demonstrations; (ii) a consolidation approach whereby the processes and partnerships promoted by the project are institutionalized and the government schemes such as SMAM and SRLMs disseminate the technologies developed in the project at scale.

C. Key assumptions vis-à-vis the sustainability of project benefits to the target group – who benefits? which benefits? for how long?

The AE technology development and scaling up efforts are mainly targeted to smallholders comprising women and hill farmers. The project would use the community institutions developed under various livelihoods programmes of the government comprising women from the lower socio-economic strata. This would ensure that the project support is accessed by the intended target group with limited possibility of elite capture. The mechanization efforts are expected to reduce the labour costs, increase labour and farm productivity and reduce post-harvest losses, resulting in increased income. These benefits will start accruing after technology adoption by the households and will continue to accrue to them. The project supported FMUs, CFCs and ATBs are expected to become profitable through the rental income /revenue stream.

The main assumptions related to sustainability of project benefits to the target groups include:

- ICAR mainstreams the smallholder and climate change adaptation focussed technology development modalities of this project into its regular technology development efforts.
- The community institutions being nurtured by the proposed partner agencies are mature enough to own and manage FMUs, CFCs and ATBs as proposed under the project.
- The revenue generation from the FMUs, CFCs and ATBs are adequate to offset the operating costs, regular repair and maintenance and replacement costs.
- The AE machinery and equipment owners have required access to after sales service.

D. Measures built into the project design to promote sustainability (environmental, social, climate, economic) including at institutional or grassroots level;

As explained in the main report, the measures for sustainability are planned as follows:

1. Social sustainability: The project through its partner agencies will select existing cohesive VOs/CIs to work with and provide support for managing the FMUs, CFCs and ATBs.
2. Institutional sustainability: The project will provide gap filling support for building institutional capacity to own and manage the FMUs, CFCs and ATBs.
3. Environmental sustainability: The Project contributes positively to the environment and natural resource management through: (i) use of machinery for timely agricultural operations, increasing farm and labour productivity and reducing post-harvest losses, thereby enhancing productivity and helping producers to cope with climate change; (ii) use of women and hill farmer friendly farm implements thereby minimizing their drudgery, especially the women; (iii) replacement of draught animals with machineries.
4. Technical sustainability: The technologies promoted will be technically sound as being subjected to rigorous evaluation and eventual certification. Certification is a pre-requisite to provision of technology incentives, thereby the issue of technical sustainability will be largely addressed.
5. Economic sustainability: Economic sustainability depends largely on the ability of the farmers to generate adequate additional income to pay for renting AE machineries. The project has put in place a user expansion modality to initially provide incentive to the smallholder for renting the machinery and experience the benefits. This will ensure win-win situation for smallholder and the AE machinery rental set up of community institutions.

E. Systemic changes that are likely to be brought about due to project interventions, in particular addressing aspects of scaling up at institutional or grassroots level;

The main systemic changes relate to the development of: (i) an ecosystem that enables research to be more responsive to the needs of smallholders, with focus on women and hill farmers and also on technologies that help smallholders adapt to climate change events; and (ii) models of scaling up with community institution focus having technology incentives and user expansion support to bring AE technologies within the reach in terms of both, physical access and the affordability.

F. Challenges and risks to the implementation of the exit strategy;

The main risks relate to the need for coordination of several agencies in implementation which is detailed in Annex 9.

G. How the exit strategy will be monitored and how the degree of readiness for the exit will be tracked and assessed.

The exit strategy will continuously be monitored throughout the implementation and during annual Supervision Missions. In addition to this, the following reviews will be used to track and assess the readiness for exit.

The Second Supervision: it will assess the effectiveness of the institutional arrangements, especially the partnership between AED, KVK and SAD, and between SAD and state level partners (SRLM, WSM and others), demonstration modalities, including procurement of AE machinery and CGIAR led capacity building, lead farmer identification and training and lead farmer led field days, and technology incentive support for the acquisition of AE machinery and equipment. It will also assess the implementation modalities put in place for technology development under innovation framework. Implementation challenges would become apparent and modifications to project activities and implementation arrangements would be considered during the supervision of the project during the second year of implementation.

The mid-term review (MTR): it will assess the project outcomes; at this stage it would be possible to assess the sustainability of the partnerships forged in the project, as well as the development of technologies by ICAR, adoption of the technologies by the

smallholders and the viability of the community managed AE rental enterprises. At the time of MTR, based on the experience between SAD and partner organizations, it would be possible to make changes to the partnership modality by expanding the scope of better performing existing partners and bringing in new partners. Expenditure under various components, sub-components and activities will be assessed to rationalize allocations and also incorporate any new activity relevant to achievement of project goals and objectives. MTR will be conducted during the third year of project completion and will fine tune the exit strategy.

The completion review: the project effectiveness and sustainability will be confirmed at this stage. In particular, the review will examine the extent of the processes, established by the project, mainstreamed within implementing agencies, such as the participatory technology development with smallholder (women and hill farmer) focus, and the climate change event adaptation technologies, and also the scaling up of technologies using community institutions. This review will also confirm the profitability of the FMUs, CFCs and ATBs supported under the project.

Investing in rural people

India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

Annex 11: List of eligible activities to be financed by FIPS

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Asia and the Pacific Division
Programme Management Department

Annex 11 List of eligible activities to be financed by FIPS

Not applicable

IFAD
Investing in rural people

India

Scaling Up Agricultural Technologies For Smallholder Farmers

Project Design Report

Annex: List of Custom Hiring Centres in Project Areas

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Annex 12. List of Custom Hiring Centres in Project Areas

This annex presents the total custom hiring centres supported by two schemes of the Government, the Sub-Mission for Agriculture Mechanization (SMAM), and the Rashtriya Krishi Vikas Yojana (RKVY which refers to Remunerative Approaches for Agriculture and Allied Sector Rejuvenation). These are presented in table 1 below and refer to the number of CHC up to 2016-17.

Table 1. Number of CHC up to 2016-17 in the project area

States	TOTAL SMAM	TOTAL RKVY	GRAND TOTAL
Assam	61	0	61
Chhattisgarh	25	0	25
Jharkhand	87	107	194
Nagaland	12	1	13
Orissa	260	0	260

The State Rural Livelihood Missions are also equipping their Self Help Groups with Custom Hiring Centres and the below is a description from the State Rural Livelihoods Mission in Jharkhand.

Custom Hiring Centre are established to facilitate farm mechanization amongst the small and marginal farmers who otherwise forgo the use of farm machinery due to their inability to invest in such machines. The farmers are using the machines and equipment on rental basis from CHC without high additional costs, thus contributing to improving their productivity. The Ajeevika Krishak Mitra (AKM) is the point person who is overall managing CHC at village level.

In an initial phase, CHCs were established through convergence from Agriculture department in which machines/tools such as Power Tiller, spray machine, pump set, paddy thresher, cono-weeder etc were provided in 572 SHGs/ block organizations. There are Standard Operating Procedures for operating the CHC. It is expected that the CHC established at producer group level will have annual revenue upto Rs. 36,000; whereas in case of CHC established at block level, it will generate a revenue upto Rs. 72,000 per annum. The list of potential equipment provided is indicated in table 2 and 3 below.

Table 2. Equipment provided at block level

Tools	Total Unit
Power Paddy thresher	1
Paddy transplanter	1
Hand Winnower	1
Manual Single Row Seed Drill	1
DSR wetland drum seeder	2

Tools	Total Unit
Irrigation pump 3HP with Pipe	2
Hand Operated Reaper	2
self-propelled reaper (Paddy/wheat/Maize)	1
Portable Rice Miller	1

Table 3. Equipment provided at producer group level

Major intervention	Tools	Total Unit
SRI	SRI line marker	5
	Paddy Weeder	5
DSR	Line sowing marker (5 type)	4
	DSR Weeder	2
Potato	Ridge Furrow Marker	4
	Animal Drawn Potato Digger	3
SWI	SWI Weeder (Single type)	2
Vegetables	Vegetable Weeder (Three Tyne)	3
Others	Manual Auger with 3 changeable heads	2
	Nursery Transplanter	2
	Knapsack sprayer 16 Ltr with Plastic Barrel	5
Thresher	Hand Operated Thresher (Double Bearing)	2
Seed Treatment	Seed Dressing Drum (Double Bearing)	1

Note: Selection of implements and its hiring charges are decided jointly by the cluster level federations and members of producer groups depending upon the cost of each implement.