IFAD
Investing in rural people

Afghanistan

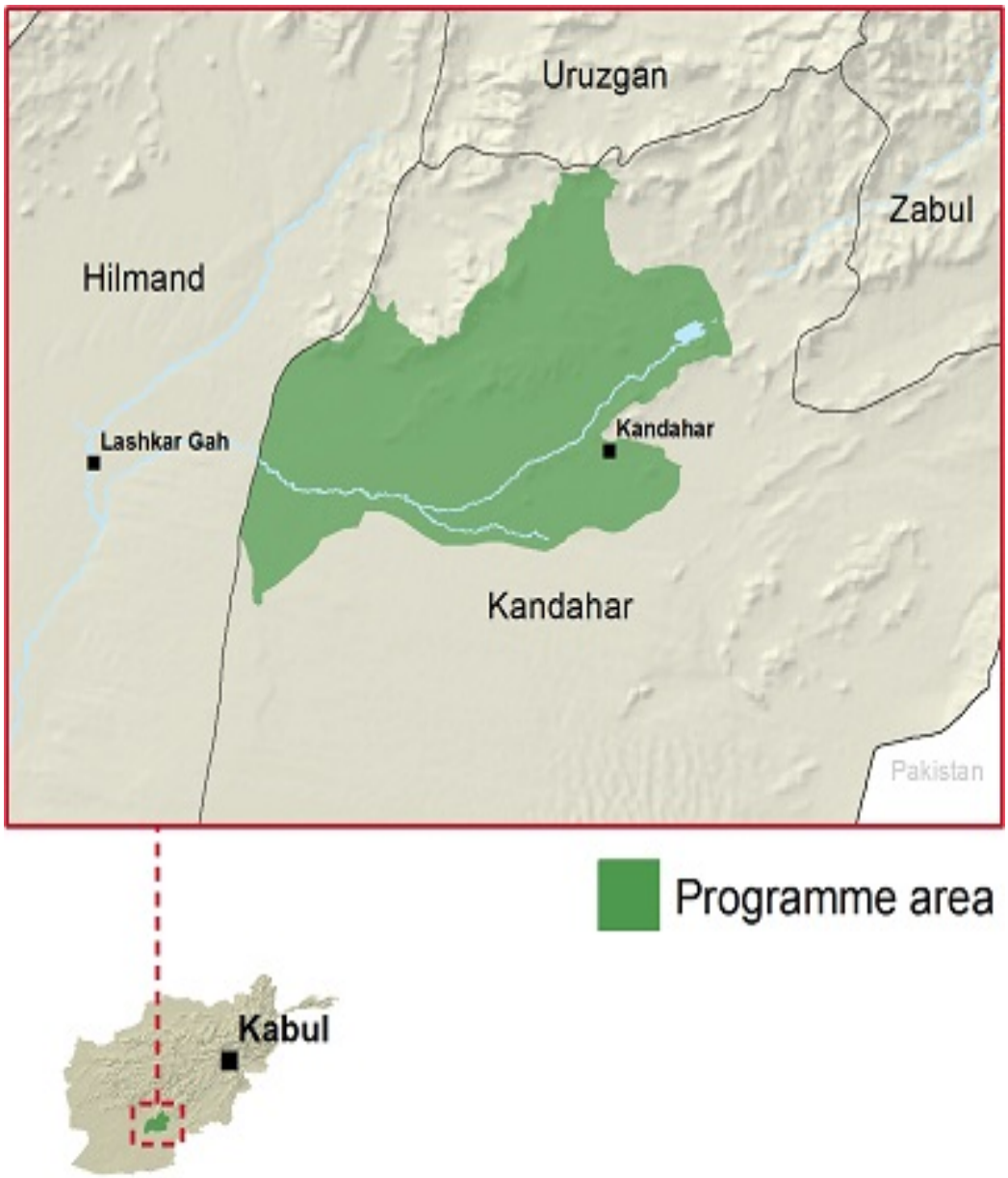
Arghandab Integrated Water Resources Development Programme

Design Report

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

Map of the Project Area



MEMO for Cofinancing “Type C” Projects

TO: QAG

THROUGH: Nigel M. Brett
Regional Director, APR

FROM: Candra Samekto
CPM, Afghanistan

Mawira Chitima
PTL

DATE: 22/10/2019

SUBJECT: Arghandab Integrated Water Resources Development Programme

Introduction

1. On the request of the Government of the Islamic Republic of Afghanistan, IFAD and the Asian Development Bank (ADB) jointly designed the co-financed Arghandab Integrated Water Resources Development Project (AIWRDP) with the total project value of US$ 403.04 million. IFAD and the ADB will finance investments in complementary activities, building on each other’s respective comparative advantages.

2. The project’s expected outcome is “improved management and use of water resources in the Arghandab River basin”, and AIWRDP will contribute to increasing jobs and gross domestic product (GDP) growth in line with the Afghanistan National Peace and Development Framework, 2017–2021. This would be achieved through four inter-related outputs, namely: (1) Dahla Dam capacity increased; (2) Reliability of irrigation water supply increased; (3) Agricultural water productivity improved; and (4) Capacity in water resource management and use strengthened.

3. At the time of the DRM discussion on 5 September 2019, there was general consensus that overall, AIWRDP represented an important opportunity for strengthening partnership between IFAD and the ADB in Afghanistan. Yet, a key concern raised was that the project design did not adequately reflect IFAD's specific role in promoting sustainable and inclusive rural transformation, and that it essentially provided financial resources to an ADB infrastructure project.

4. In this regard, it is noted that the IFAD overall grant financing in the amount of US$ 40 million specifically contributes to the above noted outputs 2 (IFAD financing of US$ 25.53 million), 3 (IFAD financing of US$ 7.53 million) and 4 (IFAD financing of US$ 1.36 million)[1]. The IFAD-supported activities are geared towards the rehabilitation of irrigation schemes and improved community irrigation services, building the capacity of smallholder farmers and their organizations to improve on-farm production and subsequent marketing, encouraging the uptake of climate-smart best practices and technologies and establishing mature marketing linkages and strategies. The development of training and advisory services will be central, as it will be supporting policy, legislation and regulatory reforms for improved management of the water resources.

5. The proposed project is expected to lead to sustainable availability and efficient use of irrigation water, enhanced productivity levels and improved market linkages as a means to improve food and nutrition security, and well-being. In this respect, the project responds directly to the objectives and priorities identified in IFAD’s CSN for Afghanistan. The proposed activities are also highly complementary to the ongoing IFAD-supported projects, on the one hand drawing on the lessons of past experience, and going forward, contributing to the growing knowledge base.

6. The above activities clearly reflect IFAD’s objective of fostering improved and more resilient livelihoods for the rural poor communities in the project area, enabling them to better manage risks and the effects of conflict, climate change and other shocks. In actual fact, by strengthening the governance of natural resources and the inclusive community-based organizations while facilitating more effective local government service delivery, IFAD’s funding will address some of the root causes of the fragility affecting the country.

Rationale for IFAD's Engagement in Co-financing and IFAD's Value Added

7. The IFAD strategy for engagement in countries with fragile situations, which was approved by the Executive Board at its session in December 2016 (EB 2016/119/R.4), states that partnerships can help IFAD to stay engaged in more

challenging contexts and that partnerships with other International Financial Institutions (IFIs) should be prioritized. It is on the basis of these considerations that the country team, with no ICO or other resources available on the ground, decided to partner with the ADB adopting a complementary approach that will enable IFAD to benefit from more than US$ 26 Million of ADB Technical Assistance, US$ 8 million of which will support IFAD-financed project activities aimed, *inter alia*, at working with communities on long-term development programmes to achieve long-term outcomes.

8. IFAD worked closely with the ADB throughout the (almost) three-year project design process, substantially influencing the same. An ADB concept originally focussed primarily on Dahla dam-related works, water resources, plans for electricity generation and for urban water supply to Kandahar city was transformed into an integrated design to include smallholder farmers and vulnerable groups, such as women and youth, and their needs in the agricultural sector, which IFAD's financing addresses through interventions under components 2, 3 or 4 of the Project.

9. The ADB financing will target the Dahla dam and major civil works, while the World Bank's investment will focus on water supply to Kandahar city. This arrangement is exactly in line with Government priorities for donor collaboration and harmonization. It is also in line with PMD's own priorities for fewer but larger projects, co-financed by large strategic partners. Today, IFAD is a promoter of effective partnerships, engaging in and often brokering the dialogue and discussions across various stakeholders. This will, in turn, enhance the effectiveness of the proposed co-financed project with ADB, as well as others such as the World Bank (financing water supply) and private sector partner (power generation) which are two additional project pathways benefiting from the investment under AIWRDP.

10. Whilst leveraging significant co-financing (US$ 348.78 million in ADB financing to IFAD's US$ 40 million contribution), the expected impact of the project is also reinforced by IFAD's added value as a recognized and strong champion of farmers and their farmer organizations (especially in marketing and 4Ps arrangements), its long experience in support of (and strengthening of) local and community participation in development, and by its particular special attention to the engagement and targeting of women and youth. These IFAD-inherent principles and approaches are also in line with the priorities of Government.

11. With the concentration of the ADB investment in hard infrastructure, the complementary IFAD financing (and experience) serves as a catalyst to support a more integrated intervention, establishing the appropriate linkages between infrastructure development, community schemes and services and longer-term and sustainable agricultural and natural resource management. Furthermore, the IFAD *modus operandi* will better ensure that benefits are directed to the appropriate target group and that the expected outreach is achieved. In effect, the co-financing is designed to achieve more sustainable and greater impact for rural people in the Arghandab catchment area.

12. In addition, it is expected that the Project will be highly complementary to IFAD's current portfolio in the country and IFAD experiences in Afghanistan under the two ongoing projects[2] . The ongoing projects have already demonstrated that supporting small farmers through irrigation infrastructure and services and increased agricultural productivity/ production has had positive effects on household income and food security, with emerging indications of accelerated poverty reduction. These projects, through support to agriculture and livestock activities, have resulted in increased income, improved food security, and better/ diversified nutrition. The lessons learned and experience will be shared with the project management of this new project on regular basis.

13.

Lessons Learned

14. In Afghanistan, IFAD has financed three projects for a total value of US$ 177.4 million. Substantial experience gained and the lessons learned from IFAD on-going projects have been fully integrated. The following lessons learned are of significance and relevance:

- The proposed approach based on community participation in management and maintenance of infrastructure is taken directly from IFAD. Community Development Councils (CDCs) and Water User Associations (WUAs) are a crucial entry point and strategy for participatory development. The CDCs have proven to be cost-effective and pragmatic especially as a means to mitigate security risks, and are effective for improved water resources management. Subsequently, the increased availability and reliability of irrigation water resulted in diversification into high-value crops and increased productivity when coupled with extension services. The changing farming system now necessitates better access to markets as productivity and incomes increase; contract farming has been found to be quite instrumental in guaranteeing access to market and fetching higher produce prices.
- An integrated approach to water resource management is useful for better managing this scarce resource, thus meeting demand from various sectors. This implies that each sector should have maintenance integrated into management plans. The institutional strengthening at the grass-root level (such as Water User Associations) foreseen under AIWRDP enhances the sustainability of the rehabilitated infrastructure and leverages on community contributions to water asset management as active partners together with the public sector entities.

- The proposed approach of community contracting and matching grants, which are also taken from IFAD's CLAP and SNAPP2 on-going projects, have been essential elements of the AIWRDP
- With regards to project management, it is more efficient to implement interventions through a dedicated PMU, rather than the administration of the project through the regular channel of the ministries. Thus key functions such as monitoring and evaluation (M&E), procurement, financial management and HR in IWRDP will be defined under a dedicated PMU if increased transparency, effectiveness and efficiency are to be achieved under AIWRDP.
- Some of the weaknesses in FM, procurement, and M&E verified in on-going projects have also been addressed through the hiring of an international technical assistance team and it is expected that, in its capacity as Lead Project Agency for AIWRDP, the Ministry of Finance (MOF) will significantly strengthen management functions around the project.

Contribution to SDGs and alignment with country sector and IFAD objectives

15. The project aims to assist the Government of Afghanistan to attain progress on the Sustainable Development Goals (SDGs) that fall within IFAD's comparative advantages. In particular, it will tackle SDG 1 (end poverty in all its forms everywhere), SDG 2 (zero hunger), SDG 5 (gender equality), SDG 6 (ensure availability and sustainable management of water and sanitation for all), SDG 8 (promote inclusive and sustainable economic growth, employment and decent work for all), SDG 13 (climate action) and, in part SDG 17 (partnerships for the goals).

16. In terms of alignment with specific country sector strategies, the project is guided by the government policy for productive water resources as outlined in the Strategic Framework for the Water Sector. It is also in line with the National Water and Natural Resources Development Program which targets improved access to irrigation for 300,000 ha; establishing and strengthening sub-basin agencies, sub-basin councils, river basin agencies, river basin councils and WUAs; and restoring 28,000 ha of rangeland through community-based management. The Afghanistan National Peace and Development Framework, 2017–2021 supports increased jobs and GDP growth through improved management and use of water resources. Other key policies are the National Comprehensive Agricultural Sector Development and Reform Strategic Framework, and the draft National Irrigation Policy.

17. The project is also responsive to the three strategic objectives outlined in IFAD’s Strategic Framework 2016-2025, and to the specific objectives as identified in the current Afghanistan Country Strategy Note.

Definition of Target Groups and Targeting Strategy

18. The overall investment programme will primarily benefit the 830,165 (2018)-strong population of Kandahar City and the population of seven rural districts of Kandahar Province (approximately 1.25 million people) – through Dahla dam upgrading, irrigation, urban water supply, and electricity power generation works. The primary target group of the IFAD-financed elements of AIWRDP will be farming communities, who will be supported through the formation of farmer organizations and Water User Associations (WUAs) as community institutions to complement 120 community irrigation systems that will be modernized.

19. There are two key reasons why AIWRDP focuses on the province of Kandahar. First, it is about poverty headcount. Afghanistan is the poorest country in APR with a 54.5% poverty rate[3]. A recent study[4] shows that around 60% of the rural population are living below the poverty line. Although it is not the poorest province in Afghanistan, Kandahar together with Herat and Nangahar, are the three provinces to have the highest percentage of poor people. The very low population sizes in some of the poorest provinces makes potential investment there much more ineffective. The approach adopted by this project is about reaching as many poor people as efficiently as possible. Secondly, irrespective of the rates of poverty, it is the prerogative of the Government to select the project area. We received a request from Government to work with the World Bank and ADB in Kandahar, and we are responding to the request of the Government.

20. The project target area itself has been pre-defined by the ADB feasibility study. This design adopts a command area development approach with rehabilitation of 120 pre-selected irrigation schemes. Importantly in the command areas to be developed, ADB feasibility studies confirm that 80% of the population own less than 1 ha of irrigated land. Hence 80% of the beneficiaries of the command area development are confirmed as small holder farmers and IFAD target groups. Moreover in a conflict affected country like Afghanistan, and with the command area approach, it is simply not possible to divide communities for not benefiting from the project. Therefore the project is adopting a saturation approach to targeting within the 120 irrigation command areas that have already been selected by ADB feasibility study. Each of these 120 irrigation command areas would have a Water User Association comprised of about 300 families each. Improvements to community irrigation systems would be done through community level contracting. On-farm demonstrations and on-farm matching grants to farmer groups would be done through careful

selection of farmer households. The total population benefiting from the project is 36,000 households (approximately 324,000 people, with special attention given to women and the youth).

21. As for the IFAD financing, the majority of the (to be targeted) households can be categorized in terms of poverty, as moderately poor and extremely poor households. In terms of food insecurity and climate change, the target groups are considered highly vulnerable with farming increasingly diminishing due to the scarcity of water and declining productivity. The target group is predominantly engaged in fruit and vegetables, wheat and rice farming. The project will also assign priorities to engaging with and creating job and income opportunities for youth. Women and youth will have specific consideration in the selection criteria for different on-farm and off-farm activities.

22. It is noted that IFAD adopted a country programme approach in Afghanistan, and has another project (CLAP) which focuses on livelihoods of the Kuchi people (the poorest group in Afghanistan).

IFAD's Mainstreaming Areas

23. The proposed project takes due consideration of all of IFAD's mainstreaming commitments, with a particularly strong attention to gender and climate-focused interventions. ADB has conducted a comprehensive climate vulnerability and risk management assessment for AIWRDP. Acknowledging the anticipated climate change impact, Afghanistan has identified among its key climate change adaptation priorities, the rehabilitation of small- to large-scale water resources infrastructure and increasing the irrigated agricultural land area. The proposed project directly serves to implement these priorities through increasing the Dahla Dam capacity and other expected outputs; the IFAD financing, in particular, concentrates on the rehabilitation of community irrigation systems (and its management), towards increasing the irrigated land area, capacity building and policy reforms. IFAD will contribute to climate adaptation financing with an amount of US$ 18.3 million (45%) according to ADB calculation or US$ 25.23 million (63%) based on IFAD climate finance screening, which is above the target of 25%.

24. With regards to gender transformation, IFAD has worked with the ADB to establish a gender action plan aimed at ensuring women secure equal access to the development opportunities created under the project, in spite of severe cultural constraints. Women will also be trained to be local resource persons (paraprofessionals), particularly for greater outreach to women farmers and their uptake of best practices and technologies. The project will also promote and encourage opportunities for the youth, specifically through the creation of employment generation in on-farm and off-farm activities. Women farmers and youth will have equitable access to agricultural extension services, training opportunities, technology transfer and advisory services.

Results Framework

25. The result framework prepared by the ADB will be used for M&E purposes. However, IFAD has succeeded in pushing the ADB to include IFAD Core Indicators in the project log frame, such as: (i) 115,000 ha of farmland under water-related infrastructure rehabilitated (IFAD core indicator; output 1.1.2); (ii) 70% of households reporting an increase in production (relevant to IFAD core indicator: outcome 1.2.4); (iii) Law on water sector regulations proposed to policy makers for amendment (IFAD core indicator; outcome Policy 3). In addition, a core indicator on total outreach (36,000 households) is referenced in the Project Administration Manual (PAM). These measures show a significant achievement in terms of IFAD visibility at the design stages of AIWRDP.

Project Cost and Financing, including IFAD contribution

26. The project is estimated to cost US$403.04 million, to be met by an ADB grant in the amount of US$348.78 million and an IFAD DSF grant in the amount of US$40 million. The beneficiary and Government contributions amount to US$14.26 million.

27. The total financing has been costed by output/ key activity and financier. The IFAD financing is allocated to partially fund outputs 2, 3 and 4, specifically for the rehabilitation of selected community irrigation systems (output 2b – US$25.53 million), demonstration and upscaling of innovative agricultural on-farm practices (3a – US$7.53 million), and water resources regulatory reform (4a – US$1.36 million)[5]. ADB will administer the IFAD funds, with IFAD disbursing grant resources directly to the recipient. These arrangements will be laid out under the co-financing Agreement between IFAD and ADB.

Alignment of the Design Process

28. Whilst ADB has initiated the design and taken the lead, the process has been highly collaborative following the Government's request for IFAD co-financing. ADB, IFAD and the Government have committed to pursuing efficiency in design, which entails the use of joint design documents, alignment of processes to the extent possible, as well as in-country joint meetings and reviews. Whilst the documentation of ADB will be utilized, IFAD has been fully involved, including for finalization of the documentation (i.e. the Report and Recommendations of the President to the ADB Board, Project Administration Manual (PAM) and other linked/supplementary documents). IFAD's participation in the final design ensures the inclusion of interventions for which IFAD has comparative advantage and added value, and that IFAD11 priorities and commitments are met.

29. The proposed project was submitted for deliberation by the ADB's Board on 11 September 2019, and will be presented to IFAD's Executive Board session in December 2019. It is noted that there is still an opportunity to shape the IFAD components implementation arrangements through additions to the PAM, but it is too late to make changes to the project design report. In this regard, specific wording has been included in the ADB PAM (Para 150) whereby *in relation to the details on stakeholder participation, outreach and engagement, detailed plans would be developed within 6 months after project effectiveness*.

Supervision Arrangements

30. The project will be administered by the ADB, including the IFAD financing. IFAD will ensure the participation of a senior consultant on key missions, including the start-up and Mid-Term Review missions, and if necessary special technical support during supervision missions. Notably, IFAD will provide the requisite support for implementation to ensure that IFAD's mandate and priority commitments for IFAD11 are fully met and that IFAD's international experiences are leveraged for effective project implementation.

Estimated Cost Sharing by IFAD for Design and Implementation

31. The associated costs of IFAD's participation in finalization of the design totalled approximately US$ 67,000. The ADB administrative charges will be set in accordance with the corporate agreements between IFAD and ADB for projects in respect of which the ADB acts as Cooperating Institution for IFAD. The approximate amount of US$ 15,000 to 20,000 is budgeted per annum for implementation support and supervision activities.

Risk

32. Afghanistan is possibly the toughest country to work in APR given the active ongoing conflict. Nevertheless, it is a LIC, a fragile state, and retains the confidence of the international community, and hence it is a country that IFAD has prioritized for support. This is very much in line with the international community position, adopted among others by the World Bank and the ADB, which are taking exactly the same position, with big new projects being processed in real time. IFAD has gone into this process with full awareness and maximum attention to the risk. ADB applied their Fragile and Conflict Situation Approach (FCAS) to design, with an action plan prepared that includes: (1) Extensive consultation with local communities; (2) Making sure the whole community benefits from investment; (3) Maximum use of local community contractors (not international contractors); and (4) Local community participation in management and maintenance of investments.

33. In addition to the security conditions in the country, the other risks are the technical nature related to the design and construction of the hard investments/infrastructure. The major risk is related to dam safety, lack of security for contractors and field staff and conflict over land ownership/water rights. These will be mitigated with appropriate expertise being available, comprehensive communication strategy and deployment of risk management toolkits and community engagement.

34. In general, there is also a particular risk associated with the co-financing arrangements, where a cooperating institution is responsible for the administration of the IFAD financing. Specifically, this risk relates to the satisfactory prioritisation of those interventions to be financed by IFAD – the extent to which activities are carried out in a timely manner and funds are disbursed as planned (rate of disbursement), as well as the timeliness of decision-making and undertaking of corrective measures when required. IFAD's involvement in project supervision, support and key

decision-making event will mitigate such risks.

35. Afghanistan just conducted the first round of presidential election on 28 September 2019, to be followed with the second one in early 2020, which creates political condition instability in the country. There is a possibility of government changes in the coming months, subject to the presidential election outcome, which may influence the preparation and implementation of the project. The country team mitigates the risk by aiming to have the grant negotiation with the Government of Afghanistan before the results of the first round of presidential election are made public. A dedicated Project Management Unit will also be established to administer and implement the project, rather than through the regular channel of the ministries, which will provide a stable project management team regardless of any government change. Furthermore the Afghanistan's national budget remains heavily dependent on foreign aid (accounts for more than 90 percent)[6], which will result in any new government needing to maintain foreign support, particularly the type of support that is directly benefiting the communities.

Footnotes

[1] The remaining financing of US$ 5.58 million is costed for (physical and price) contingencies.

[2] Support to National Priority Programme - Phase 2 (SNaPP2) and Community Livestock and Agriculture Project (CLAP)

[3] ADB Basic Statistics 2019

[4] UNICEF 2019 multidimensional calculation of poverty

[5] The remaining financing of US$ 5.58 million is costed for (physical and price) contingencies.

[6] USD 15.7 billion out of US$ 17.1 billion (the World Bank Country Partnership Framework for Afghanistan 2017-2020)

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Arghandab Integrated Water Resources Development Programme

Design Report

Annex 1: CI PDR

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

Report and Recommendation of the President to the Board of Directors

Project Number: 48096-002
August 2019

Proposed Grant and Administration of Grant Islamic Republic of Afghanistan: Arghandab Integrated Water Resources Development Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 14 July 2019)

Currency unit	–	afghani (AF)
AF1.00	=	$0.0124545099
$1.00	=	AF80.2922

ABBREVIATIONS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
AIS	–	Arghandab Irrigation System
ASBA	–	Arghandab Sub-Basin Agency
EIA	–	environmental impact assessment
FCAS	–	fragile and conflict-affected situations
GAP	–	gender action plan
GDP	–	gross domestic product
ha	–	hectare
IFAD	–	International Fund for Agricultural Development
LAR	–	land acquisition and resettlement
LARF	–	land acquisition and resettlement framework
LARP	–	land acquisition and resettlement plan
MAIL	–	Ministry of Agriculture, Irrigation and Livestock
MCM	–	million cubic meters
MEW	–	Ministry of Energy and Water
MOF	–	Ministry of Finance
O&M	–	operation and maintenance
PAM	–	project administration manual
SPV	–	special purpose vehicle
TA	–	technical assistance

NOTE

In this report, “$” refers to United States dollars.

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Director	Donneth Walton, Environment, Natural Resources, and Agriculture Division, CWRD
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Peer reviewer	Noriyuki Mori, Senior Water Resources Specialist (Dam Optimization), Sustainable Development and Climate Change Department

CONTENTS

PROJECT AT A GLANCE

1. Basic Data

Project Number: 48096-002

Project Name	Arghandab Integrated Water Resources Development Project	**Department /Division**	CWRD/CWER
Country	Afghanistan, Islamic Republic of	**Executing Agency**	Ministry of Finance
Borrower	Afghanistan, Islamic Republic of		
Country Economic Indicators	https://www.adb.org/Documents/LinkedDocs/?id=48096-002-CEI		
Portfolio at a Glance	https://www.adb.org/Documents/LinkedDocs/?id=48096-002-PortAtaGlance		

2. Sector

Sector	Subsector(s)	ADB Financing ($ million)
Agriculture, natural resources and rural development	Agricultural production	48.45
	Irrigation	25.97
	Water-based natural resources management	274.36
	Total	**348.78**

3. Operational Priorities

- ✓ Addressing remaining poverty and reducing inequalities
- ✓ Accelerating progress in gender equality
- ✓ Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability
- ✓ Promoting rural development and food security
- ✓ Strengthening governance and institutional capacity

Climate Change Information

Climate Change impact on the Project	High
ADB Financing	
Adaptation ($ million)	109.60
Cofinancing	
Adaptation ($ million)	14.39

Sustainable Development Goals

SDG 1.5
SDG 2.4
SDG 5.b
SDG 6.4, 6.5
SDG 10.1
SDG 13.a

Gender Equity and Mainstreaming

Effective gender mainstreaming (GEM) ✓

Poverty Targeting

Geographic Targeting ✓

4. Risk Categorization: Complex

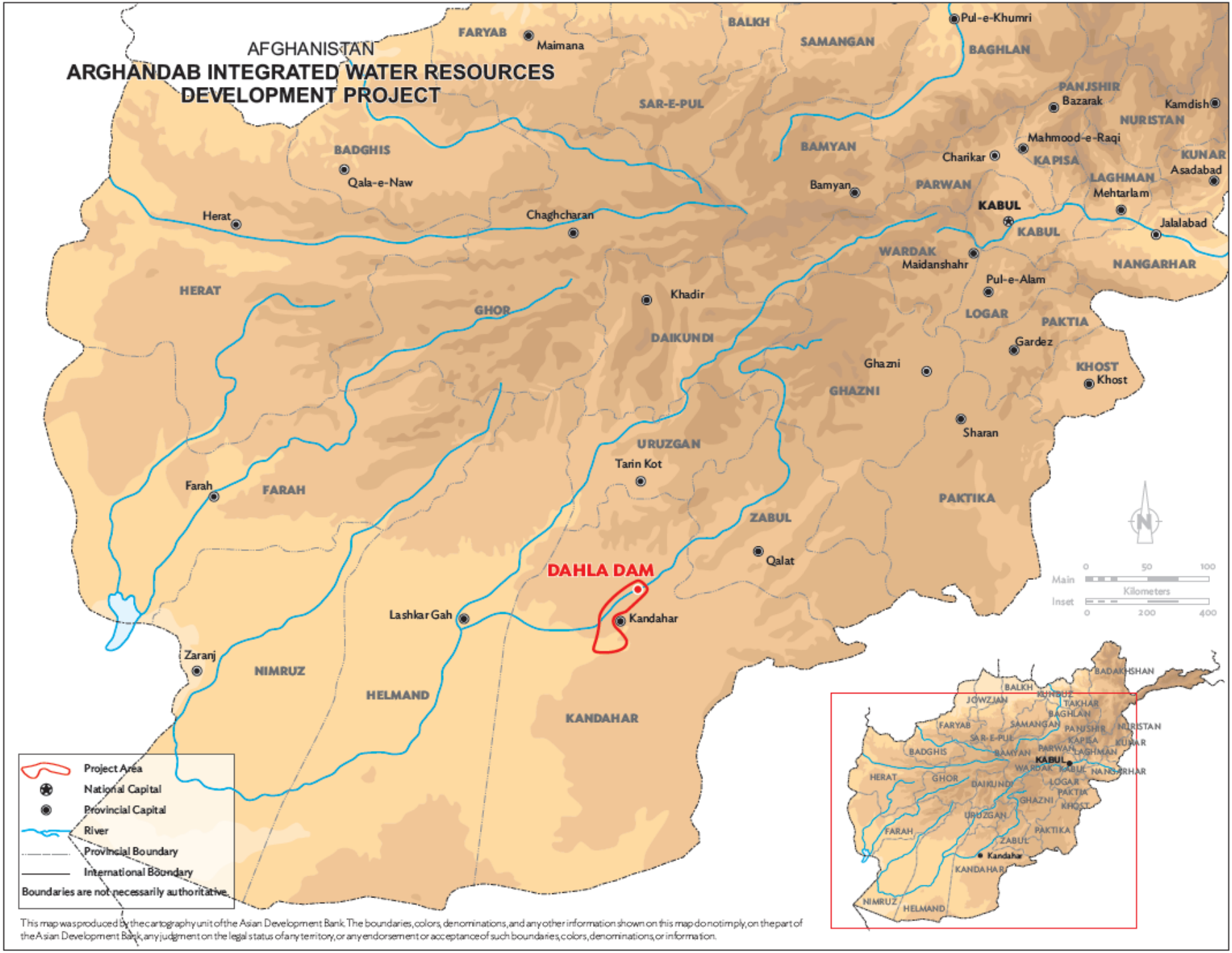
5. Safeguard Categorization

Environment: A **Involuntary Resettlement:** A **Indigenous Peoples:** C

6. Financing

Modality and Sources	Amount ($ million)
ADB	**348.78**
Sovereign Grant projects: Asian Development Fund	348.78
Cofinancing	**40.00**
IFAD Grants - Grant projects (Partial ADB Administration)	40.00
Counterpart	**14.26**
Beneficiaries	10.00
Government	4.26
Total	**403.04**

Currency of ADB Financing: US Dollar



This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

191392A 19AFG ABV

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed grant to the Islamic Republic of Afghanistan for the Arghandab Integrated Water Resources Development Project. The report also describes the proposed administration of a grant to be provided by the International Fund for Agricultural Development (IFAD) for the Arghandab Integrated Water Resources Development Project, and if the Board approves the proposed grant, I, acting under the authority delegated to me by the Board, approve the administration of the IFAD grant.

2. Water availability in Afghanistan is highly seasonal and erratic, with frequent and worsening droughts affecting agriculture, living standards, and the local economy. Improved reliability of irrigated water supply is crucial to enable the expansion of high value cropping enterprises and associated activities. The project will improve the availability and management of water resources in the Arghandab basin in Kandahar province by (i) increasing the storage capacity of the Dahla Dam by raising its height, (ii) increasing the reliability of irrigation water supplies downstream of the dam, (iii) improving agriculture water productivity by providing on-farm support to farmers to improve crop production, and (iv) strengthening institutions in water resource management. Additional benefits associated with raising the dam include hydropower generation, to be undertaken by the private sector; and urban and industrial water supply to Kandahar City and its surroundings, to be undertaken by World Bank.

II. THE PROJECT

A. Rationale

3. Afghanistan is a conflict-affected state and one of the least-developed countries in the world. In 2016, its poverty rate was 55%, while 44.6% of its inhabitants were considered food insecure.[1] With the country's average annual per capita gross domestic product (GDP) of $610 from 2011 to 2017, Afghanistan ranked 167th out of 183 countries in terms of GDP according to the World Bank.[2] Agriculture is Afghanistan's major source of livelihood, employing 62.2% of the national workforce of 10.9 million people in 2017 and contributing 21.1% of national GDP, with sector value addition of $4.1 billion in 2016.[3] However, crop yields are below the world average; the average wheat yield in 2017 was 2.0 tons per hectare (ha), compared with a world average of 3.5 tons per ha.[4] Within agriculture, horticulture accounts for 34% of sector GDP. The diverse geographical and climatic conditions of Kandahar Province enable a wide range of crops to be produced at different times of the year, including apricots, pomegranates, grapes and cereal crops such as wheat. While horticulture provides a comparative advantage in terms of revenue for farmers, it requires sufficient availability and reliability of irrigation water.

4. **Water resources.** Afghanistan is a dry country with low precipitation: the average annual precipitation in Kandahar is 176 millimeters. Limited access to reliable irrigation water is a key constraint to agricultural productivity, besides low-quality inputs and traditional agricultural practices. High summer temperatures, low humidity, and lack of rainfall between April and November mean that without irrigation, few crops can produce profitable yields. The Dahla

[1] Government of Afghanistan, Central Statistics Organization. 2017. *Afghanistan Living Conditions Survey (2016–2017*). Kabul.
[2] World Bank. World Development Indicators (accessed 2 April 2019).
[3] The Global Economy.com. Afghanistan: GDP Share of Agriculture (accessed 2 April 2019).
[4] Food and Agriculture Organization of the United Nations. Food and Agriculture Data (accessed 5 June 2019).

Dam, constructed in 1952, is the second largest dam in Afghanistan with a height of 55 meters and a crest length of 535 meters.[5] It is in the Shah Wali Kot District of Kandahar Province in Afghanistan, about 40 kilometers north east of the provincial capital Kandahar. Its design capacity of 478 million cubic meters (MCM) of water provides irrigation water to the downstream Arghandab Irrigation System (AIS), which delivers water to 55 community irrigation schemes, and 60 riparian community irrigation schemes, covering five districts of Kandahar Province including Kandahar City. Dahla Dam does not supply water to downstream urban communities, and its hydropower potential has not been developed.

5. The Dahla Dam reservoir stores and controls irregular and short duration snowmelt flow from the Hindu Kush mountains. However, the reservoir has lost 40% of its storage capacity because of siltation, and its ability to provide regulated downstream flow has been seriously constrained. This has resulted in (i) reduction in cropped area, with only 47% of the command area being regularly irrigated; (ii) expansion constraints for high value cropping; (iii) increased reliance on groundwater for more reliable irrigation water supplies impacting the water table and the cost of pumping which is borne by farmers; and (iv) cropping patterns which are biased to winter and forage crops of lower value cereal to reduce risk from water shortage. Lack of water storage regulation also increases the risk of flood events.

6. The AIS has also suffered deterioration, reducing water conveyance efficiency and losing water distribution control. Among farmers, there is limited awareness and low adoption of water-efficient on-farm technologies such as laser levelling and drip irrigation, contributing to low yields and unproductive use of limited water resources. Current yields of irrigated crops in the project area average 30% of good agricultural practice.

7. **Climate change impacts.** Current climate change models indicate significant warming across Afghan provinces, and decreased precipitation, particularly spring rainfall.[6] Increased drought frequency, extreme weather events, and a raise in the ambient Afghanistan climatic temperature by 4°C - 6°C are predicted by 2070, further highlighting the need for improved water resources management, including improving storage capacities.[7] Among Afghanistan's key climate change adaptation priorities are: (a) rehabilitating small- to large-scale water resources infrastructure, (b) increasing irrigated agricultural land area, (c) strengthening hydrological and meteorological monitoring networks, and (d) improving watershed management.[8] Ahead of project formulation, the Asian Development Bank (ADB) undertook a climate change assessment for agriculture and water resources, and consulted with key government stakeholders including the Ministry of Energy and Water (MEW) and the Ministry of Agriculture, Irrigation and Livestock (MAIL) on adaptation investment needs. ADB identified multi-purpose dams with climate-resilient irrigation, hydropower, and water resources management as priority project investments to mitigate risks associated with a changing climate (e.g. drought and floods).[9]

8. The Arghandab Sub-Basin Agency (ASBA) under MEW handles the management of

[5] Six saddle dams have been built in the periphery of the dam, which together measure 2,040 meters.
[6] M. Savage et al. 2009. *Socio-Economic Impacts of Climate Change in Afghanistan.* Stockholm: Stockholm Environment Institute.
[7] Climate Risk and Vulnerability Assessment (accessible from the list of linked documents in Appendix 2).
[8] Government of Afghanistan. 2015. *Intended Nationally Determined Contribution. Submission to the United Nations Framework Convention on Climate Change.* Kabul.
[9] ADB. 2016. *Economics of Climate Change in Central and West Asia – Adaptation Component: Final Report*. Consultant's Report. Manila (TA 8119-REG).

river flows and operation of the Dahla Dam, and management of the AIS main canal system. Community irrigation schemes are managed by *mirabs* (community-assigned water bailiffs) for the various subdivisions and individual farms within the community irrigation schemes. The government recognizes the need for effective operating capacity for the Dahla Dam and the AIS. To improve AIS management, it intends to establish two special purpose vehicles (SPVs) for water delivery services and revenue collection, one for Dahla Dam operations and the other for AIS operations, to be developed by the project for implementation by MEW. This requires restructuring support and capacity building, including provision of suitable equipment for infrastructure maintenance. MEW also has limited capacity to forecast water availability and coordinate delivery to meet irrigation demand. Strengthening capacity and regulatory development will enable improved management of the AIS and increased reliability of irrigation water to farmers' fields.

9. By increasing the storage capacity of the Dahla Dam and improving its operations, combined with modernization and improved management of the AIS and farmers' stronger capacity and skills for more productive agriculture, the area under irrigation is expected to expand from an average of 54,000 ha to 65,000–81,300 ha by 2026, depending on the dam storage and associated flow releases.[10] Increased storage capacity will also provide water for municipal supply to Kandahar City, hydropower and environmental flows for the Arghandab River.

10. About two-thirds of employed women in Afghanistan are engaged in agriculture, mainly in horticulture, livestock raising, and agro-processing activities. Cultural restrictions limit women's mobility, and sex segregation curbs access to inputs and agriculture extension services. Very few women own land or have water rights, which further impedes their ability to contribute to improved land and water management. The project will build the capacity of female agriculture extension workers to access female farmers, provide scholarships to female government officers for master of science degrees in integrated water resources management, and provide female farmers with grants for improving agricultural productivity and economic opportunities.

11. **Enabling policy environment.** The High Council for Land and Water is responsible for coordinating water-related tasks of national institutions, recommending development plans and strategies for cabinet approval; recommending drafted legislation and regulations for approval; monitoring the implementation of plans by line ministries; resolving water-related disputes between ministries; and ensuring compliance with the Water Law, 2009 by relevant ministries and agencies. The Water Law states that "water is free," which has constrained progression to implement water delivery service charges and, therefore, a sustainable budget for operation and maintenance (O&M). Not contradicting this principle, amendments to the Water Law explicitly allowing for the charging of water delivery services has been agreed by the Office of the President, and legislative changes are in motion.

12. **Government strategies.** Government policy for productive water resources is outlined in the Strategic Policy Framework for the Water Sector, which provides directions for the water sector in Afghanistan.[11] The Afghanistan National Peace and Development Framework, 2017–2021 supports increased jobs and GDP growth through improved management and use of

[10] The agricultural (and urban) demand is highest in the months of June to August, and irrigation flow varies according to availability and crop water demands.
[11] Government of Afghanistan. 2004. *A Strategic Policy Framework for the Water Sector*. Kabul.

water resources.[12] Other key policies are the National Comprehensive Agricultural Development Priority Program[13] and the draft National Irrigation Policy.[14] These highlight critical issues for the sector, including (i) land and water productivity in irrigated agriculture not reaching its potential; (ii) weak irrigation management institutions (government and community-based); (iii) constrained public and private stakeholder capacity; and (iv) legal framework governing irrigation requiring updates to further clarify mandates, functions, and responsibilities.

13. The $1.1 billion National Water and Natural Resources Development Program (2010–2013, but continuing) targets to improve access to irrigation, and to establish and strengthen water basin agencies. The National Irrigation Program (2016–2025), with an investment requirement estimated at $1.5 billion, aims to improve and rehabilitate irrigation services, enhance agricultural extension services, and improve on-farm water management and O&M.

14. Since 1966, ADB has invested about $545 million in water resources, mainly for irrigation. ADB operations have resulted in 140,000 ha of improved irrigated land, with more than 225,000 ha under development. Key areas of assistance in ADB's country operations business plan, 2019–2021 for Afghanistan are irrigation and water resources, agriculture market infrastructure, value chain development, integrated water resources management, institutional strengthening and reforms, and increased participation of women in agriculture.[15]

15. ADB has financed the Western Basins Water Resources Management Project,[16] the Agriculture Market Infrastructure Project,[17] the Water Resources Development Investment Program,[18] the Community-Based Irrigation Rehabilitation and Development,[19] the Northern Flood-Damaged Infrastructure Emergency Rehabilitation Project,[20] the Panj-Amu River Basin Sector Project,[21] the Horticulture Value Chain Development Sector Project,[22] and regional technical assistance (TA) for Strengthening Integrated Water Resources Management in Mountainous River Basins.[23] Lessons from these interventions highlight the need to integrate approaches to water resources allocation between competing users, increase water productivity, adapt to climate change and disaster risk impacts, strengthen and develop

[12] Government of Afghanistan. 2016. *Afghanistan National Peace and Development Framework (ANDPF), 2017 to 2021*. Kabul.
[13] Government of Afghanistan, MAIL. 2009. *National Comprehensive Agriculture Development Priority Program, 2016-2021*. Kabul.
[14] Government of Afghanistan, MAIL. 2017. *National Irrigation Policy, 2017-2030* (draft). Kabul.
[15] ADB. 2018. *Country Operations Business Plan: Afghanistan, 2019–2021*. Manila.
[16] ADB. 2005. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Asian Development Fund Grant to the Islamic Republic of Afghanistan for the Western Basins Water Resources Management Project*. Manila.
[17] ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Asian Development Fund Grant to the Islamic Republic of Afghanistan for the Agriculture Market Infrastructure Project*. Manila.
[18] ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility and Administration of Grant and Cofinancing to the Islamic Republic of Afghanistan for the Water Resources Development Investment Program.* Manila.
[19] ADB. 2012. *Grant Assistance Report: Proposed Grant Assistance to the Islamic Republic of Afghanistan for Community-Based Irrigation Rehabilitation and Development*. Manila.
[20] ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Grants and Administration of Grant to the Islamic Republic of Afghanistan for the Northern Flood-Damaged Infrastructure Emergency Rehabilitation Recovery Project*. Manila
[21] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Grant and Administration of Grant to the Islamic Republic of Afghanistan for the Panj-Amu River Basin Sector Project.* Manila.
[22] ADB. 2018. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Horticulture Value Chain Development Sector Project.* Manila
[23] ADB. Regional: Strengthening Integrated Water Resources Management in Mountainous River Basins.

agricultural value chains for inclusive and equitable development impact, use national contractors to the extent possible, and conduct diligent ADB supervision of safeguards compliance.

16. Development partners have contributed to water resources and agriculture development and management, with irrigation and horticulture the main beneficiaries. The Arghandab Irrigation Rehabilitation Project (2008–2012, financed by the Canadian International Development Agency)[24] improved irrigation in about 30,000 ha, and cleared mines around the Dahla Dam.[25] Ongoing relevant projects include the Support to National Priority Programme 2,[26] and Community Livestock and Agriculture Project,[27] both financed by IFAD, and the National Horticulture and Livestock Productivity Project financed by the World Bank.[28]

17. The project is consistent with ADB's country partnership strategy, 2017–2021,[29] as it will develop agriculture and water resources in support of the government's strategic priorities, and is included in ADB's country operations business plan, 2019–2021 (footnote 15). The project is aligned with the objectives of ADB's Strategy 2030 through the operational priority on promoting rural development and food security, and the guiding principles of promoting innovative technology and delivering integrated solutions.[30] It is also aligned with ADB's Operational Plan for Agriculture and Natural Resources, 2015–2020[31] and Water Operational Plan, 2011–2020.[32]

18. Project preparation adopted an approach that is sensitive to fragile and conflict-affected situations (FCAS). During design planning, it was essential to (i) conduct meaningful local consultations to the extent permitted by prevailing security restrictions, to ensure that local voices were heard and considered; and (ii) take an integrated approach to water resources development so that conflicts over water would be minimized and all segments of the community would, to the extent possible, benefit. Implementation arrangements needed to (i) place high priority on achieving fair and equitable resettlement of affected persons; (ii) design civil works contract packages to maximize opportunities for national, and preferably local contractors, in line with the Enhanced Project Delivery Approach Paper;[33] (iii) ensure extensive empowerment of farmer beneficiaries through community contracting and grant matching programs; and (iv) place significant efforts on effective communication by each implementing agency.

B. Project Description

19. The project is aligned with the following impact: jobs and GDP growth increased

[24] In 2013, the Canadian International Development Agency merged with the Canadian Department of Foreign Affairs, Trade and Development.
[25] Government of Canada. Executive Summary - Arghandab Irrigation Rehabilitation Project (accessed 2 April 2019).
[26] IFAD. 2015. *President's Report: Proposed Grant to the Islamic Republic of Afghanistan for the Support to National Priority Programme 2*. Rome.
[27] IFAD. 2012. *President's Report: Proposed Grant to the Islamic Republic of Afghanistan for the Community Livestock and Agriculture Project*. Rome.
[28] World Bank. Afghanistan: National Horticulture and Productivity Project (accessed 2 April 2019).
[29] ADB. 2017. *Country Partnership Strategy: Afghanistan, 2017–2021. —Achieving Inclusive Growth in a Fragile and Conflict-Affected Situation*. Manila.
[30] ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.
[31] ADB. 2015. *Operational Plan for Agriculture and Natural Resources: Promoting Sustainable Food Security in Asia and the Pacific in 2015–2020*. Manila.
[32] ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.
[33] ADB. 2016. *Afghanistan: Enhanced Project Delivery Approach Paper.* Manila.

(footnote 12). The project will have the following outcome: management and use of water resources in the Arghandab River basin improved.[34] The project has four outputs.

20. **Output 1: Dahla Dam capacity increased.** This will be delivered through (i) civil works to raise the main dam, six saddle dams, spillways and other associated structures, to increase the full reservoir level by 13.6 meters and the storage capacity from 288 to 782 MCM, and to install monitoring equipment; (ii) 9.6 kilometer road realignment to allow alignment above the new full reservoir water level; and (iii) capacity improvement in dam operation and management. During construction, works are planned to have limited or no effect on irrigation water supply. Construction planning will be coordinated by ASBA with contractors to execute as much of the works as possible during August–February, when there is minimum irrigation water demand. A recreational facility for families will be developed by ASBA to provide an area for community participation and women's inclusion. Increased dam capacity will reduce flood risks to downstream areas. Dam operation rules reflecting multiple water use requirements and O&M manuals will be developed under the project. The project will also provide training to dam operators to improve their capacity in timely and appropriate dam operation.

21. **Output 2: Reliability of irrigation water supply increased.** Reliable supply of irrigation water will be increased through irrigation infrastructure modernization, including by upgrading canals and structures, and introducing monitoring and control systems on the AIS and community-managed systems. Improved water ordering will allow water on demand to be introduced on the AIS. There are two key activities: (i) modernization of the AIS infrastructure and procurement of maintenance equipment for the ASBA so that the irrigation operating entity can ensure timely delivery of irrigation services to community systems; and (ii) support for village communities, including women, for improvement of community irrigation infrastructures through community contracting.

22. **Output 3: Agricultural water productivity improved.** The project will strengthen the capacity of farmers to improve farm management and will adopt climate-smart irrigation and agricultural technologies and practices to improve production and sustainability. This will be delivered by demonstrating innovative agricultural practices and investment options, including support for agricultural extension services; conducting on-farm demonstrations; providing training and advisory services to farmers; and conducting a grant-matching scheme to facilitate investment in technologies to improve water productivity.[35] Female farmers will have equitable access to agricultural extension services, training opportunities, technology transfer, and advisory services. Women will be trained as local resource persons, and separate training courses for female farmers will be arranged.

23. **Output 4: Capacity in water resource management and use strengthened.** The project will (i) support the development of policy, legislation, and regulatory options for a system of water entitlements and allocation to allow improved management of water resources and multipurpose dams, as well as the development of regulations and a business structure to charge fees for water delivery services to strengthen financial sustainability and improve water resources management, resulting in improved irrigation productivity; (ii) provide water resources management training to government staff, including women; and (iii) establish a national hydrological modeling platform for integrated water resources policy, planning, operation, and

[34] The design and monitoring framework is in Appendix 1.

[35] The grant-matching scheme is a simplified version of the grant-matching scheme used in the ADB-funded Horticulture Value Chain Development Sector Project currently under implementation (footnote 22).

management to strengthen water resources management.

C. Value Added by ADB

24. The project design has taken an integrated approach to water resources development. During project preparation, ADB conducted comprehensive technical analysis and due diligence on (i) the Dahla Dam raise; (ii) irrigation and agriculture development; (iii) an urban water supply to Kandahar City and surrounding areas; and (iv) hydropower development, where hydropower is produced as a by-product of water releases. In addition to reliable irrigation water supply and improved agricultural productivities that will be achieved through the project, increasing the storage of the Dahla Dam will allow the development of an urban water supply based on the reservoir, and raising the height of the dam wall will make hydroelectricity production viable to meet suppressed power demand in Kandahar. Given Asian Development Fund (ADF) grant resource limitations, in consultation with the Ministry of Finance (MOF), the World Bank agreed to finance the urban water supply, and ADB has shared all relevant project preparation documents to the World Bank. In addition, all project documents have been shared by the project team with ADB's Office of Public-Private Partnership for the hydropower development for structuring as a public private-partnership transaction.

25. The integrated solution is important to: (i) ensure that the project delivers widespread benefits to the different communities so that, in a dry environment with a fractured society, no community will feel disadvantaged or left out; (ii) deliver important development needs to Kandahar; and (iii) deliver an optimized and rationale economic outcome from the investment in increased water storage capacity. The project design advances the integration of improved water resources management, irrigation system management and water productivity at farm for improved irrigation farm profitability.

D. Summary Cost Estimates and Financing Plan

26. The project is estimated to cost $403.04 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM).[36] The major expenditure items are civil works, consulting services, and capacity development costs.

Table 1: Summary Cost Estimates
($ million)

Item			Amount[a]
A.	**Base Cost**[b]		
	1.	Output 1: Dahla Dam capacity increased	219.61
	2.	Output 2: Reliability of irrigation water supply increased	47.91
	3.	Output 3: Agricultural water productivity improved	55.08
	4.	Output 4: Capacity in water resource management and use strengthened	5.51
	5.	Project management	17.15
		Subtotal (A)	**345.27**
B.	**Contingencies**[c]		**56.98**
C.	**Financial Charges During Implementation**[d]		**0.78**
		Total (A+B)	**403.04**

Note: Numbers may not sum precisely because of rounding.
[a] Includes taxes and duties of $16.1 million. Such amount does not represent an excessive share of the project cost.
[b] In mid-2019 prices as of June 2019.

[36] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

[c] Physical contingencies computed at 9.0% for civil works for output 1 except for design, management and supervision; and 13.4% for outputs 2–4 and project management except grants for on-farm productive technologies. Price contingencies computed at 1.5% for 2019–2020, and 1.6% onwards on foreign exchange costs; and 0.6% for 2019, 3.0% for 2020, and 4.0% for 2021 onwards on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of purchasing power parity exchange rate.
[d] The financial charges include 2.0% of administration charges for the grant from the International Fund for Agricultural Development.
Source: Asian Development Bank estimates.

27. The government has requested a grant not exceeding $348.78 million from ADB's Special Funds resources (ADF) to help finance the project.[37]

28. The summary financing plan is in Table 2.[38] ADB will finance the expenditures in relation to civil works, consultancies, goods, grant-matching sub-projects, security, non-land-related costs and land acquisition and resettlement plan (LARP) implementation, inclusive of all taxes. IFAD will cofinance, through a $40.00 million grant, the rehabilitation of community irrigation systems and Kandahar sections of the Tarnak canal (output 2b), demonstration and upscaling of innovative agricultural on-farm practices (3), and water resources regulatory support (4). ADB will partially administer the IFAD funds and ADB and IFAD will finance separate expenditure items. Farmer beneficiaries will finance $10.00 million of outputs 2 and 3 through cash payment. The government will contribute $4.26 million in the form of office space and utilities for project implementation.

Table 2: Summary Financing Plan

Source	Amount ($ million)	Share of Total (%)
Asian Development Bank		
Special Funds resources (Asian Development Fund grant)	348.78	86.5
International Fund for Agricultural Development (grant)[a]	40.00	9.9
Beneficiaries (farmers)	10.00	2.5
Government of Afghanistan	4.26	1.1
Total	**403.04**	**100.0**

[a] The Asian Development Bank will partially administer the International Fund for Agricultural Development cofinancing, which includes administration fees and other charges as may be deducted pursuant to the cofinancing agreement.
Source: Asian Development Bank estimates.

29. Climate change adaptation is estimated to cost $123.65 million, of which ADB will finance 86%.[39] The project adaptation components comprise (i) increasing the dam's storage capacity, (ii) improving irrigation and drainage services, and (iii) building capacity for climate-smart agriculture and water resources management. The ADF disaster risk reduction fund will support the government in strengthening its capacity to manage climate change-related risks, particularly those related to the management and use of its water resources. The support will complement the project's overall efforts to improve water availability and allocation and reduce water-related risks (e.g., droughts and floods).

E. Implementation Arrangements

[37] Includes $5 million from the ADF disaster risk reduction financing mechanism.
[38] The World Bank plans to parallel cofinance the Kandahar urban water supply component. The hydropower station will be financed under a public–private partnership structure, with advisory services provided by ADB's Office of Public Private Partnership, with the transmission lines and electrical sub-station to be financed by the energy utility Da Afghanistan Breshna Sherkat using public sector resources.
[39] Climate Change Assessment (accessible from the list of linked documents in Appendix 2).

30. The implementation arrangements are summarized in Table 3 and described in detail in the PAM (footnote 35).

31. The MOF will be the executing agency. MEW will be the implementing agency for (i) the Dahla dam raise and its initial operation under output 1, (ii) implementation of works in the AIS under output 2, and (iii) implementation of output 4 for strengthening capacity in water resources management and use. The Ministry of Rural Rehabilitation and Development will implement (i) the Kandahar-Bamian highway road realignment above the new full reservoir level under output 1; and (ii) works in the community irrigation systems, including canals and bridges that pass through Kandahar City. MAIL will implement output 3 for investments to improve water productivity

Table 3: Implementation Arrangements

Aspects	**Arrangements**		
Implementation period	December 2019–November 2026		
Estimated completion date	30 November 2026		
Estimated grant closing date	31 May 2027		
Management			
(i) Oversight body	Project steering committee: MOF (chair), MEW, MAIL, MRRD, security agencies (members)		
(ii) Executing agency	MOF		
(iii) Key implementing agencies	MEW, MAIL, and MRRD		
(iv) Implementation units	MEW, CPMO in Kabul (24 staff), PIU in Kandahar (43 staff) MAIL, CPMO in Kabul (23 staff), PIU in Kandahar (20 staff) MRRD, regional program in Kabul (23 staff), PIU in Kandahar (37 staff)		
Procurement	Open competitive bidding	17 contracts (including lots)	$235,470,000
	Request for quotation (community contracting)	Multiple community contracts	$65,115,687
	Request for quotation (others)	Multiple contracts	$7,101,620
Consulting services	QCBS 90:10	3 contracts (443 international person-months; 1333 national person months)	$32,300,000
	CQS	1 contract (auditor)	$240,000
	SSS	2 contracts (31 international person-months; 27 national person months	$1,700,000
	ICS	2 contracts (22 international person months)	$765,000
Retroactive financing and/or advance contracting	Withdrawal from the grant account may be made to finance eligible expenditures incurred under the project before the effective date, but not earlier than 12 months before the date of the special operations (Asian Development Fund) grant agreement, subject to a maximum amount equivalent to 20% of the grant amount. Advance recruitment actions will begin for three consultant contracts.		
Disbursement	The grant proceeds will be disbursed following ADB's *Loan Disbursement Handbook* (2017, as amended from time to time) and detailed arrangements agreed between the government and ADB.		

Aspects	Arrangements

ADB = Asian Development Bank; CPMO = central project management office; CQS = consultants' qualification selection; ICS = individual consultants selection; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MOF = Ministry of Finance; MRRD = Ministry of Rural Rehabilitation and Development; PIU = project implementation unit; QCBS = quality- and cost-based selection; SSS = single source selection.
Source: ADB estimates.

III. DUE DILIGENCE

A. Technical

32. The transaction TA[40] carried out extensive due diligence of the Dahla Dam structures (including the six saddle dams), reservoir catchment hydrology and reservoir bathymetry, road realignment (impacted by the dam raise) and the AIS and community irrigation infrastructure. The transaction TA consultants (footnote 40) reviewed all available data and prior design work on the Dahla Dam and conducted a farmer survey to understand community needs for improved irrigation management and water productivity.

33. Various scenarios were modelled for different dam spillway height raise (from 9.1 to 13.6 meters) to assess feasibility and cost-benefits, including future climate change impacts. A 13.6-meter spillway height increase is the basis for the project design and cost estimates. This design addresses climate change impacts including: (i) coping with high, short-duration inflows that are forecast to be more frequent, without unplanned spills that may cause downstream floods; (ii) providing increased water storage and strengthening water resource management capacity to reduce drought impacts; (iii) improving dam safety; and (iv) increasing dam life with sufficient reservoir capacity for siltation effects.

34. Irrigation infrastructure and on-farm irrigation technologies have been designed to reduce conveyance and on-farm application losses. On-farm technologies including drip irrigation which has been pilot-tested under other investments in Afghanistan will be demonstrated and introduced to farmers on a cost-sharing (grant-matching) basis.

B. Economic and Financial Viability

35. The economic analysis undertaken on the overall investment — (i) height raise for the Dahla Dam and six saddle dams (output 1), (ii) irrigation and agriculture development (outputs 2–4), (iii) improved water supply for Kandahar City,[41] and (iv) Dahla Dam hydroelectric power development,[42]—followed ADB's Guidelines for the Economic Analysis of Projects.[43] Hence, the economic analysis included the project investments (i and ii), and the parallel investments (iii and iv). Results show that with a hurdle rate of 9%, the project is economically viable with a 15.7% economic internal rate of return in constant 2019 prices. Without raising Dahla Dam to store more water and investing in modern and climate-smart irrigated agriculture and improved systems for integrated water management, the lack of available water and low productivity from water will remain.

36. The project will enlarge the effective dam storage capacity to 782 MCM, or from 60% to

[40] ADB. Afghanistan: Arghandab Integrated Water Resources Development Investment Program.
[41] Project preparation for financing by the World Bank is well advanced.
[42] To be financed separately under a public–private partnership.
[43] ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila.

165% of the 1952 capacity, and 271% of the current effective storage capacity. It will improve irrigation system reliability and efficiency and on-farm water productivity, resulting in an expanded irrigated area, increased cropping intensity and yields, a shift to higher-value crops, higher productivity of scarce water and higher returns to farmers. Incremental crop production will displace imports and increase exports. The economic analysis identified improvement in the gross margins of six crop categories on two farm technological levels. The outputs from the significantly improved service level of the urban-rural water supply and hydropower resulted in an incremental economic benefit valued using the consumer surplus method.[44]

37. The project outputs were categorized as non-revenue generating and revenue generating. The dam and the AIS irrigation canal are presently non-revenue generating outputs. The incremental annual O&M costs of $1.08 million for the dam, and $0.55 million for the AIS will be funded through two SPVs for water delivery services and revenue collection, to be developed by the project for implementation by MEW. The incremental O&M costs for the 120 community irrigation systems is minimal and largely funded by farmers while annual O&M costs for on-farm technology investments would be funded by adopting farmers.

C. Sustainability

38. To improve water resources management at basins, the project will help the government move to a system of water entitlements and allocation and the use of rule curves for the timing and operation of water releases from the Dahla Dam. For the first time in Afghanistan, dedicated environmental allocations and releases will be planned to help deliver environmental outcomes. Sustainable operations of the Dahla Dam and the AIS have been planned through two SPVs for water delivery services and revenue collection, one for Dahla Dam operations and the other for the AIS operations, to be developed by the project for implementation by MEW. Improved levels of qualified human resources have been built into the project, particularly through the funding of 120 part time student positions at the Kabul Polytechnic University for water resource managers to complete a master of science in integrated water resource management. With a project design focus on investments to improve irrigated farm profitability, irrigation farmers will have the financial resources to sustainably maintain community irrigation systems and on-farm technology investments.

D. Governance

39. Implementation of civil works and other activities will follow relevant government requirements and ADB procedures for financial management and safeguards.[45] Three consultant packages are ready for advanced recruitment actions. An engineering, procurement and construction supervision consultant will take the current designs from the 70% completion stage to design ready and prepare the tender documents.

40. The overall financial management risk is *substantial*. The project management offices have fully functional finance sections with adequate financial management capacity and experience with ADB-funded projects. Their overall capacity continues to improve and the risk at

[44] Consumer surplus is calculated using the equation $CS = 0.5[P_E (\Delta Q)^2 / (e_d Q_1)]$ where P_E is the tariff rate, ΔQ is incremental power production at 13.6-meter dam raise, e_d is the price elasticity of demand and Q_1 is the existing consumption level. P. Choynowski. 2018. *Measuring Welfare Gains from Infrastructure Projects: Power, Road Transport and Water and Sanitation.* Ottawa.

[45] Throughout project design preparation, government representatives have been closely consulted and contributed valuable governance measures that have been incorporated in the project design.

project level is considered moderate. However, the assessments have identified risks related to the country's public financial management system in financial reporting and weak line ministries' internal audit which focus more on financial compliance rather than the adequacy and effectiveness of control environment. An action plan for further improvement is in the PAM (footnote 35).

41. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and the MOF. The specific policy requirements and supplementary measures are described in the PAM (footnote 35).

E. Poverty, Social and Gender

42. The project will provide a long-term sustainable solution to the acute shortage of water in the Arghandab sub-basin by increasing Dahla Dam's storage capacity, allowing for significantly improved irrigated agriculture. Separately, an urban water supply will be funded by the World Bank and hydropower will be installed and operated by the private sector. Each development will contribute to economic growth and poverty reduction. The project will also increase the population's resilience to droughts and floods. Irrigation modernization and climate-smart agriculture will stimulate growth of farmers' incomes and increase value addition and marketing activity. In most cases, full irrigation would not be feasible for several years in the absence of the project, causing widespread hardship and hunger and severely limiting agricultural production. In these circumstances, and where substantial areas of land can be brought back into production in 1–2 years, financial returns are likely to be high.

43. The key social issue to be addressed is the inefficient management and use of water resources; the impacts are vulnerability to climate change trends of reduced precipitation and higher temperatures, low agricultural productivity and low farm incomes, inability to generate jobs in agricultural value chains, and food insecurity in rural and urban populations.

44. The project will primarily benefit the population of 830,165 (2018) in Kandahar City and 1.25 million population in seven rural districts in Kandahar Province (as of 2018). Kandahar Province is among the top three provinces with a significant internal migration (6% per year) from three immediately surrounding districts whose residents move in search of security, jobs, and services. The three priority areas of preference of the surveyed population are security, provision of irrigation water, and marketing of agricultural products.

45. A gender action plan (GAP) has been prepared by ADB to include women in project activities and as beneficiaries of project outcomes.[46] The key actions of the GAP include conducting socially inclusive dissemination and consultation workshops with men and women on project scope and benefits; providing recreational areas at the Dahla Dam with gender design features, such as separate rest areas, eateries, and seating arrangements; training at least 21 female farmers as local resource persons; providing 300 farmers (30% women) with improved skills and climate-smart technologies in irrigated agricultural production by 2025; supporting 100 government staff, of whom 30% are women, in completing master of science degrees in integrated water resources management by 2025; and hiring gender specialists to support GAP monitoring and implementation.

46. An FCAS assessment was undertaken by the transaction TA consultants (footnote 40)

[46] Gender Action Plan (accessible from the list of linked documents in Appendix 2).

during project preparation using the new FCAS risk management toolkit developed by ADB's Afghanistan Resident Mission. An FCAS action plan, to be actioned during project implementation, is described in the PAM (footnote 35).

F. Safeguards

47. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.[47]

48. **Environment (category A).** Output 1 is classified *category A* for the environment because of anticipated irreversible, diverse, or unprecedented impacts from raising the full reservoir level by 13.6 meters. Buildings in several villages and several hectares of irrigable land surrounding the reservoir will be affected. Moreover, aquatic environments and habitats may also be affected in case environmental flow conditions are not accounted for at the downstream end. A draft environmental impact assessment (EIA) study was prepared by MEW and disclosed on the ADB website on 2 April 2019. The EIA presented a preliminary review of baseline environmental conditions, impacts, and risks. The project area has pockets of natural habitat. Some protected species of interest were observed during the environmental surveys undertaken in November 2018, but biodiversity screening and a critical habitat assessment are needed to gain sufficient information on how these species will be impacted by the project. Introducing water protection zones, including protective measures around the reservoir, is suggested to maintain water quality in the reservoir over the long run. Moreover, the environmental management plan includes monitoring activities to be conducted during construction and operational stage (monitoring of noise, dust, water quality, and ambient air quality). The EIA will be updated upon the completion of the detailed design and other studies on biodiversity, riverine ecology, and environmental flow management to further reinforce the assessment findings and recommended environmental management actions.

49. Outputs 2–3 are classified *category B* for environment. The initial environmental examination study prepared for outputs 2 and 3 assessed and described the environmental impacts. Potential site-specific impacts that may arise during construction include generation of dust from soil excavation and refilling; disturbance to residents and traffic by construction works; water availability; and occupational, community, health, and safety hazards. Some impacts may also arise during operations, including waste dumped in canals resulting in clogging, and water unavailability for downstream farmers. Appropriate avoidance, mitigation, and enhancement measures, and implementation of the environmental management plan, will help minimize the significance of the impacts.

50. **Involuntary resettlement (category A)**. Land acquisition and resettlement (LAR) will be significant and extensive. Security constraints prevented resettlement surveys from being completed in the reservoir area, within the resource and time allocation under the transaction TA. High resolution satellite imagery taken in 2018 indicates that the reservoir (output 1) will inundate or partially inundate about 22 communities, physically displacing about 5,800 people from 596 households and permanently affecting their livelihoods. Displacement from this output will only occur following dam completion and subsequent inundation of the reservoir area. Multiple LARPs will be developed by MEW to provide compensation measures for lost assets and, equally important, to implement livelihood restoration and development plans over the life of the project for multiple communities. Comprehensive LARPs for reservoir resettled

[47] ADB. Safeguard Categories.

communities, with complex site selection and livelihood restoration processes, require 1–2 years of planning. A LARF[48] has been prepared by MEW to guide the LARP preparation process during the project implementation, according to the principles of SPS 2009. Irrigation and agriculture development (outputs 2 and 3) is expected to cause LAR impacts on 4,445 people from 495 households. A LARF has been prepared by MEW to guide the LARP preparation process during project implementation, following ADB's Safeguard Policy Statement. About $27.797 million will be required for involuntary resettlement impact mitigation. Replacement land will be provided by the government, and non-land related expenditures for LARP implementation will be funded under the project in compliance with applicable requirements under the *Operations Manual* section on Safeguard Policy Statement and the ADB-approved resettlement planning documents.[49] The PAM (footnote 34) contains details to remind the government of the strict compliance requirements between safeguards and contract award.

51. External monitors will be engaged by the implementing agencies to report on LARP implementation, including livelihood restoration programs and grievances. Capacity building of implementing agencies in LAR will be provided through separate proposed TA.

52. **Indigenous peoples (category C).** The project is not expected to have impacts on indigenous peoples. Ethnic groups live across Afghanistan, but none are considered indigenous peoples as defined by ADB's Safeguard Policy Statement for project operation purposes.

53. In line with the operational flexibility provided under ADB's Safeguard Policy Statement for conflict areas, resettlement frameworks have been prepared by MEW, and the EIA has been prepared and developed by MEW to the extent possible, given security limitations.

G. Summary of Risk Assessment and Risk Management Plan

54. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[50]

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigation Measures
Dam safety is compromised by incorrect design or construction	A panel of experts (including international and national experts of various technical fields) will be recruited by MEW to review the detailed engineering and design and to monitor construction.
Lack of security for contractors and field staff prohibits freedom of movement	Multiple security risk mitigation measures have been considered during project preparation and are built into the project design. The integrated approach to water resources development design is critical, as it allows most communities in the project area to be project beneficiaries. The FCAS risk management tool kit was deployed during project design. As part of inclusive and strategic communication with local communities to increase local residents' ownership of the project, local residents and authorities were well-informed of the project's objectives and design during project processing. Consultation will be continued during project implementation. Resettlement planning has been carefully worked through with the relevant agencies. Contractors will be responsible for their own

[48] LARFs have been prepared as allowed for consideration in projects in conflict areas under ADB's Safeguards Policy Statement, 2009, Appendix 4, para 11.
[49] ADB. 2013. Safeguard Policy Statement. *Operations Manual.* OM F1. Manila.
[50] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

Risks	Mitigation Measures
	security arrangements, a measure that has proved successful in other projects. The project and contractors will employ and upskill locals, and community contracting works will be applied to minor civil works. A 7-year implementation period was planned to accommodate potential delays. Finally, project risk managers and security teams will work closely with local police and security senior personnel and community leaders.
Inadequate budget for O&M results in Dahla Dam and AIS asset deterioration	The government has committed to continuing the annual ASBA budget for staff and O&M for the Dahla Dam and the AIS canal network services. The government is also committed to regulatory reform (supported by the project) to enable water supply delivery charges, which will allow for sustainable revenue for O&M. Specific covenants are included in the grant agreement.

ASBA = Arghandab Sub-Basin Agency, AIS = Arghandab Irrigation System, FCAS = fragile and conflict-affected situations, O&M = operation and maintenance.
Source: Asian Development Bank.

IV. ASSURANCES AND CONDITIONS

55. The government has assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, financial management, and disbursement as described in detail in the PAM and grant documents. The government has agreed with ADB on certain covenants for the project, which are set forth in the draft grant agreement. Additionally, no withdrawal shall be made for community contracting related to matching grants for investment technologies to improve water productivity until guidelines for evaluating subproject investment proposals have been prepared and are acceptable to ADB, and MAIL have trained the relevant project staff on the guidelines.

V. RECOMMENDATION

56. I am satisfied that the proposed grant would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the grant not exceeding $348,780,000 to the Islamic Republic of Afghanistan, from ADB's Special Funds resources (Asian Development Fund), for the Arghandab Integrated Water Resources Development Project, on terms and conditions that are substantially in accordance with those set forth in the draft grant agreement presented to the Board.

Takehiko Nakao
President

Date

DESIGN AND MONITORING FRAMEWORK

Impact the Project is Aligned with:
Jobs and gross domestic product growth increased (Afghanistan National Peace and Development Framework, 2017–2021).[a]

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Management and use of water resources in the Arghandab River basin improved	By 2027: a. Overall irrigation delivery efficiency increased to 36% (2019 baseline: 25%)[b] b. Irrigated grape yield increased to 4 tons/ha (2019 baseline: 2 tons/ha)	a. Monitoring reports from DAIL in Kandahar Province b. Monitoring reports from DAIL in Kandahar Province	Security conditions affect operations of the dam or farming districts.
Outputs 1. Dahla Dam capacity increased	By 2026: 1a. Dahla Dam spillway crest raised to 1,149.0 masl to increase the full reservoir level by 13.6 meters (2019 baseline: 1135.4 masl) 1b. 9.6 km of Kandahar-Bamian highway realigned to be above 1,154 masl (2019 baseline: not applicable) 1c. ASBA operating the Dahla Dam following the agreed rule curves and operating guidelines 100% of the time (2019 baseline: standard release schedules without rule curves)	1a. Independent panel of experts' reviews, completion certificate and completion report 1b. MRRD PMO quarterly reports 1c. ASBA monthly dam operation reports, and ASBA annual planning reports on water storage and release	Land acquisition and resettlement issues cause delay to completion of civil works
2. Reliability of irrigation water supply increased	By 2025: 2a. 120 community irrigation systems modernized (2019 baseline: 0) 2b. 115,000 ha of farmland under water-related infrastructure rehabilitated (2019 baseline: 0), RFI A[c] 2c. Water delivered in a timely manner to 95% of farmers 90% of the time (2019 baseline: 95% of farmers 25% of the time)	2a. Completion certificates and MAIL CPMO quarterly reports 2b. MAIL CPMO quarterly reports 2c. O&M agreements signed by community councils, and surveys and feedback from farmers	Climate change, severe droughts and/or increased sediment inflows reduces the live storage of the reservoir

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
3. Agricultural water productivity improved	3a. Number of farmers with improved knowledge who practice climate-smart technologies increased to 300, at least 30% of whom are women, by 2025 (2019 baseline: 0) RFI B[d]	3a-b. MAIL CPMO quarterly reports	
	3b. 20 extension staff from MAIL trained to conduct farmer workshops on climate-smart irrigation. (2019 baseline: 0)		
	3c. 70% of households reporting an increase in production (2019 baseline: to be determined)	3c. Annual monitoring survey	
4. Capacity in water resource management and use strengthened	4a. Law on water sector regulations proposed to policy makers for amendment by 2025 (2019 baseline: not amended)	4a. Gazette of new regulations	Political resistance delays the amendments.
	4b. 100 government staff, 30% of whom are women, complete master of science degrees in integrated water resources management by 2026 (2019 baseline: 0)	4b. List of graduates from the Kabul Polytechnic University	Transfer of trained staff, inadequate and/or inefficient organizational structure, and lack of staff incentives lower the number of government staff with master of science degrees.
	4c. National hydrological monitoring and management platform established and used by ASBA to guide reservoir operations by 2021 (2019 baseline: not amended)	4c. MEW quarterly progress reports, training reports, and ASBA annual planning reports on water storage and release	

Key Activities with Milestones

1. Dahla dam capacity increased

1.1 Undertake and complete resettlement (MEW) (Q4 2019–Q3 2024)
1.2 Complete detailed design of recreation area, dam and dam safety training (MEW) (Q1 2020–Q4 2021)
1.3 Conduct bidding, bid evaluation (MRRD and MEW) (Q2 2020–Q1 2024)
1.4 Award contracts (MRRD and MEW) (Q1 2021–Q3 2024)
1.5 Construct road realignment (MRRD) (Q1 2022–Q1 2023)
1.6 Construct recreation area (MEW) (Q2 2020–Q2 2021)
1.7 Raise main dam, intake tower, tunnel lining, trash rack (MEW) (Q1 2022–Q1 2025)
1.8 Raise and extend saddle dams (MEW) (Q4 2021–Q3 2024)
1.9 Raise spillways (MEW) (Q1 2025–Q3 2026)
1.10 Install electrification along dam (MEW) (Q1 2022–Q3 2024)
1.11 Install instrumentation (MEW) (Q1 2022–Q3 2024)

2. Reliability of irrigation water supply increased
2.1 Undertake and complete resettlement on the AIS main canal (MEW) (Q2 2020-Q2 2021)
2.2 Design and approve community irrigation sub-projects (MRRD) (Q4 2019–Q3 2021)
2.3 Sign contracts with CDCs (MRRD) (Q1 2020–Q2 2022)
2.4 CDCs construct irrigation works (MRRD) (Q1 2020-Q1 2023)
2.5 Design and undertake AIS rehabilitation and modernization works (MEW) (Q3 2020–Q2 2024)
2.6 Establish and equip the AIS works center (MEW) (Q3 2020–Q1 2021)
3. Agricultural water productivity improved
3.1 Design and implement agricultural extension and demonstrations (MAIL) (Q1 2020–Q3 2025)
3.2 Train extension staff in climate smart agriculture (MAIL) (Q1 2020-Q3 2025)
3.3 Establish grant matching scheme administration (MAIL) (Q1–Q3 2020)
3.4 Approve and implement grant matching sub-projects (MAIL) (Q4 2020–Q2 2026)
3.5 Undertake feasibility study for pressurized drip irrigation supply (MAIL) (Q4 2020–Q1 2022)
4. Capacity in water resources management and use strengthened
4.1 Prepare and submit water regulation reform (MEW) (Q1 2020–Q2 2025)
4.2 Conduct strategic water resources management training (MEW) (Q1 2020–Q2 2027)
4.3 Establish national hydrological management platform (MEW) (Q1 2020–Q3 2022)
Project Management Activities
Recruit PMO and PMU staff (Q3 2019–Q4 2021)
Recruit international consultants (Q3 2019–Q1 2020)
Recruit national supervision consultants (Q3 2019–Q1 2020)
Establish PMPS (Q4 2019–Q1 2020)
Recruit auditors (Q2–Q4 2020)
Train village construction supervisors (Q1–Q3 2020)
Monitor project activities (Q3 2020–Q3 2026)
Prepare and execute a communication, consultation and participation plan (Q1 2020–Q3 2026)
Submit PMPS monitoring reports regularly (Q2 2020–Q3 2026)
Undertake project completion survey (Q4 2026–Q1 2027)
Prepare project completion report (Q2 2027)
Inputs
Asian Development Bank: $348.78 million (Asian Development Fund grant)
International Fund for Agricultural Development: $40.00 million
Government of Afghanistan: $4.26 million
Beneficiaries contributions $10.00 million
Assumptions for Partner Financing
The World Bank plans to parallel cofinance the Kandahar urban water supply component. The hydropower station will be financed under a public–private partnership structure with advisory services provided by ADB's Office of Public–Private Partnership, with the transmission lines and electrical substation to be financed by the energy utility Da Afghanistan Breshna Sherkat using public sector resources.

AIS = Arghandab Irrigation System; ASBA = Arghandab Sub-Basin Agency; CDC = community development council; CPMO = central project management office; DAIL = Department of Agriculture, Irrigation and Livestock; ha = hectare; km = kilometer; masl = meter above sea level; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; O&M = operations and maintenance; PMMS = project monitoring and management system; PMO = project management office; PMU = project management unit; Q = quarter; RFI = results framework indicator.

[a] Government of Afghanistan. 2016. *Afghanistan National Peace and Development Framework (ANDPF), 2017–2021*. Kabul.

[b] Calculated as follows: 100% from dam; after river transport and diversion 65% x canal conveyance 55% x distribution 70% = efficiency to farm gate (25% in 2019)

[c] Contribution to the Asian Development Bank Results Framework RFI A: Land improved through irrigation, drainage, and/or flood management. Target 115,000 ha.

[d] Contribution to the Asian Development Bank Results Framework RFI B: Operations supporting climate change mitigation and/or adaptation.

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=48096-002-2

1. Grant Agreement
2. Sector Assessment (Summary): Agriculture, Natural Resources and Rural Development
3. Project Administration Manual
4. Economic and Financial Analysis
5. Summary Poverty Reduction and Social Strategy
6. Risk Assessment and Risk Management Plan
7. Climate Change Assessment
8. Gender Action Plan
9. Environmental Impact Assessment
10. Initial Environmental Examination
11. Resettlement Framework - Output 1
12. Resettlement Framework - Outputs 2 and 3

Supplementary Documents

13. Detailed Financial and Economic Analysis
14. Arghandab River Basin Integrated Water Resources Management Study
15. Multisector Water Allocation Options Study
16. Strategic Procurement Planning
17. Climate Risk and Vulnerability Assessment
18. Fragile and Conflict-Affected Situations Action Plan

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Arghandab Integrated Water Resources Development Programme

Design Report

Annex 2: CI Logframe

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

DESIGN AND MONITORING FRAMEWORK

Impact the project is aligned with:
Increased jobs and gross domestic product growth (Afghanistan National Peace and Development Framework, 2017–2021).[a]

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Improved management and use of water resources in the Arghandab River basin	By 2028: a. Overall irrigation delivery efficiency increased to 36% (baseline 2019: 25%)[b] b. Irrigated grape yield increased to 4 tons/ha (baseline 2019: 2 tons/ha)	a. Monitoring reports of DAIL of Kandahar Province b. Monitoring reports of DAIL of Kandahar Province	Security conditions affect project implementation or subsequent operations
Outputs 1. Dahla Dam capacity increased	By 2026: 1a. Dahla Dam spillway crest raised to 1,149.0 masl to increase the full reservoir level by 13.6 m (baseline 2019: 1135.4 masl) 1b. 9.6 km of Kandahar-Bamian route bearer highway realigned to be above 1,154 masl (baseline 2019: n/a) 1c. ASBA operating Dahla Dam in accordance with agreed rule curves and operating guidelines 100% of the time (baseline 2019: standard release schedules without rule curves)	1a. Independent panel of experts' reviews, completion certificate and completion report 1b. MRRD PMO quarterly reports 1c. ASBA monthly dam operation reports, ASBA annual planning reports on water storage and release	Security conditions affect project implementation or subsequent operations
2. Reliability of irrigation water supply increased	By 2025: 2a. 120 community irrigation systems modernized (baseline 2019: 0) 2b. 115,000 hectares of farmland under water-related infrastructure constructed/rehabilitated (baseline 2019: 0), RFI[c] 2c. Water delivered in a timely manner to 95% of farmers 90% of the time (baseline 2019: 95% of farmers 25% of the time)	2a. Completion certificates and MAIL CPMO quarterly reports 2b. MAIL CPMO quarterly reports 2c. O&M agreements signed by community councils, surveys and feedback from farmers	Security conditions affect project implementation or subsequent operations Climate change, severe droughts and/or increased sediment inflows reduces the live storage of the reservoir
3. Agricultural water productivity improved	3a. Number of farmers with improved knowledge and practices using climate smart	3a and 3b. MAIL CPMO quarterly reports	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	technologies increased to 300 farmers, at least 30% of whom are women, by 2025 (baseline 2019: 0) RFI[d] 3b. 20 extension staff from MAIL trained to be able to conduct farmer workshops on climate-smart irrigation. (baseline 2019: 0) 3c. Percentage (70%) of persons/households reporting an increase in production (baseline 2019: TBD)	3c. Annual monitoring survey	
4. Capacity in water resource management and use strengthened	4a. Law on water sector regulations proposed to policy makers for amendment by 2025 (baseline 2019: not amended)	4a. Gazette of new regulations	Political resistance Transfer of trained staff, inadequate and/or inefficient organizational structure, lack of staff incentives
	4b. 100 government staff with 30% women complete M.Sc. in integrated water resources management by 2026 (baseline 2019: 0)	4b. List of graduates from Kabul Polytechnic University	
	4c. National hydrological monitoring and management platform established and used by ASBA to guide reservoir operations by 2021 (baseline 2019: not amended)	4c. MEW quarterly progress reports, training reports, ASBA annual planning reports on water storage and release	

Key Activities with Milestones

1. Dahla dam capacity increased

1.1 Undertake and complete resettlement (MEW) (Q4 2019–Q3 2024)
1.2 Detailed design of recreation area, dam and dam safety training (MEW) (Q1 2020–Q4 2021)
1.3 Bidding, bid evaluation (MRRD and MEW) (Q2 2020–Q1 2024)
1.4 Award of contracts (MRRD and MEW) (Q1 2021–Q3 2024)
1.5 Construct road realignment (MRRD) (Q1 2022–Q1 2023)
1.6 Construct recreation area (MEW) (Q2 2020–Q2 2021)
1.7 Raise main dam, intake tower, tunnel lining, trash rack (MEW) (Q1 2022–Q1 2025)
1.8 Raise and extend saddle dams (MEW) (Q4 2021–Q3 2024)
1.9 Raise spillways (MEW) (Q1 2025–Q3 2026)
1.10 Install electrification along dam (MEW) (Q1 2022–Q3 2024)
1.11 Install instrumentation (MEW) (Q1 2022–Q3 2024)

2. Reliability of irrigation water supply increased

2.1 Undertake and complete resettlement on AIS main canal (MEW) (Q2 2020-Q2 2021)
2.2 Design and approve community irrigation sub-projects (MRRD) (Q4 2019–Q3 2021)
2.3 Sign contracts with CDCs (MRRD) (Q1 2020–Q2 2022)
2.4 CDCs construct irrigation works (MRRD) (Q1 2020-Q2 2024)
2.5 Design and undertake AIS rehabilitation and modernization works (MEW) (Q3 2020–Q2 2024)
2.6 Establish and equip AIS works center (MEW) (Q3 2020–Q1 2021)

3. Agricultural water productivity improved
3.1 Design and implement agricultural extension and demonstrations (MAIL) (Q1 2020–Q3 2025)
3.2 Extension staff trained in climate smart agriculture (MAIL) (Q1 2020-Q3 2025)
3.3 Establish matching grant scheme administration (MAIL) (Q1–Q3 2020)
3.4 Approve and implement matching grant sub-projects (MAIL) (Q4 2020–Q2 2026)
3.5 Undertake feasibility study for pressurized drip irrigation supply (MAIL) (Q4 2020–Q1 2022)
4. Capacity in water resource management and use strengthened
4.1 Prepare and submit water regulation reform (MEW) (Q1 2020–Q2 2025)
4.2 Conduct strategic water resources management training (MEW) (Q1 2020–Q2 2027)
4.3 Establish National Hydrological Management Platform (MEW) (Q1 2020–Q3 2022)
Project Management Activities
Recruit PMO & PMU staff (Q3 2019–Q4 2021)
Recruit international consultants (Q3 2019–Q1 2020)
Recruit national supervision consultants (Q3 2019–Q1 2020)
Establish PPMS (Q4 2019–Q1 2020)
Recruit auditors (Q2–Q4 2020)
Train village construction supervisors (Q1–Q3 2020)
Monitor project activities (Q3 2020–Q3 2026)
Prepare and execute a communication, consultation and participation plan (Q1 2020–Q3 2026)
Submit PPMS monitoring reports regularly (Q2 2020–Q3 2026)
Undertake project completion survey (Q4 2026–Q1 2027)
Prepare project completion report (Q2 2027)
Inputs
Asian Development Bank: $348.78 million (ADF Grant)
International Fund for Agricultural Development: $40.00 million
Government of Afghanistan: $4.26 million
Beneficiaries contributions $10.00million

ADF = Asian Development Fund, AIS = Arghandab Irrigation System; ASBA = Arghandab Sub-Basin Agency; CDC = community development council; CPMO = central project management office; DAIL = Department of Agriculture, Irrigation and Livestock; ha = hectare; km = kilometer; m = meter; masl = meter above sea level; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; M.Sc. = Master of Science; n/a = not applicable; O&M = operations and maintenance; PMO = project management office; PMU = project management unit; PPMS = project monitoring and management system; Q = quarter.

[a] Islamic Republic of Afghanistan. 2016. *Afghanistan National Peace and Development Framework (2017–2021)*. Kabul.

[b] Calculated as follows: 100% from Dam; after river transport and diversion 65% x canal conveyance 55% x distribution 70% = efficiency to farm gate (25% in 2019)

[c] Contribution to ADB Results Framework: Land improved through irrigation, drainage, and/or flood management (target 115,000 hectares).

[d] Contribution to ADB Results Framework: Operations supporting climate change mitigation and/or adaptation.

Source: Asian Development Bank.

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Arghandab Integrated Water Resources Development Programme

Design Report

Annex 3: Logframe

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

Arghandab Integrated Water Resources Development Programme

Logical Framework

Results Hierarchy	Indicators				Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Source	Frequency	Responsibility	
Outreach	1 Persons receiving services promoted or supported by the project							
	Females		6000	10800				
	Males		14000	25200				
	Young							
	Not Young							
	Total number of persons receiving services		20000	36000				
	1.a Corresponding number of households reached							
	Women-headed households							
	Non-women-headed households							
	Households		20000	36000				
	1.b Estimated corresponding total number of households members							
	Household members		180000	331200				
Project Goal Improved water management and rural economic growth	Reduction in poverty levels in project area				Mid-Term Evaluation, impact survey	baseline, mid-term and completion	MAIL/ MRRD/ MEW/ MoF	Security conditions do not affect negatively project implementation or subsequent operations
	less poor Households							

Results Hierarchy	Indicators				Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Source	Frequency	Responsibility	
Development Objective Improved management and use of water resources in the Arghandab River basin contributes to improved food security and poverty reduction	Overall Irrigation delivery efficiency increased				Monitoring Reports of DAIL of Kandahar province		MAIL/ MRRD/ MEW/ MoF	Security conditions do not affect negatively project implementation or subsequent operations
	delivery	25		36				
	Irrigated grape yield increased				Monitoring Reports of DAIL of Kandahar province		MAIL/ MRRD/ MEW/ MoF	
	yield increase	2		4				
	1.2.4 Households reporting an increase in production				Outcome surveys		MAIL/ MRRD/ MEW/ MoF	
	Households			70				
	Households							
	1.2.8 Women reporting improved quality of their diets				outcome surveys		MAIL/ MRRD/ MEW/ MoF	
	Women reporting improved quality of their diets							
	Percentage			60				
Outcome 1. Dahla Dam capacity increased	length of Kandahar-Bamian route highway realigned to be above 1.154 metres above sea level				MRRD PMO reports	quarterly		Security conditions do not affect negatively project implementation or subsequent operations
	Length of roads			9.6				
Outcome 2. Reliability of irrigation water supply increased	Community irrigation systems modernized				Completion certificats and MAIL CPMO reports	quarterly	MAIL/ MRRD/ MEW/ MoF	Security conditions do not affect negatively project implementation or subsequent operations Climate changes, severe droughts and/or increased sediment inflows do not reduce the live storage of the reservoir
	irrigation systems	0		120				
	Water being delivered in timely manner to 95% of farmers				O&M agreements signed by community councils, surveys and feedback from farmers	annual	MAIL/ MRRD/ MEW/ MoF	
	frequency	25		90				

Results Hierarchy	Indicators				Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Source	Frequency	Responsibility	
Output same	1.1.2 Farmland under water-related infrastructure constructed/rehabilitated				reports	quarterly	MAIL	Security conditions do not affect negatively project implementation or subsequent operations
	Hectares of land	0		115000				
Outcome 3. Agricultural water productivity improved	3.2.2 Households reporting adoption of environmentally sustainable and climate-resilient technologies and practices				MAIL CPMO reports	quarterly		No political resistance; Trained staff not being transferred, adequate and efficient organizational structure, availability of staff incentives
	Total number of household members							
	Households	0		300				
Output same								
Outcome 4. Capacity in water resource management and use strengthened	Policy 3 Existing/new laws, regulations, policies or strategies proposed to policy makers for approval, ratification or amendment				Gazette of new regulations			No political resistance; Trained staff not being transferred, adequate and efficient organizational structure, availability of staff incentives
	Number			1				
	Government staff complete M.Sc. in integrated water resources management				List of graduates from Kabul Polytechnic University			
	Males			70				
	Females			30				

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Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex 4: Integrated Risk Framework

Document Date: 22/10/2019

Project No. 2000002332

Asia and the Pacific Division
Programme Management Department

Risk categories	Risk Probability	Risk Impact	Mitigations/comments
1. Political and governance	High	Medium	i) Political volatility and insecurity may adversely impact on the performance of public institutions; and, ii) corruption. Mitigation: i) Project will engage service providers, local institutions (CDCs, FO, and Associations), MFI, and private sector. ii) Effectively manage complaint system, audit and maintain transparency. Comments: This risk is rated as High. The political situation in the country remains volatile with security has been deteriorating over the last several years. Transition of security from the International Security Assistance Force to the Afghan National Security Forces since 2014 has resulted in escalated insecurity. The recent round of dialogue between armed resistance and government is underway which will define the future course of political scenario and governance. These developments may have a significant impact on the ability of Government to deliver services in a secure and stable environment. The experience of existing projects indicates that working closely with local partners and community networks can also mitigate security risks. The participatory approach applied through CDCs and other local organizations provide opportunities for offsetting security risks to some degree. The project will involve external service providers, all of which have considerable experience in volatile areas. In extreme cases, where outreach and monitoring is not possible, outsourcing option will be explored.
2. Macroeconomic	Medium	Medium	Market situation (availability and prices) of inputs may change due to internal and external factors. Mitigation: i) Improved technologies, practices and quality improvement will tend to offset inflation; and, (ii) communities to be trained to adopt to market dynamics. Comments: This risk is rated as Medium. According to Afghanistan Development Outlook (ADB), Afghanistan's GDP expected to grow with inflation rate increasing and current account balance remains positive. The poverty rates and unemployment are growing reaching as historic high levels. The macroeconomic policies are in place and institutions are generally adequate. The macroeconomic environment has limited effect on private sector operations. Prices are moderately stable and key operational inputs are generally available.

Risk categories	Risk Probability	Risk Impact	Mitigations/comments
3. Sector strategies and policies	Medium	Medium	Policies governing agriculture, livestock and irrigation sector and financial services are evolving. Mitigations: Project intervention and knowledge management will inform policy for an evidence-based dialogue and capacity building. Comments: This risk is rated as Medium. There is a moderate risk of adverse impact on the Project Objective stemming from sector strategies and policies. Policies and strategies in agriculture, livestock and irrigation and water sectors are generally adequate for the purposes of the operation and mostly consistent with the country's development strategy and objectives. Sector governance has some weaknesses but is overall adequate. Sector strategies are financially viable and sector policies are generally sustainable. Funding for the sector is predictable and broadly adequate. Some residual risk to the Project Objective remains, which include varying nature of government interventions, distorting subsidy practices of the government especially related to the seed/input sectors.
4. Technical aspects of project or program	Medium	Medium	Low institutional capacity to promote technological innovations and infrastructure management services. Mitigations: (i) Promotion of participatory approaches to infrastructure development and maintenance; (ii) promotion of contract farming with embedded services; and, (iii) strengthening linkages. Comments: The risk is rated Medium owing to the fact that the proposed programme is moderately complex with respect to design and its implementation. There is also some degree of dependence on the pace of investment regarding raising of the Dalha dam which shall improve flow of water to the canals and the water channels thereof. The design is robust and well-informed from analytical work carried out by ADB and is comprehensively spelled out in the feasibility study carried out for the sub-components. The project intervention are ready to be implemented with designing ready to the level of micro details.

Risk categories	Risk Probability	Risk Impact	Mitigations/comments
5. Institutional capacity for implementation and sustainability	Low	Medium	There is a moderate likelihood that institutional capacity for implementing and sustaining the operation or operational engagement may adversely impact the Project Objective. The proposed project involves three Ministries i.e. Ministry of Agriculture, Irrigation and Livestock (MAIL), Ministry of Rural Rehabilitation and Development (MRRD) and Ministry of Energy and Water (MEW). In addition at the target area level the project will actively engage with Arghandab Sub-basin Irrigation Authority (ASBA). All these institutions will be supported in development of the necessary capacity to implement the operation with assistance from external consultants. Monitoring and evaluation arrangements are largely adequate, with some support proposed under the project. The operation is focused on a well-defined geographical area. Operational rules, processes and systems are comprehensive and generally enforced, but are lengthy, time consuming and generate an unnecessary bureaucratic burden. Oversight and control mechanisms are adequate but not routinely applied; and instances of fraud and corruption occur but are infrequent and small in the implementing agencies. The institutional decision-making structure is clearly defined and well-functioning. In addition the project have identified the necessary institutional capacity building gaps and will undertake staff training, provision of equipment and put in place mechanisms in order to enable effective project implementation as well as improve service delivery in the post-project period.
6. Financial management	High	High	The current FM organizational arrangements issues of the two ongoing IFAD projects managed by MAIL together with the results of past collaboration with MRRD (the two proposed Lead Implementing Agencies) qualify the project as High Risk from a fiduciary perspective. The possible utilization of MAIL and MRRD as Lead Implementing Agencies together with the first experience of collaboration with ADB in the country poses some fiduciary concerns (especially in the funds flow, accounting, reporting and audit areas) that will need to be addressed during the finalization of the design. The final ADB design will need to clearly define a set of FM arrangements compatible with IFAD requirements. Special focus will need to be placed on the organization of the finance units within MAIL and MRRD, accounting, reporting and audit standards to be used by the project, accounting systems/software, consolidation. IFAD will need to conform to FM arrangements applied by ADB in monitoring and supporting projects and eventually supplement if and when required. An IFAD FM specialist needs to participate to the finalization of the design and start a collaboration with the counterpart in ADB to ensure adequate coverage of all basic FM arrangements. In order to protect the project's organizational arrangements from the country's political volatility, it will be necessary to clearly codify in the Financing Agreement the required structure of the PSUs, especially the project's finance unit, including safeguards.

Risk categories	Risk Probability	Risk Impact	Mitigations/comments
7. Procurement	High	Medium	2018 PEFA based on the 2016 Assessment framework scores B+ on Procurement Management. In term of corruption risk based on the current ranking Afghanistan's score is 16/100 and is ranked 172/180. At the Ministry Level, capacity remain weak, while independence of the procurement units (fiduciary units) are influenced by political actors. Contract management and administration is fragmented. Mitigation: Dedicated PMU with certified professional procurement specialist. Include an international/national expert that is able to work and report independently as safeguards. Frequency of 2nd Tier risk management measures to be strengthen. Participate in ADB supervision missions.
8. Stakeholders	Low	Low	Awareness raising to generate interest from stakeholders, especially poor households regarding community contribution. Mitigations: (i) Demand for co-financing/community contribution by small farmers could be in-kind; and, (ii) Development of a robust selection criteria and a monitoring framework to ensure targeting guidelines. Comments: This risk is rated as Low. There is generally limited likelihood of opposition from stakeholders except in the case of resettlement related to the raising of the Dalha dam. Although it is not linked directly to the component 2, some negative impact on the achievement of the Project Objective is expected, but the likelihood and/or impact of this opposition is moderate. The operation's objectives are generally well understood by the public and will awareness will be raised throughout the implementation of the project. The project will undertake farmer organization and will use these to leverage cooperation and buy-in. Many stakeholders and donors support the operation.
9. Environment and social	Low	Medium	Environment and CC concerns, as well as social risks, may impact on performance. Mitigations: (i) Promotion of environment/climate smart technologies; and, (ii) equitable and transparent targeting mechanisms. Comments: This risk is rated as High. Although the activities under this operation are rated moderate, the overall rating of the entire project is Category A. There is a moderate likelihood that exogenous environmental or social risks could adversely affect the achievement of the operation's (or operational engagement's) objectives or the sustainability of results. The pertinent environmental and social risks include extreme events such as heat waves, flooding, severe storms, earthquakes, landslides and volcanic eruptions, as well as slower changes due to droughts and sea-level rise. These risks are well understood and expected to be limited in impact. The environmental and social impacts would tend to be away from sensitive areas and vulnerable groups. The operation may also have moderate adverse effects on gender, vulnerable groups, poverty and/or equity but plans are in place to mitigate these effectively.

Risk categories	Risk Probability	Risk Impact	Mitigations/comments
Overall	Medium	Medium	

IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex 5: CI Environmental safeguards review

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

Environmental Impact Assessment

July 2019

AFG: Arghandab Integrated Water Resources Development Project

Part 1 of 2: Main Report

Prepared by the Ministry of Finance, Islamic Republic of Afghanistan for the Asian Development Bank. This is an updated version of the draft originally posted in April 2019 available on https://www.adb.org/projects/documents/afg-48096-002-eia

CURRENCY EQUIVALENTS

(as of 9 July 2019)

Currency unit	–	Afghani (AF)
AF1.00	=	$0.0124545099
$1.00	=	AF80.2922

ABBREVIATIONS

ADB	–	Asian Development Bank
AP	–	Affected person
ARES	–	Arghandab River Environmental Study
ASBA	–	Arghandab Sub-Basin Agency
AUWSSC	–	Afghanistan Urban Water Supply and Sanitation Corporation
CIA	–	Cumulative Impact Assessment
CIDA	–	Canadian International Development Agency
CITES	–	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CU	–	Consolidated undrained
DABS	–	Da Afghanistan Breshna Sherkat
DAIL	–	Department of Agriculture, Irrigation, and Livestock
DFID	–	Department for International Development
DP	–	Displaced people
EHS	–	Environmental, Health, and Safety
EIA	–	Environmental impact assessment
EMP	–	Environment management plan
FSL	–	Full supply level
GRC	–	Grievance redress committee
GRM	–	Grievance redress mechanism
HRBMP	–	Helmand River Basin Master Plan
IBAT	–	Integrated Biodiversity Assessment Tool
ICOLD	–	International Commission on Large Dams
IEE	–	Initial environmental examination
IFC	–	International Finance Cooperation
IUCN	–	International Union for Conservation of Nature
LARP	–	Land Acquisition and Resettlement Plan
MAIL	–	Ministry of Agriculture, Irrigation, and Livestock
MASL	–	Meters above sea level
MDD	–	Maximum dry density
MEW	–	Ministry of Energy and Water
NATO	–	North Atlantic Treaty Organization
NEPA	–	National Environmental Protection Agency
NGO	–	Non-governmental organization
NOC	–	Non-objection certificate
O&M	–	Operation and maintenance
OBE	–	Operational basis earthquake
OMC	–	Optimum moisture content
PGA	–	Peak ground acceleration
PIU	–	Project Implementing Unit
PMF	–	Probable maximum flood
PMU	–	Project management unit

REA	–	Rapid Environmental Assessment
ROW	–	Right-of-way
SPS	–	Safeguard Policy Statement
SSEMP	–	Site-Specific Environmental Management Plan
TDS	–	Total dissolved solids
TRTA	–	Transaction Technical Assistance
UN	–	United Nations
UNESCO	–	United Nations Educational Scientific and Cultural Organization
USACE	–	US Army Corps of Engineers
VEC	–	Valued environmental and social component
WHO	–	World Health Organization

WEIGHTS AND MEASURES

^{o}C	–	Degree Celsius
%	–	Percent
cm	–	Centimeter
d	–	Day
g	–	Gram
ha	–	Hectare, 10,000 m^2
hr	–	Hour
kg	–	Kilogram
km	–	Kilometer
km^2	–	Square kilometer
kPa	–	Kilopascal
L	–	Liter
m	–	Meter
m^3	–	Cubic meter
mg	–	Milligram
mL	–	Milliliter
mm	–	Millimeter
MW	–	MegaWatt

GLOSSARY

Jerib	–	2,000 m²
Hamouns	–	Wetland
Karez	–	Kanat, a system of connected wells through tunnels
Kuchi	–	Nomadic pastoralists / herding communities
Mirab	–	Water Master
Shura	–	Community Development Council

NOTE

(i) In this report, "$" refers to US dollars.

EXECUTIVE SUMMARY

The Government of the Islamic Republic of Afghanistan (Government) requested the Asian Development Bank (ADB) for Transaction Technical Assistance (TRTA) to prepare a project to improve water resources management, irrigated agriculture, water supply for Kandahar city, and to augment electric power in Kandahar city and the surrounding area.

The contract for consulting services for TA-9273 AFG: Preparing the Arghandab Integrated Water Resources Development Investment Project was signed on 20 September 2017 between ADB and FCG ANZDEC Limited from New Zealand to design a project suitable for funding.

Under the project, ADB resources or ADB administered resources will finance the following outputs: (i) Dahla Dam capacity increased, (ii) reliability of irrigation water supply increased, (iii) agricultural water productivity improved, and (iv) capacity in water resource management and use strengthened. Other investments not financed by this project but prepared by ADB and being implemented in parallel, will provide Kandahar with an urban and industrial water supply, and bring additional power generation capacity for Kandahar City and its surroundings.

Output 1 project activities have the most potential to cause significant adverse human and environmental impacts, and an Environmental Impact Assessment (EIA) has been prepared accordingly. Separate Initial Environmental Examination (IEE) have been prepared for output 2, and for the water supply and hydropower investment components.

This EIA concerns addressing the potential impacts from output 1: raising Dahla Dam and six saddle dams, combined with the associated realignment of a portion of the route bearer highway. The project output 1 is classified as ADB Category A due to anticipated irreversible, diverse, or unprecedented impacts from raising the existing dam's height by 13.6 m and related infrastructure. Buildings in several villages will be affected, as well as several hectares of irrigable land surrounding the reservoir.

This EIA presents a preliminary review of baseline environmental conditions, impacts, and risks. It should be interpreted as an interim and working document. The recommended Arghandab River Environmental Study (ARES) is essential to reinforce the assessment findings and recommended management actions which will be produced during the detailed design stage. This EIA report will be revised on several occasions prior to the construction phase in order to satisfy ADB Safeguard Policy Statement (SPS) requirements, providing an adequate basis for understanding potential project impacts and identification of appropriate mitigation measures.

The ARES is recommended for implementation before commencement and during the detailed design, from the second half of 2019. The detailed design shall, using information from the ARES, update the EIA. Identified data gaps to be filled include specifics regarding an important range of biophysical elements (e.g. flora, aquatic and ornithological environments), contemporary figures relating to the establishment of environmental flows, and site-specific baseline data related to noise, air and water quality. Additional information concerning potential community mobilization to implement revegetation establishment and protection is also a component of the ARES.

Output 1 project and impacts. The project is raising the existing dam height and related infrastructure by 13.6 m providing an additional 500 million m^3 water to Dahla reservoir. By increasing storage volume, the project aims at improving water management and water allocations throughout the year as compared to the existing situation.

Realignment of a portion of the route bearer highway is subsequently required. Minimal environmental impact is expected as a result of the route realignment, as the proposed road is located away from settlement and located on land which is almost unvegetated. A 600 m portion of the proposed alignment passes through an agricultural land to be acquired prior construction. The tract of the existing route bearer highway (which will be inundated) is being proposed as the 'borrow pit' for material suitable for the dam wall.

EIA methodology and report. A field visit to Kandahar was conducted during 9-13 July 2018. The main irrigation canal, upper division weir (output 2), saddle dams, spillway, main dam including infrastructure (tower, waste collecting structure), proposed contractor's yard, and the reservoir were visited. A boat trip was carried out on the reservoir. The main stakeholders (Ministry of Energy and Water (MEW), Ministry of Agriculture, Irrigation, and Livestock (MAIL), National Environmental Protection Agency (NEPA), Arghandab Sub-Basin Agency (ASBA), Da Afghanistan Breshna Sherkat (DABS), Afghanistan Urban Water Supply and Sewerage Corporation (AUWSSC), and the Cultural Department of Kandahar City) were visited.

Data collected from various sources have been evaluated (NEPA in Kabul and Kandahar, AUWSSC, Cultural Department Kandahar, DABS, ASBA, Helmand River Basin Authority, Archaeology Institute Kabul, and KNMI climate explorer, Helmholtz Institut Geesthacht, Germany).

This EIA report includes description of the physical and the biological environment, assessment of impacts on the environment during detailed design, construction and operation, and the Environmental Management Plan (EMP). Environmental impacts have been identified and mitigation measures have been recommended accordingly. The EMP includes monitoring activities to be conducted during construction and during the operational stage.

Mitigation measures. Presentation of the impacts and recommendations for their mitigation have been categorized for detailed design, construction, and operation, using a risk-based approach that assesses impact significance and provides a rating:

(i) Mitigation of impacts identified for addressing at detailed design include protection of the water resource and biophysical environment, development of precautionary emergency response plan, addressing social issues associated with resettlement and land use, ensuring appropriate detailed design specifications for seismic condition and strategic long-term catchment management issues, as well as independent review of all documentation.

(ii) For construction phase, the critical impact mitigation measure is for the contractor to assume solid ownership of the major environmental concerns through adoption of the Site-Specific Environmental Management Plan (SSEMP) which outlines management of all biophysical and social issues including on-site safety and employment of local people wherever possible.

(iii) The operation phase foresees the need develop appropriate environmental flows and ensure that both water quality and water management issues increasingly involve farmers for successful implementation. In addition, re-establishment of potential habitat around the perimeter of the new water alignment is anticipated to offer sanctuary for avian species.

It is generally found that the raising of Dahla Dam will not have any long-term impacts upon the biological environment, and in most cases, preconditions can be improved. There are no protected areas in the vicinity of the dam. Protected species have been recorded during the environmental surveys in November 2018. While some species will be affected in the short-term

during construction of the dam raise and saddle dams, mitigation measures are in place to minimize the impact of these. Introduction of water protection zones including protective measures around the reservoir are suggested for maintaining water quality in the reservoir over the long run.

Challenges and limitations. The realities against which this document has been produced need to be clearly stated. Afghanistan is recognized as being one of the most insecure environments in which such a study can be conducted. Major parts of the catchment to this dam area are considered to be “no-go” areas, which has highly compromised the efficacy and rigorousness of the EIA data gathering and analysis process. Although there has been generous cooperation between the TRTA, partners and government agencies, the insecurity has been a major driver in determining the limitations of what could be done.

Firmly associated with both the insecurity and the lengthy period of the civil war, is the lack of contemporary data on which analysis and conclusions can be made. While government agencies are willing partners in assisting the TRTA, both their human resource capacity and lack of physical resource add to the general state of inferior data. These issues can be overcome but they require longer time than what logical planning would determine. This EIA has been a victim of such shortfalls.

To establish appropriate environmental flows is a pertinent example of the challenges faced. The time required to assess the variables involved including the deliberations by TRTA members in consulting with all the stakeholders involved and documenting the issue has been professional, well placed, but insufficient. At the same time, instituting any environmental flows will require proactive collaboration with farmers and water users along the river. To be successful, these actions will require a cautious and careful mix of technical dialogue combined with an understanding of the realities of subsistence level arid-zone farming. As a result, what is being recommended in this document is a two-stage process to establish a pilot approach, and then secondly refine the real-time data gathering process during the dam operation phase.

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APPENDIXES (separate document)

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I. INTRODUCTION

1. The proposed Arghandab Integrated Water Resources Development Investment Project (the project) will finance improvements to the availability and use of water resources for irrigated agriculture, urban water supply, and power generation for Kandahar, the country's second largest city, and its vicinity. The project—located in the Arghandab River sub-basin, within the Helmand River system—will also make the management of these water resources more efficient. The availability of water in the sub-basin, along with the rest of the Islamic Republic of Afghanistan, is highly seasonal and erratic, with frequent and worsening droughts affecting agriculture, living standards, and the local economy. The water supply for Kandahar city as well as irrigated agriculture for over 64,000 ha of farmlands in the Kandahar vicinity is solely dependent on Dahla Dam. Built in 1952, the dam stores irregular runoffs from snowmelt in high mountains, however, the reservoir has lost 40% of its storage capacity to sedimentation over 66 years of continuous operations. Subsequently its ability to provide regulated flows during frequent droughts is seriously constrained.

2. Promoting stability and growth in Kandahar province is a high priority for the Government of the Islamic Republic of Afghanistan (Government). The potential for socio-economic development in the province is severely impeded by the lack of access to sustained and reliable water. Enough water would be available to address these issues if this resource was managed efficiently, however, the ability of the government and provincial authorities to do this is severely constrained by the diminishing storage in Dahla Dam reservoir, lack of institutional and human capacity in water sector institutions. The proposed investment program will provide a long-term sustainable solution to these problems.

3. Given the large number of development partners and limited institutional capacity, the government and the Asian Development Bank (ADB) agreed that ADB's assistance would be focused on the infrastructure investments in agriculture and natural resources management, energy, and transport and communications. The Country Partnership Strategy (2017-2021) shows that the performance of ADB's Afghanistan portfolio was above the average despite vast implementation challenges, and the performance of agriculture and natural resources sector projects were generally satisfactory. The government puts a high priority on this proposed investment program.[1]

A. Purpose of the Report

4. This Environmental Impact Assessment (EIA) report has been prepared to identify potential environmental impacts for the project output 1. Output 1 is focusing on raising the wall of the Dahla Dam and saddle dams, and the realignment of the route bearer highway. The project is classified as ADB Environmental Category A due to impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. Physical works will focus on raising six saddle dam walls and construction of the realigned highway. Environmental impacts are expected for these construction sites and, in addition, for the area to be inundated after the dam wall raising. Category A projects require environmental assessment in the form of an EIA. EIA findings are used to prepare the Environmental Management Plan (EMP) including the environmental monitoring plan.

[1] ADB. 2017. "Afghanistan: Country Partnership Strategy (2017-2021)". Manila. https://www.adb.org/documents/afghanistan-country-partnership-strategy-2017-2021

5. The EIA was prepared for, and in coordination and consultation with, the Ministry of Energy and Water (MEW) from May 2018 to February 2019. The international and national environmental specialists visited the project sites. Consultations with the relevant stakeholders were carried out in order to discuss the project's goals and implementation. Scope and progress of the EIA were presented to the Project Steering Committee at MEW in Kabul on 8 July 2018.

6. This EIA presents a preliminary review of baseline environmental conditions, impacts, and risks. It should be interpreted as an interim and working document. The recommended Arghandab River Environmental Study (ARES) is essential to reinforce the assessment findings and recommended management actions which will be produced during the detailed design stage. This EIA report will be revised on several occasions prior to the construction phase in order to satisfy ADB Safeguard Policy Statement (SPS) requirements, providing an adequate basis for understanding potential project impacts and identification of appropriate mitigation measures. The next revision will be done in June-July 2019 and will add the results from the bird and fish summer surveys.

B. Data Collection

7. Baseline data referring to the physical, biological and the socio-economic environment have been collected from previous studies and through meetings with the following authorities and agencies:

(i) MEW Kabul;
(ii) Afghanistan Urban Water Supply and Sewerage Corporation (AUWSSC);
(iii) Arghandab Sub-Basin Agency Kandahar (ASBA);
(iv) Da Afghanistan Breshna Sherkat (DABS) Kandahar;
(v) Helmand River Basin Authority;
(vi) National Environmental Protection Agency (NEPA) Kabul and NEPA Kandahar;
(vii) Archaeology Institute Kabul;
(viii) Department of Culture Kandahar.

8. The primary data was collected through site visits and observations, technical and environmental surveys, and consultations with the government and community representatives. The Transaction Technical Assistance (TRTA) team conducted two sites visits to Dahla Dam in 2018 (in January–February 2018 by dam engineers and in July 2018 by environmental specialists). These site visits provided the TRTA team with valuable familiarization of physical site characteristics and condition and a first-hand opportunity to collect data. Further, following surveys were conducted: (i) bathymetric survey to assess topography of bottom of Dahla Dam reservoir and estimate reservoir volume capacity in May 2018; topographic survey to refine reservoir volume capacity from September to December 2018; geotechnical survey to conduct sample tests on main dam, saddle dam 6, and borrow areas during September and October 2018; environmental ornithological and fish surveys in the Dahla reservoir area in November 2018; and environmental surveys to assess air quality (reservoir area, current highway) and water quality (reservoir, canal downstream and Kandahar groundwater wells). Subsequent to the site-based data gathering work, the TRTA team consulted and collaborated with relevant government agencies including implementation agencies in Kandahar and Kabul. Additionally, a Kandahar based TRTA coordinator has been providing information as required.

9. Secondary research utilized the considerable body of work which has been produced by agencies regarding previous proposals to upgrade the Dahla Dam, including the now defunct Canadian International Development Agency (CIDA) investigations and partial implementation / rehabilitation of both the Dahla Dam and irrigation network, and the Department for International

Development (DFID) funded Helmand River Basin Master Plan, a three-year study which specifically included the Arghandab River as a tributary.

C. Impact Assessment and Mitigation

10. Potential consequences and project impacts on the physical and biological environment have been assessed. Analysis is based on findings during field visits and evaluation of data received from various sources. Assessment relates to environmental impacts during construction and operation of output 1a (Dahla Dam wall raising). A Rapid Environmental Assessment (REA) has been carried out to address the likely/potential impacts. Significant adverse environmental impacts which are irreversible, diverse, or unprecedented due to construction and operation of output 1 have been identified. The likely and potential impacts and mitigation measures are summarized in the EMP and mitigation measures have been developed accordingly.

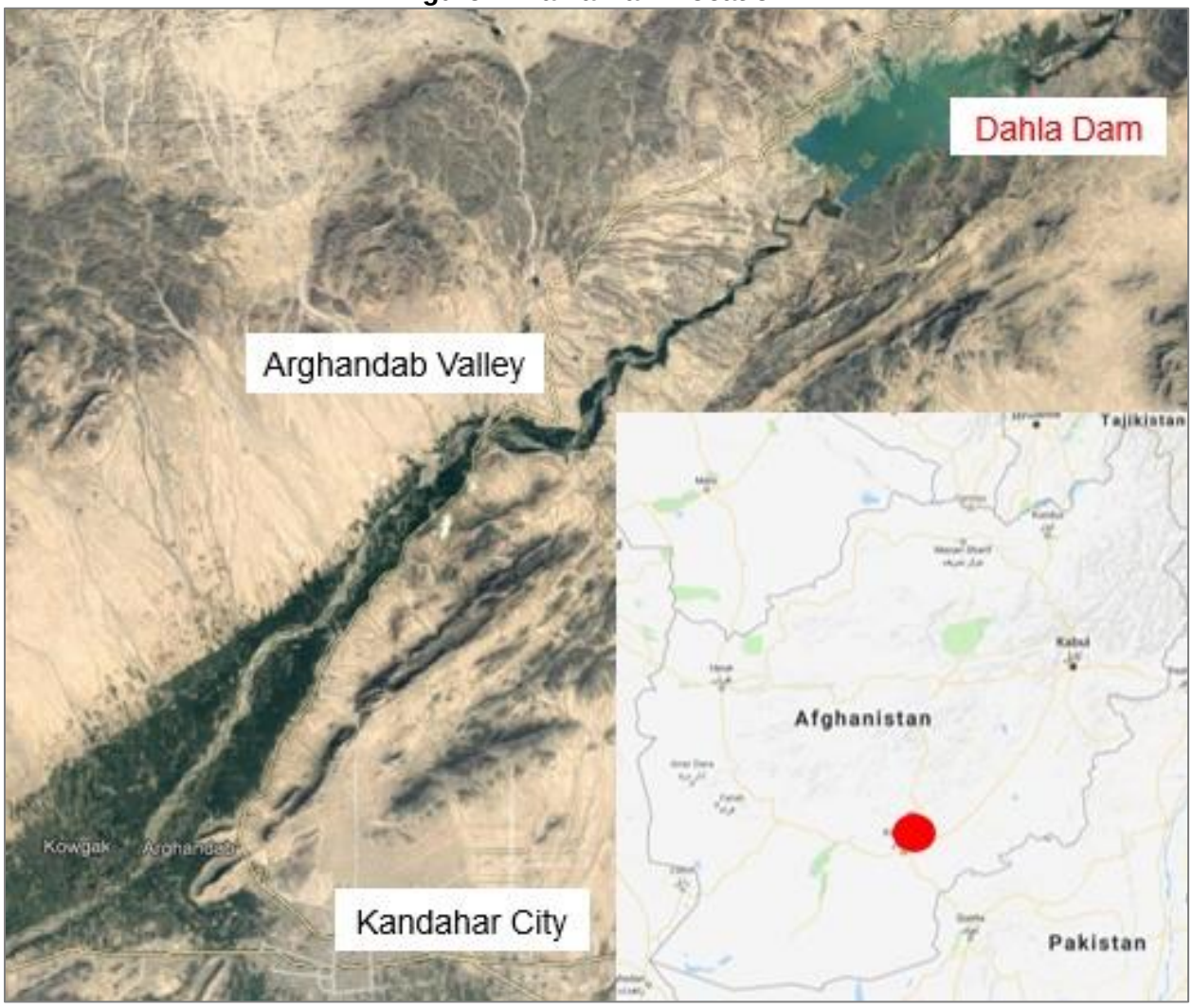
II. DESCRIPTION OF THE PROJECT

A. Existing Dam

1. Location and Purpose

11. Dahla Dam is the largest dam in Kandahar province, and the second largest in Afghanistan. It is located approximately 35 km northeast of Kandahar city on the Arghandab River. Its location is presented in Figure 1 below.

Figure 1. Dahla Dam Location



Source: TRTA Consultants, 2019

12. Dahla Dam was designed by International Engineering Company, Inc. and constructed by Morrison-Knudsen, Afghanistan, Inc for the government of Afghanistan as part of the larger Helmand and Arghandab Valley Authority Project. Dam construction began in 1950, and the dam has been in operation since 1952. It is operated by the Helmand and Arghandab Valley Authority. Dahla Dam was constructed to store 478 million m^3 of water mainly for irrigation and flood control purposes, with the anticipated extension of the Arghandab reservoir water use for hydropower generation not being implemented.

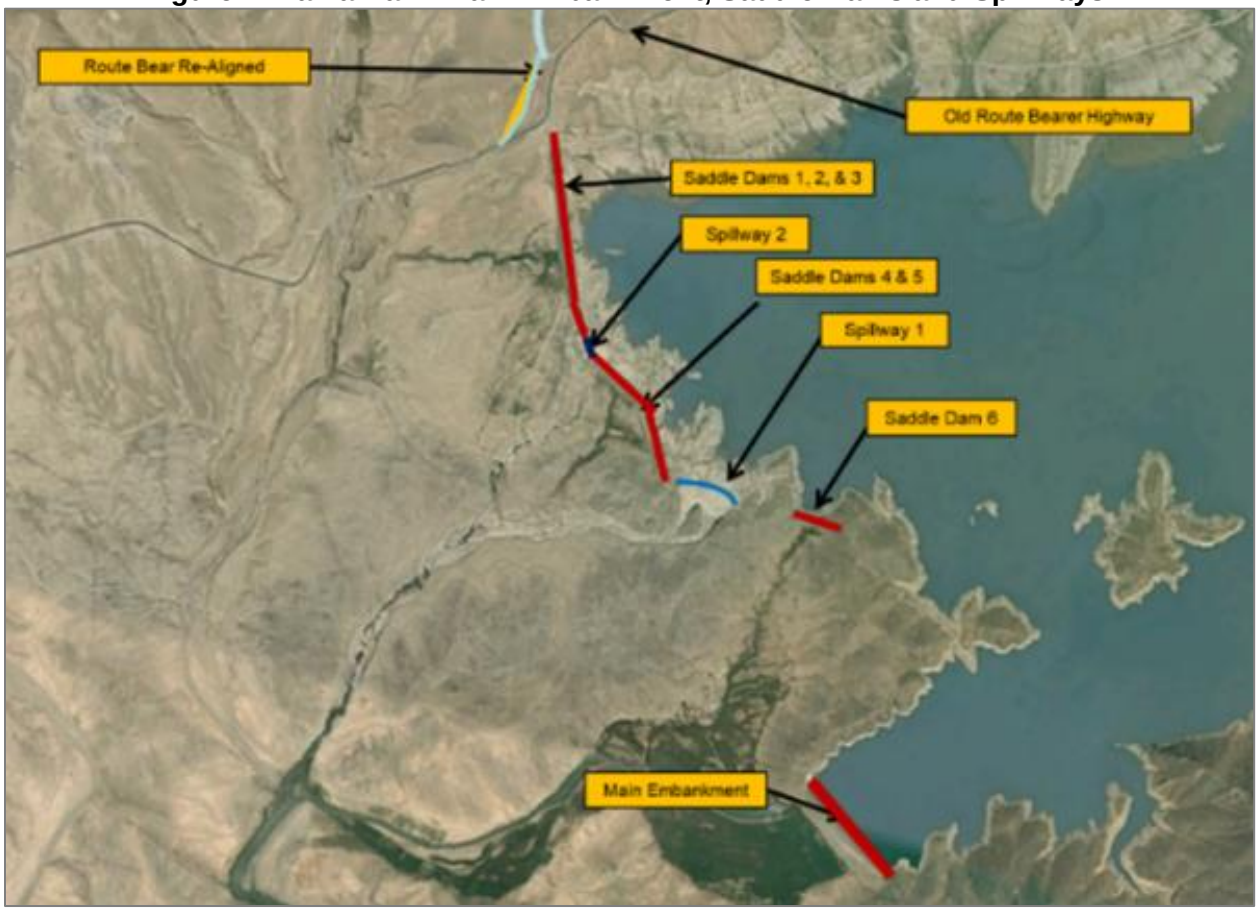
2. Main Characteristics

13. The dam has a clay core rockfill embankment / zoned earth fill, and has a catchment area of 12,925 km^2.

14. The main dam embankment is 60 m high from the deepest foundation, has a WGS84 crest elevation of 1,140.9 m with a crest length of approximately 540 m. The reservoir's full supply level (FSL) is 1,135.4 m, with a surface area of 29.4 km^2 and a storage capacity of approximately 478 million m^3 at FSL. The project includes six saddle dams along the reservoir perimeter. Five of the saddle dams have a maximum height of 15 m and an aggregate length of 1,515 m. The sixth saddle dam has a maximum height of 20 m and a crest length of 145 m.

15. There are two open channel spillways: spillway 1 is about 240 m long and is located 1.5 km between saddle dams 6 and 5, and spillway 2 is about 100 m long and is located 2.2 km northwest of the main embankment between saddle dams 3 and 4. Both spillways have an ungated concrete weir and discharge into existing channels that enter the river downstream of the dam. Figure 2 and Figure 3 below show the main components of Dahla Dam and an aerial view of Dahla Dam, its main embankment and saddle dam 6.

Figure 2. Dahla Dam: Main Embankment, Saddle Dams and Spillways



Source: USACE, TAM Construction Management Plan Concept of Operation, 30 April 2014, Dahla Dam Improvements Project

Figure 3. Aerial View of Dahla Dam

Source: Wikipedia, accessed in 2019

3. Dam Safety Inspection

16. Dahla Dam along with the spillway and the six saddle dams were inspected by the TRTA international and national dam engineers with the Director of ASBA in January and November 2018. Despite poor maintenance, the dam has performed well over the last 66 years. In general, the main dam was noted to be in good condition except the downstream erosion was noted along the sandy gravels. The abutments and groins are in good condition and dry. The spillways were in reasonable condition with some scouring of the stone masonry apron on the downstream of the short height weir. Some erosion of the bed rock appears to have occurred under the high energy flow.

B. Rationale

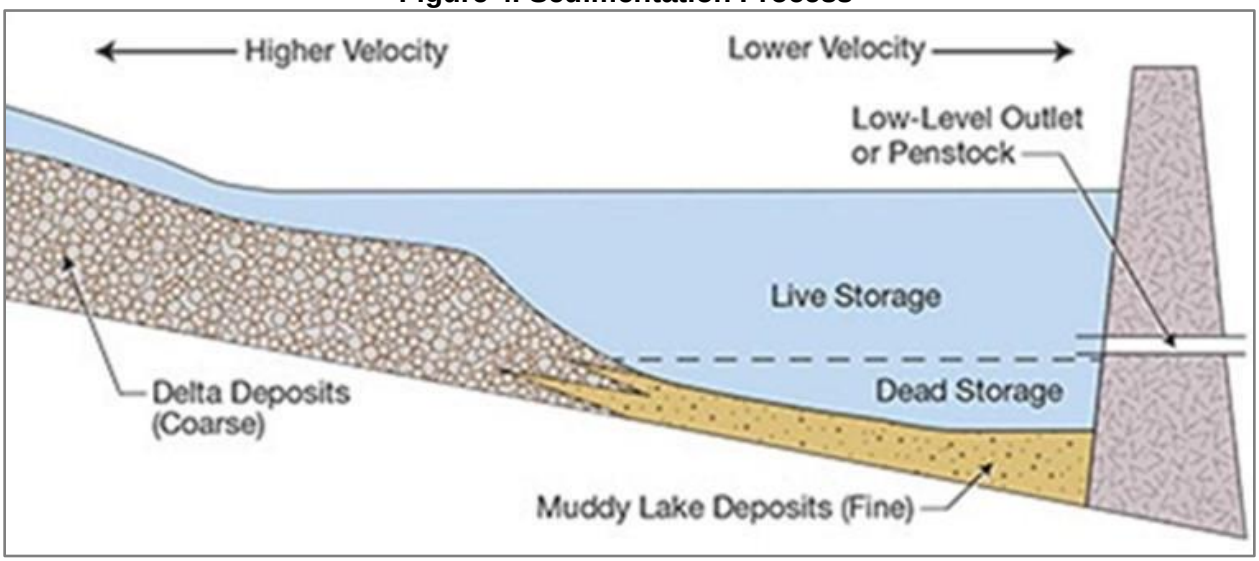
17. The TRTA team completed a bathymetric survey and a topographic survey in 2018 and collected data which were used in this study combined with data from previous studies. Bathymetric survey estimated volumes were further improved with the results of the topographic survey. The estimated corrected reservoir volumes were:

(i) Present reservoir volume, as of 2018, at FSL (spillway crest level): 288 million m^3; and
(ii) Estimated reservoir volume with 13.6 m dam raise: 782 million m^3.

18. Sedimentation in the dam since 1952 has reduced the storage from 478 to 288 million m^3: 190 million m^3 over a period of 67 years. The reservoir has consequently lost 40% of water

storage capacity. Sedimentation with delta deposits (coarse material) in high velocity zones and muddy lake deposits (fine material) in low velocity zones has taken place.

Figure 4. Sedimentation Process



Note: Typically, sedimentation in the reservoir behind a dam takes the form of progressively finer materials being deposited as the flows approach the dam.
Source: Adapted from Morris G.L. and J. Fan, Reservoir Sedimentation Manual, McGraw-Hill, New York, 1998.

19. Present sedimentation rate is 2.7 million m^3 per year. It is anticipated that during high inflows, sedimentation flushing should be performed through irrigation outlets. The irrigation outlets should be kept fully open. During detailed design, consideration should be given to re-assess the discharge capacity and changing the type of the outlet channel. Additional sedimentation studies should also be performed during detailed design.

20. Considering a sedimentation rate of 2.7 million m^3 per year, in a no project scenario, the dam would be filled with sediments with no water storage in about 100 years and the dam would be decommissioned. This would have a very critical impact on irrigation and agriculture of the Arghandab valley and livelihoods for those that depend on water from the reservoir. It shall be noted that over 64,000 hectares of farmlands are solely dependent on Dahla Dam.

21. The potential for socio-economic development in the province is severely impeded by a lack of access to sustained and reliable water and a chronic power shortage.

22. Extensive studies have been conducted for raising Dahla Dam since 2012, including the studies carried out by CIDA and the United States Army Corps of Engineers (USACE).

23. Raising Dahla Dam by 13.6 m will add an additional storage of about 500 million m^3 to the existing 288 million m^3 reservoir and will be a significant opportunity to generate and add electricity to the grid. Dahla reservoir once raised should have a life of over 200 years. When raised, the Dahla Dam is envisaged to provide water for domestic and municipal water supply, irrigation, hydropower and environmental flows.

C. Proposed Project

1. Raising of Dahla Dam

24. The project involves rehabilitation and raising of the main embankment of Dahla Dam, its six saddle dams, and two new spillways.

25. The outlet works consists one 4.6 m diameter tunnel, an inlet portal and trash rack located at the main dam right abutment, an octagonal concrete intake tower located 49 m upstream of the dam axis, and an outlet control valve house, located at the right abutment at the downstream toe of the embankment. Two 122 cm diameter pipes branch from the tunnel into the valve house to supply the irrigation outlets, which are controlled by Howell Bunger valves.

26. Table 1 presents the principal project data for the 1952 design existing dam and proposed dam with a 13.6 m spillway raise.

Table 1. Principal Project Data

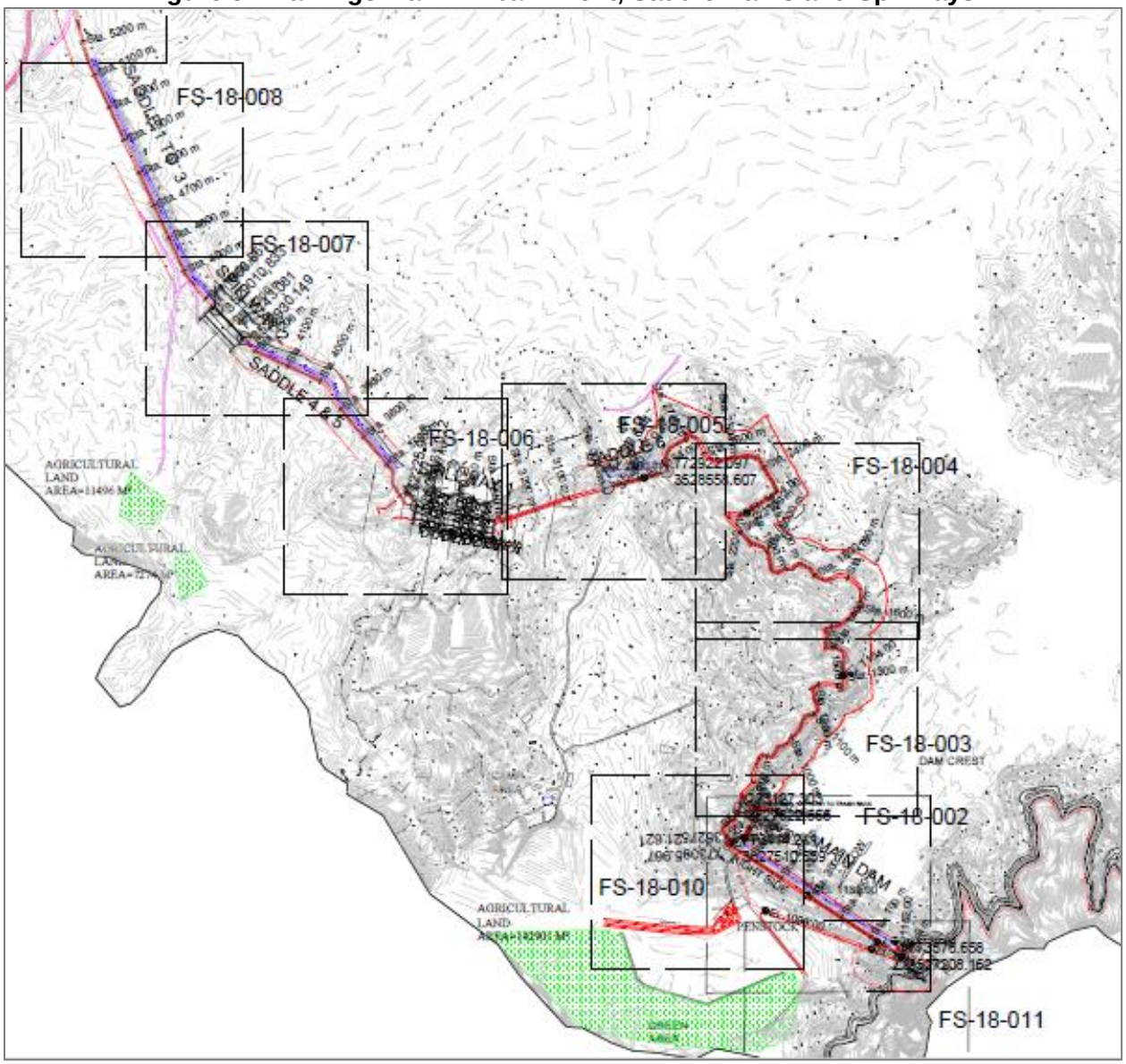
Characteristic	Current dam	Change	Proposed dam
Catchment area (km^2)	12,925	-	12,925
Bottom of conservation storage (WGS 84) (m)	1,0954.4	-	1,0954.4
Storage capacity (million m^3)	478	304	782
Current storage, 2019 (million m^3)	**288**	**494**	**782**
Reservoir area (km^2)			
At Full Supply Level (FSL)	29.54	16.27	45.81
At Probable Maximum Flood (PMF)	33.00	17.05	50.05
At Dam Crest Flood (DCF)	35.05	17.66	52.71
Dam crest elevation (WGS 84) (m)	**1,141**	**13**	**1,154**
Dam height above deepest foundation (m)			
Main dam	60	13	73
Saddle dam 6	20	13	33
Saddle dams 1 to 5	5-15	13	18-29
Dam crest length (m)			
Main dam	535	220	755
Saddle dam 6 and extension	180	330	510
Saddle dams 1 to 5 and extension	1,515	480	1,995
Dam crest width (m)			
Main dam	8.0	-	8.0
Saddle dam 6 and extension	6.4	1.6	8.0
Saddle dam 1 to 5 and extension	6.4	1.6	8.0
Saddle dam 5 extension with Spillway 1		12.0	12.0
Saddle dam 3,4 extension with Spillway 2		12.0	12.0
Free board at spillway level (m)	5.0	-	5.0
Spillway crest elevation (WGS 84) m	**1,135.4**	**13.6**	**1,149**
Spillway length (m)			
Spillway 1	260		220
Spillway 2	100		120
Discharge capacity at PMF (m^3/s)			
Spillway 1	2,600	-299	2,301
Spillway 2	1,160	-95	1,255

Total discharge capacity	3,760	-394	3,556
Inlet / outlet / diversion tunnel Trash rack Intake Tower Irrigation outlet Penstock outlet for hydropower	To be reviewed in detailed design		

Source: TRTA Consultants, 2019

27. Figure 5 below shows the drawings of the main construction work.

Figure 5. Drawings Main Embankment, Saddle Dams and Spillways



Source: TRTA Consultants, 2019

2. Realignment of Route Bearer Highway

a. Existing Highway

28. The proposed dam raise requires realignment of a section of the existing route bearer highway also known as Kandahar-Bamiyan Highway in Shah Wali Kot District of Kandahar. The route bearer highway passes the project area along the right abutment of saddle dam 1. The highway was realigned at limited reaches for an 8 m raise of the Dahla Dam in 2014.

Figure 6. Existing Route Bearer Highway

Source: Google Maps, 2019

29. Existing route bearer is a two-lane single carriage highway. The highway is 7.3 m wide of paved area and has 1.5 m shoulders on both sides. Existing alignment passes mainly along barren hilly areas with limited or no inhabitant adjacent to it. Shahjoi is the only village in this stretch.

Figure 7. Photo of the Existing Route Bearer Highway

Source: TRTA Consultants, 2018

30. No drains exist along the existing route and water flow naturally along the road embankment in natural topography. No embankment damage was noted due to non-availability of drains along the route. There are number of culverts and one existing causeway. Several of the existing culverts were destroyed by the improvised explosive device attacks.

b. Proposed Alignment

31. The proposed realigned highway will be 9.3 km long and passes mostly through barren hilly terrain. This includes 850 m stretch of existing highway for rehabilitation / repair. The new construction will be limited to about 8.45 km.

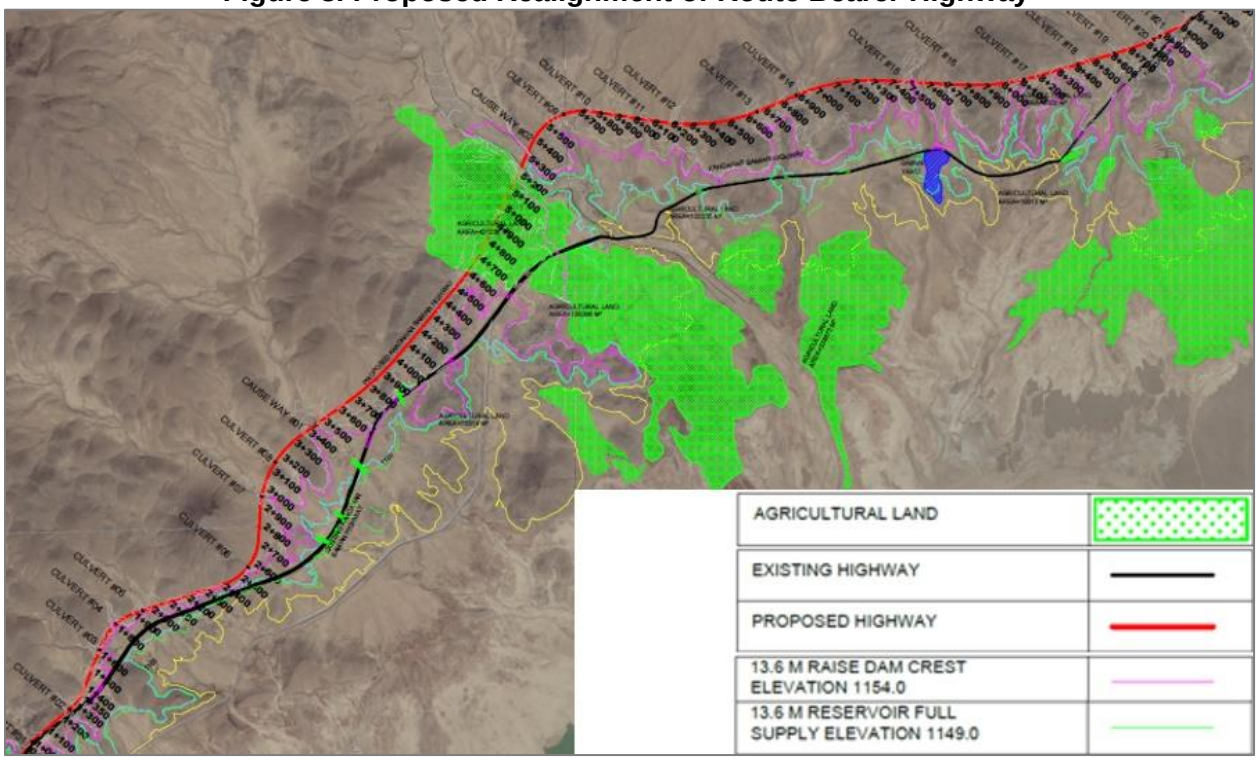
32. The proposed alignment design was considered based on number of issues like all time safe travel for road users even in case of dam crest flood i.e. above 1,154 m (WGS 84 elevation), possibility of future extension to motorway, possibility for dual carriageway, minimum cut and fill or balance cut and fill, minimal effect on commute distance and travel time for users.

33. 23 culverts and two super passages (causeways) are proposed along the route. It was noted that number of existing culverts were destroyed and due to security risks, it was preferred to defer design of bridge along the super passage.

34. The detailed design of the highway prepared by the TRTA in 2019 is according to the American Association of State Highway and Transportation Officials standard.

35. Figure 8 below shows the proposed realigned highway and existing highway with the 13.6 m raise at dam crest flood and at full supply elevation.

Figure 8. Proposed Realignment of Route Bearer Highway



Source: TRTA Consultants, 2019

D. Construction Activities

1. Raising of Dahla Dam

36. The construction activities for raising of Dahla Dam will include:

(i) **Borrow areas:** Development of the borrow area for clay core, filters, rockfill, riprap and aggregates for the dam and concrete works.

(ii) **Raise of main dam**: raising of the main dam from 1,140.9 to 1,154 m with an increase in length of the dam from 535 to 755 m. The design assumes up to 5 m excavation of the existing core to eliminate any tension cracks and mitigate risk of high seepage zones. Then the core and other zones will be extended to 1,152 m (WGS84) elevation at existing slope. A 2 m high retaining wall provides additional free board in case of probable maximum flood (PMF). Although it has been found that core and sandy gravels are in filter relationship, the core shall also be protected with a geotextile bidim A64 or similar to mitigating risk of escape of fines from the dam body in to sandy gravel zones. A 2 m thick sandy gravel zone filter shall be placed along the existing embankment slope to provide additional filter capacity to check seepage. A crest width of 8 m is proposed for the dam. Downstream slope remains the same as on 1952 design: 1V: 2.5H. Figure 9 below shows a typical cross section of the embankment.

(iii) **Raise of saddle dam 6**: raising of saddle dam 6 from 1,140.9 to 1,154 m with an increase in length of from 180 to 510 m and widening of the crest width from 6.4 to 8 m; saddle dam 6 extension increase in crest width with spillway 1 from 8 to 12 m. Grouting or Bentonite cut-off wall construction works for the reaches of the saddle dams. The design assumes 5 m excavation of the existing core under

gravel crest to eliminate any tension cracks and mitigate risk of high seepage zones. Although it has been found that core and sandy gravels are in filter relationship the core shall also be protected with geotextile bidim A64 or similar to mitigate risk of escape of fines from the dam body in to sandy gravel zones. A 2 m thick sandy gravel zone filter shall be placed along the existing embankment slope to provide additional filter capacity to check seepage. Downstream slope remains the same as on 1952 design: 1V: 2.5H. Figure 10 below shows the cross section of the saddle dam.

(iv) **Raise of saddle dams 1 to 5**: raising of saddle dams 1 to 5 from 1,140.9 to 1,154 m with an increase in total length from 1,515 to 1,995 m and widening of the crest width from 6.4 to 8 m; saddle dam 5 extension increase in crest width with spillway 1 from 8 to 12 m; saddle dam 3 and 4 extension increase in crest width with spillway 2 from 8 to 12 m. Grouting or Bentonite cut-off wall construction works for the reaches of the saddle dams. The design for saddle dams 1-5 has been performed considering both an upstream core in additional to the original 1952 design and the remaining parts, such as saddle dam 6. For a 13.6 m raise, a 6 m wide core along the upstream at a slope of 1:2.25 has been proposed. The design assumes 5 m excavation of the existing core to eliminate any tension cracks and mitigate risk of high seepage zones. Although it has been found that core and sandy gravels are in filter relationship, the core shall also be protected with geotextile bidim A64 or similar to mitigate risk of escape of fines from the dam body in to sandy gravel zones. A 2 m thick sandy gravel zone filter shall be placed along the existing embankment slope to provide additional filter capacity to check seepage. The downstream slope remains the same as on 1952 design: 1V: 2.5H. Figure 11 below shows the cross section of the saddle dams.

(v) **Raise of intake tower, tunnel lining and trash rack:** raising of the existing 5.2 m diameter intake tower from elevation 1,136.4 to 1,158 m elevation with an existing 0.4 m wall thickness; raising of the existing 2.6 m x 12.37 m wide two trash racks from 1,136.5 m to 1,150.5 m elevation; and concrete lining of the remaining 184 m length of the inlet / outlet diversion tunnel.

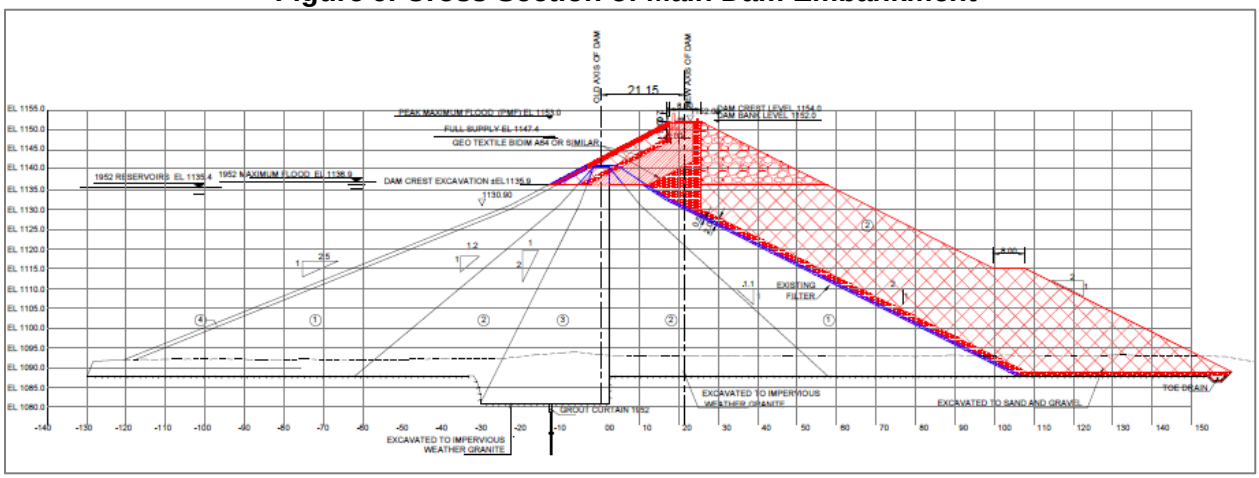
(vi) **Extension of saddle dam 1**: saddle dam 1 extension from station 5+150 to 5+600 with dam crest elevation at 1,153.0 m to act as fuse plug embankment. The crest will be protected with concrete 0.15 m thick from elevation 1,149 m and downstream will be rock armored.

(vii) **Preparatory work for spillway 1 and 2**: Construction of coffer dam / diversion works for the construction of spillway 1 and 2; Removal / dismantling of the existing spillways; Foundation grouting works of the spillway 1 and 2.

(viii) **Construction of spillway 1 and 2**: constructing a new concrete spillway adjacent to old spillway 1 from 1,135 m to 1,149 m with a 220 m long overflow weir abutting against rock.

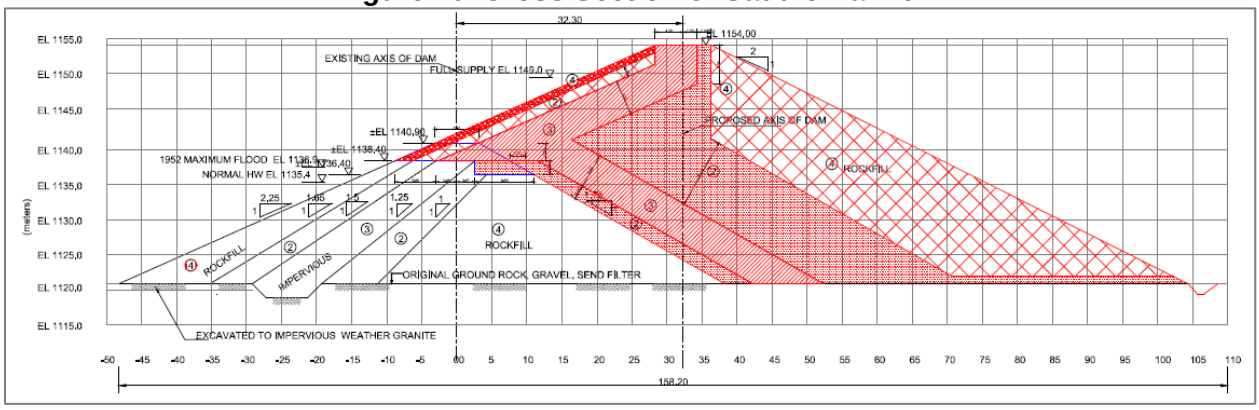
(ix) **Construction of spillway 2**: constructing a new concrete spillway adjacent to old spillway 2 from 1,135 m to 1,149 m with a 120 m long overflow weir abutting against embankments.

Figure 9. Cross Section of Main Dam Embankment



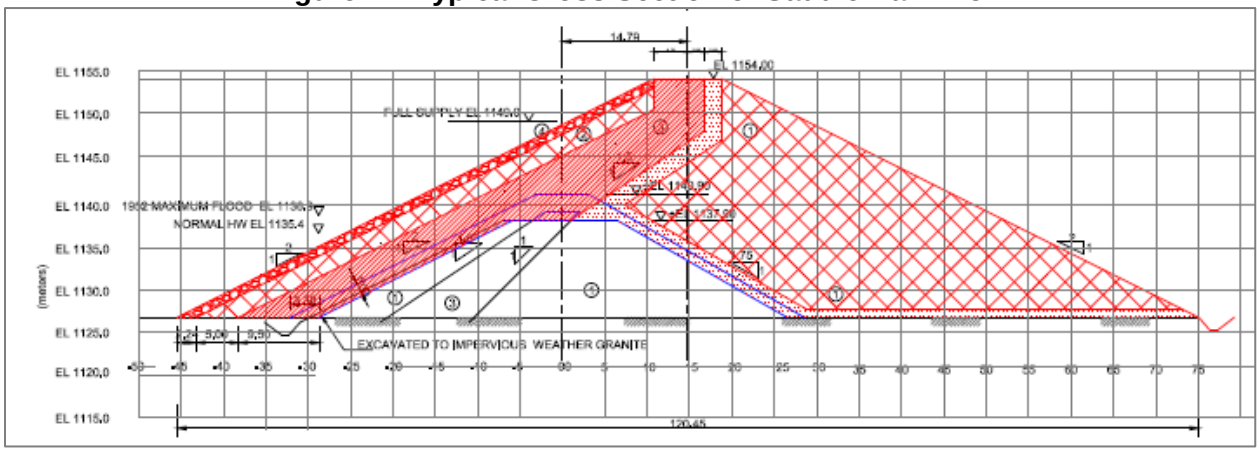
Source: TRTA Consultants, 2019

Figure 10. Cross Section of Saddle Dam 6



Source: TRTA Consultants, 2019

Figure 11. Typical Cross Section of Saddle Dam 1-5



Source: TRTA Consultants, 2019

37. Other activities will include:

(i) Site security fence;
(ii) Electrification along dam;

(iii) Staff colony and security camp; this will require town planning input to plan a small colony adjacent to dam site for the operation and security staff working on the dam. Possibly the camp will be in the same area where Turkish contractor 77 built his camp for the construction of the new outlet structure.
(iv) Geotechnical instrumentation; Installation of the geotechnical, seismic and hydraulic instrumentations;
(v) Dam safety staff training;
(vi) Resettlement; resettlement will be initiated for the villages living along the reservoir prior construction.

2. Realignment of Route Bearer Highway

38. The construction activities for output 1b – realignment of route bearer highway will include:

(i) Construction of 9.3 km highway including 0.85 km rehabilitation of existing road, width maximum 11 m in hilly terrain;
(ii) Construction of carriage way (7 m), 1 m shoulder on each side, side drain;
(iii) Cut and fill will almost balance, no surplus soil for disposal is expected;
(iv) construction of a number of 18 to 22 small to medium culverts (610 mm circular pipe) and two causeways along with the pavement works;[2]
(v) Security fencing of culverts to mitigate risk of improvised explosive device explosion;
(vi) Construction works will include excavation, limited drilling and blasting to remove rockfill and pavement works;
(vii) Stockpiling and processing of construction material downstream of saddle dam 6; (area used by previous contractors);
(viii) Asphalt to be imported from Pakistan (Quetta);
(ix) Stone, rock gravel and sand from existing quarries inside the dam and in the vicinity of the dam;
(x) Installation of asphalt plant, crushing plant at contractor's camp;
(xi) Pavement works will be performed after the road surface has been prepared;
(xii) The proposed alignment from Chainage 4+600 to 5+200 i.e. (length: 600 m), will pass through Shahjoi village agriculture land - removal and stockpiling of topsoil in fertile stretches for subsequent use or landscaping is required;
(xiii) Removal of fruit trees from agricultural land by owners or by contractor;
(xiv) Pothole repairing at existing highway (0.85 km) with double bituminous surface treatment;
(xv) Traffic management along the existing road. A temporary road will be required to divert traffic during rehabilitation of existing road;
(xvi) Provision of security including clearance of mines and explosives along the right-of-way (ROW);
(xvii) Works in existing streams shall consider suitable measures to manage water flow and drainage;
(xviii) Traffic signs and road markings along the rea-aligned highway will be installed.

[2] Locations of all culverts will be finalized as per site conditions and approved by the engineer.

E. Construction Schedule

39. **Raising of Dahla Dam**. Typically, low reservoir volume periods are from July to November. Most construction could be planned in such days with minimal risk of spillway flows. Contractor has to design his own coffer dams to protect under construction spillways and structures. Similarly, various material for construction should be procured early so that most construction could be completed during low reservoir levels.

40. Recent geotechnical investigations have confirmed availability of significant quantities of the construction material along clay core, sand-gravel mix, rockfill from the extended reservoir area. Rockfill should also be available from spillway area excavation. Drilling and blasting need careful planning. As this area is clear of the reservoir, contractor can easily start processing and stockpiling of the material for use during low reservoir time. This is a critical activity and must be managed carefully well in advance to ensure availability of enough material for construction. The contractor must perform his own investigations to validate the availability of the construction material from various sources and develop strength parameters before start of construction. Like cement and gravels can be obtained from various local quarries and are easily available in Kandahar. The proposed wall along main dam crest should be pre-casted well in advance to place on dam crest during dry months. All filters and other materials must be stockpiled before the start of the dry season to complete the construction with in dry months.

41. A planning for long lead items will be required. Long lead items have to be identified at the earliest and procurement of these items must be started soon to avoid delay in the construction to avoid unnecessary claims.

42. **Route Bearer Highway**. Works for the realignment of the route bearer highway can start at any time of the year. It is anticipated that the procurement for the work will be completed during second and third quarter of 2019. The construction works should be completed within six to nine months and is expected to start on first quarter of 2020.

43. The construction schedule is presented in Figure 12 below.

Figure 12. Proposed Construction Schedule

Activity Number	Activity Description	2019				2020				2021				2022			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	TENDERING AND CONTRACTUAL ARRANGEMENTS																
2	Constructions Schedule																
3	Procurement of Various Contracts under Component 1 Works																
4	Tender Design																
6	Procurement of Engineering Procurement & Supervision Consultants (EPCS)																
7	ROUTE BEARER HIGHWAY WORKS CONTRACT																
8	Contractor's Mobilization (Equipment and Plants)																
9	Surveys																
10	Procurement of long lead items																
11	Earthworks																
12	Structural works																
13	Pavement works																
14	Traffic Signs works																
15	Handover to government / De-mobilization																
16	DESIGN, CONSTRUCTION AND SUPERVISION WORKS																
17	Selection of Detailed design engineering (civil and E&M)																
18	Mobilization of the EPCS Team																
19	ENGINEERING, DESIGN AND INVESTIGATIONS																
20	Detailed Inspection of Intake Tower, Trash Rack and Tunnel and preliminary design																
21	Basic design engineering (Civil and E&M + earthworks / excavation drawings)																
22	Hydraulic model testing of the spillways																
23	Electromechanical / Structural / Geotechnical investigations																
24	Detailed design engineering (civil and E&M+Detailed drawings)																
25	PREPARATORY CONSTRUCTION WORKS																
26	Contractor's Mobilization (Equipment and Plants)																
27	Site Clearance and temporary access roads																
28	Site and camp infrastructure																
29	Processing / screening of the embankment fill																
30	Precasting of the Main Dam RCC parapetwall																
31	Procurement of long lead items																
32	Hydraulic gates for Spillway 2																
33	Electromechanical machinery for Intake tower and trash rack																
34	Pre-cast tunnel lining / Shotcrete procurement Contract																
35	HYDRAULIC STRUCTURES																
36	SPILLWAY 1 CONSTRUCTION CONTRACT																
37	Temporary Coffer dam																
38	Excavation, foundation treatment, instrumentation																
39	Concrete works																
40	SPILLWAY 2 CONSTRUCTION CONTRACT																
41	Temporary Coffer dam																
42	Excavation, foundation treatment, instrumentation																
43	Concrete works																
44	Installation of hydraulic gates																
45	INTAKE TOWER, TRASH RACK STRUCTURE CONTRACT																
46	E&M Works																
47	Civil Works																
48	Excavation, foundation treatment, instrumentation																
49	Concrete works																
50	Structure ready for installation of hydraulic machinery																
51	TUNNEL LINING / SHOTCRETING CONTRACT																
52	Inspection by Geotechnical / Rock Mechanics / Hydraulics experts																
53	Design decision on concrete lining / shotcreting																
54	Procurement for the tunnel works																
55	Concrete lining / Shotcrete works																
56	MAIN DAM EMBANKMENT RAISE CONTRACT																
57	Civil Works																
58	Excavation, foundation treatment, instrumentation																
59	Filling works																
60	Concrete works																
61	SADDLE DAMS RAISE CONTRACT																
62	A. Saddle Dam 6 and extension Raise																
63	Civil Works																
64	Excavation, foundation treatment, instrumentation																
65	Filling works																
66	B. Saddle Dam 4 and 5 Raise																
67	Civil Works																
68	Excavation, foundation treatment, instrumentation																
69	Filling works																
70	Concrete works with Spillway 1																
71	C. Saddle Dam 1, 2 and 3 and extension Raise																
72	Civil Works																
73	Excavation, foundation treatment, instrumentation																
74	Filling works																
75	Concrete works with Spillway 1 and 2																
76	PROJECT COMMISSIONING																
77	Pre-Commissioning tests																
78	Commissioning tests																

Source: TRTA Consultants, 2019

F. Operation and Maintenance, Emergency Response

44. This activity will include the following works:

(i) A study, design and installation of a Seasonal Forecasting Tool for Kandahar basin. This shall be done by a hydrologist / meteorologist and will require close coordination with MEW, ASBA, NEPA, Weather Bureau and Kandahar Government. This will involve procurement of the equipment, installation in Kandahar in an approved building and hiring and training national staff;
(ii) Management of the operation and maintenance of the dam;
(iii) Capacity development of ASBA by hiring relevant engineering and operational staff. Numbers and positions need to be discussed and agreed with ASBA and MEW: engineers (civil, hydrologists, hydraulics, geotechnical, electrical, mechanical, geographic information system) and staff for operation of the dam safety emergency response vehicles;
(iv) Preparation of the operation and maintenance manuals for the dam in close coordination with MEW / ASBA and other relevant agencies for: the dam operational safety and, the dam safety emergency response;
(v) Training to the dam safety staff for emergency response: ASBA staff and other relevant emergency response organizations;
(vi) Procurement of emergency response equipment and vehicles for ASBA and MEW:

a. 2 Land Cruiser Prado Vehicles for the management;
b. 4 Toyota Hilux double cabin SRS 4 x 4 or equivalent vehicles for the staff working on dam safety;
c. 4 Toyota Hilux single cabin 4 x 4 or equivalent vehicles for the staff working on dam safety;
d. 2 long reach boom excavators Komatsu or equivalent;
e. 2 wheel loaders WA470-7 Komatsu or equivalent;
f. 2 dump trucks HM-400-5 Komatsu or equivalent;
g. 2 smooth wheel double drum 12 tons rollers Komatsu or equivalent;
h. 2 dozers D39EXi/PXi-23 Komatsu or equivalent;
i. 1 sheep foot roller 12 tons Komatsu or equivalent;
j. 1 9HP walk behind Double drum roller;

(vii) Provision of the inhouse mechanical and electrical workshop for the maintenance of these vehicles;
(viii) Provision for the petrol, oil and lubricants and maintenance of these vehicle for the project duration;

45. Costs for these dam safety activities are expected to be spread over five years and need careful management. It is assumed that subsequently Afghan government / MEW will be able to manage the operation and management (O&M) costs.

G. Human Resources and Equipment

46. The project will be subdivided into number of sub-components to encourage use of local contractors. The typical machineries involved the project will include cranes, long reach boom excavators, loaders, dumpers, graders, dozers, smooth wheel drum rollers, sheet foot rollers, walk drum rollers, water tanks, and sprinklers, etc.

47. Approximate number and categories of job opportunities likely to be created as a result of the proposed construction are presented in Table 2 and Table 3 below.

Table 2. Raising of Dahla Dam: Human Resources Requirements

Type/Profession	Construction	O&M
Resident Site Engineers (Civil, Geotechnical, Mechanical, Electrical, Hydraulics) with B.Sc Engineering Degree and 10-15 years' experience	5	2
Assistants Resident Site Engineer, Geotechnical, with B.Sc Engineering Degree and 5 years' experience	3	1
Assistants Resident Site Engineer, Hydraulics, with B.Sc Engineering Degree and 5 years' experience	3	1
Assistants Resident Site Engineer, Mechanical, with B.Sc Engineering Degree and 5 years' experience	2	1
Assistants Resident Site Engineer, Electrical, with B.Sc Engineering Degree and 5 years' experience	2	1
Assistant Engineer, Civil, with B.Sc Engineering Degree and 3 years experience or Diploma holder with 8 years experience	5	2
Assistant Engineer, Geotechnical, with B.Sc Engineering Degree and 3 years experience or Diploma holder with 8 years experience	3	2
Assistant Engineer, Mechanical, with B.Sc Engineering Degree and 3 years experience or Diploma holder with 8 years experience	5	2
Assistant Engineer, Electrical, with B.Sc Engineering Degree and 3 years experience or Diploma holder with 8 years experience	5	2
Assistant Engineer,Hydraulics, with B.Sc Engineering Degree and 3 years experience or Diploma holder with 8 years experience	1	2
Assistant Engineer, Civil / Civil 3D/ AutoCAD, with B.Sc Engineering Degree and 3 years experience or Diploma holder with 8 years experience	3	1
Work supervisor, diploma holder with 3 years' experience	20	0
Administrator	5	2
Administration staff	10	2
Clerical staff	20	4
Skilled labor	200	5
Unskilled labor/helpers	500	0
Total	**791**	**32**

Source: TRTA Consultants, 2019

Table 3. Realignment of Route Bearer Highway: Human Resources Requirements

Type/Profession	Construction
Resident Site Engineers (Civil, Geotechnical) with B.Sc. Engineering Degree and 10-15 years' experience	2
Assistants Resident Site Engineer, Geotechnical, with B.Sc. Engineering Degree and 5 years' experience	1
Assistants Resident Site Engineer, Hydraulics, with B.Sc. Engineering Degree and 5 years' experience	1
Assistant Engineer, Civil, with B.Sc. Engineering Degree and 3 years' experience or Diploma holder with 8 years' experience	2
Assistant Engineer, Geotechnical, with B.Sc. Engineering Degree and 3 years' experience or Diploma holder with 8 years' experience	2
Assistant Engineer, Civil / Civil 3D/ AutoCAD, with B.Sc. Engineering Degree and 3 years' experience or Diploma holder with 8 years' experience	2
Work supervisor, diploma holder with 3 years' experience	5
Administrator	2
Administration staff	3
Clerical staff	2
Skilled labor	100
Unskilled labor / helpers	200
Total	**322**

Source: TRTA Consultants, 2019

48. Following are the list of equipment, which would be required during the implementation stage of the subprojects. The contractor will provide the equipment and machinery required for execution of this subproject.

Table 4. Raising of Dahla Dam: Equipment Requirements

Equipment	Quantity	Capacity
Long boom excavators	5	
Front end loaders	10	
Dump trucks	30	
Grader	5	
Steel smooth wheel drum roller	5	
Vibratory roller	5	
Water tanks	20	
Crane	2	70 ton
Mobile crane	2	50 ton
Concrete mixer	10	
Asphalt plant	1	
Crusher plant	1	
Processing plant	1	
Drilling / grouting plant	3	

Source: TRTA Consultants, 2019

Table 5. Realignment of Route Bearer Highway: Equipment Requirements

Equipment	Quantity	Capacity
Long boom excavators	3	0.45 - 0.8 m^3
Front end loaders / bulldozer	10	15 ton
Dump trucks	15	
Grader	3	
Steel smooth wheel drum roller	4	
Vibratory roller	4	8 - 20 ton
Tire roller	4	8 - 20 ton
Water tanks	5	
Concrete mixer	5	> 0.6 m^3
Asphalt Plant	1	60 ton / hr
Crusher plant	1	
Processing plant	1	
Asphalt finisher	1	2.4 - 6 m
Vibrating roller	2	3 - 4 ton and 0.5 - 0.6 ton
Vibrating compactor	1	50 - 60 kg
Line marker	1	Thermoplastic type
Truck crane	2	16 ton and 4.9 ton
Rough terrain crane	1	20 ton
Dump truck	1	10 ton
Truck	3	2 ton; 3-3.5 ton; 4-4.5 ton

Source: TRTA Consultants, 2019

H. Identified Sites

1. Borrow Areas

49. Summary of the estimated quantity of soils for the earthworks is presented in Table 6 below. About 7.3 million m^3 overall volume is required from borrow areas: (i) clay core 1.2 million m^3, (ii) sandy gravels 4,8 million m^3, (iii) riprap / filters: 1.3 million m^3.

Table 6. Quantities of Soil for Raising of Dahla Dam (m^3)

Description	Main Dam	Reservoir Protection	Saddle Dam 6	Saddle Dam 4-5	Saddle Dam 1-3	Spillways
Excavation	388,675	229,190	20,760	76,000	123,500	445,400
Filling	4,797,745	-	1,043,520	531,880	908,180	71,740
Expansion Joint	-	-	-	-	-	1,014
Geo Textile	71,220	-	-	-	-	-
Concrete	2,643	-	-	-	-	112,240
PCC Blinding	-	-	-	-	-	16,480
Road Surfacing	6,795	-	4,590	6,840	11,115	-

Source: TRTA Consultants

50. Preliminary field investigations showed that materials suitable for construction of an earth fill dam, and in suitable quantities, were available near the main dam site. The available materials were generally of two types which were suitable together for a zoned embankment: an impervious silty clay and pervious sand and gravel.

51. Quarries for raising the dam and construction of Route Bearer highway are located in the vicinity of the dam. Some of them are to be found in the area to be flooded after the dam rise. Most of the areas adjacent to the existing raised route bearer highway should have sufficient material for the earthwork. However, processing of this material will be required.

52. Rockfill from spillway 1 area will also be available after removal. Gravels and cement will be obtained from Kandahar.

53. Only existing and licensed borrow areas will be used and NEPA shall approve their use.

54. A total 23 test pits were made by the TRTA. Details of test pits are presented in drawing No. FS-60-004, extracted in the Figure below. Most of the test pits were reported as stiff to hard clay/silt (to claystone/siltstone) and dense sand /gravels (to sandstone). Contractor excavated the test pits with difficulty as the material was mostly very stiff or dense with very limited moisture. The table below presents an overall aggregate summary of the material types and possible locations based on reported test pits data. It was noted that depth of various material varies in test pits. Like sometimes from one test pit various types of material should be available. The number of test pit is accordingly listed in multiple columns.

Table 7. Borrow Area Investigation with Anticipated Material Availability Summary

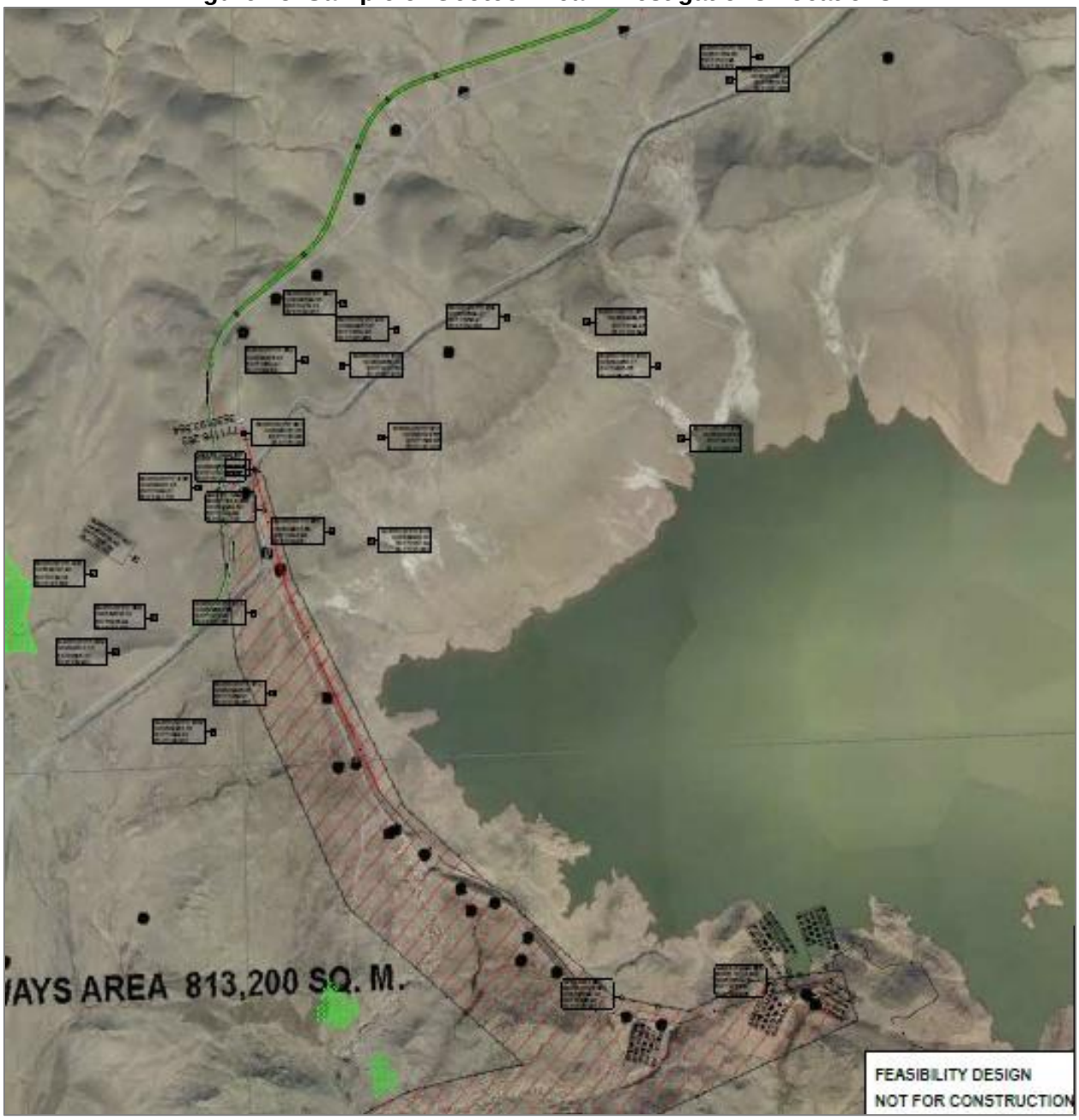
Sr. No.	Material Description	Potential Borrow Area as per test pits	Remarks
1	Selected compacted sand and gravel fill	2, 3, 5, 6, 9, 10, 11, 13, 18,	0 to 2 m gravels are reported in test pits 11 and 12. In test pit 11 below 4 m conglomerates are reported.
2	Random rolled fill	1, 2, 4, 5, 6, 7, 15, 16, 18, 21, 22	Sand + silt +clay
3	Impervious rolled fill (clay core)	1, 2, 6, 7, 8, 12, 14, 16, 17,19, 20 and 23	Stiff to hard clay / claystone
4	Dumped rockfill	From spillway and some may be available from excavation along route bearer highway	After Shahjuy Village route bearer passes through hilly area. This rock may be used for dam construction as well.
5	Rip rap	-	From Quarry

Source: TRTA Consultants, 2019

55.

56. Figure 13 is an extract of boreholes in saddle dams 1-6, spillways, and borrow areas testing performed along the existing structures and along the existing route bearer highway.

Figure 13. Sample of Geotechnical Investigations Locations



Source: TRTA Consultants, 2019

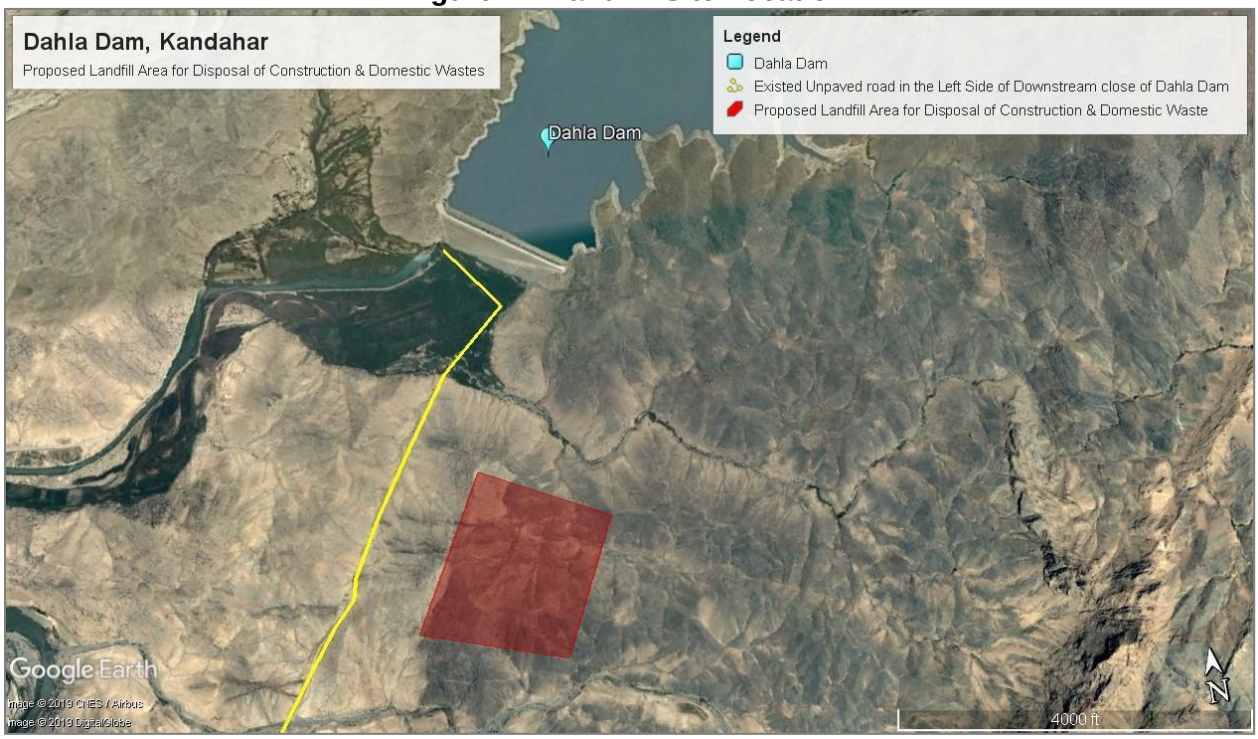
2. Landfill

57. The design has been performed in general to nearly balance out the cut and fill. This should minimize wastage and disposal issues. The unsuitable material will be disposed in landfills approved by NEPA downstream of main Dahla Dam to ensure that the excavated does not interfere with existing streams or waterways.

58. There will be need for stockpiling and processing / screening of the excavated and borrow material. Borrow fill would be available from existing reservoir area. This may be performed at location downstream of the saddle dam 6 where previous contractors made their site offices.

59. A site located 1.7 km in the left downstream side of Dahla Dam outlet, is considered has best location for disposal of construction waste. The site is in barren state land and is not located nearby any residential, water body, orchard, or agriculture land. This was confirmed by ASBA in March 2019. The location of the site is presented in Figure 14 below.

Figure 14. Landfill Site Location



Source: TRTA Consultants, 2019

3. Construction Camp

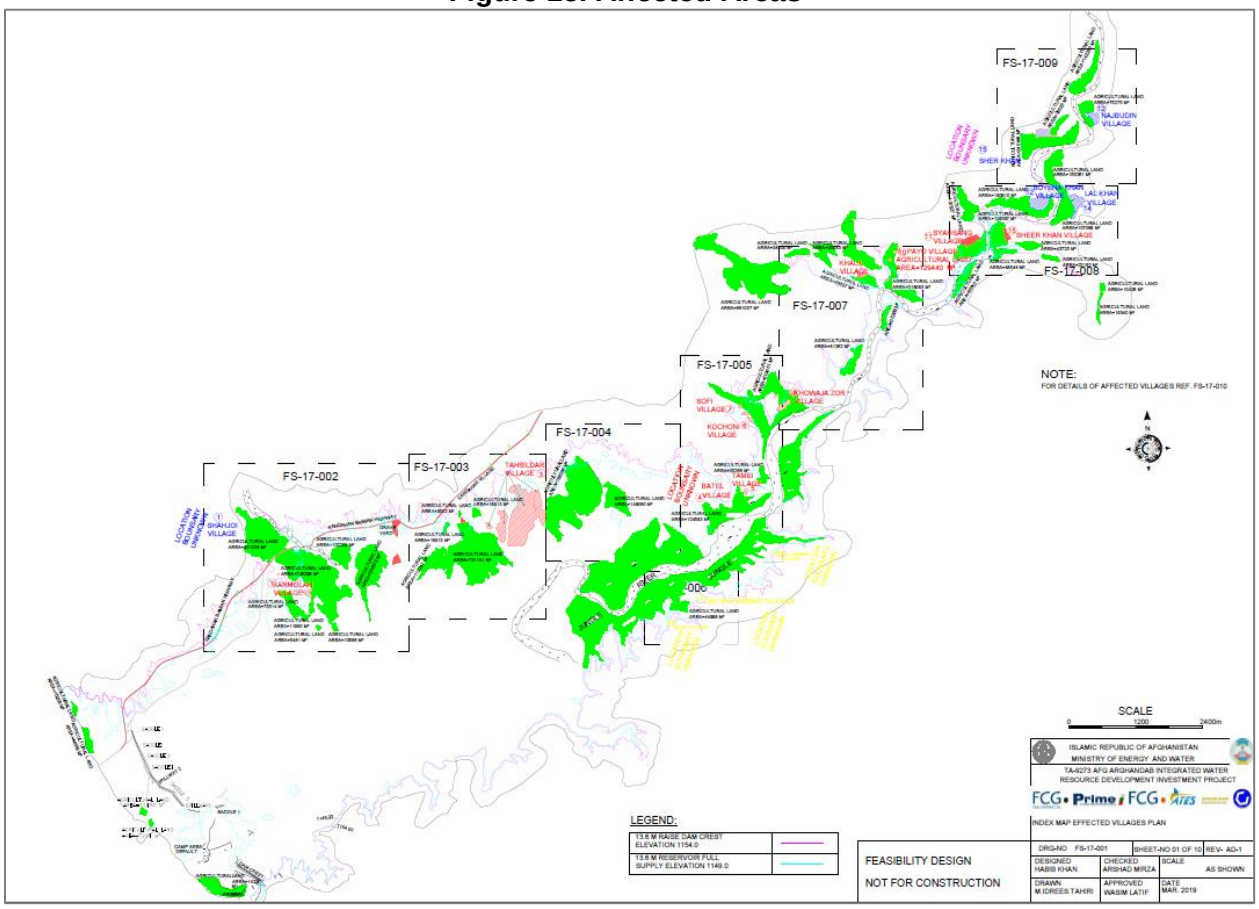
60. A construction site-camp exists near saddle dam 6. It is an open area, with paved ground surface. The site is close to both saddle dam 6 and main dam. This place was used as construction camp for the dam construction in 1952, as well as by 77-Turkish company more recently. There is enough space for construction site offices, construction machinery, and other site-camp activities.

I. Project Impacted Areas

1. Raising of Dahla Dam

61. Agricultural land and settled areas will be inundated after the dam raise. An estimated 22 villages with a population of approximately 6,500 will be affected. The inundation will cause a loss of about 800 hectares of arable land, 300 hectares of pasture land, 643 orchards with 92,241 fruit trees and 16,000 wood trees. A preliminary map of affected areas is presented in Figure 15 below.

Figure 15. Affected Areas



Note: The green areas represent the agriculture lands affected and the red areas the villages affected.
Source: TRTA Consultants, 2019

62. Areas of the project that will be impacted due to the raising of the dam are:

(i) Area to be inundated upstream the dam (up to 22 villages, agricultural land, route bearer highway and upstream forest);
(ii) The whole construction area of the main dam, the six saddle dams and the two spillways;
(iii) Access roads;
(iv) Canals below the spillways;
(v) Floodplain of the Arghandab River;
(vi) Borrow areas;
(vii) Area and close vicinity of contractor's camp.

2. Route Bearer Highway

63. The proposed alignment from chainage 4+600 to 5+200 i.e. 600 m long, will pass through Shahjoi village agriculture land. The ROW has been considered as 50 m from centerline. Considering the proposed ROW, a land of 30,000 m^2 will need to be obtained for this highway. In order to start realignment works, the concerned land has to be acquired. Land acquisition will be a critical activity before the start of construction of the highway. The resettlement surveys are currently underway, and the Land Acquisition and Resettlement Plan will be prepared in April 2019.

64. It shall be noted that the existing route bearer highway already passes through this agricultural land.

65. Impacted areas of this highway for a 13.6 m reservoir level increase are as follows:

(i) Agricultural land of Shahjoi village (Chainage 4+600 to 5+200, length: 600 m);
(ii) Road corridor needed for the realignment: 9.3 km in hilly terrain including 0.85 km of existing highway;
(iii) Structures sites and effects on temporary streams;
(iv) Topsoil stockpiles;
(v) Waste disposal areas;
(vi) Access roads;
(vii) Borrow areas inside Dahla Dam and in the vicinity of the dam;
(viii) Contractor's camp including asphalt plant, crushing plant;
(ix) Existing temporary streams.

3. Construction Camp

66. The establishment of a contractor's work camp may cause adverse impacts on the environment if aspects such as liquid and solid waste management, equipment maintenance, materials' storage, and provision of safe drinking water are not addressed properly. The site for the work yard will be selected by the contractor. It is suggested to use the existing facilities below the dam which have been used by previous contractors. A large already sealed area can be used for the installation of equipment and storage sites. The existing area provides enough space to set up the concrete batching plant.

67. In order to ensure that potential impacts resulting from the construction works are kept at a minimum, the contractor will be obliged to prepare the following plans or method statements:

(i) Layout plan of the work camp including a description of all precautionary measures proposed to avoid potential adverse impacts on the receiving environment (surface and groundwater, soils, ambient air, human settlement);
(ii) Sewage management plan for the provision of sanitary latrines and proper sewage collection and disposal system to prevent pollution of soil, watercourses or groundwater;
(iii) Waste management plan covering the provision of garbage bins, regular collection and disposal in a hygienic manner, as well as proposed disposal sites for various types of wastes (e.g., domestic waste, used tires, etc.) consistent with applicable national regulations;
(iv) Description and layout of equipment maintenance areas and lubricant and fuel storage facilities, including distance from water courses. Storage facilities for fuels and chemicals will be located far from open watercourses. Such facilities will be bounded and provided with impermeable lining to contain spillage and prevent soil and water contamination;
(v) These plans will be approved by the supervising engineer prior to beginning of construction activities.

68. Prior to the establishment of the work camp(s) the contractor shall conduct consultations with local authorities to identify sources of potable water for the workforce that will not compete with the needs of the local population. Potable water for the workforce shall comply with the World Health Organization (WHO) quality standards.

III. ANALYSIS OF ALTERNATIVES

A. Raising of Dahla Dam

69. The project feasibility involves raising or rehabilitating existing structures. Only the alternatives discussed in the engineering design are therefore mentioned in this section.

70. During concept design and dam optimization phase, a number of alternatives were examined concerning the sites, the technology used, and possible alternative design outcomes and, as a result, variations in operational capacity, longitude and efficiency of the dam. These included: the dredging of the existing dam to remove silt and liberate greater capacity in the existing dam; review of previous documentation regarding the option to build the Hasanzay dam some 50 km upstream; and then exploration the impact of raising the Dahla Dam wall using a number of different height configurations.

71. The existing dam site, as will be detail further, is vulnerable to high levels of sedimentation due to the intensity of the seasonal melt-down, the predominant topography, and the constancy of both free-range grazing of animals and collection of fuel-wood across the catchment. Alternatives considered needed to aim to deliver an improved water resource amid some considerable challenges.

1. Dredging of the Existing Dam

72. The option to dredge the existing dam would see millions of cubic meters of silt excavated and relocated using machinery and trucks. Technically, dredging is feasible but the unit cost and the environmental impact ruled this out as a viable option. The costs per cubic meter to excavate and remove the silt build up on the floor of the existing are high. Timing and site preparation for this option would be critical. In addition, the sheer size of the water body means that dredging and removal would be time consuming, and is considered to be limited in the impact it can have over such a large area. The environmental dimensions of such a proposal would also have some considerable negative impact including temporary loss of habit, as well as a deterioration of water quality during the process.

2. Hasanzay Dam

73. The option to build an additional dam was reviewed in light of work completed by the previous CIDA proposal. The opportunity which an additional upstream dam could provide is that it would strategically strengthen the capacity to manage both sediment loads and potential flooding during periods of peak melt-down. There are two major reasons for this option to have been excluded. Detailed survey information regarding the site for the potential Hasanazay Dam is extremely limited and would require extensive field work to assess the potential. The reality is that the area is currently a high-risk zone from a security perspective, and has been so for years. Environmental dimensions, technical challenges for construction and social elements including any need for resettlement have therefore not been assessed. While it could make some contribution as part of future plans, it is not considered to be a feasible alternative at this point in time.

3. Dam Wall Raising to Different Heights

74. The raising of the dam wall was looked at across a spectrum of possibilities, from that of a 9.1 m rise to that of 13.6 m. In addition, access to material required for construction was also assessed.

75. Design and construction was considered to be the same for each of these options. The main dam, saddle dams and the two spillways are located in geologically favorable areas with strong to very strong granite and granodiorite foundation rocks. Preliminary field investigations, showed that materials suitable for construction of an earth fill dam, and in suitable quantities, were available near the main dam site. The investigations have confirmed availability of significant quantities of the construction material clay core and sand-gravel mix. For example, rockfill should also be available from the spillway 1 construction where controlled blasting to create a foundation will liberate considerable material. It is proposed that this work be performed during the low water period in the dam.

76. Water catchment and supply were modeled for different dam spillway raise heights (from 9.1 m to 13.6 m raise) to assess feasibility and cost-benefits, including future impacts of climate change. In November 2018, the government agreed with the recommendation to raise the spillway height by 13.6 m, allowing the preliminary project design and costs to be finalized on this basis. This design addresses climate change impacts including: (i) coping with short-duration, high inflows that are forecast to be more frequent, without unplanned spills that may cause downstream floods; (ii) provide greater water storage and strengthen water resource management capacity so that impacts of drought are reduced; (iii) strengthens dam safety; and (iv) prolonged dam life for sediment deposition.

77. The social dimensions of resettlement were examined for both the 9.1 m rise to that of 13.6 m. The results of this work identified that there was no significant difference between them. Following assessment of these various options, the government has accepted the TRTA recommendation for a dam raise of 13.6 m.

4. Route Bearer Highway

78. The option to raise the dam 13.6 m will require the relocation of the route bearer highway. Although the proposed optional route of the road is adjacent to Shahjoi village and there will be consideration required during construction to limit environmental impacts such as dust and noise, the scenario has positive benefits. The realignment road option revealed that rockfill as well as other suitable materials can be mined as a dividend from this road construction.

79. Justification of the major options considered are detailed in Table 8.

Table 8. Alternative options considered

Subject	Options considered	Option chosen and justification
Catchment status	Position of existing dam and liability to sedimentation	The need for long-term improvements to the management of the Dahla Dam catchment and, from an integrated perspective, the need for attention to be given to the greater Helmand River Basin have been documented in this EIA. Although beyond the terms of reference for the current proposal, the integrated approach has been well supported by other government policy and strategy plans.
Dam site	Construct Hasanzay dam 50 km upstream Raise existing dam	Currently there is only limited information on the Hasanzay site. The proposed site is not accessible due to security concerns. The estimated cost for Hasanzay was $330 million in previous studies with a capacity of 500 million m^3. Dahla is easily accessible and people have willingness to support government for the raise of the existing dam site. The Dahla site has limited risks as compared to Hasanzay. The dam has performed well since 1952 and there should be less

		dam safety concerns. The cost for the Dahla raise for a storage of 500 million m^3 is only $231 million. The raise with existing storage will also give 29 MW hydropower potential which will be a great benefit for people of the region. Hasanzay Dam may be constructed within a medium to longer-term timeline to reduce sedimentation to Dahla Dam as well as assist in management of potential flooding. Additional sedimentation studies could also be performed during detailed design.
Intervention type	Raise of the dam, or dredging	Sluicing / flushing or dredging were considered by CIDA (2013) and concluded that sediment removal by sluicing and flushing would likely be technically infeasible and that sediment removal by dredging would be relatively costly on the basis of cost per cubic meter of recovered storage. The report also estimated that dredging would be a very time consuming method of increasing storage capacity, with continuous dredging operations over a number of years required in order to recover significant capacity. The environmental impacts of such an approach would also be considerably negative, as water quality and habitat would be affected over a long period of time. The report concluded that preferred alternative for increasing storage capacity is to raise the dam.
Dam type	Raising the dam by Roller Compacted Concrete Dam; Concrete Faced Rockfill Dam or by Earthfill similar to existing dam body	Existing Dahla Dam is a mixed homogenous earth and rockfilled dam. A roller compacted concrete dam on top of such a dam may have several concerns including differential settlements under normal and seismic events. A concrete faced dam option was possible for the saddle dam 6 and 1 to 5. However, this could be considered if limited construction material was available at dam site. For Dahla Dam body material is readily available from extended reservoir area excavation. These materials have to be in filter relation as per existing dam body material. The material used will be Zone 1 - Selected Compacted Sand and Gravel Fill; Zone 2 - Random Roll Fill; Zone 3; Impervious Rolled Fill (Clay Core) and Zone 4: Dumped Rock Fill. Zone 1,2 and 3 will be available from the reservoir side borrow areas. Zone 4 will be available from spillway 1 excavation and from approved borrow areas. The details on borrow areas and likely availability of various material is discussed in Feasibility Drawing FS-60-004. Processing of these materials will be required to satisfy filter criteria.
Storage levels	9.1 and 13.6 m raise in Full Supply Levels	13.6 m increase in storage was selected due to increased long-term benefits.
Spillway options	Roller Compacted Concrete weir or Conventional Reinforced Cement Concrete Spillways to pass flood and lower water in case of an emergency	Conventional Reinforced Cement Concrete Spillways were selected to facilitate and simplify operation. Additional Model studies will be performed during detailed design to see if a gated spillway, fuse plug or a low-level outlet facility would be required.

Source: TRTA Consultants. 2019

B. Realignment of Route Bearer Highway

80. The TRTA selected a possible alignment which is economical in the long run and offers flexibility and ease to road users. The proposed alignment was considered based on the following factors:

(i) Safe travel for road users even in case of dam crest flood (i.e. above 1,154 m);
(ii) Development of regional economic activities;
(iii) Improvement of the living environment of citizens;
(iv) Possibility for dual carriageway;
(v) Possibility of future extension to motorway;
(vi) Minimum cut and fill or balance cut and fill.
(vii) Minimal effect on commute distance and travel time for users; and
(viii) Optimized design for super passages will ensure safe access to commuters most of the year around.

81. The design has been performed to optimize cut and fill. This should minimize wastage and disposal issues. The unusable material will be disposed in approved landfills of NEPA along downstream of the main dam to ensure that the excavation does not interfere with existing streams or waterways.

82. The terrain along the realigned route bearer is mainly hilly with some mountains and dissected by numerous gullies and at least two river valleys. The realigned road crosses Shahjoi village near 4+600 m chainage. Then the road passes through agriculture land of the village. The typical elevations of the mountains are in the range of 1,100−1,170 meters above sea level (MASL). The road only crosses Shahjoi agriculture land with no requirement to remove houses or buildings. Resettlement requires government to acquire that land. Various options were initially explored to avoid the village but would require road to cross high mountains resulting in high cost, more distance and gradients along road. This would have resulted in high fuel cost and poor economy for the realigned part.

83. Generally, the hills and mountains are barren with limited vegetation. However, Shahjoi village has good agricultural land along the route. The fertile top soil from the area may be removed and stockpiled for construction of a recreational facility like a ground / park downstream of the dam site.

C. No Project Scenario

84. Environmentally a major variable to be considered regarding the existing infrastructure is that of climate change. Current models indicate significant warming across all regions of Afghanistan, and a decrease in precipitation, particularly spring rainfall. Climate change predictions indicate increasing drought frequency, more extreme weather events and a raising of the ambient Afghanistan climatic temperature by 4°C to 6°C over the next 50 years. The lack of buffering effect of the Arghandab reservoir means that flows cannot be managed between upstream inflow and downstream demands.

85. The impact of warmer conditions at the macro atmospheric level, as well as in the regional high country of the catchment, causes a decrease in the amount of snow fall, as well as an acceleration in the melt-down of snow which will, as a result, occur over a much shorter period of time. In addition, climate change is increasing the number of uncharacteristic weather events including unseasonal and aberrant rainfall events. With limited water storage capacity, the subsequent increased flows cause serious flooding downstream, as was in evidence during

March 2019 when at least 20 people lost their lives and housing, agricultural lands and vehicles were all severely impacted. A large number of Kuchi families, numbering near 500 people, were reported to be stranded on a river bank and there was an urgent need for air support to rescue them.[3]

86. Thus, the current status of the Dahla Dam is that its expected usable life, particularly the utility purposes, are threatened by both the limited storage capacity exacerbated by the current rates of sedimentation combined with the realities of climate change. The 'do nothing' or no project option will see the continued degrading of the infrastructure capacity amid increasing risk.

87. Environmental supply to the river environment and downstream wetlands is also a high priority, for the river channel, adjacent communities, river-based ecosystems and downstream wetlands.

88. In the no project scenario, the dam will be filled with sediments with no water storage in 106 years. The dam will have to decommissioned. Current agricultural enterprises downstream of the dam rely upon the reservoir for irrigation and the no project option would have a negative effect on irrigation, agriculture, and livelihoods for those that depend on water from the reservoir. The limited and diminishing storage capacity threatens continuity, quality, quantity and thus the sustainability of livelihoods and settlement is put at risk.

89. The positive alternative of a 13.6 m dam wall raise at Dahla Dam will add an additional storage of 500 million m^3 to the existing 288 million m^3 reservoir. Considering a sedimentation rate of 2.7 million m^3/year, Dahla reservoir once raised should have a life extended by more than 200 years.

90. Additional benefits include reduction of emissions through generation of electrical power using hydropower replacing diesel generation and the reduction of the need for continual and ongoing extraction of groundwater from boreholes by improved water storage of natural annual rainfall and snow melt water.

91. Another positive impact will be the reduction of water loss from spillways with consequent ability to enable minimal environmental flows to be maintained in the main river networks of the river delta and its linked canals. With its enlarged capacity, the dam will have potential for improved flood control and should be able to reduce flood damage even in the wettest years, and eliminate it in average and above average years. Improved flood control is considered a major benefit of raising Dahla Dam.

92. The following environmental, social and economic impacts are expected if this project is not implemented:

(ix) Climate change, severe droughts and/or increased sediment inflows reduces the storage of the reservoir as well as the potential threat of flooding;
(x) Ongoing sedimentation of the dam reducing storage capacity;
(xi) Ongoing shortage of water in the agricultural sector (irrigation);
(xii) Increasing harvest and economic losses;
(xiii) Ongoing decrease of the ground water level linked to an ongoing over-exploitation of groundwater resources;
(xiv) Limited water supply will not satisfy the needs of a rapidly-growing city;
(xv) Significant effect on the ecosystem of the region along river.

[3] United Nations Office for the Coordination of Humanitarian Affairs media statement.

IV. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

93. The project is classified 'Category A' under ADB's SPS, requiring preparation of a project EIA. Under Afghanistan regulations, the project is classified as Category 1 implying potentially 'significant impacts'.

A. Afghanistan

1. Constitution

94. The following laws of the government govern the way in which the environmental management of the project must be implemented, in order to proceed. Constitutional articles pertaining to environmental management include:

95. **Article 40:** Private Property

(i) Property is immune from invasion;
(ii) No person shall be forbidden from acquiring and making use of a property except within the limits of law;
(iii) Nobody's property shall be confiscated without the provisions of law and the order of an authorized court;
(iv) Acquisition of a person's property, in return for a prior and just compensation within the bounds of law, is permitted only for securing public interests in accordance with the provisions of law; and
(v) Inspection and disclosure of a private property are carried out only in accordance with the provisions of law.

96. **Article 51:** Compensation

(i) Any person suffering undue harm by government action is entitled to compensation, which he can claim by appealing to the court;
(ii) With the exception of situations stated in the law, the state cannot claim its right without the order of an authorized court.

97. **Article 15:** Environment

(i) With the exception of situations stated in the law, the state cannot claim its right without the order of an authorized court;
(ii) The state is obliged to adopt necessary measures for safeguarding forests and the environment.

2. National Legislation, Policies, and Regulations

98. **Environment Act (2007).** The Government adopted its first environmental framework, the Environment Act of 2005, with the goal of ensuring that environmental issues were addressed as an integral part of the development process. The Environment Act was approved by the Cabinet in December 2005 and was developed by NEPA over a period of two years with the assistance of international experts, including extensive stakeholder consultation with concerned ministries, quasi-government agencies, civil society and other interested parties.

99. The Environment Act sets forth national administrative roles and coordination with provincial authorities; establishes management frameworks for natural resource conservation,

biodiversity, drinking water, pollution control, environmental education, and defines enforcement tools.[4]

100. The Act has been promulgated to give effect to Article 15 of the Constitution of Afghanistan and provide for the management of issues relating to rehabilitation of the environment and the conservation and sustainable use of natural resources, living organisms and non-living organisms.

101. Legislators continued this new theme, leading to the drafting of an enhanced Environmental Law in 2006. Subsequently, the Environmental Law became part of the Islamic Republic of Afghanistan Official Gazette No. 912, dated 25 January 2007.

102. **Environmental Law (Official Gazette No. 912, 25 January 2007).** The Environmental Law is the fundamental law on environmental consideration in Afghanistan; it stipulates basic policies and procedures of activities for environmental consideration such as EIA, pollution control, conservation and management of water resources, protected area, biodiversity, environmental information and education. The law also defines NEPA as the responsible agency on the activities for environment. NEPA has overall responsibility to address policy and legal issues as well as environmental management in coordination with other related departments.

103. The Environmental Law contains a specifically designed legal framework needed to sustainably manage Afghanistan's natural resources and rehabilitate its damaged environment. The law also clarifies institutional responsibilities and contains the compliance and enforcement provisions required to allow the government to enforce the legislation. The law is a fundamental prerequisite to enable NEPA to fulfill its mandate. The primary objectives of the law are to:

(i) Improve living conditions and protect the health of humans, fauna, and flora;
(ii) Maintain ecological functions and evolutionary processes;
(iii) Secure the needs and interests of present and future generations;
(iv) Conserve natural and cultural heritages; and,
(v) Facilitate the reconstruction and sustainable development of the national economy.

104. The Environmental Law (2007), Article 19, provides a legal framework for public consultation during environmental assessment.

105. Article 19, public participation: Affected persons (APs) may express their opinion on a proposed project, plan, policy or activity, preliminary assessment, environmental impact statement, final record of opinion and comprehensive mitigation plan, before the approval of the project, plan, policy or activity, and the proponent must demonstrate to the NEPA that APs have had meaningful opportunities, through independent consultation and participation in public hearings, to express their opinions on these matters on a timely basis.

106. NEPA shall not reach a decision on any application for a permit until such time that the proponent has demonstrated to the satisfaction of NEPA that copies of the document has been distributed to APs, informed the public that the document is being made available for public review by advertising the document and displaying a copy of it for inspection, and convened and recorded the proceedings of a public hearing.

[4] Taylor, D. A. 2006. "Policy: new environment law for Afghanistan". *Environmental Health Perspectives*, 114(3). Accessed at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1392251/

107. After NEPA has reviewed the application for a permit, they shall reach a decision, inform the public of that decision and make available any relevant documentation or information for public review.

3. Regulations and Guidelines for EIA

108. National EIA policy is an integrated approach to EIA in Afghanistan. The definition of EIA as described in the Environmental Law is: 'EIA refers to the procedures used for evaluating the likely environmental and consequent social impacts, both beneficial and adverse, of proposed projects, plans, policies or activities where there is a possibility of significant adverse effects arising as a result, in order to improve the quality and development impact of such projects by identifying ways of improving project selection, siting, planning, design and implementation'.

109. NEPA created this policy to provide guidance to project proponents while undertaking development projects that may have potential impacts on the environment. They also provide guidance on how the public should be consulted and define the roles and responsibilities of various stakeholders in that process.

110. The three documents below are the main regulations and guidelines for EIA in Afghanistan.

(i) **National Environmental Impact Assessment Policy (2007)** follows on from the Environment Law and sets forth a policy vision, principles, strategy, and process for environmental assessment in Afghanistan. The emphasis is on ensuring that projects with potentially significant impacts are identified to the national environmental regulator, NEPA, and follow adequate due diligence procedures. The document provides a range of additional useful information on NEPA and environmental assessment in the Afghanistan context.

(ii) **Environmental Impact Assessment Regulations.** Official Gazette No. 939 (March 2008). Schedule I lists project types likely to have significant impacts (Category 1) or potentially adverse impacts (Category 2); and the industries likely to give rise to pollution. Schedule II provides the clearance certificate application form.

(iii) **Administrative Guidelines for the Preparation of Environmental Impact Assessments** (June 2008). These guidelines were prepared as a companion to the 2008 Regulations, to guide proponents on interacting with NEPA, on public consultation, and roles and responsibilities of stakeholders.

111. Under Article 20 of the Environment Law, NEPA shall appoint an EIA Board of Experts to review, assess and consider applications and documents submitted by proponents for obtaining permits and make technical recommendations in regard to whether to issue permits, as well as the conditions that should be attached to any permit that is granted.

112. In more detail, the legal procedure of EIA starts with submitting application to NEPA by the project proponent. The purpose of the application is to screen the projects which require EIA. A screening report needs to be attached to the report to explain brief description of the project activities, site conditions, potential impacts and mitigations in initial environmental examination (IEE) level. It is also required to describe results of public consultation with APs. The systematic process to identify, predict and evaluate the environmental effects of proposed projects, plans or policies given in the National EIA policy is described in Figure 16 below. The policy also describes the timeline for approval of different stages of EIA process.

113. National EIA policy provides a project screening list which categorizes different projects. Category 1 and Category 2 are defined for each type of activities based on the likelihood of the significance of the impacts stemming from particular projects. Category 1 is for activities likely to have significant adverse impacts while Category 2 is for those with less adverse than Category 1. According to NEPA, both of categories 1 and 2 require EIA. NEPA reviews the submitted screening report and finalize the requirement of EIA considering the results of the public disclosure after submission of the screening report. Public disclosure is conducted by the proponent under the responsibility of NEPA.

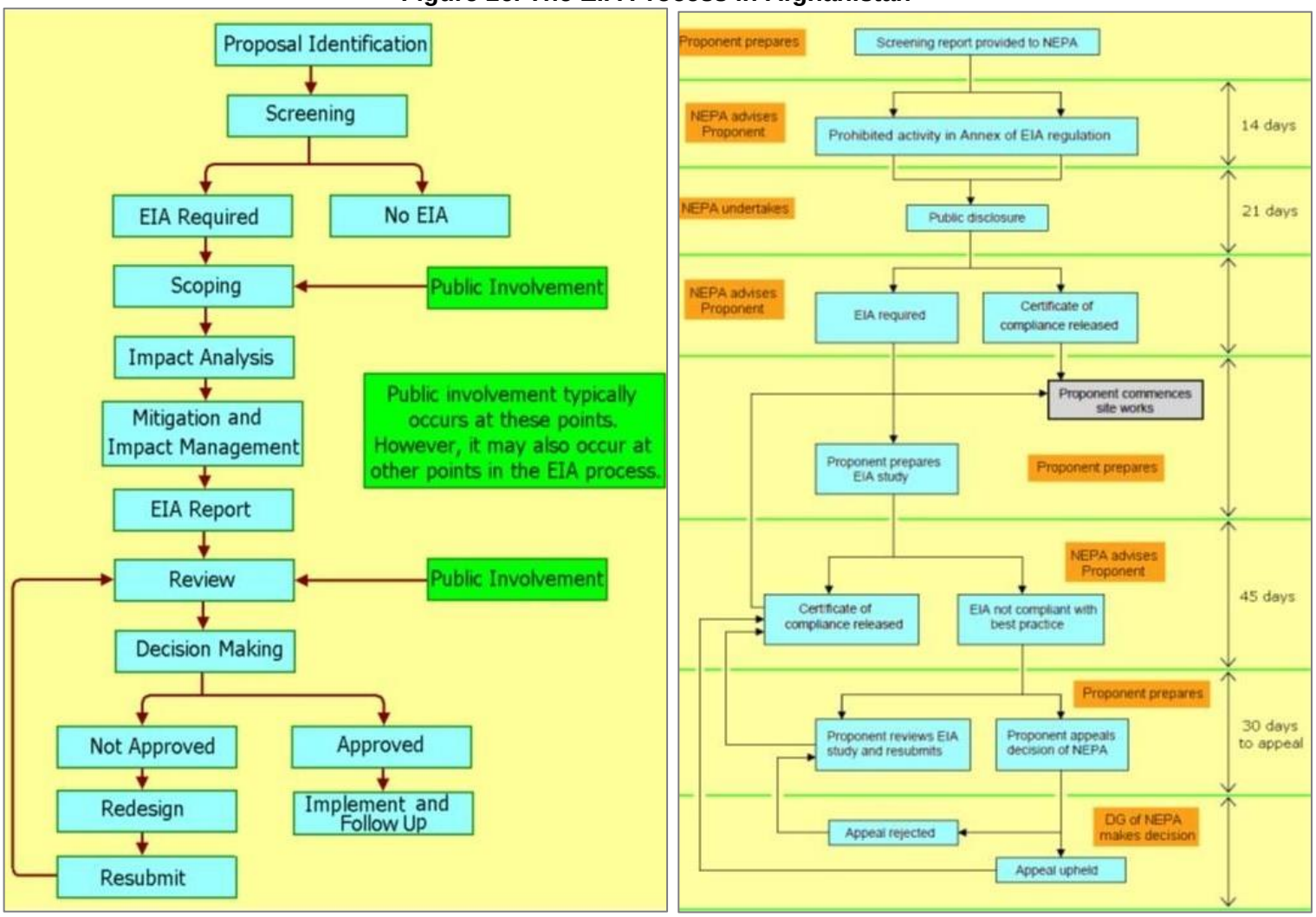
114. The regulations state that a proponent intending to undertake multiple projects in a particular area should prepare a single screening report and assign the environment category appropriate to the projects' collective potential environmental impacts. Separate screenings are unacceptable.

115. In the case that NEPA decided that the activity does not require EIA, certificate for compliance is issued without EIA to approve the activity. In the case that EIA is decided to be required, the project proponent has to complete EIA and submit EIA report to NEPA. Within 45 days after the submission, NEPA reviews the report and approve the activity if it is sufficient. According to NEPA, board of experts has been established which comprises of 12 experts from Kabul University and ministries for reviewing EIA.

116. In addition, EIA Regulations Schedule 1 lists project types that are automatically assigned to these two categories. Category 1 and 2 projects must obtain a Certificate of Compliance from NEPA prior to starting construction. Certificate applications consist of a screening report and the application form in EIA Regulations Schedule 2.

117. The raising of the Dahla Dam in output 1 is categorized as Category 1 according to Afghan EIA policy. Physical works will focus on the raise of the dam, six saddle dams and realignment of a section of the route bearer highway. Environmental impacts are expected for these construction sites and, in addition, for the area to be inundated after dam raising.

Figure 16. The EIA Process in Afghanistan



Source: National Environmental Impact Assessment Policy (2007)

4. Other Relevant Laws and Regulations

118. **Water Law (2009**). The Water Law states that water is owned by the public and that the Government is responsible for water protection and management. It assigns responsibilities to government institutions for management and protection of water resources, water ownership, and regulates water ownership fees, rights, permits, and usage.[5]

119. Afghanistan's Water Law is one component of the country's strategy to integrate its water systems and institutions. The water law recognizes the key role of local water user associations in the protection and management of water resources. The MEW has responsibility for setting up water user associations (Article 10), and the Ministry of Agriculture, Irrigation and Livestock (MAIL) has the task of setting up irrigation associations (Article 11). Throughout years of conflict, non-governmental organizations (NGOs) developed and maintained strong links with rural communities in all provinces. The AUWSSC proposes broadening their role to coach

[5] Ahmad, T. 2013. *Legislation on use of water in agriculture: Afghanistan*. http://www.loc.gov/law/help/water-law/afghanistan.php

Water Users Associations and members of Community Development Councils in conservation techniques and water management systems. In particular, AUWSSC advocates end-user participation in decision making relating to water resource management, operation and maintenance of water supply systems and agreeing on water use allocations.

120. **Law on the Protection of Historical and Cultural Properties**, Issue No. 828 (2004). After defining the material falling within its scope, the law sets forth the State's interest and rights in such materials, specifies prohibited and regulated activities involving such materials, and establishes enforcement measures such as penalties and fees.

121. **The Law on Land Expropriation** sets out the provisions governing the expropriation or acquisition of land for public interest purposes, such as the establishment/construction of public infrastructure or for acquisition of land with cultural or scientific values, land of higher agricultural productivity and large gardens.

122. Accordingly, the Law declares that:

(i) Acquisition of a plot or portion of a plot of land for public use is decided by the Council of Ministers and is compensated at fair value based on current market rates (Article 2);
(ii) The right of the owner or land user will be terminated three months prior to the start of civil works on the project and after the proper reimbursement to the owner or person using the land has been made. (Article 6); and
(iii) The value of land, value of houses and buildings on the land, and value of trees and other assets on the land will be considered for compensation (Article 8;) and compensation is determined by the Council of Ministers.

123. **Pesticide Regulations** (1989). Afghanistan has had pesticide regulations since 1989, but they have never been enforced due to lack of resources. A draft Pesticide Law dating from 2009 has yet to be enacted.

B. International Agreements

1. International Environmental Agreements

124. The Constitution binds the state to abide by the United Nations (UN) charter, international treaties, international conventions that Afghanistan has signed, and the Universal Declaration of Human Rights (Article 7).

125. International agreements relevant to environmental management of water resources development to which Afghanistan is a party are (listed in order by the year in which each came into force):

(i) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1975) – international cooperation to control trade in species threatened with extinction or in danger of becoming so; in species whose trade interferes with regulation of trade in extinction-threatened species; and in species identified by a party under national-level trade control to prevent/restrict exploitation, for which international cooperation is needed;
(ii) Convention on the Conservation of Migratory Species of Wild Animals (also called Convention on Migratory Species, and the Bonn Convention, 1983) – conserve terrestrial, marine and avian migratory species throughout their ranges;

(iii) UN Convention on Biological Diversity (1993) – objectives are to conserve biological diversity; promote sustainable use of biological diversity; and (iii) seek more fair and equitable sharing of the benefits of genetic resource utilization;
(iv) UN Framework Convention on Climate Change (1994) – aims to stabilize greenhouse gases in the atmosphere at levels that will not change climate systems in dangerous ways;
(v) UN Convention to Combat Desertification (1996) – aims to combat desertification and mitigate drought effects in countries experiencing serious drought or desertification;
(vi) Kyoto Protocol (2005) – extends the Convention on Climate Change;
(vii) Paris Agreement on Climate change (2015);
(viii) Afghan – Iranian Helmand River Water Treaty (1973) Afghanistan is committed to sharing the water from Helmand River with Iran and supply it with 26 m^3 of water per second or 850 million m^3 per annum.[6]

126. In addition, Afghanistan has signed but not ratified:

(i) The United Nations Educational, Scientific and Cultural Organization (UNESCO) Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (1970) – aims to protect cultural property against theft and promotes restitution of stolen items;
(ii) Ramsar Convention on Wetlands (1975) – promotes conservation and sustainable use of wetlands;
(iii) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1992*)* – aims to reduce movement of hazardous waste between nations, prevent transfer of such waste from developed to less developed countries; minimize waste amounts and toxicity; promote environmentally sound management at or near generation sites; assist less developed countries in environmentally sound management of their wastes; does not address radioactive waste;
(iv) Memorandum of Understanding Concerning Conservation Measures for the Siberian Crane (1993) – aims to protect the species (*Leucogeranus leucogeranus)* through concerted, coordinated actions to prevent disappearance of remaining populations;
(v) The United Nations International Institute for the Unification of Private Law Convention on Stolen or Illegally Exported Cultural Objects (1995) – attempts to fill gaps in the UNESCO convention by making the final owner of a stolen cultural item who cannot show due diligence responsible for restitution;
(vi) UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2006) – safeguard, ensure respect for, and raise awareness at local, national, international levels, and provide international cooperation and assistance.

2. International Commission on Large Dam

127. The International Commission on Large Dams (ICOLD) was founded in 1928 to provide a forum for discussion and for the exchange of knowledge and experience in dam engineering for engineers and others concerned with the development of water resources. Its objectives are

[6] The 1973 Helmand River Treaty is the only agreement that Afghanistan has that specifically addresses water allocations

to encourage improvements in dam engineering in all its aspects, and in all phases of the planning, design, construction and operation of dams and associated works.

128. At Congresses and Symposia as well as in specially appointed Technical Committees, ICOLD gathers relevant information, and addresses questions concerning technical, environmental, social, economic and financial aspects of dam development, with particular emphasis on overall safety and compatibility with the environment, and then disseminates the results to its members.

129. ICOLD has about 90 member countries including Afghanistan.

130. Although ICOLD was initially mostly concerned with security, it became pretty early concerned with the subject of environment. Environment was first discussed during the 1973 Congress, one year after the first UN Environment Summit of Stockholm. The first Technical Committee devoted to the subject was created in 1977 and the first Technical Bulletin appeared in 1981. In 1997, ICOLD published a document that presents guidance for environmental consideration, assessment and mitigation: "Position Paper on Dams and the Environment". It states: "Increased awareness of the natural environment and its endangered situation is one of the most important developments of the late 20th century."

131. Large dams are defined by ICOLD[7] as those with a crest height of 15 m or more from the foundation and also those between 5-15 m high with a reservoir volume over 3 million m^3. With a crest height of 60 m above foundation prior to the raise (73 m after) and a reservoir volume of 288 million m^3 prior to the raise (882 million m^3 after), Dahla Dam is categorized as a large dam.

C. Asian Development Bank

1. Policies

132. **Safeguard Policy Statement (2009)** is ADB's safeguards policy document. It describes the common objectives and policy principles of ADB's safeguards and outlines the delivery process for ADB's safeguard policy. SPS 2009 promotes sustainability through protection of people and the environment from the adverse impacts of projects, and by supporting the strengthening of country safeguard systems. It presents a consistent, consolidated framework for environment, resettlement, and indigenous peoples safeguards.

133. **Public Communications Policy (2018)** guides ADB's efforts to be transparent and accountable to the people it serves, which it recognizes are essential to development effectiveness. The policy recognizes the right of people to seek, access, and impart information about ADB's operations, and it aims to enhance stakeholders' trust in and ability to engage with ADB, through proactive disclosure, presumption in favor of disclosure, recognition of the right to access and impart information and ideas, country ownership, limited exceptions, and the right to appeal.

134. **Information Disclosure.** In line with ADB's Public Communications Policy, ADB is committed to working with the borrower/client to ensure that relevant information (whether positive or negative) about social and environmental safeguard issues is made available in a timely manner, in an accessible place, and in a form and language(s) understandable to meaningful inputs into project design and implementation. For environment Category A projects,

[7] International Comission on Large Dams (ICOLD)

ADB will post draft EIAs at least 120 days before Board consideration on the ADB website. Final EIAs along with EMP will be uploaded upon receipt.

135. **Due Diligence and Review.** For projects proposed for financing, ADB will conduct safeguard reviews, including reviews of the borrower's/client's safeguard documents, as part of its overall due diligence. ADB's safeguard due diligence and review emphasizes environmental and social impact assessments and the planning process, in addition to safeguard documentation. Due diligence and review involves field visits as well as desk reviews. Through such due diligence and review, ADB will confirm:

(i) That all key potential social and environmental impacts and risks of a project are identified;
(ii) That effective measures to avoid, minimize, mitigate, or compensate for the adverse impacts are incorporated into the safeguard plans and project design;
(iii) That the borrower/client understands ADB's safeguard policy principles and requirements and has the necessary commitment and capacity to manage social and environmental impacts and/or risks adequately;
(iv) That the role of third parties is appropriately defined in the safeguard plans; and
(v) That consultations with APs are conducted in accordance with ADB's requirements.

136. In cases where the assessment and planning process, or the safeguard documents, do not meet ADB's safeguard requirements, the borrower/client will be required to undertake additional assessment and/or improve the safeguard plans. When the borrower/client has inadequate capacity to carry out safeguard plans for a proposed project, the project will include component(s) to strengthen that capacity. For projects that are deemed by ADB to be highly complex and sensitive, ADB will require the borrower/client to engage an independent advisory panel during project preparation and implementation.

2. Guidance

137. **Environmental Assessment Guidelines (2003)**. These guidelines describe how to fulfill the requirements outlined in ADB's Environment Policy and the Operations Manual on Environmental Considerations in ADB Operations. These guidelines also guide consultants in preparation of an IEE or an EIA report for a project under consideration.

138. **Environmentally Responsible Procurement (2007)**. This document provides guidance to ADB staff, consultants, and executing agencies on environmentally responsible procurement, defined as "a systematic approach to the purchase of goods and services that are thought to be less damaging to the environment than other goods and services that serve the same purpose," specifically, products that "reduce waste, improve energy efficiency, limit toxic by-products, contain recycled content or are reusable, and are produced with the least environmental impact, and services that help improve the environment, are rendered with minimum environmental and social impacts, and use resources and energy efficiently."

139. **Complaint Handling in Development Projects - Grievance Mechanisms: A Critical Component of Project Management (2010)**. This document presents definitions, concepts, rationale, and history relevant to the ADB project grievance redress mechanism.

140. **Complaint Handling in Development Projects - Building Capacity for Grievance Redress Mechanisms (2010)**. This document presents a framework and practical suggestions

for building the capacity of an organization to manage an effective grievance redress mechanism.

141. **Selected References for Good Practice in Environmental Safeguards Implementation (2014)**. This internal Central and West Asia Department document presents internet hyperlinks to exemplary environmental safeguards documents (IEEs, EIAs, environmental assessment and review frameworks, etc.) prepared for projects in these countries.

3. Categorization

142. ADB water resources projects and subprojects are screened using a REA checklist filled out for the components. This checklist captures the type; location, sensitivity, scale, nature, and magnitude of potential environmental impacts, and availability of cost-effective mitigation measures. Based on the checklist findings, the project or component is assigned to one of the following ADB environmental categories.

143. **Category A** – likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An EIA, including an EMP, is required.

144. **Category B** – Potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for Category A projects. An IEE, including an EMP, is required.

145. **Category C** – A proposed project is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.

146. The project output 1 has been categorized as Category A due to anticipated irreversible, diverse, or unprecedented impacts from raising the existing dam's height by 13.6 m and related infrastructure. An EIA report has been prepared accordingly.

D. Assessment Standards and Guidelines

147. Implementation of Afghanistan laws and regulations is supported by technical national and international standards and guidelines. Afghanistan has recently established national environmental standards or guidelines for air quality, noise, or water quality. Baseline measurements have been compared to Afghanistan standards and guidelines when available and to international institutions such as the International Finance Cooperation (IFC)[8], and WHO. The Ministry of Mining of Afghanistan, for example, uses the IFC Environmental, Health and Safety Guidelines in its environment, health, and safety regime, and WHO standards are routinely used for drinking water quality.

148. The relevant standards applicable to the project are listed below:

(i) WHO Water Quality Standards (4th edition 2017)
(ii) WHO Air Quality Standards (Global update 2005)
(iii) IFC Environmental, Health, and Safety Guidelines (2018)

[8] International Finance Cooperation. 2018. Environmental, Health, and Safety Guidelines. Approaches for Annual Crop Production. www.ifc.org/ehsguidelines

(iv) Afghanistan National Air Quality Standards (Standard Organization, 2009);
(v) Regulation on Decrease and Prevention of Air Pollution (NEPA, 2010)
(vi) Afghanistan National Water Quality Standards (Standard Organization, 2011);
(vii) Regulation on Water Quality Control and Maintenance (NEPA, 2015);
(viii) Afghanistan National Noise Quality Standards (Standard Organization, 2013)
(ix) Regulation on reduction and prevention of noise pollution (NEPA, 2016).

1. Water Quality

149. Drinking water: The project will provide water from the dam reservoir to water treatment plants (separate investment) for subsequent drinking water supply to Kandahar communities. Water to be supplied to residents must comply with Afghanistan Drinking Water Quality Standard.

150. Irrigation water: The project will provide water from the dam reservoir to the Arghandab canals for irrigation purposes (output 2). Irrigation modernization is expected to increase the current river basin irrigated area from 54,088 ha to between 65,000 and 90,000 ha.

151. Biodiversity: Fishing is occurring at the dam reservoir but also upstream and downstream. Water quality and water flows must be monitored in order to preserve biodiversity.

152. **WHO Drinking Water Quality Guidelines (4th edition 2017).** The guidelines have formed an authoritative basis for the setting of national regulations and standards for water safety in support of public health.

153. **Afghanistan National Water Quality Standards** have been prepared subsequently of WHO guidelines.

Table 9. Afghanistan and WHO Drinking Water Quality Guidelines

Parameters	Afghanistan National Water Quality Standard	WHO (4th edition 2017)
Micro-biological (e.g. E-coli)	0 CFU/100 mL	<1 CFU/100 mL
Turbidity	5 NTU	5 NTU
pH	6.5-8.5	6.5-9.5
TDS	1000 to 2000 mg/L	-
Total Hardness	500 mg/L	-
Nitrate (as NO_3^-)	50 mg/L	50 mg/L
Nitrite (as NO_2^-)	3 mg/L	3 mg/L
Barium	0.7 mg/L	1.3 mg/L
Boron	2.4 mg/L	2.4 mg/L
Arsenic	0.05 mg/L	0.01 mg/L
Fluoride	1.5 mg/L	1.5 mg/L
Lead	0.01 mg/L	0.01 mg/L
Cyanide	0.05 mg/L	previously 0.07 mg/L
Nickel	0.07 mg/L	0.07 mg/L
Nitrate as Nitrogen	11 mg/L	11 mg/L
Zinc	3 mg/L	-
Selenium	3 mg/L	0.04 mg/L
Chloride	250 mg/L	-
Sulphate	250 mg/L	-

Source: Afghanistan National Water Quality Standards and WHO Drinking Quality Standards 2017

2. Air Quality

154. **WHO Air Quality Guidelines (Global update 2005).** The WHO guidelines offer guidance on thresholds and limits for key air pollutants that pose health risks.

155. **Afghanistan National Water Quality Standards** have been prepared subsequently of WHO guidelines.

Table 10. Afghanistan and WHO Air Quality Standards

	Averaging Period	WHO Guideline value in µg/m^3	Afghanistan maximum allowable concentration value in µg/m^3
TSP	24 hours	-	300
Carbon monoxide (CO)	8 hours	-	10
	1 hour		30
	30 minutes		60
Lead (Pb)	1 year	-	0.5
Sulfur Dioxide SO_2	24 hours	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)	50
	10 minutes	5000 (guideline)	-
Nitrogen dioxide NO_2	1 year	49 (guideline)	40
	1 hour	200 (guideline)	80
Particulate Matter PM_{10}	1 year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)	70
	24 hours	150 (Interim target-1) 100 (Interim target-2) 74 (Interim target-3) 50 (guideline)	150
Particulate Matter $PM_{2,5}$	1 year	35 (Interim target-1) 23 (Interim target-2) 15 (Interim target-3) 10 (guideline)	35
	24 hours	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)	75
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)	100

Source: Afghanistan National Air Quality Standards and WHO Air Quality Standards 2005

3. Noise Levels

156. **IFC EHS Guidelines on Environmental Noise Management** (2018). The environmental health and safety (EHS) guidelines are technical references and measures that are generally considered to be achievable in new facilities with reasonable costs. IFC has set limits which noise impacts shall not exceed. When national standards differ from the EHS guidelines measures, the projects are required to follow the more stringent option.

Table 11. Afghanistan and IFC EHS Noise Management Standards

	Afghanistan		IFC EHS	
Receptor	**Day-time 7:00 – 22:00**	**Night-time 22:00 – 7:00**	**Day-time 7:00 – 22:00**	**Night-time 22:00 – 7:00**
Residential, institutional, educational	55*	45*	55	45
Industrial, commercial	70*	70*	70	70

Note: * Interim figures for Afghanistan only - to be confirmed.
Source: International Finance Cooperation. 2018. Environmental, Health, and Safety Guidelines.

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

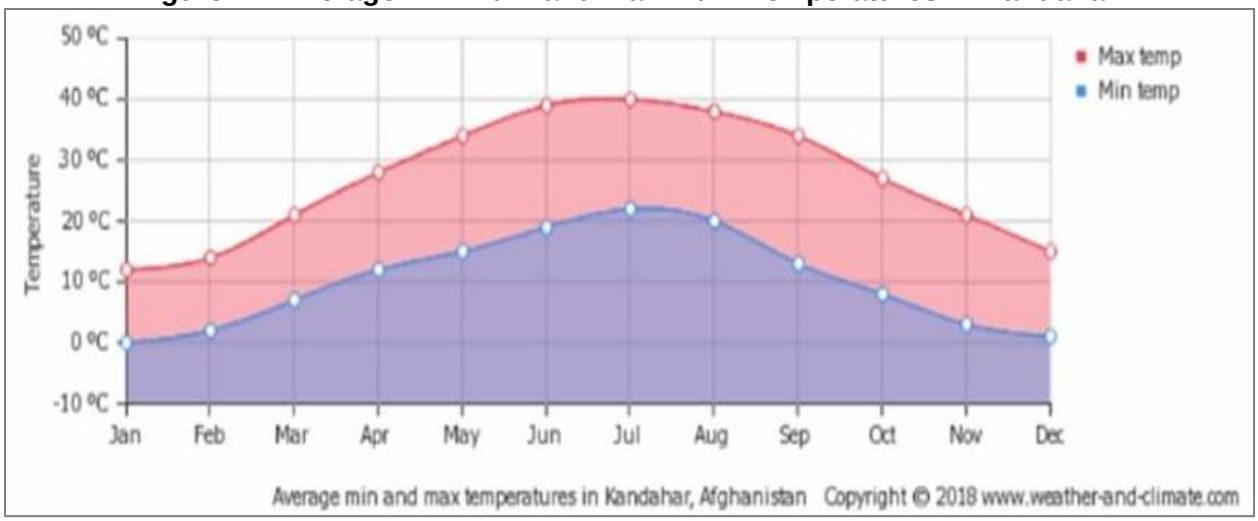
1. Climate

157. Afghanistan's climate is typical for an arid or semi-arid steppe, with cold winters and dry summers. The climate varies substantially between the different regions of the country. The plains in the western and southern regions are characterized by hot semi-arid (BSh) and hot desert climates (BWh). During the summer northerly, dry and hot and steady winds prevail. The central mountains are characterized by cold semi-arid and cold desert climates (BWk and BSk) with cold and dry winters. In January the temperature may drop to under -15°C at the highest altitudes, while in July the temperatures vary between 0°C and 26°C depending on the elevation. In the mountainous regions bordering Pakistan a divergent fringe effect of the monsoon brings tropical, warm and humid air masses, which sometimes advance up to the central regions between July and September. Precipitation generally fluctuates greatly during the course of the year in all parts of the country. Apart from the eastern regions, which are influenced by the monsoon, major precipitation levels occur from December to April. The annual precipitation totals vary between 50 mm in the desert and 1,100 mm on the north side of the Hindukush.

158. Kandahar is a desert climate, and precipitation is low. While annual rainfall has an average 176 mm, the evaporation figure is just over 10 times that.[9] Classification is BWh according to Köppen and Geiger.[10] The annual average temperature in Kandahar is 18.8 °C. Annual average rainfall is 176 mm. The hottest month is July with average temperatures of 31.8 °C. January shows the lowest temperature with an average of 5.7 °C.

159. In Figure 17 below, the mean daily maximum (solid red line) shows the maximum temperature of an average day for every month for Kandahar while the mean daily minimum (solid blue line) shows the average minimum temperature.

Figure 17. Average Minimum and Maximum Temperatures in Kandahar



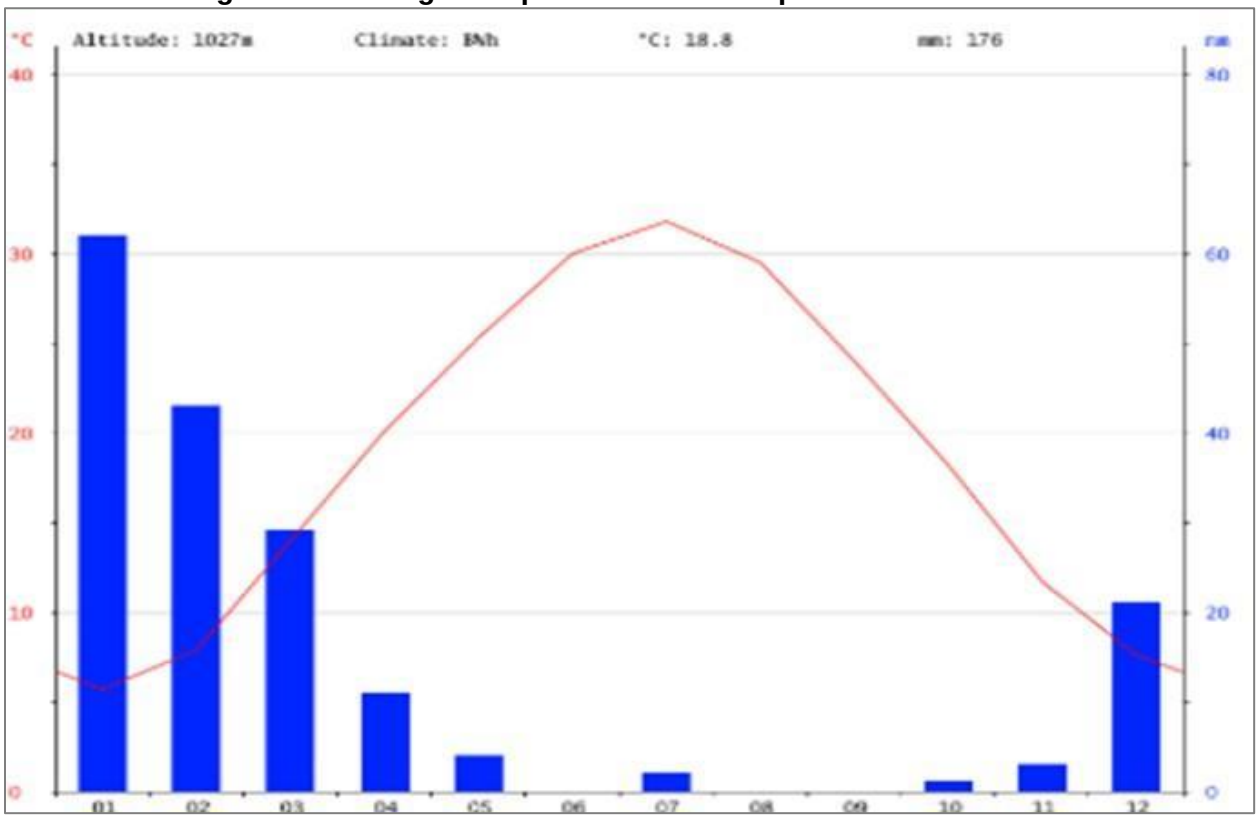
[9] Michel. 1957. The Kabul, Kunduz, and Helmand Valleys and the National Economy of Afghanistan: A Study of Regional Resources and the Comparative Advantages of Development. *National Academy of Sciences, USA.*

[10] Köppen–Geiger climate classification system.

Source: World Weather and Climate Information 2010-2019

160. All over Kandahar province, the summer heat is intense, and the simoom (hot dust storms) and fiery winds which frequently occur throughout this part of the country during the hot season make life difficult. At the same time, the bare rocky ridges that traverse the country, absorbing heat by day and radiating it by night, render the summer nights almost as hot.

Figure 18. Average Temperature and Precipitation in Kandahar



Source: Climate-Data.org. 2018 https://de.climate-data.org/location/1255/

2. Geographical and River Basin Location

161. The Kandahar province is in the southeastern part of Afghanistan, which is bound on the northeast by the Zabul Province, on the north by the Uruzgan Province, on the west by the Helmand Province, and on the east and the south by Pakistan. The province's area is 53,500 km^2 and lies between 32°-30' N and 29°-30' N latitude and between 64°-30' E and 67°-50' E longitude.

162. The overall Helmand River system, including the Arghandab River as a major tributary, together drain 43% of Afghanistan including most of the southern part of the country. It has an average discharge of approximately 140 m^3/s but is highly variable both annually and seasonally as the waters are primarily snow melt from the ridge of mountains running through the center of the country. These include the Sia Koh Mountains and the Parwan Mountains northwest of Kabul.

3. Topography

163. Mountains, with an elevation of about 1,200 to 2,800 MASL, dominate the northern and the eastern parts of the province. On the other hand, the southern and the western parts of the province are dominated by desert with an elevation of about 1,000 MASL.

164. The topography of the project site includes bare mountains without vegetation and the flood plain of Arghandab River. Elevations of the mountains are up to 1,300 MASL. Highlands below the dam have very scarce vegetation (elevation: 1,120 – 1,140 MASL). The Arghandab River valley begins at 1,200 m at Dahla Dam. The elevation below Kandahar is below 1,000 MASL.

4. Geology

165. Afghanistan has some of the most complex and varied geology in the world. The oldest rocks are Archean and they are succeeded by rocks from the Proterozoic and every Phanerozoic system up to the present day. The country also has a long and complicated tectonic history, partly related to its position at the western end of the Himalaya mountain range.

166. The Kandahar province is characterized by numerous ranges of bedrock. This bedrock is elongated from northeast to southwest. Bedrock is eroded and modeled by weather (wind, rain, freeze). Sediment terraces exist in the valleys and along Arghandab River. The following bedrock occurs in the project area:[11]

(i) Limestone and sandstone (Early Cretaceous (Aptian and Barremian))—Limestone, marl, sandstone more abundant than conglomerate;
(ii) Ultramafic intrusions (Early Cretaceous)—Dunite, peridotite, serpentinite;
(iii) Lava (Oligocene and Eocene)—Basaltic andesite, basalt, trachyte, dacite, rhyolite, ignimbrite, tuff; conglomerate and sandstone, siltstone, limestone.

167. Surficial deposits in the area consist of flood plain alluvial origin. These flood plain deposits are of quarterly age, forming a body of succession of alluvium that is overlain by the surficial deposits of Holocene age. Lithologically, they can be classified as flood plain deposits.

168. According to the changing locations of the Arghandab River and its tributaries, the lithological composition or variation of the alluvial fill is varying not only in vertical but also in horizontal direction. It is evident that the alluvium consists of alternating beds of gravel, sand, silt and clay (fan alluvium and colluvium, shingly and detrital sediments, determined to be from the Holocene and late Pleistocene).

169. Loess is also very common in the project area. Loess is more abundant than sand and clay. Loess is an aeolian sediment formed by the accumulation of windblown dust and silt.

5. Soils

170. Characteristics of soils upstream of all dams in arid and semi-arid lands are of particular relevance due to the relatively high incidence of sedimentation in the water impoundments each year. This TRTA study relied for information on soils from the recently completed Helmund River Basin Master Plan (HRBMP).[12] The HRBMP study combined generalized findings to establish a

[11] USAID. 2005. Geological map of Afghanistan.
[12] Mott McDonald, 2013

schematic soil classification based upon the United States Department of Agriculture classification of the Helmand Basin, combined with the United States Department of Agriculture Natural Resources Conservation Service Geographic Information System study of the soils of Afghanistan. Within this collective body of work there is specific reference to the Arghandab River and the catchment north of Kandahar.

171. Soils characteristics vary in correlation to topography and adjacent the river small settlements signify the presence of favorable soils for subsistence farming systems. Above the impoundment of the Dahla Dam there are four distinct soil types, all of which are correlated with topography. They are abbreviated from the HRBMP and presented as follows:

(i) **Soils on upper river terraces and plains**: vary in depth, are moderately fine textured and moderately well drained, with slow permeability. Frequently the soils are very gravelly. There is an occurrence of both gypsum and thick lime layers with variation in hardness depending on location. Conglomerates are common at depth and washes extremely gravelly or cobbly. Soils are classified as Camborthids, Calciothids, Gypsiorthids, and Torripsamments.

(ii) **Soils on alluvial fans**: mostly more than 0.5 m in depth, moderately coarse to moderately fine textured, and range from well drained to moderately well drained, with moderate to very slow permeability. Slopes can generally range from 1 to 45%, and closer to the base of mountains more poorly drained soils occur in seepage zones. Usually, the soils are gravelly, cobbly or stony and frequently underlain by conglomerates or gravel cemented by silica. Washes are extremely gravelly or cobbly. soils are classified as Torriorthents.

(iii) **Soils on mountains**: these soils are mostly less than 0.5 m deep, coarsely structured, very gravelly and stony, and well drained. These soils generally have rapid permeability. Slopes range from 35 % to nearly vertical. The soils occur in cracks, crevices and drainage ways of otherwise continuous rock outcrops. They are classified mostly as Cryorthents at the upper elevations and Torriorthents at the lower elevations.

(iv) (iv) **Rocky outcrop**: this is mostly exposed limestone bedrock. Extrusive and intrusive rocks also outcrop on mountains in the basin. These rock outcrops are not considered to be a soil, but represent a significant proportion of the land area in the basin.

172. Water and to a lesser extent wind are the principal drivers of soil erosion. However, susceptibility to erosion and the subsequent high sediment loads it generates in river flows is endemic to vulnerable soils combined with the impact of infrequent but intense rainfall events and limited or degrading levels of biomass/vegetation.

173. Climate change scenarios include a greater incidence of uncharacteristic weather events which could exacerbate further the function of erosion. The HRBMP community consultation process confirmed the loss of important riparian vegetation systems which provided significant habitat, helped to mitigate or arrest impact of flash flooding. The civil war has not contributed in a positive way to resource stewardship, particularly protection of the vegetation communities which have defended landscape elements, most particularly soil.

174. When interpreting this information, it is important to note that the soil maps available at present for the basin are only at a reconnaissance level and as such can only highlight the broad categories of soils regions), and hence do not show specific locations of soils to any degree of accuracy (Ibid).

175. The main dam, saddle dams and the two spillways are located in geologically favorable areas with strong to very strong granite and granodiorite foundation rocks. No shear zone or fault was witnessed during the TRTA study, geotechnical investigations and field observations. Limited grouting, however, will be required in some areas to check seepage due to embedded sand gravels and permeable zones.

176. During the TRTA, geotechnical investigations were undertaken. A total of nine consolidated undrained (CU) tests were requested. Two tests were requested on main dam and one on saddle dam 6. Six tests were requested on the borrow areas samples. The investigations are reported as below:

177. **Main dam:** The core typically starts at 2 m below the dam crest and reported to have about 40 % silts and clays with 40 % sand and 20 % gravels in first borehole. As per the Unified Soil Classification System (USCS) the core is stated to be SC (clayey sand) to (silty sand – clayey sand) SM-SC. The core has only 3 to 4% low moisture with a specific gravity of 2.7. Liquid limit, Plastic Limit and Plasticity Index are reported as 22, 16 and 6 %. However, in borehole 2 it is reported as non-plastic from 3 to 4 m depth. CU Triaxial test report an effective cohesion (c') of 22 kPa and effective angle of internal friction (ø') as 33 degrees. The reported permeability is 5 x 10^{-10} m/sec. The material above 2 m is non-plastic and comprises 10 to 15% clays and 34 to 43 % sands and remaining as gravels. The reported permeability is 1.5 x 10^{-9} m/sec. Test pit remolded samples report maximum dry density (MDD) as 2.05 g/cc and an optimum moisture content (OMC) as 9.6% for the material above core. Two additional CU Triaxial test report an effective cohesion (c') of 18 and 12 kPa and effective angle of internal friction (ø') as 36 and 39 degrees.

178. **Saddle dam 6:** As per USCS the core is stated to be CL (clay of low plasticity, lean clay), SC (clayey sand), CL-ML (clay-silt) to SM-SC (silty sand-clayey sand). The core typically starts at 2 m below the dam crest, is inclined as per 1952 design and reported to have about 40 to 60 % silts and clays with 30 to 40% sand and remaining gravels in borehole number 2. The core has 3 to 9% moisture with a specific gravity of 2.7. Liquid limit, Plastic Limit and Plasticity Index are reported from 17 to 40, 12 to 15 and 5 to 26 %. CU Triaxial test report an effective cohesion (c') from 14 to 30 kPa and effective angle of internal friction (ø') from 25 to 28 degrees. Insitu density has been reported as 2.1 gm/cc. Test pit remolded samples report MDD as 1.86 g/cc and an OMC as 15%. This appears to require further reduction in moisture content to 10% or so. For the main dam MDD was reported higher like 2.05 gm/cc at 10% moisture. Therefore, it appears that under 10% moisture content, MDD should be higher. The material above 2 m is non-plastic and comprises 10 to 15% clays and 34 to 43 % sands and remaining as gravels. The reported permeability is 2 x 10^{-9} m/sec for the material above core.

179. **Test pit Investigations:** Based on the reported data, stiff to hard clay / claystone has been reported in test pits 4, 5, 6, 7, 12, 16, 17 and 23. The clays were highly over-consolidated and have Insitu strength. These clays should be available in significant quantity at the reported sites. These clays typically have high thixotropic strength gain after compaction like the existing clay core for the existing dam. The reported MDD ranges from 1.7 to 1.85 gm/cc at moisture range typically around 20%. This appears to require further reduction in moisture content to 10% or so. For the main dam MDD was reported higher like 2.05 gm/cc at 10% moisture. Therefore, it appears that under 10% moisture content, MDD should be higher. This should be further validated during detailed design. Typically, same consolidated triaxial strength parameters could be used for these soils as stated above for main and saddle dams. However, it is proposed that the contractor must perform additional geotechnical investigations on proposed borrow areas including CU Triaxial tests before construction and validate remolded strength and thixotropic strength. Thixotropic strength gain may be estimated on samples

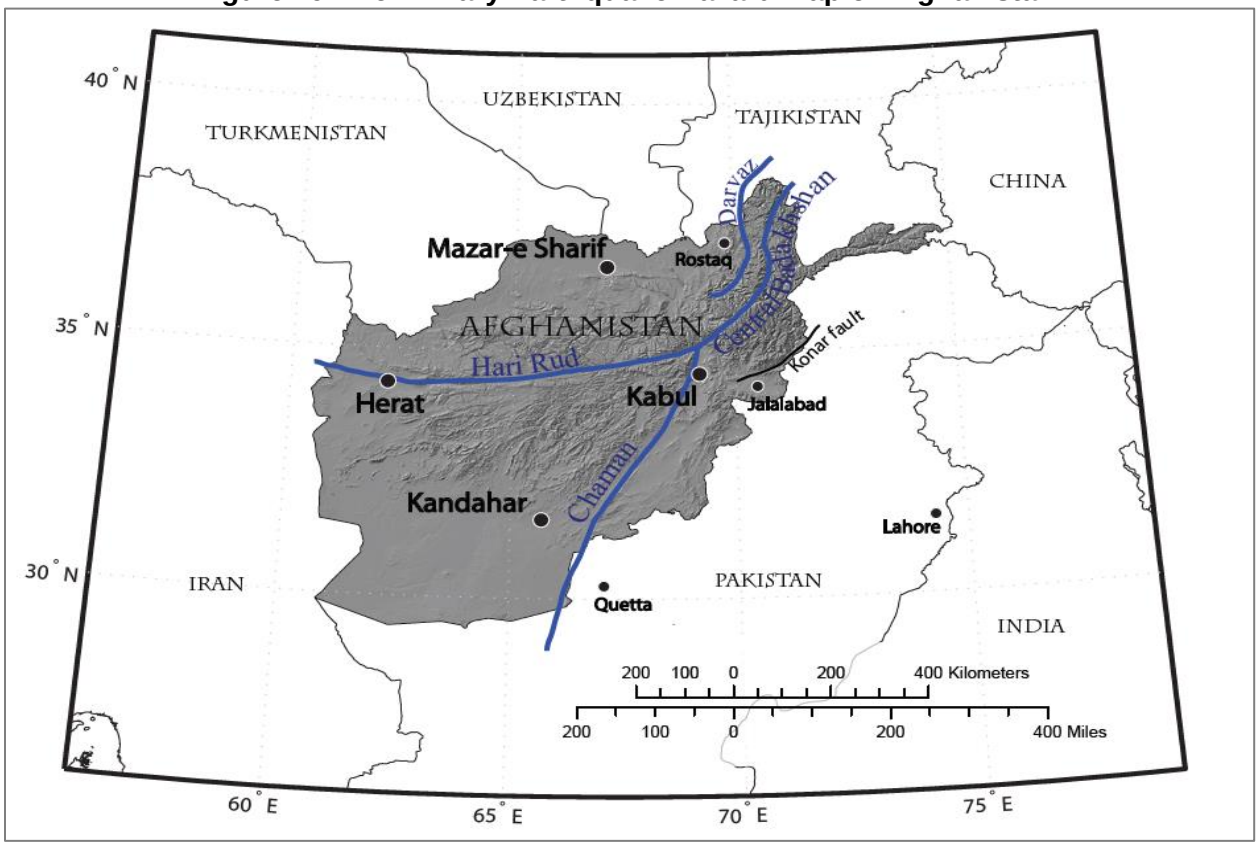
compacted to 98% SMDD (maximum dry density with respect to the Standard Proctor compaction test) and left for 28 and 90 days testing in a closed moist container.

6. Seismic Hazard

180. The history of destructive earthquakes in Afghanistan spans more than 4,000 years. Earthquakes have killed more than 7,000 Afghans in the last 10 years, including the Nahrin earthquake in May 1998 that killed an estimated 4,000 people. Future large earthquakes, driven by ongoing active geologic processes in the region, will occur close to population centers and lifelines, with a consequent risk for greater casualties and damage. The seismic hazard must be considered in the siting, construction, and restoration of communities and facilities in Afghanistan. Several sources of seismicity are present in Afghanistan and contribute to appreciable seismic hazard for several major cities including Kabul, Mazar-e Sharif, and Herat.

181. In 2007, the US Geological Survey completed the most extensive study to date of potential seismic sources in Afghanistan and developed probabilistic ground motion maps to help quantify the expected frequency and strength of ground shaking in the country. An Operational Basis Earthquake (OBE) event normally corresponds to a 144-year return period. However, to date there is no published probabilistic Peak Ground Acceleration (PGA) developed for a 144-year event in Afghanistan. Therefore, the 475-year event was selected as the OBE event (which is conservative). Figure 19 below presents the map of Afghanistan showing the locations of modeled fault sources (heavy blue lines).

Figure 19. Preliminary Earthquake Hazard Map of Afghanistan



Source: USAID, by Oliver S. Boyd, Charles S. Mueller, and Kenneth S. Rukstales, US Department of the Interior, US Geological Survey, 2007

182. For Dahla Dam embankment, OBE was assigned a return period of 500 years with a PGA of 0.075 gravity while the Maximum Design Earthquake was assigned a return period of 10,000 years with a PGA of 0.18 gravity.

183. In 1952, the dam structures were designed to resist inertia forces produced by a ground wave-acceleration equivalent to 0.05 gravity. As this ground acceleration is too low in today's practice for high dams with high hazard consequences, USACE initiated geotechnical investigations in 2014 for determining the shear strength parameters. The deterministic seismic hazard analysis performed by USACE in 2014 yielded a PGA of 0.32 gravity at the foundation rock level for a magnitude 6 earthquake. The damage class for Dahla Dam is thus class 1 on a scale of 0 to 4 and the corresponding probability of transverse cracking at the crest is 0.05 which is very low. The maximum crack width in the event of a magnitude 6 earthquake could be 50 mm.

184. In December 2017, the TRTA engineers inspected the dam crest; no longitudinal cracks were observed on the dam crest and the parapet wall alignment indicates that the crest has settled by less than 1% of the embankment height over the last 60 years of dam operation. This is in line with the assessment reported above. A further assessment of dam settlement has been discussed in subsequent sections.

185. In 2018, the TRTA performed further geotechnical investigations on the main dam crest, saddle dam 6 (which was not surveyed by USACE) and borrow areas. The proposed dam raise has been performed to ensure that core and filter zones are wide enough and in filter relation to mitigate risk of piping. The results show that saddle dam 6 has also been constructed using similar clay core material as that of main dam. Investigations revealed no dam safety risk for further raising of the dam. The proposed dam raises use downstream raised method for all main and Saddle dams, this method is conservative. Additional redundancy in design has been added by increasing core thickness. The dam raise will use similar existing construction material with filter relations to mitigate piping risks.

186. The gradation curves for main and saddle core along with the gradation curves for main and saddle core with sand-gravel zones indicate that the two materials are in filter relation and if the dam will be constructed on similar material there should not be a piping concern.

187. From the TRTA studies, it was concluded that, despite the absence of a properly designed no-erosion filter, the main and saddle dam 6 embankments of Dahla Dam are safe against internal erosion or piping failure. A total of 27 stability cases were run for the dam models. These included the 1952 design, 8 m raise, and 13.6 m raise for the main dam and saddle dam 1-6. The analysis concluded that under proposed design, all of the dams are safe for the water full supply level, dam crest floods and seismic loads.

188. During the detailed design it is important that geotechnical investigations performed be reviewed further and if required additional investigations may be performed. The material characterization from previous reports from Helmand should also be studied and gradation envelopes be further developed for tender works. The thickness of filter zones should be developed further and if required more processed filters may be used.

7. Flooding and Climate Change

189. Typically, low reservoir volume periods in the project area are from July to November. However, the frequency of high and lows for the inflow to Dahla reservoir is likely to increase over time due to climate change. The impacts of climate change on reservoir performance are

likely to result in reduced inflow and partly increased maximum flows during extreme events. This results in respective differences in downstream water availability. Especially with regards to extreme runoff events, it needs to be understood that the capacity of the reservoir and respectively the buffering capacity is limited (storage capacity is about 11% of the annual inflow under average conditions).

190. The general climate trend of reducing inflows is of less impact than the increase in extreme conditions and respective water availability fluctuations where the low inflow during dry years or the high inflow during wet years is difficult to be buffered. These differences between wet and dry years are causing the largest challenges for the downstream irrigation schemes as with a reservoir and dam built for average conditions significant spill occurs and over-year buffering is not possible.

191. Reservoir behavior was simulated as part of the TRTA hydrology study based on predefined scenarios considering baseline (2005-2014), and future 2050 conditions under average, wet and dry conditions for a defined set of downstream current and future environmental as well as urban demands. Irrigation water demand has been iteratively tuned to understand maximum irrigation water availability while maintaining a reservoir reserve of 50 million m^3. The irrigation water demand was set considering the differing monthly demands, with the condition that demands must be met in all months during the irrigation period in order to avoid crop damage. Results show that climate change, i.e. a potential drier future, will have a significant effect on water availability that cannot be fully compensated by the reservoir buffer, even with increased reservoir capacity.

192. Overall, the project is categorized as low-risk for climate change impact and in practice will reduce emissions through use of generation of electrical power using hydropower replacing diesel generation. The project will also remove the need for continual and ongoing extraction of ground water from boreholes by improved water storage of natural annual rainfall and snow melt water. Another positive impact will be the reduction of water loss from spillways with consequent ability to enable environmentally minimal flows to be maintained in the main river networks of the river delta and its linked canals. Climate risks were considered based on the sample subprojects.

8. Hydrology

193. An aquifer, or water bearing formation, is a term used to designate a formation that contains and can transmit a considerable amount of water. Aquifers are defined as a water bearing bed or structure of earth, gravel or porous stone.[13]

194. The most important hydrogeological properties of an aquifer where ground water is flowing include: (i) Transmissibility = permeability x thickness of the aquifer; and (ii) Specific yield or the storage capacities of the water bearing formation.

195. Kandahar groundwater aquifers have been assessed in previous studies through several groundwater surveys. The results are presented in the table below.

[13] Nespak, I. 1980. Analysis and Evaluation of Pumping Test Data Second Edition (Completely Revised), *Delft.*

Table 12. Characteristics of Kandahar Groundwater Aquifers

Kandahar City Groundwater Model	Afghanistan Geological Survey (Abdullah and Chmyroiv, 2008)	DACAAR Nationwide Monitoring Report (Saffi, 2007)	Kandahar Groundwater Resource Assessment (CDM, 2003)	Description	Notes
Unconfined/Semi-Confined	Recent, Aeolian+, Talus, Upper and Middle Quaternary	Unconfined	Unconfined	Gravels, sands, talus, sand loam	Loess cover present in north and much of Kandahar area
Upper Confined	Neogene	Neogene Multi-Aquifer System	Upper Confined	Sands and gravels	May not be correlative with northern part of the model domain
City Aquifer	Neogene		City Aquifer	Sands and gravels with scattered layers of conglomerate and caliche	Not correlative with northern part of the model domain *Hard layers at percussion drilling limit (100-120m) will give a false bedrock depth
Deep Aquifer	Paleogene-Helmand-Arghandab Uplift	Not Defined	Not Defined	Variably cemented, red to pale red fine grain sediments with sandstone and conglomerate	Not correlative with northern part of the model domain *May be source of artesian flow
Mixed Age Carbonate Bedrock Aquifer System	Cretaceous Bedrock Aquifer System *Paleozoie Aquifer System	Fracture Karst Water	Not Defined	Carbonate units known and suspected to have karst potential	Relatively High Hydraulic Conductivity, enhanced neat faults and major fracture zones
Mixed Age Coarse Clastic Bedrock Aquifer System	Not Defined	Not Defined	Not Defined	Cambrian-Cretaceous and younger sandstones and conglomerates, and some mixed carbonate units	Relatively medium hydraulic conductivity excluding fracture sets and faults
Mixed Age Low Porosity Bedrock Aquifer System	Paleogene Katawaz Artesian Basin *Mixed Age Intrusives Aquifer System *Pre-Cambrian Aquifer System	Not Defined	Bedrock	Igneous metamorphic, and fine-grained sedimentary rocks	Relatively low hydraulic conductivity excluding fracture sets and faults

196. Groundwaters have been widely used in the irrigated areas of the Arghandab basin to support surface water irrigation. While in principle, tubewells need to be approved and registered, this appears not to have happened in the Arghandab River basin, or in fact in much of Afghanistan. This is leading to rapid decline of the water table in many areas, and if not controlled will ultimately lead to the loss of aquifers and the inability of groundwater to support irrigation. Increasing the availability and planning of surface water release under the project should have a major goal of limiting the need for groundwater usage, and thus reversing or at least stabilizing the falling water tables. This must be supported through adequate links with the community.

197. Dahla Dam, which is fed by precipitation and snow melt in its upper catchments, currently only supplies irrigation water. The Loy Walla irrigation canal which is supplied with water from the dam, is one of the few surface water sources flowing through the city. This canal water is also unofficially used for domestic water consumption by residents without piped water connections, and is often used untreated. Even though the leakage water from this canal infiltrates into the shallow unconfined aquifer, groundwater levels are still dropping.

9. Water Quality

a. Water Sources

198. Kandahar has an estimated population of between 630,000 and 830,000, estimates vary depending on the source, and is currently predominantly relying on groundwater as water source. All existing water wells are operated and managed by AUWSSC and are drawing water from the deep aquifer 60-200 m below Kandahar.

199. Previous studies indicate that the sustainable groundwater yield of the aquifers near the city is around 33,000 m^3/d and is insufficient to meet the total water demand for Kandahar city, which is estimated at 53,000 m^3/d based on the current population (2018) and a water consumption of 50 liters per-capita per day.

200. In addition, the water of the aquifers in many locations near Kandahar city appears to have high total dissolved solids (TDS) concentrations which exceed the Afghanistan National Water Quality Standards 2013.[14]

201. As part of the water supply investment component Feasibility Study, it is recommended that surface water from Dahla Dam is developed as a new source for urban water supply for Kandahar city. The water has a relatively good water quality, a low TDS and, can be supplied by gravity to 70% of the city from the dam due to its high elevation.

b. Survey Results

202. Water at 12 wells in Kandahar city were tested in November 2017 and at two surface water sources: Dahla Dam and downstream of the reservoir in Arghandab River, in February 2018. Additional water quality analysis was conducted in January 2019 on 10 wells in Kandahar city and on two surface water sources. The locations of the sampling are presented in Figure 20 below.

[14] USACE. 2015. *Kandahar City Water Supply Master Plan Kandahar Province, Afghanistan Commander's Emergency Response Program*. United States Army Corps of Engineers, 30 Sept 2015.

Figure 20. Locations of Water Quality Sampling, January 2019

Source: TRTA Consultants. 2019

203. Results are presented in details in Appendix 5. The main characteristics of all tests performed in 2017, 2018 and 2019 exceeding either WHO, or Afghanistan standard for physical, chemical or bacteriological characteristic are summarized in the table below.

Table 11. Water Quality Survey Results (2017-2019)

Sample Location	Sampling Date	Physical *turbidity: 5* *EC: 1500 (WHO) - 3000 (ANSA)*	Chemical *Chloride: 250* *Sulphate: 250* *Fluoride: 1.5* *Hardness: 300* *Sodium: 200*	Bacteriological *Total coliforms: 0 col/100ml (WHO)* *Fecal coliforms: 0 col/100ml (WHO)*
SURFACE WATER				
Close to Intake Tower, Dahla Dam reservoir, Shah Wali Kot district, Kandahar province	26/02/2018	Turbidity: 13 NTU	-	?
	1/01/2019	Turbidity: 60 NTU	-	Total Coliform and Fecal coliform: > 250
Downstream, Dahla Dam, Shah Wali Kot district, Kandahar province	26/02/2018	-	-	?
	1/01/2019	-	-	Total Coliform and Fecal coliform: > 250
GROUNDWATER WELL				
AUWSSC 1st operational water well in Kandahar city. Maikhanik High School, District 2, Kandahar province	1/11/2017	-	-	?
	9/01/2019	-	Total Hardness: 360 mg/l	-
AUWSSC 3rd operational water well in Kandahar city. AUWSSC Office, District 2, Kandahar city	25/10/2017	-	-	?
	9/01/2019	-	Total Hardness: 390 mg/l	Total Coliform: 20 Fecal Coliform: 10
AUWSSC 4th operational water well in Kandahar city. Fazal Kandahari High School, District 8, Kandahar city	31/10/2017	-	-	?
	9/01/2019	-	-	Total Coliform and Fecal coliform: > 250
AUWSSC 5th operational water well in Kandahar city. Dand Chowk (Square), District 8, Kandahar city	12/11/2017	-	-	?
	9/01/2019	-	-	-
AUWSSC 8th operational water well in Kandahar city. Sra Miasht Clinic, District 14, Kandahar city	30/10/2017	-	-	?
	9/01/2019	-	Sodium: 259 mg/l	Total Coliform: 37 Fecal Coliform: 17

AUWSSC 10th operational water well in Kandahar city. Mirwais Nika High School, District 14, Kandahar city	20/11/2017	-	-	?
	9/01/2019	-	-	-
AUWSSC 11th operational water well in Kandahar city. Ahmad Shah Baba High School, District 2, Kandahar city	23/10/2017	-	-	?
	9/01/2019	-	-	-
AUWSSC 12th operational water well in Kandahar city. Kandahar Mahbas (Prison), District 8, Kandahar city	29/11/2017	-	-	?
	9/01/2019	-	-	-
AUWSSC 15th operational water well in Kandahar city. School Aino number 2, Kandahar city	18/11/2017	-	-	?
AUWSSC 16th operational water well in Kandahar city. In front of Aino Mina, District 5, Kandahar city	7/11/2017	EC: 2020 µS/cm TDS: 1010 mg/l	-	?
	9/01/2019	EC: 2460 µS/cm TDS: 1692 mg/l Turbidity: 43.55 NTU	Chloride: 510 mg/l Sulphate: 380 mg/l Fluoride: 2.5 mg/l Total Hardness: 560 mg/l Sodium: 453 mg/l	-
AUWSSC 17th operational water well in Kandahar city. AUWSSC Office, District 2, Kandahar city	25/10/2017	-	-	?
	9/01/2019	-	Total Hardness: 390 mg/l	Total and Fecal Coliform: 11
MPW Well	5/11/2017	TDS: 1088 mg/l	-	?

Note: (i) WHO and ANSA standards are indicated below the first row for the characteristics exceeded. (ii) 2017 results indicate negative bacteriological results for all tests. This may be incorrect and this test has been classified as invalid.
Source: TRTA Consultants, 2019

c. Groundwater

204. In 2017, analysis of the water samples from the 12 wells were provided to the TRTA consultants by AUWSSC. Sterilized polyethylene sampling containers were used to collect water samples. Water sampling begun at around 10:00am, and water samples were stored in an ice box during collection and transportation. Laboratory tests were conducted at around 11:00am the same day. The water samples were tested in AUWSSC laboratory by the Laboratory Manager. Water quality parameters were analyzed and compared with WHO and Afghanistan National Water Quality Standards. The summary of water quality test results is presented in Table 12 above. The water of all samples had no noticeable odor and unobjectionable taste.

205. Water sample analysis of the 12 wells shows low level of TDS apart at MPW well and the Ansari Mena well, where TDS exceeds 1,000 mg/L, however it is still below the drinking water standards of 2,000 mg/L.

206. **In January 2019, bacteriological contamination has been detected in four of the ten wells tested.** Disinfection of the water is recommended before human consumption for these wells. While the previous 2017 and 2018 displayed negative bacteriological

contamination, it is expected that these results may be incorrect. Indeed, bacterial contamination is very common in the Kandahar city aquifers and wells. Water borne diseases are expected for Kandahar city due to absence of or incomplete disinfection of drinking water.

d. Arghandab River and Canals

207. Water quality data from a water sample taken at the main canal in February 2018 shows low TDS concentrations (259 mg/L < 1,000 mg/l Afghan National Standard). Electrical conductivity was low accordingly (538 µS/cm). Turbidity was also low (1,7 NTU < 5 NTU Afghan National Standard). It appears from conversations with local AUWSSC staff that during the snow melt in the spring turbidity levels increase in the Arghandab River and Dahla reservoir.

208. Bacteriological analysis on total coliform and fecal coliform bacteria showed negative results, however it is expected that this result may be invalid. Indeed, the water quality of the canal is highly affected by domestic sewage. There is evidence of organic pollution from the following sources:

(i) Discharge of sewage from adjacent settlements into the river;
(ii) Car washing in the river;
(iii) Detergents from laundry in the river, which includes phosphates.

209. There is no public waste collection system. Waste from markets, households, and construction sites affect the river and the canals. There is also no appropriate landfill and waste disposal mechanisms in place. Most waste generated in Kandahar city is dumped into the ditches and canals, and the city is suffering from adverse effects of unmanaged waste.

210. In January 2019, bacteriological contamination has been detected in Arghandab River. Disinfection treatment of the water is required before human consumption.

e. Dahla Reservoir

211. In February 2018, water quality analysis from the dam showed low TDS (383 mg/L < 1,000 mg/L WHO Standard) and low conductivity (384 mg/L). The dam is located in a remote area; there are some villages (Karmollah and Karamullah) and some small settlements in the vicinity of the dam. Sewage coming from these settlements may pollute the water body of the dam. The water quality of the dam itself appeared not to be affected by human activities. There is no industry, mining activities, large settlements or large agricultural fields nearby.

212. Turbidity observed was 13 NTU and exceeded the WHO drinking water standard which is between 1 and 5 NTU depending on the size of the water supply. Turbidity depends on weather patterns and inflow into the dam. For human consumption the dam water has to be treated for turbidity.

213. In January 2019, high turbidity was measured (60 NTU) and bacteriological contamination was been detected in Dahla reservoir. Disinfection treatment of the water is recommended before human consumption and further testing is required at different times of the year.

214. Green algae were found at the dam during the site visit carried out by the TRTA team on 10 July 2018. The algae were found in the close vicinity of the dam itself and indicated organic matter. They have been accumulated by northern winds.

10. Noise Levels

215. The noise level, in the absence of any construction work, is typical of a busy village area and city area dominated by the cumulative effect of many unidentifiable sounds, mostly related to road traffic. Noise will increase in the project area during construction due to the noise of heavy machinery and transportation of construction materials.

216. The noise generated by the construction and operation of the raising of Dahla Dam will not affect any settlement as no communities are living closer to 500 m of the different site. As such, noise monitoring is not required. The following measurements of the closest settlement to the different project sites have been recorded by the TRTA in March 2019:

(i) Closest settlement to main dam embankment: downstream: 2,100 m, upstream 4,950 m;
(ii) Closest settlement to saddle dam 1: downstream: 890 m, upstream: 3,98 0 m;
(iii) Closest settlement to saddle dam 2: downstream: 1,145 m, upstream: 4,113 m.
(iv) Closest settlement to saddle dam 3: downstream: 1,475 m, upstream: 4,222 m;
(v) Closest settlement to saddle dam 4: downstream: 1,970 m, upstream: 4,275 m;
(vi) Closest settlement to saddle dam 5: downstream: 2,200 m, upstream: 4,320 m;
(vii) Closest settlement to saddle dam 6: downstream: 2,460 m, upstream: 4,080 m;
(viii) Closest settlement to spillway 1: downstream: 2,160 m, upstream: 4,350 m;
(ix) Closest settlement to spillway 2: downstream: 1,730 m, upstream: 4,300 m.

217. It is anticipated that settlements of the Shahjoi village located close to the proposed route bearer realignment will be affected by noise during the construction phase, and during the operation phase. The closest settlement to the proposed realigned route is Shahjoi village which is located approximately 150 m away. Number of houses and population will be identified during the workshop in Kandahar that will take place early April with APs. The proposed route bearer highway also passes close to two other villages, but the settlements are located further and should not be considerably affected by the route construction and operation. The closest settlement in Landai Showraw village is located 650 m from the proposed route and the closest settlement in Lowar Arab village is located 1,150 m from the proposed route.

218. Baseline noise monitoring will be measured before commencement of construction activities at Shahjoi village. During the detailed design, documentation will detail that the contractor will be responsible for scheduling meetings with respective communities to establish agreement as to the commencement and completion of daily work times. It will also be the responsibility of the contractor to monitor noise levels of all machinery involved in the construction.

11. Air Quality

219. Existing air quality is considered not to be a critical issue and, although not measured, appeared normal during site visits. Quality can deteriorate rapidly during dust storms generated across barren land and deserts during windy seasons. Actual pollutants in Kandahar city consist of windblown and re-entrant dusts, emission from brick kilns, residential heating and cooking, portable domestic generators, as well as mechanical shop generators. Dust storms are the main source of particulate matters.

220. Air quality measurements have been carried out at the following locations in January 2019:

(i) Right Abutment Dahla Dam, Shah Wali Kot district;
(ii) Downstream, Dahla Dam, Shah Wali Kot district;
(iii) Water supply station compound (C-3), Kotal-e-Murcha, Arghandab district;
(iv) Highway, Shah re Naw, District # 6, Kandahar city;
(v) Sub-Road (1), Shah re Naw, District # 6, Kandahar city;
(vi) Sub-Road (2), Shah re Naw, District # 6, Kandahar city.

Figure 21. Locations of Air Quality Monitoring, January 2019

Source: TRTA Consultants, 2019

221. The measurements have been carried out on PM2.5 using Kaiterra Laser Egg 2 air monitoring device. A total of 60 measurements were conducted from 4 January 2019 to 8 January 2019 in the six locations. Measurements have been conducted mostly during day-time due to security reasons and therefore 24 hours measurements were not possible. The detailed results of these measurements are listed in Appendix 6.

222. The air quality measured were in most cases below the WHO Interim target-1 (75 µg/m^3) and Afghanistan maximum allowable concentration (75 µg/m^3) over 24 hours. As per Table 13 below, in two cases for roads in Kandahar city, the concentration was higher, however, it was only recorded over 13 hours (day-time). One of the measurements was done for the road during night-time. Averaging both results for the 24 hours period, the results is estimated to be close to the standard.

Table 13. Air Quality Results Summary

Location	Date	Time	Number of samples / hours	Mean PM2.5 (µg/m^3)
Right Abutment Dahla Dam	4/01/2019	9:37 - 14:54	6	19.5
Downstream, Dahla Dam	5/01/2019	9:00 - 15:15	7	9.6
Water Supply Station Compound (C-3)	6/01/2019	8:10 - 16:47	10	42.8
Highway, Shah re Naw, District 6	7/01/2019	7:10 - 19:04	13	**115.7**
Sub-Road (1), Shah re Naw, District 6	7/01/2019	7:18 - 19:10	13	**132.2**
Sub-Road (2), Shah re Naw, District 6	7/01/2019	20:00 - 06:04	11	46.4

Source: TRTA Consultants, 2019

223. Additional comprehensive measurements on air quality including ozone, PM10, NO2, SO2 are suggested for the detailed design phase before commencement of construction activities.

B. Biological Environment

1. Biodiversity

224. Of importance to this draft EIA is the status of existing biodiversity across the footprint of the Dahla Dam catchment, as well as the important riparian biomes of the Arghandab River downstream of the dam. An effective tool which provides a basic risk screening on biodiversity is the Integrated Biodiversity Assessment Tool (IBAT) developed by The International Union for Conservation of Nature (IUCN). The IBAT draws together globally recognized biodiversity information which assists in identifying biodiversity risks and opportunities within or close to a project boundary. An IBAT report was completed, for an area 20 km circumference of the Dahla Dam wall and dated 02 July 2019 (Appendix 9). The IBAT aims to overlap with relevant protected areas, key biodiversity areas and the IUCN red list.[15] In this case, the report reveals that there are no protected area and no key biodiversity areas within the zone. The report also reveals the potential for the occurrence of a number of species from the vulnerable, endangered, critically endangered lists.

Table 14. IUCN Red List of Threatened Species Potentially Found in the Project Area

Species Name	Common Name	IUCN Category	Taxonomic Class
Aquila heliaca	Eastern imperial eagle	VU	Aves
Aquila nipalensis	Steppe eagle	EN	Aves
Aythya ferina	Common pochard	VU	Aves
Capra aegagrus	Wild goat	VU	Mammalia
Chlamydotis macqueenii	Asian houbara	VU	Aves
Clanga clanga	Greater spotted eagle	VU	Aves
Falco cherrug	Saker falcon	VU	Aves
Gazella subgutturosa	Goitered gazelle	VU	Mammalia
Gyps bengalensis	White-rumped vulture	CR	Aves
Marmaronetta angustirostris	Marbled teal	VU	Aves
Neophron percnopterus	Egyptian vulture	EN	Aves
Ovis orientalis	Mouflon	VU	Mammalia
Oxyura leucocephala	White-headed duck	EN	Aves
Panthera pardus	Leopard	VU	Mammalia
Ursus thibetanus	Asiatic black bear	VU	Mammalia
Vanellus gregarius	Sociable lapwing	CR	Aves

[15] The IUCN Red List is a comprehensive inventory of the global conservation status of plant and animal species through the application of a set of quantitative criteria to evaluate extinction risk of thousands of species.

Vormela peregusna	Marbled polecat	VU	Mammalia

CR = critically endangered; EN = endangered; VU = vulnerable.
Source: IBAT Proximity Report, 2018. Generated under licence 146-2715 from the Integrated Biodiversity Assessment Tool on 02/07/2019. http://www.ibat-alliance.org

225. At time of writing (July 2019) the second round of field work to establish biodiversity status in the Dahla Dam is being conducted by two experts from NEPA supported by the TRTA team. Findings from this survey will be incorporated into an updated version of this draft EIA as they become available.

2. Vegetation and Land Use

226. The study area is located in a semi-desert ecosystem characterized by low annual rainfall (~70mm), high diurnal temperature range include intense heat during summer and low temperatures during the winter months. As a result, plant communities in such a situation are highly evolved to a very difficult climatic regime including both highly responsive annual and perennial material. Plant communities consist predominantly of low ground-covering shrubs exhibiting small leaf and biomass density and large root systems. In undisturbed areas plant diversity can be considerable, with 80% of the diversity being less than 1.0 m in height. The diverse ecological conditions within the Arghandab catchment, ranging from barren deserts to areas affected by the Indian monsoons in the high country have fostered the establishment of a complex and varied endemic and indigenous flora. Arid-zone plant communities are highly opportunistic, and can demonstrate variance in response to soils, aspect and micro-climate, precipitation and altitude. These conditioning factors result in considerable diversity in flora, and that variance can occur in the predominantly south facing land form above Dahla Dam. Where scree conditions prevail, plant material can be highly vulnerable to disturbance, so although considered tough, plant communities subjected to regular disturbance will struggle to survive. Closer to the riparian conditions, individual plants which favor more moist conditions prevail. The dominant plant families are Compositae, *Asteraceae (Artemisia spp, Cousinia spp),* as well as a large number of xerophytes and halophytes in lower sandy desert areas.

227. Of particular importance to the project is the need to select a palate of plant material which can be used for planned revegetation. It is important that the preconditions favorable for plant propagation and growth be developed as a component of the ARES.

228. As a result of the ongoing impacts of free-range grazing as well as extensive collection of biomass for use as fuel-wood across the catchment, there is limited vegetation cover out of the river basin and, as a result, top soil degradation is common as are the signs of surface erosion. The land cover can be described as a semi-desert environment.[16]

229. The area surrounding the dam is largely altered by local residential mud house developments, but there are still pockets of natural vegetative areas with conservation value. Despite the low proliferation of alien plant species in the dam and surrounding area, a number of indigenous aquatic plant species still occupy the area. The establishment of many of these species has been promoted by the artificially wet conditions created by the dam. Remnant riparian tree flora also exists along the banks of the canal and major tributaries entering the dam, and in some cases the extent and condition of these zones has been enhanced by the dam's effects.

[16] UNEP 2003. *Annual Evaluation Report*. Evaluation and Oversight Unit. September 2004.

230. Shore vegetation may also help limit sedimentation of the dam by trapping sediment washed into the dam from the adjacent agricultural lands and small streams which flow into the dam. They may also help to improve water quality, but the extent of this is unclear and has not yet been quantified. However, considering both the sources and volumes of water and sediment supplied to the dam, it is unlikely that this is a major beneficial function of these shore habitats.

231. The immediate watersheds surrounding the dam and its reservoir are mostly denuded and the upper catchments are completely degraded. There is a dire need for a strategic and integrated watershed management program in the upper catchments to reduce soil erosion. Instituting such a program is a challenge while the major proportion of the catchment is not under the direct control of government agencies. In addition, rangelands grazing by Kuchi, fuel-wood collection and greater awareness and ultimately protection of important vegetation for habitat are all issues which will require considerable attention and resource commitment.

232. No national, provincial nor regional flora and fauna species of significance or their habitat were found within the area potentially affected by the project. While no large wetlands are located within the project area, in part, the perimeter of the existing water body provides important habitat for avian species. It is proposed that such “wetland” species be replicated to areas at what will be the new high water mark. to achieve this may require generous dressings of fine silt/soils in shallow areas. The ARES will specifically detail observations on conditions required and the speciation to be incorporated.

233. Small reed areas are found below the dam and these likewise play an important role in riparian ecology. Riparian forests along the river bank have frequently been cut with no replanting program. As a result, canopy species are now non-existent, a situation which impacts the local and micro climatic conditions as well as leaving river banks vulnerable to erosion. Long-term strategies for the improved management of these riparian plant communities will include replanting programs linked with use of bioengineering devices as required.

234. Plant communities within the catchment of both the Dahla Dam and the broader Arghandab River fall into a number of categories based upon topography, soil types and aspect. (i) Riparian / water tolerant species favoring shoreline conditions and commonly supporting habitat and nursery conditions for aquatic and bird species; (ii) Immediate land beyond high water mark broadly referred to as having a fan-shape characteristics and subject to sheet erosion and seasonal flooding; (iii) higher sloping terrain. It is recommended that a comprehensive plant list for these areas, along with propagation details, will be assembled as a component of the detailed ARES.

235. Above the dam area and following the course of the river, flood-out zones and steeply sided valleys, there is a denser community of plant material referred to by local communities as the "jungle" or “bird nest”. The spatial extent of this plant community is estimated to be approximately 7 km^2. A list of vegetation appraised to be found in the jungle area and produced during the consultation indicates that the topography includes riparian/alluvial river flats, possibly steeply inclined "scree" conditions and away from the river, free draining and feasibly mobile sand hill / desert-edge conditions. This plant community has been anecdotally described as one of considerable insecurity due to the fact that it is said to be used by Taliban as a sanctuary. As a result, the area has not been ground-truthed nor surveyed during the TRTA.

236. The use of the “jungle” and “bird nest” term to describe the area indicates the perceived value of the plant community as habitat for birdlife. The significance of the area has been identified as part of the community consultation processes, and is illustrated in Figure 23. The extent of the growth is outlined by the color red. Unfortunately, the area known as the jungle has

not been appropriately surveyed by the TRTA as it has been declared by anti-state armed groups to be prohibited to visitors. A more comprehensive survey using high resolution satellite imagery will be a component of the ARES.

Figure 22. Forest Area Impacted by the Dam Raise

Source: TRTA Consultants, 2019

3. Fauna and Wildlife

a. Arghandab River

237. Both upstream and downstream of Dahla Dam, the Arghandab River banks demonstrate a range of degradation. As a result of the seasonal fluctuation of water flow levels combined with the constancy of human impact (agriculture, sewage, deforestation), the environment is in part highly compromised with a low ecological importance.

238. However, at various locations river morphology shows only minor human impact and appears undisturbed.[17] The greater the distance from permanent settlement, particularly where the river meanders and islands are very common, there are areas of natural habitat which will be of ecological importance for aquatic and terrestrial species. These areas offer potential habitat for ground nesting birds (gravel bank, reed) etc. In addition, there is evidence of deep

[17] Embankments consisting of natural substrate (rocks, gravel, sand), exist only in settlements and at bridges to protect against floods and erosion.

pools where trout have been recorded to exist. The ARES will substantiate the status of a representative number of these non-degraded riparian areas to both identify nodal points where real-time monitoring could be established, and complete detailed fish / aquatic specie surveys to inform the Environmental Flow (EF) database and assist the detailed engineering design stage.

239. Due to topography the river has no major drops nor large waterfalls. Subsequently, the river flows in level reaches broken up by many rapids and riffles. Deep pools can be found close to rapid areas. Depending upon outfall source and relative temperature differentials, it is anticipated that the increased flow throughout the year combined with environmental flows (after the raising of the Dahla Dam) can improve potential habitats below the dam compared to the existing situation. As hunting of birdlife is recognized as a local activity, the success of these habitats will depend upon ongoing stewardship and protection by local community groups.

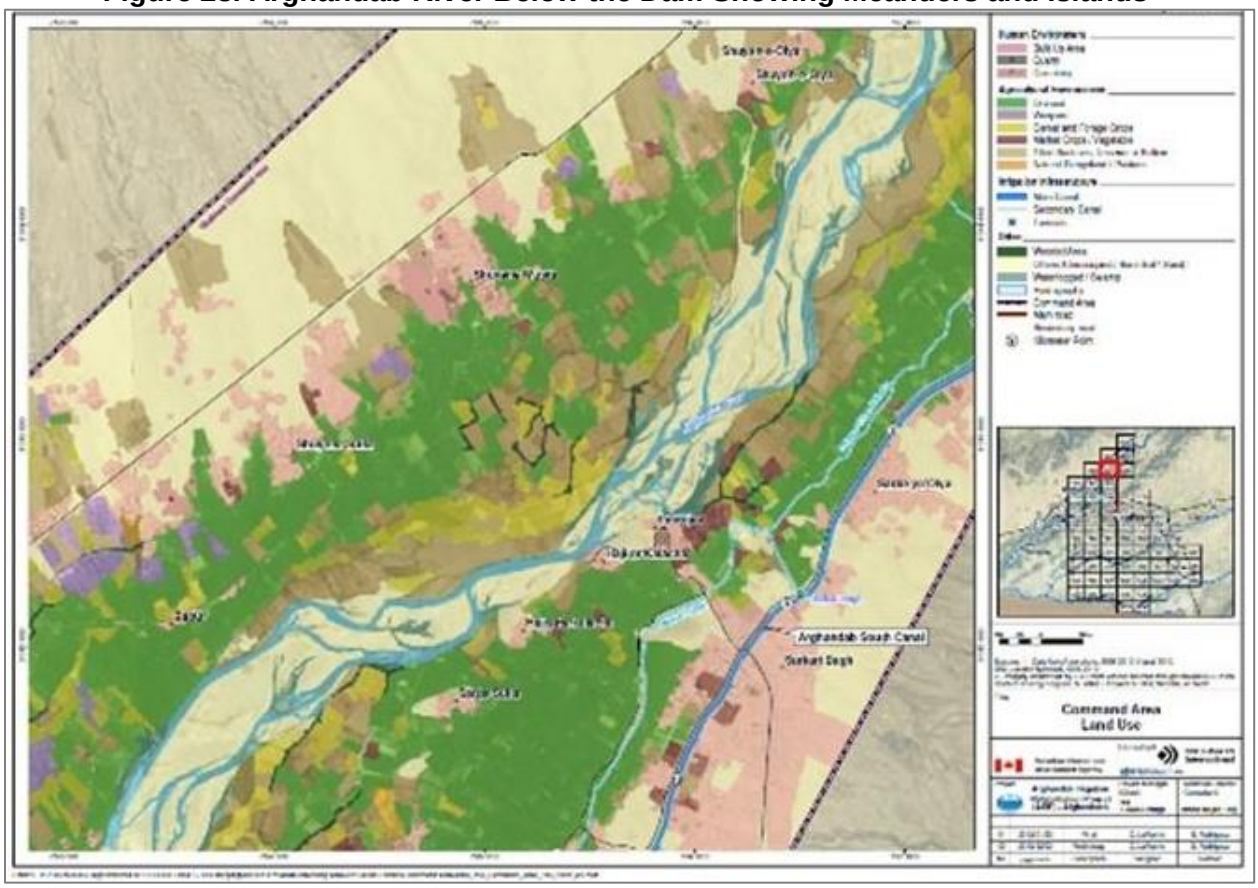
240. Extensive data on wildlife numbers and habitat is not available however the ARES will be responsible for assembling greater information on relevant species, habitat and opportunities for the project to enhance and protect wildlife. There is evidence that avian species which rely on the water are present, such as: (i) Fish eagle *(Pandion haliaetus*); and (ii) Black kite *(Milvus migrans*). The November 2018 survey identified 14 waterfowl species and 17 individual birds from other species within the Dahla Dam. This is a preliminary indicator that the dam water is an important area and plays a significant role for waterfowl and other wildlife species in the south-west of Afghanistan. Water birds use this area as an aquatic habitat for shelter, foraging, roosting and breeding. In addition to the water birds, the survey also identified two mammals, Jungle Cat (*Felis chaus*) and Golden Jackal (*Canis aureus*), both of which are on the Afghanistan "Red List".[18]

241. So, while the 2018 survey found that these species use the river as their feeding habitat, the occurrence of these species is impacted by water scarcity and human impacts, such as sewage and hunting.

242. Beyond the dam, and in the surrounding catchment / desert areas, striped hyena (*Hyaena hyaena*) are very common.

[18] **IUCN** The **IUCN Red List** of Threatened Species™ is the world's most comprehensive inventory of the **global conservation** status of plant and animal species. It uses a set of quantitative criteria to evaluate the extinction risk of thousands of species.

Figure 23. Arghandab River Below the Dam Showing Meanders and Islands



Source: CIDA. Cartographic Atlas command area and land use, 2012

Figure 24. Upstream of First Division Weir - Reeds and Potential Habitat for Nesting Birds

Source: TRTA Consultants, 2018

b. Dahla Dam

243. Dahla Dam is an artificial, man-made habitat and is well recognized as a recreational destination for families from Kandahar. The dual purpose of the dam area means that ongoing maintenance and management of the area is critical if standards are to be maintained. The cost to support this could be covered by admittance fees.

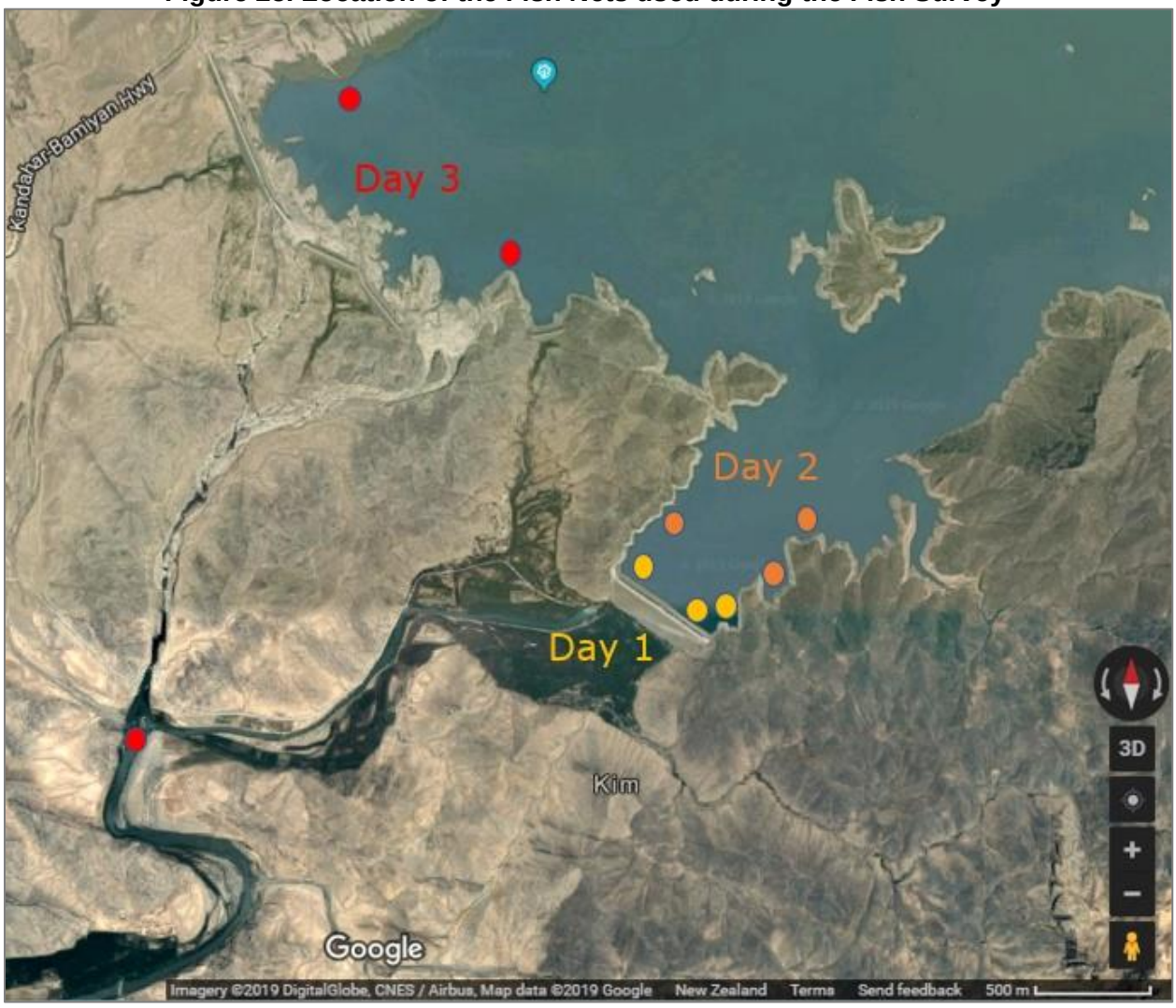
c. Aquatic Environment

244. A fish biological survey was implemented in November 2018 by the TRTA and NEPA to assess the aquatic life at the dam. The survey was conducted using three methods: (i) interviews of fisherman using a questionnaire on the fishing method used, time of the year, and main threats to fishing, (ii) meetings with aquaculture owners and related governmental organizations, and (iii) fish catches in nets at nine different sites of Dahla Dam reservoir and one site downstream of Dahla Dam. The locations are shown in Figure 25 below. On day one, the survey team surveyed deep water zones, on day two, deep and shallow, and on day three shallow zones including one zone downstream of the dam.

245. The river south from the dam is habitat for rheophile trout (*Salmo trutta oxenesus*), which is recognized as being endemic to the region.[19] The 1953 construction of the Dahla Dam made no provision for fish ladder technology, so for 65 years there has been no upstream fish migration above the dam. However, *Salmo trutta oxenesus* is reported to exist in the river above the dam. It is anticipated that the lack of river sediment downstream of the dam will also have compromised seasonal cycles of nutrient deposits. The ARES will specifically assess the (i) effectiveness of modified “fish-friendly” hydro turbines, (ii) identify fish endemic to this river system, and (iii) evaluate the potential for a fingerling program to be introduced into the dam to replenish fish stocks.

[19] TRTA communication ASBA Kandahar.

Figure 25. Location of the Fish Nets used during the Fish Survey



Source: TRTA Fish survey, 2018

246. The ARES will survey the river and dam again to collect and document in a usable form, additional information regarding the existing aquatic species (preferred habitat conditions, breeding cycle, predators, susceptibility to overfishing along with their vulnerability to project activities). This information is an important component of understanding and improving management of aquatic species. The project has the opportunity to make very positive long-term contributions in this regard.

247. Three existing fish species were found in the dam reservoir as part of the 2018 TRTA survey. It has been observed that these species may be vulnerable to major construction and the disturbance in the water body adjacent the new walls. The ARES will specifically investigate this issue and make appropriate recommendations to mitigate. The three species concerned are:

(i) **Sheer Mahi** *(Clupisoma Naziri)*. Sheer Mahi was caught in all the fish nets used during the three days in different parts of the dam (shallow water zones and pelagic zones). The extent of occurrence of this species is high and exists in all parts of the dam. It mostly exists in the south-west part of the dam.

(ii) **Common Carp** *(Cyprinus carpio).* The Common Carp was caught in four out of nine fish nets that were used to catch the fish in the dam. The specie mostly exists in the southern parts of the dam. No specimen was caught in the deep water zone.

(iii) **Mola Carplet** (*Amblypharyngodon mola*). 1,092 Mola Carplet were caught in only three of the fish nets among all the nine nets (63% of the fishes caught) in the western part of the dam near the overflow and valve tower and eastern part of the dam. This species is likely to be most affected during the construction of the overflow and valve tower because the population of this species is very high in this part of the reservoir and is mostly found in this area.

248. The results of fish caught in the dam reservoir and downstream are summarized in Table 15 and the survey report is in Appendix 4.

Table 15. Quantities of Fish Caught during the Fish Survey

Local name	Common name	Scientific name	Quantity				
			Day 1	Day 2	Day 3	TOTAL	
Toghandy	Sheer Mahi	*Clupisoma naziri*	42	328	40	**410**	**24%**
Gulpam	Common Carp	*Cyprinus carpio*	12	4	210	**226**	**13%**
Yaqubyan	Mola Carplet	*Amblypharyngodon mola*	1068	24	0	**1092**	**63%**
		TOTAL	1122	356	250	**1728**	**100%**

Source: TRTA fish survey, 2018

249. Downstream, only sheer mahi was caught. One of the fishermen met during the survey mentioned that there were two species downstream: (i) Sheer Mahi and (ii) Dag fish. However, the survey team was not able to catch any specimen of Dag fish.

250. *Salmo trutta oxenesus* (common name: Khaldar Mahi) was not caught, although it is reported as existing in Dahla Dam.[20] This species is expected to occur upstream of the dam in river sections with high velocity due to its high oxygen demand. It is common in some rivers of Afghanistan.[21]

251. The catfish Sheer Mahi (*Clupisoma Naziri*), an indigenous fish of Khyber Pakhtunkhwa, is facing serious threats to its survival due to climatic changes, water pollution, and overfishing. The species is found in Afghanistan and adjacent river basins.

252. Experts in the fisheries department of Pakistan's Khyber Pakhtunkhwa province, zoologists, and those in the fish business have observed a decrease in the population of Sher Mahi in its main habitat, the Kabul river. These experts believe extreme weather events – especially severe floods and erratic rainfall – combined with water contamination and overfishing are the main cause of the depletion of sheer mahi. The construction of the Warsak Dam in 1960 blocked the migratory route of the fish upstream. *Clupisoma Naziri* cannot be reared in water ponds, or fish farms, due to its biology. Experiments of rearing the sheer mahi in hatcheries were not successful.[22]

[20] TRTA communication with ASBA

[21] Simon Funge-Smith et al. 2004. The potential for aquaculture development in Afghanistan, Asia Pacific *Fishery Commission. AD HOC Publication.*

[22] The Third Pole.net. *Understanding Asia's Water Crisis*. 2018. https://www.thethirdpole.net

253. For the same reasons, decrease in this fish species is also expected in Arghandab River. This fish species uses Dahla Dam reservoir as their habitat. The dam contributes to the survival of this species and must not be emptied completely.

254. There is no information available regarding the existing aquatic ecology of the river and of the dam. The river is expected to have a variety of substrates, mostly hard rock but also sand, silt and gravel. Habitats for different aquatic species are expected to decline due to water scarcity and the complete drying out of the ecosystem in dry years. Establishment of a sustainable, minimum environmental flow after the dam raise will boost the emergence of aquatic habitats below the dam and upstream of human settlements (benthic fauna, zooplankton, phytoplankton, fish). In times of flooding when water falls over the spillway, fish can migrate downstream of the dam. Fish species are present in the section of the Arghandab River below the dam.

255. Dahla Dam is an important habitat for fish (and birds). Adequate water management will be needed to sustain and protect these species. The ARES survey will specifically survey and recommend upon ways to improve aquatic habitats in Arghandab River after the dam raise. In addition, measures to invoke water source protection will be strategically applied to the river to achieve appropriate management of human excreta and waste disposal in settlements both upstream and downstream of the dam. If not, while environmental flows may improve with increased water releases from the Dahla Dam they in turn may be compromised by wastewater discharges to Arghandab River.

256. Policy recommendations from the ADB and the World Bank support the introduction of integrated sewage systems within five years of water reticulation being available.

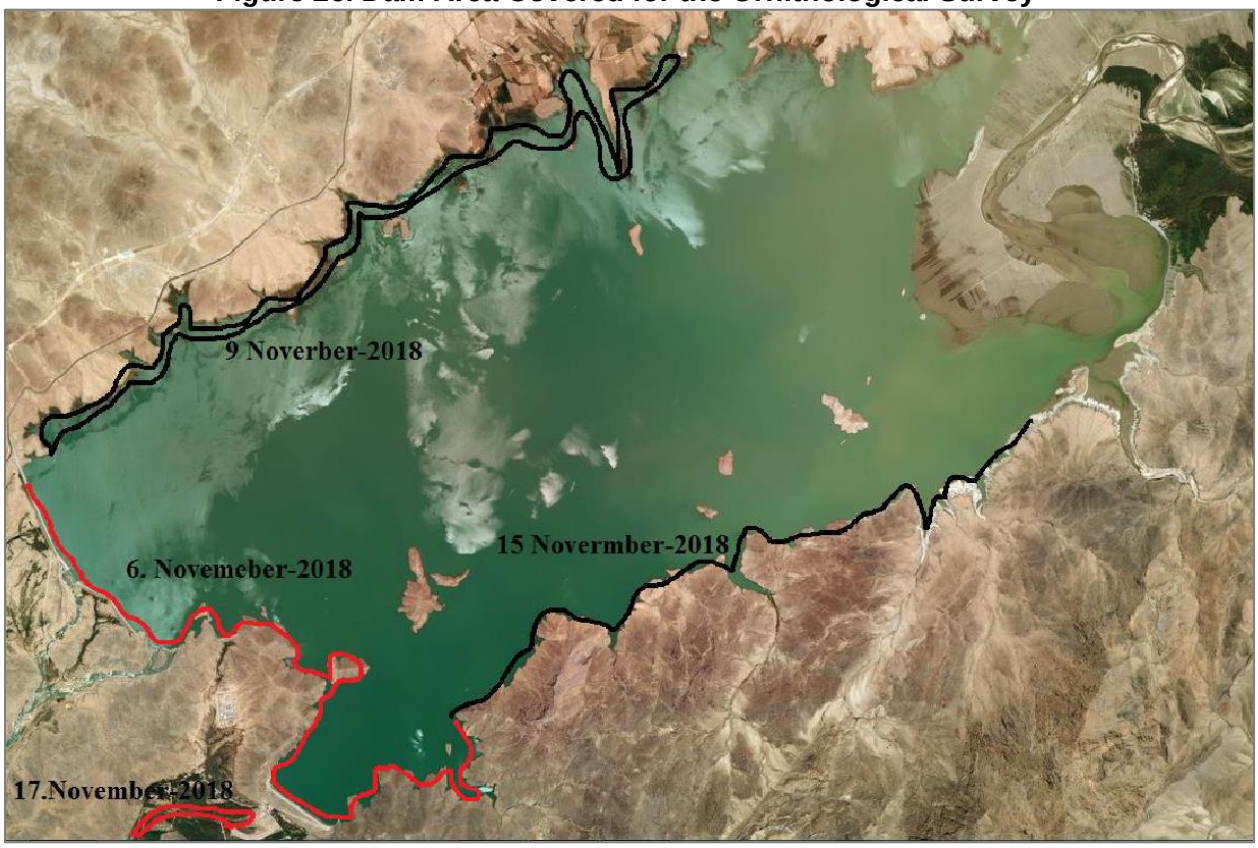
d. Ornithological Environment

257. Dense populations of waterfowl were found during the site visit of Dahla Dam (cormorant, different kinds of heron, duck, geese, etc.). The habitats of these birds are shallow swampy shores. These shores arose during the sedimentation process in the past decades. Dahla Dam is a large habitat for waterfowl that needs protection. Recommendation is also made that the site needs to be registered by NEPA Kandahar.

258. An ornithological survey was implemented in November 2018 by the TRTA and NEPA to assess the bird life at the dam. The survey was conducted using two methods: (i) collecting data through direct observations; (ii) interviewing local hunters (three hunters from surrounding villages) by using a specialized questionnaire on the presence of water birds, main threats, and hunting practices at Dahla Dam.

259. The observatory survey was conducted in November 2018. The survey team drove to Dahla Dam and conducted the survey in the shorelines (using motorcycles, boats, or walking), situated to the northwest, west, south, and southwest of the dam. The eastern shoreline of the dam was not included due to security issues: the dam security police did not permit walking there, but the survey team visited the eastern shoreline by using a motorboat. Figure 26 below shows the dam area surveyed.

Figure 26. Dam Area Covered for the Ornithological Survey



Source: TRTA Ornithological Survey, 2018

260. The questionnaire investigations and direct observations showed that the inhabitants of the area extensively hunt waterfowl during fall and winter seasons. Spring and summer are breeding seasons, during which time hunting is uncommon.

261. Overall, the observations from the 2018 survey confirmed that Dahla Dam is an important area for waterfowl and other wildlife species in the south-west of Afghanistan. Water birds use this area as an aquatic habitat for shelter, foraging, roosting and breeding. The TRTA will aim to establish mechanisms to enhance the waterfowl species which use the dam.

262. The survey team identified 14 waterfowl species, 17 individual birds from other species, and two mammals − Jungle cat (*Felis chaus*) and Golden Jackal (*Canis aureus*): both in the Red List of Afghanistan. The waterfowl species and other birds observed are presented in Table 16 and Table 17 with the indication of their conservation status. The complete survey report is in Appendix 3.

263. The 14 waterfowl species identified are listed in Table 16 below. Main habitats are presented in Figure 27 below.

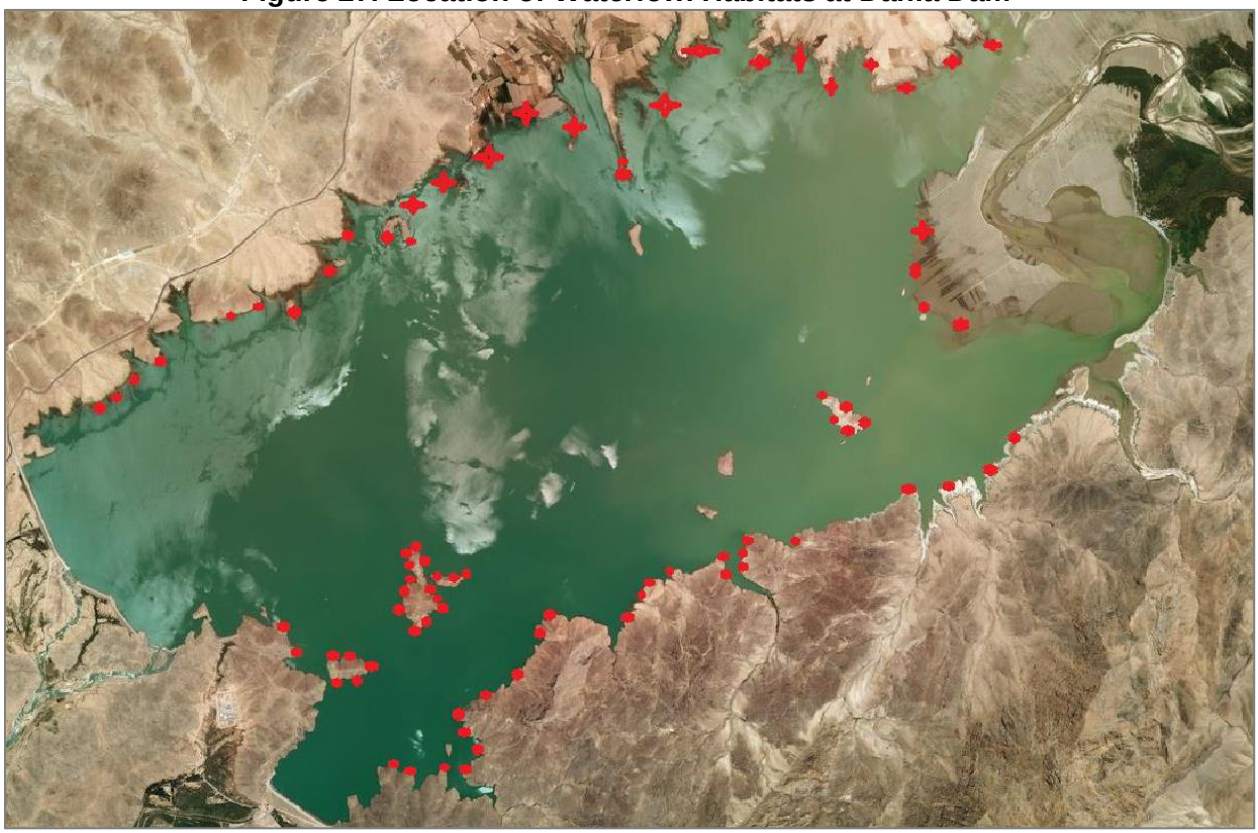
Table 16. List of Waterfowl Species Identified at Dahla Dam

Common Name	English Name	Latin Name	IUCN Red List	Conservation Status Afghanistan
Helmandai helae	Great Cormorant	*Phalaracrocorax carbo*	LC	Not listed
Zarghon sare helly	Mallard	*Anas platyrhynchos*	LC	Not listed

Kotan	Great white Pelican	*Pelecanus onocrotalus*	LC	Listed on red list
Ghotayee helly	Red necked Grebe	*Podiceps grisegena*	LC	Not listed
Zarghon komol	Grey heron	*Ardea cinereal*	LC	Not listed
Cabkhowaronkai	Slender-billed gull	*Larus genei*	LC	Not listed
Speen komol	Great egret	*Egretta alba*	LC	Not listed
Cabkhowaronkai	Black-headed gull	Larus ridibundus	LC	Not listed
Cabkhowaronkai	Caspian gull	*Larus cachinnans*	LC	Not listed
Obez charg	Black coot	*Fulica atra*	LC	Not listed
Obez charg	Common moorhen	*Gallinula chloropus*	LC	Not listed
Dandez komol	Black -crowned night heron	*Nyclicorax nycticorax*	LC	Not listed
	Water rail	*Rallus aquaticus*	LC	Not listed
Shentaghy	Common kingfisher	*alcedo attis*	LC	Not listed

LC = Least Concern
Source: TRTA Ornithological Survey, 2018

Figure 27. Location of Waterfowl Habitats at Dahla Dam



Source: TRTA Ornithological Survey, 2018

264. In addition, 17 bird species were identified during the survey. These are detailed in Table 17 below and locations of habitats presented in Figure 28 below.

Table 17. Bird Species Found During the Field Survey at Dahla Dam

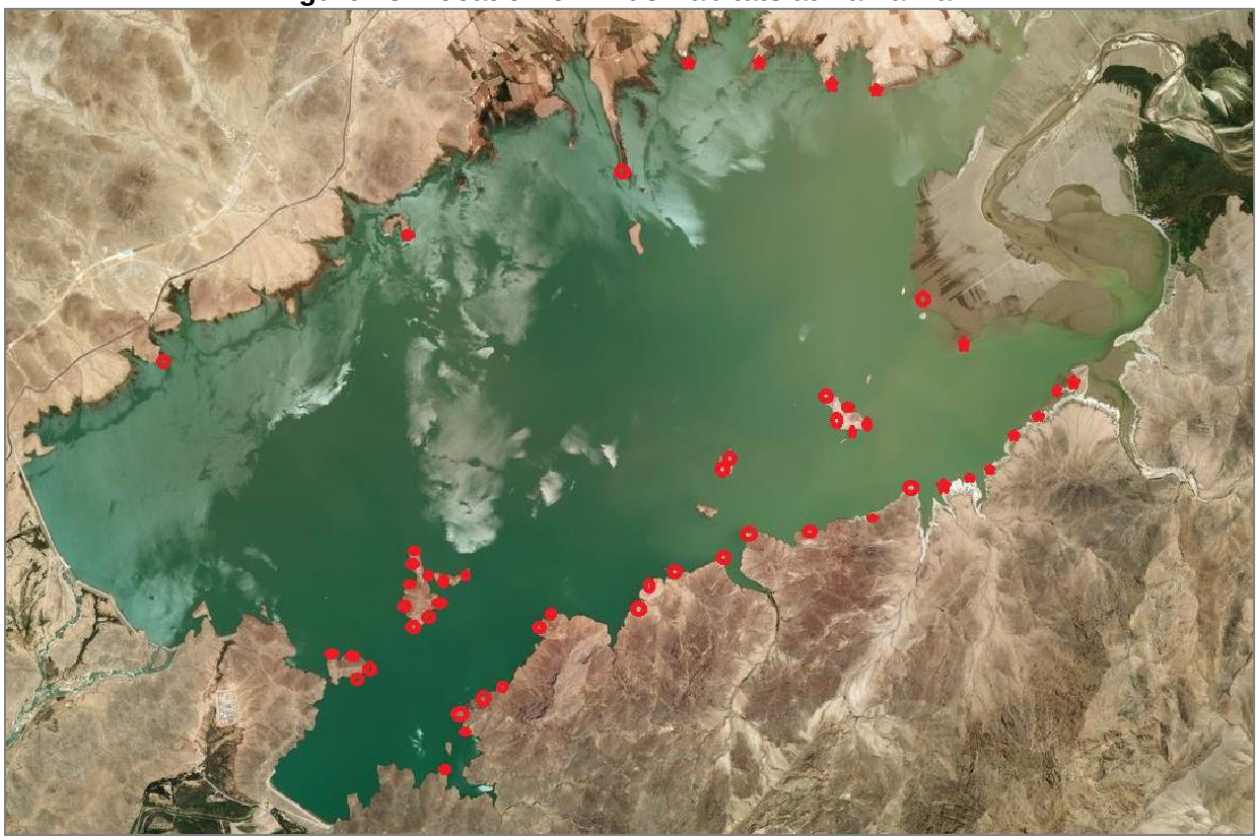
Common Name	English Name	Latin Name	Habitat	Conservation Status Afghanistan
Jal	Crested lark	*Galerida cristatata*	Terrestrial	Not listed

Ababel	Barn swallow	*Hirundo rustica*	Terrestrial	Not listed
Balbal	White-eared bulbul	*Pycnonotus leucotis*	Terrestrial	Not listed
Jal	Eurasian skylark	*Alauda arvensis*	Terrestrial	Not listed
	Pied wheatear	*Oenanthe pleschanka*	Terrestrial	Not listed
Gul Sar	Red-fronted sarin	*Serinus pusillus*	Terrestrial	Not listed
	Hume's wheatear	*Oenanthe albonigra*	Terrestrial	Not listed
Keshkara	Eurasian magpie	*Pica pica*	Terrestrial	Not listed
Myna	Common myna	*Acridotheres tristis*	Terrestrial	Not listed
Totee	Rose-ringed parakeet	*Psittacula kramer*	Terrestrial	Not listed
Sangkoyake	Eastern rock-nuthatch	*Sitta tephronota*	Terrestrial	Not listed
Gorbata	**Bonelli's eagle**	***Aquila fasciata***	**Terrestrial**	**Listed on red list**
Oqabe telayee	**Golden eagle**	***Aquila chrysaetos***	**Terrestrial**	**Listed on red list**
Sesae	See-see partridge	*Ammoperdix griseogularis*	Terrestrial	Not listed
Chatkai	Bright-green warbler	*Phylloscopus nitidus*	Terrestrial	Not listed
Basha	**Common buzzard**	***Buteo buteo***	**Terrestrial**	**Listed on red list**
Basha	Booted eagle	*Hieraaetus pennatus*	Terrestrial	Not listed

Source: TRTA Ornithological Survey, 2018

265. The raising of the water body height will, by default, remove existing perimeter habitat. The ARES survey will specifically offer recommendations regarding the redevelopment of suitable alternative habitat areas upon completion of the dam raise.

Figure 28. Location of Birds Habitats at Dahla Dam



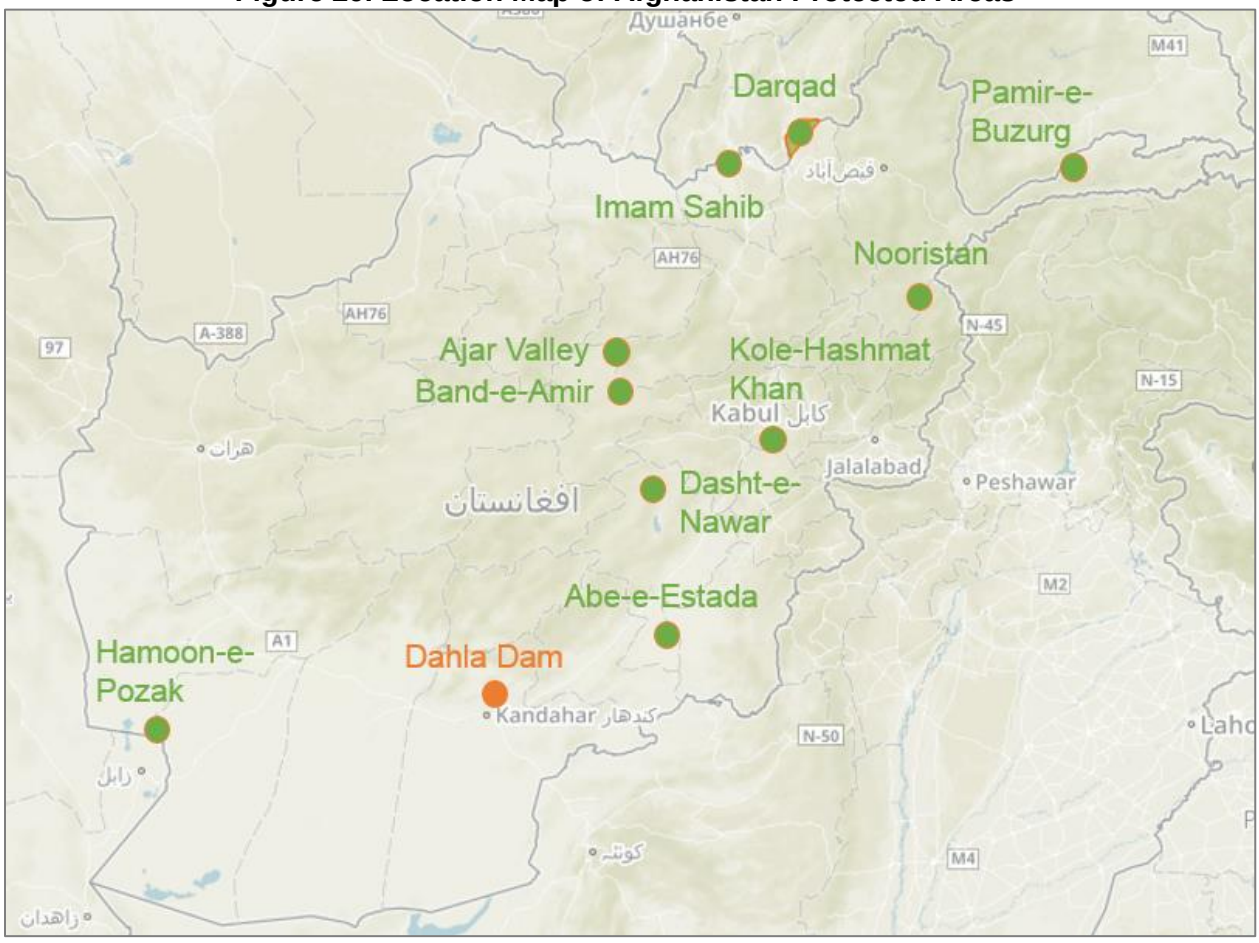
Source: TRTA Ornithological Survey, 2018

4. Nature Conservation Status of the Project Impact Areas

266. There are 10 reported protected areas in Afghanistan. A location map is presented below:[23]

(i) Darqad: wildlife reserve;
(ii) Abe-e-Estada: flamingo and waterfowl sanctuary;
(iii) Ajar Valley: national park;
(iv) Kole Hashmat Khan: waterfowl sanctuary;
(v) Hamoon-e-Pozak: waterfowl sanctuary;
(vi) Pamir-e-Buzurg: national park;
(vii) Dasht-e-Nawar: flamingo and waterfowl sanctuary;
(viii) Imam Sahib: wildlife reserve;
(ix) Nooristan: national park;
(x) Band-e-Amir: national park.

Figure 29. Location Map of Afghanistan Protected Areas



Source: UN Environment World Conservation Monitoring Centre, Protected-Planet, 2019

[23] United Nations Environment World Conservation Monitoring Centre, Protected-Planet, 2019

267. No protected areas are in the vicinity of Dahla Dam. This was confirmed by NEPA to the TRTA. The closest protected area to Dahla Dam is Abe-e-Estada, located 200 km northeast of Dahla Dam. Abe-e-Estada is a 270 km^2 flamingo and waterfowl sanctuary.

5. Wetlands

268. The drainage systems in Afghanistan predominantly conclude in endorheic (closed) basins.[24] The Helmand and Arghandab rivers receive their input from rainfall, snowmelt and glaciers, and create lakes and marshes which are important wetland ecosystems. The rivers are a source of water for irrigation, while the lakes raise the humidity in the surrounding areas and reduce the need for irrigation of crops – a much needed saving in arid climatic conditions. The small number of wetlands formed by these rivers support a wide variety of wetland-dependent birds, particularly migratory water birds. Most of the wetlands are used by migratory birds for feeding and resting, while some are used for breeding. It is therefore important that consideration is given to environmental flows for the system.

269. Arghandab River meets Helmand River at Qala-I-Bust. The Helmand River provides the *hamouns* (wetlands) with water in Iran after the border. These lakes are one of the main and most valuable aquatic ecosystems in Iran and are registered wetlands in the Ramsar and UNESCO Biosphere Reserve Conventions.[25]

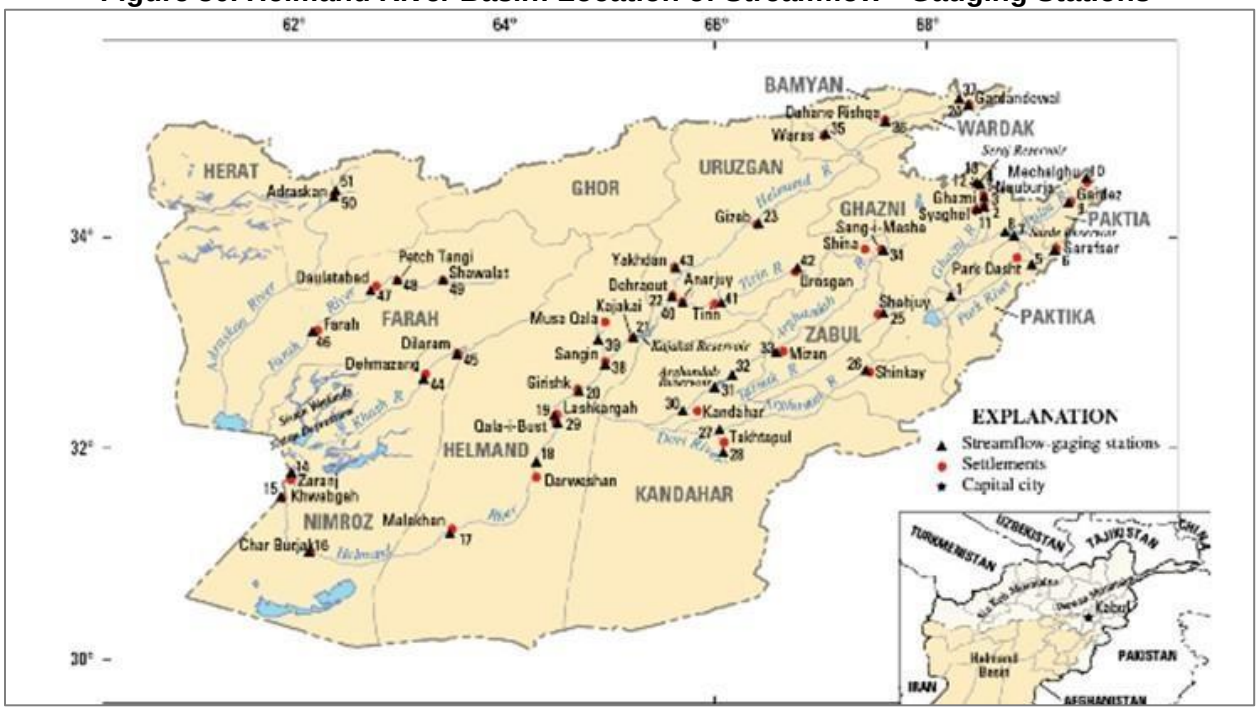
270. The basin is a closed inland delta at the lower end of the Helmand River. It consists of a delta plain (2,500 km^2) and a wetlands system (5,000 km^2). The Helmand River can completely dry up within a series of dry years. The Helmand is the main source for water for these wetlands.

271. High floods are necessary to prevent the lakes from gradually becoming saline, by intermittent flushing the contents into the terminal saline depression of the Goud-e-Zereh. Periodical droughts are needed to 'reset' the system and maintain the dominance of early succession stages of marsh vegetation.

272. Implementation of the transboundary agreement between Afghanistan and Iran has problematic during periods of the civil war. The planned Environmental Flow for the Arghandab River aims to supply the approximate 17% of flow to the Helmand. At the same time, the Cumulative Impact Assessment (CIA) for the project will raise the issue of the need to address environmental flows across the entire basin. If successful, such an initiative can make a very positive contribution to the sustainability of the highly valued and registered wetlands / *hamouns* in both Afghanistan and Iran.

[24] UNEP. 2003. *Annual Evaluation Report*. Evaluation and Oversight Unit. September 2004.
[25] Delft Hydraulics. 2006. Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran.

Figure 30. Helmand River Basin: Location of Streamflow - Gauging Stations



Source: US Agency for International Development, Streamflow Characteristics of Streams in the Helmand Basin, Afghanistan, 2018

Table 18. List of Streamflow Gauging Stations in the Arghandab River Basin

Map number	Afghan ID number	USGS ID number	Station name
25	4-1.21R-7A	323200067280000	Tarnak River near Shahjoi
26	4-1.222R-6A	320000067180000	Lora River near Shinkay
27	4-1.22R-1A	312600065550000	Arghastan River near Kandahar
28	4-1.2L0-5A	311300065570000	Dori River at Takhtapul
29	4-1.L00-1A	313000064230000	Arghandab River at Qala-I-Bust
30	4-1.L00-3A	313700065340000	Arghandab River near Kandahar
31	4-1.L00-4A	315000065520000	Arghandab River below Arghandab reservoir
32	4-1.L00-5A	315700066020000	Arghandab River above Arghandab reservoir
33	4-1.L00-6A	321000066270000	Arghandab River at Mizān
34	4-1.L00-9A	330800067280000	Arghandab River at Sang-i-Masha

Source: Delft Hydraulics. 2006. Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran.

C. Environmental Flows

1. Definition, Models and Benefits

273. An environmental flow is defined as a system for managing the quantity, timing, and quality of water flows below a dam, with the goal of sustaining freshwater and estuarine ecosystems and the human livelihoods that depend upon them. There are numerous environmental flow models which can be applied, and they are determined by:

(i) Existing status of a river; pristine, modified, highly modified;

(ii) A holistic river system assessment including the ability to mimic flow variance related to the spectrum of characteristic ecological conditions (unique biota, aquatic habitat richness, aquatic species diversity, measures of flow regulation and catchment fragmentation, presence of protected areas);
(iii) Consideration of sediment movements and the lateral and longitudinal migration of biota, and;
(iv) Status of catchment, proximity and density of settlement, and livelihood dependence upon river flows.

274. Anticipated benefits of the environmental flow are as follows:

(i) Improve the ecological integrity of the river by replenishing endemic fish habitats below the dam and Kandahar (revitalization of ecomorphological structures of the river like sand and gravel banks);
(ii) Protection of existing river basin ecosystems from negative impacts while protecting critical natural habitats below the dam and in Kandahar according to the US Large Dam Legislation;
(iii) Mitigate the decline of ground water adjacent the river downstream of the dam (and Kandahar) including the upstream part of the irrigation area;
(iv) Supplementing numerous handpumps along the river with water.

2. Considerations

275. Establishing appropriate environmental flows depends on several factors, including hydrological and ecological data availability and the understanding and acceptance of the environmental flows system by the community of users. The civil war and associated insecurity have created challenges for data gathering in the project area, and a compromised plan based upon very old data is inevitable (available flow data is dated from 1950s-1978). However, maps from 2012 provided by CIDA indicate that the Arghandab River has a natural, almost untouched morphology and numerous 'potential' habitats for ground dwelling birds, waterfowl and rheophilic fish species which could be 'reactivated'. Clear understanding and acceptance of the potential of the overall system by water users requires promoting a shared understanding of ecosystem objectives, along with carefully examining pressures and constraints in reaching these objectives. Where water availability is limited with a high dependency from adjacent settlement, it can be expected that there will be social and political realities which implementing agencies will need to be responsible for. The stakeholders involved should include water users along the river, as well as relevant ministry and agency specialists.

276. In summary, the validity of any water flow predictions and development of prescriptive environmental flow approaches will rely upon engagement of all water users and effective monitoring. Assuming the positive CIDA data regarding sections of the river, there are very positive indicators that environmental flows can have considerable positive impact, supporting the viability of existing habitat and aquatic species. Improved baseline data regarding downstream status collected thru the ARES, will aim to confirm and strengthen the impact of the anticipated environmental flows.

277. Recognition that any river flow will have its limitations is fundamental. The Arghandab River rises in the high-altitude foothills of the Hindu Kush and flows through a predominant arid-zone where for some months of the year it may appear to have no flow as surface water dries

up. The Arghandab is a tributary of a closed system (Helmand River) which terminates in the endorheic Sistan basin in neighboring Iran.[26] This basin includes a series of wetlands and lakes, which equilibrate through evaporation. By effectively initiating steps to establish real-time monitoring, the project can contribute to the long-term sustainability of the river.

3. Contributors and Allocations

278. The combined contributors to environmental flows are: (i) the "spill" from the dam, i.e., water which must be released (almost always through the hydropower turbines) because it cannot be stored, (ii) deliberate releases from the dam, (iii) return flows from irrigation (iv) return flows from urban and peri-urban water supply, i.e., water which returns to the river due to tailwater runoff or soil infiltration, and (iv) seepage from the dam which infiltrates into the aquifer and the river below the dam.

279. Environmental allocations from Dahla Dam should flow down the Arghandab, and be supplemented by seasonal flows from the Arghastan, Tarnak and Dori rivers which join the Arghandab at Doad. In many irrigated areas, groundwater pumping has been increasing in volume, with the consequence that the water table has fallen, reported to be as much as 180 m in some areas. Thus, some environmental flows will in practice go towards shallow aquifer replenishment, although this is dependent upon soil profiles and percolation rates. A potentially profound anomaly to the impact and efficiency of any environmental flow is that where no overarching system of management prevails, flows classed as environmental in the Arghandab may be abstracted by farmers further downstream on the Helmand River.

4. Management of Environmental Flows

280. A preliminary-pilot or benchmark environmental flow proposal is recommended as a starting point. This has been calculated as 254 million m^3 for an average year. This flow provides enough water for water supply, irrigation and hydropower development and will mimic the average monthly and annual discharges in the Arghandab. Additionally, these flows will also voluntarily percolate and accede to what has been identified as diminishing and falling groundwater table due to pumping for irrigation.

281. Environmental flows have been calculated for dry year (0%), average year (50%), and wet year (100%). Currently it is unknown whether any prescribed environmental flow will reach Qala-I-Bust where Arghandab River meets the Helmand River. The proposed environmental flow will provide the upper Arghandab River with water (area of 13 weirs below the dam and some kilometers below the last weir no 13).

282. **Dry year.** In dry years, the water in the reservoir will be used only for urban and industrial water supply. The river will fall dry completely in summer and autumn. Almost no environmental flow will be released from the dam, which is the same process that would occur naturally. The ecosystem is adapted to droughts even when the whole river falls dry. Low annual flow has been reported in 1952, 1963 and 1971. Endemic fish species *Clupisoma Naziri* (common name: Sheer mahi, catfish) and *Salmo trutta oxenesus* (common name: Khaldar Mahi, trout) will migrate upstream if the water level will drop continuously. *Schizocypris altidorsalis* is a

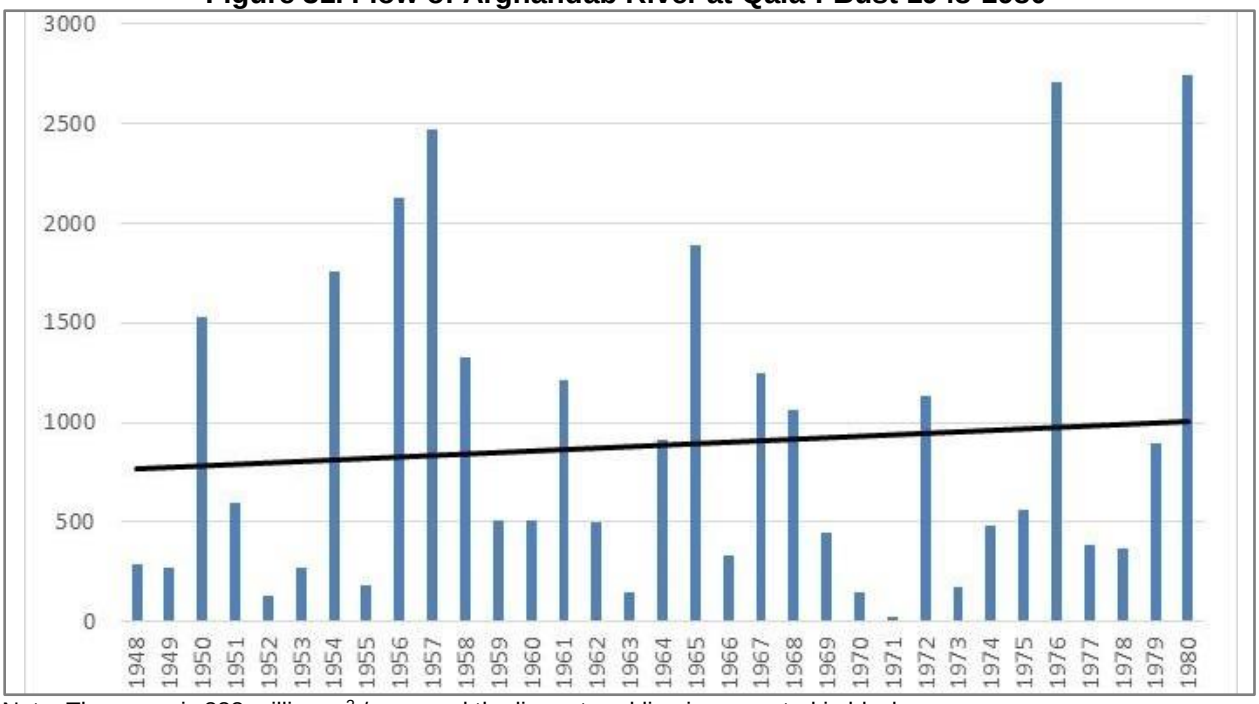
[26] An endorheic basin is a closed drainage basin that retains water and allows no outflow to other external bodies of water, such as rivers or oceans, but converges instead into lakes or swamps, permanent or seasonal, that equilibrate through evaporation.

benthopelagic fish species that has been reported from pools in dry river beds in Afghanistan and Iran, and this fish returns to more permanent rivers when water levels drop.

283. In drier years, when irrigation water is limited, it is unlikely that communities will allow the water to pass their offtakes, particularly if their crops are thirsty. Therefore, to avoid over-exploitation of this dedicated environmental surface water, it is imperative that all water users are involved and informed concerning the purpose behind the environmental flows.

284. **Average year.** Flow data shows an average annual flow of 888 million m^3 of Arghandab River at Qala-I-Bust where the Arghandab River meets the Helmand River (time series: 1948–1980). The flow shows a slight increase over the years (linear trend line in Figure 31 below), probably due to the construction of the dam in 1952.

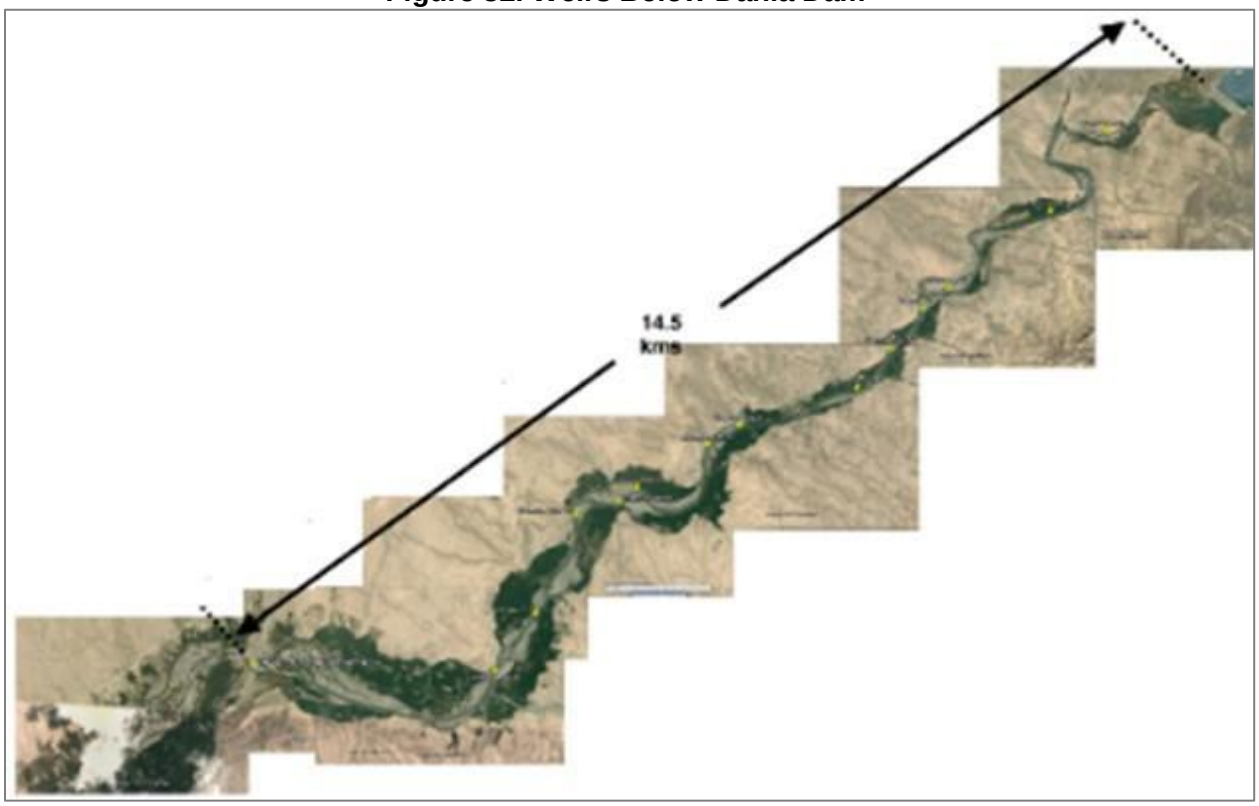
Figure 31. Flow of Arghandab River at Qala-I-Bust 1948-1980



Note: The mean is 888 million m^3 / year and the linear trend line is presented in black.
Source: MEW 2018 and TRTA Consultants, 2018

285. Unfortunately, current flow data are not available. The proposed environmental flow will provide the river with water below the beginning of the main channel (weir no 13). The river will get additional water from irrigation and water supply via drainage canals and groundwater during the irrigation season. Drainage will increase due to increased irrigation water use. Raising of the dam will improve the existing situation for the average year. Currently, a high proportion of the spring flood runs over the spillway and is thus not available for the dry season.

Figure 32. Weirs Below Dahla Dam



Source: ASBA Kandahar and TRTA Consultants, 2018

286. **Wet year**. When flows are expected to exceed the capacity of the dam over the early spring period, environmental releases can commence in early to mid-winter and river flow can be expected almost throughout the year.

287. A review of the Arghandab/Helmand on Google Earth at moderately high resolution has not identified any wetlands between Kandahar and Shila-i-Chark. This situation, combined with the lack of regular summer to winter flow at Qala-I-Bust, suggests that the environmental contribution from Dahla to the Arghandab is mainly beneficial to existing habitats in the river bed (e.g. spawning and feeding habitats) and to those settlements/communities which exist along the river for water supply for people and livestock, recreation, and for groundwater recharge.

288. Maps of Arghandab River produced by CIDA[27] indicate that in some sections, the river itself has a natural, almost untouched morphology with numerous potential habitats for ground nesting birds, water fowl and rheophile fish species. It is anticipated that these habitats in particular will benefit from environmental flows. To be successful, the proposed flows need to be activated as far as is possible in coordination with the water demand for irrigation, urban and rural water supply and the hydropower development.

Table 19. Environmental Flow Releases in Addition to Spills

%		0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3
Hamal	**Apr**	16,0	20,0	27,5	35,0	42,5	50,0	52,5	55,0	57,5	60,0	66,0
Sawr	**May**	9,6	12,0	16,5	21,0	25,5	30,0	32,5	35,0	37,5	40,0	44,0

[27] Cartographic Atlas command area land use, 2012

Jawzā	**Jun**	9,6	12,0	12,0	12,0	12,0	12,0	16,5	21,0	25,5	30,0	33,0
Saratān	**Jul**	0	0	0	12,0	12,0	12,0	15,0	18,0	21,0	24,0	26,4
Asad	**Aug**	0	0	0	11,0	11,5	12,0	15,0	18,0	21,0	24,0	26,4
Sonbol a	**Sep**	0	0	0	10,0	11,0	12,0	15,0	18,0	21,0	24,0	26,4
Mizān	**Oct**	0	0	0	9,0	10,5	12,0	15,0	18,0	21,0	24,0	26,4
Aqrab	**Nov**	0	0	0	9,0	10,5	12,0	15,0	18,0	21,0	24,0	26,4
Qaws	**Dec**	0	0	0	9,0	10,5	12,0	15,0	18,0	21,0	24,0	26,4
Jadi	**Jan**	6,4	8,0	11,0	14,0	17,0	20,0	21,0	22,0	23,0	24,0	26,4
Dalvæ	**Feb**	9,6	12,0	16,5	21,0	25,5	30,0	32,5	35,0	37,5	40,0	44,0
Hūt	**Mar**	16,0	20,0	25,0	30,0	35,0	40,0	47,5	55,0	62,5	70,0	77,0
Year		**67,2**	**84,0**	**108,5**	**193,0**	**223,5**	**254,0**	**292,5**	**331,0**	**369,5**	**408,0**	**448,8**
% of inflow		**17%**	**18%**	**17%**	**24%**	**22%**	**22%**	**20%**	**19%**	**18%**	**18%**	**18%**

Source: ASBA and TRTA Consultants, 2018

289. While the environmental flows in spring in a moderate to extreme wet year will be substantial, there will be issues relating to such flows in dryer years. Kandahar farmers have a tradition of abstracting high to maximum volumes for their crops, almost regardless of downstream demand. It will therefore be difficult to persuade *mirabs* and farmers to allow water to flow down the river when they need water for their crops.

290. It is recommended that *mirabs* and farmers have the environmental flow needs fully explained to them, and that their actions in the first two or three years after project completion are monitored closely. The approach to environmental management and water releases will then be reassessed if necessary.

291. In principle it is suggested that the proposed environmental flows are added to the irrigation releases planned for a given month, and also added to the 60% of flow that passes downstream at the diversion to the Main South Canal. A proposed gauge on the Arghandab just above the Arghastan junction will be installed and will measure the flow reaching the lower Arghandab. If this is successful, environmental flow in summer can be continued. If not, it may be necessary to curtail them or revise the approach.

292. Dry to wet season environmental flows can be improved after raising of the dam due to its higher storage capacity. While significant degradation of existing critical habitats is not expected, the anticipate environmental flows will provide conditions for an increase in the viability of the riparian ecological system. However, to be successful this will require collaboration with downstream water user associations.

293. As a ballpark figure, the intention of the environmental flow must be that the Arghandab and tributaries contribute about the same proportion of Helmand flow as in the past or around 17%.[28] The raising of the dam wall will allow for a water holding capacity increase to approximately 782 million $m^{3.}$ The added capacity is 500 million m^3 which is approximately equivalent to the holding when the dam was built in 1952, and a bit more. Average annual inflows are about 1,400 million m^3. Inflows of up to 2,800 million m^3 (called wet year flows) or more are typical once every 10 years. These inflows are the result of high and quick snow melt along the Hindukush and it can be expected that there will be significant outflows from spillways during such events. The raising of the dam wall cannot capture the magnitude of all the snow melt. While greater water will be immediately available, it is recommended that the issue of appropriate environmental flows be established over time.

[28] Delft Hydraulics. 2006. *Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran*.

5. Limitations and Future Studies

294. The recommended preliminary-pilot or benchmark environmental flow of 254 million m^3 is a rough estimate and a starting point.[29] From this estimate, flow measurements could be carried out at existing water gauging stations monthly over a period of one year to monitor the availability of water in the river and clarify how much water can reach different sections and habitats of the river (Dahla Dam to Qala-I-Bust). Assessment can subsequently be made as to the adequacy of this flow. It is important to note that the pilot flow is not anticipated to be available every year.

295. It is recommended to conduct additional studies during the detailed design stage, and that this work be seen as a capacity building initiative for NEPA. As part of the recommended detailed ARES, hydraulic calculations on Dahla Dam and the Arghandab River shall be conducted to clarify how much water will reach different sections and habitats of the river (Dahla Dam to Qala-I-Bust) and to show whether this flow is providing sufficient water to sustain riparian vegetation and aquatic life including fish and waterfowl throughout the year. The ARES Terms of Reference are in Appendix 7.

296. Assembling real-time datasets across the catchment and downstream using remote stations is considered to be an important step in refining a workable and responsive approach to environmental flows. It is recommended that the detailed design shall define the number and location of monitoring units to log with greater accuracy the needs over time during dam operation. Rehabilitation of water gauging stations will be required in advance. If rehabilitation cannot be completed, temporary measurements will be required at these locations (e.g. use of Ott SLD – side-looking doppler sensor). Procurement of mobile measuring devices would be required.

297. With the benefit of more comprehensive datasets, an Environmental Flow Management Plan will be developed during detailed design stage.

6. Environmental Flow Monitoring During Dam Operation

298. During the dam operation, long-term monitoring and recording in an ongoing manner is recommended. Appropriate environmental flow could be identified by (i) maintaining a record of what has voluntarily gone across the spillway - annual melt-down flooding (if any), added to (ii) flows from hydro and (iii) monitored along the downstream course of the river. Calculation of what is possible to make up any deficit each year given the compounding set of circumstance would follow. This model could deliver scenarios where a range of four to eight years out of 10 years may see no environmental flows at all - assuming that dry conditions prevail in the mountains. It is this year-by-year range combined with the limitations in the dam which will ultimately determine the environmental flows that are possible.

299. Based on the collected data, the assessment shall include: (i) combining real-time spring time data from the Hindu Kush (detailing temperature, commencement and time interval of snow

[29] As outlined in the introduction of this section, the variables in assessment of appropriate environmental flows in the project area present a challenge. The Arghandab River is an ephemeral system in an arid zone where increasing demands have been made on adjacent groundwater resources with the result of levels dropping dramatically in parts. The increasing demands upon the river combined with the anticipated uncharacteristic weather events and more rapid spring meltdown associated with climate change all contribute to change the potential dynamics of the river. In some areas, flows to the river can be expected to percolate to depleted groundwater levels, compromising the immediate utilization of the flows.

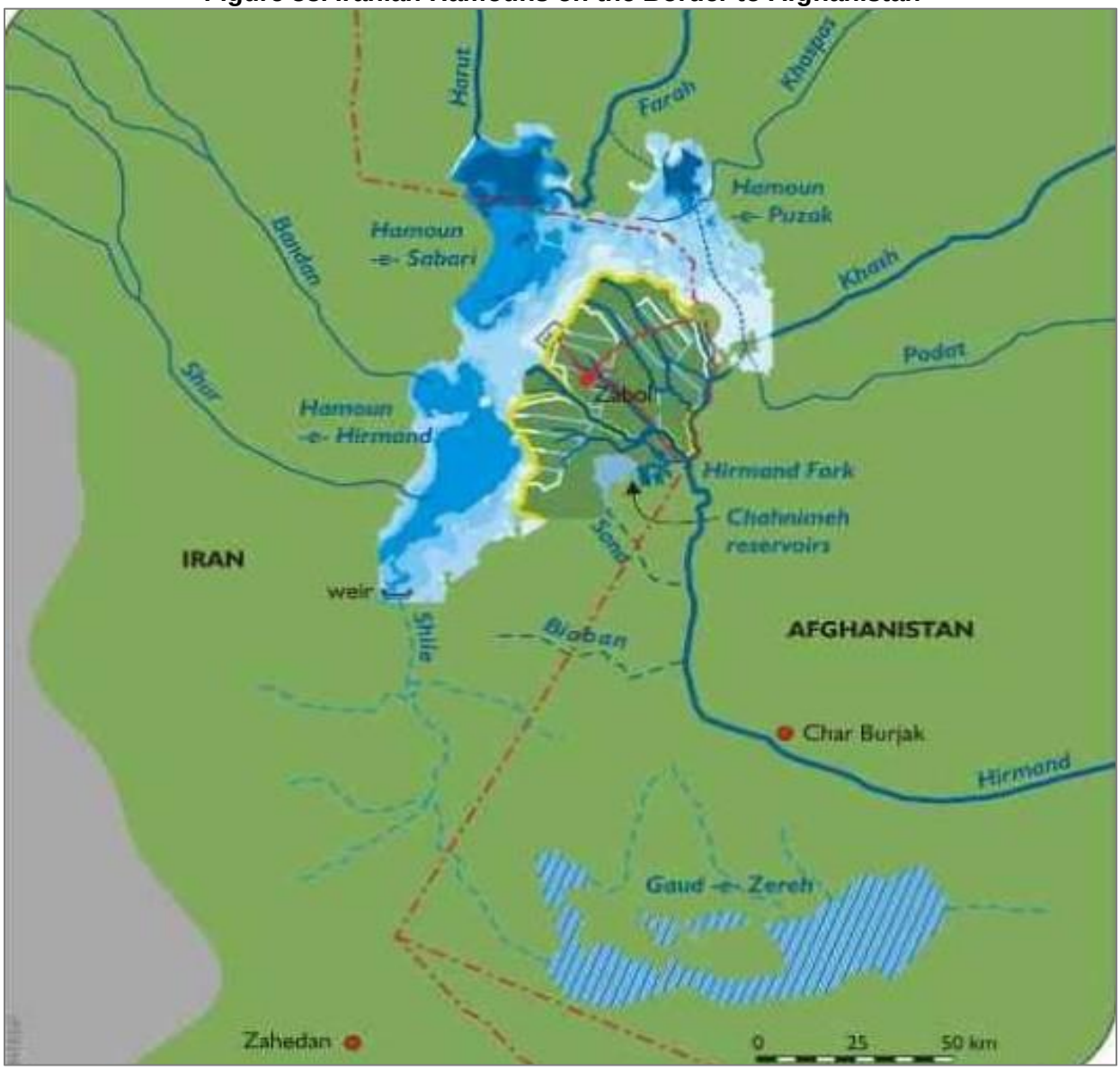
melt), with (ii) existing water held in the dam post-construction, along with (iii) downstream deficits at various nodal points to identify what flows have occurred and whether these will adequately support environmental flow requirements.

300. The results of the assessment will also help to identify: (i) how the rise in the dam can improve the contribution to water availability for the Helmand River given the arid / ephemeral characteristics of the river; (ii) the contribution and limitations required for a Helmand Basin wide response; (iii) how improved seasonal management of the flow can improve availability of environmental flows and identify a series of nodal points which could be used as indicators; (iv) how various datasets can be used to mimic and support wet/dry year phenomena through deployment of stand-alone, real-time measurement stations; and (v) how any shortfalls can be mitigated against.

7. Transboundary Water

301. Of significance to this EIA is that there is an international agreement between Iran and Afghanistan concerning the cross-border flows of the Helmand River system. According to the 1973 Treaty, Afghanistan is committed to sharing the water from Helmand River with Iran and supply it with 26 m^3 of water per second or 850 million m^3 per annum. The key questions are of timing and whether steady flows are required or whether obligations are based on minimum annual transfer. The answer to this will be based upon real-time monitoring.

Figure 33. Iranian Hamouns on the Border to Afghanistan



Source: Delft Hydraulics. 2006. Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran.

302. The Arghandab River contributes about 17% of the annual discharge of Helmand River according to 2006 Delft Hydraulics study.[30] According to this study and Table 20 below, a contribution of approximately 1,000 million m^3/year is required on average to keep the sensitive ecosystem of the Iranian *hamouns* alive.

Table 20. Monthly and Annual Discharges in Helmand, Arghandab, Khash, Farah Rivers (million m^3)

Station	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Aug	Sep	Annual	Period
Helmand at Kajaki	185	221	229	252	287	818	1509	1335	546	257	158	**5947**	**1947-71**
Arghandab at	7	13	48	54	98	145	286	162	39	56	10	**924**	**1948-65**

[30] Delft Hydraulics. 2006. Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran.

Qala-I-Bust													
Helmand at Char Burjak	165	174	258	311	409	604	1187	1348	570	290	207	**5692**	**1947-71**
Farah at Farah	2	3	18	67	237	426	519	173	54	16	3	**1519**	**1953-65**
Khash at Dilram	1	7	12	18	44	144	157	49	12	4	2	**451**	**1953-65**
Helmand at Kajaki	188	226	250	271	297	894	1648	1439	587	291	175	**6429**	**1953-65**
Arghandab at Qala-I-Bust	10	18	67	67	115	142	314	184	49	77	14	**1065**	**1953-65**
Helmand at Char Burjak	217	229	354	380	479	562	1216	1408	656	377	286	**6393**	**1953-65**

Source: Delft Hydraulics. 2006. Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran.

303. The time series which Delft Hydraulics used refers to different periods, none of which are up to date (1947–1971; 1948–1965; 1953–1965). MEW flow measurements show an annual contribution of 888 million m^3 from the Arghandab River according to a time series during 1949–1980.

304. The total allocation to the *hamouns* as per the 1973 Helmand Water Treaty is an average of 24m^3/s or an annual volume of about 760 million m^3. There are difficulties with the treaty, for a variety of reasons, including the natural ephemeral nature of the Arghandab River which naturally would experience years with no flow at all.

A. Socio-Cultural Environment

1. History

305. The history of the region before the coming of Islam (600-800s CE) is demarcated by the Persian Achaemenids (6th-4th century BCE), Alexander and the Greeks (4th century BCE), Asoka and Buddhism (3rd century BCE), Kanishka and the Kushans (1st century CE), the Persian Sasanians (100-600s CE), and the Iranian Huns (300-800s CE). Islamic civilization initially flourished under the Ghaznavids (900-1100s) and the Ghurids (1100-1200s) but this era ended with the Mongol invasion (1200s). The opening of the new maritime trade route between Europe and the East Indies in the 1500s sent Afghanistan and all other areas along the traditional overland silk route into economic and cultural decline. During the latter half of the 1700s, Ahmad Shah Durrani liberated the area between the Hindu Kush and the Amu Darya from Persian and Indian influence, thereby creating modern Afghanistan.

306. Modern water management was introduced to Afghanistan in the mid-20th century. Under the monarchy (1919-1973), irrigation management was significantly improved, individuals were allocated water rights, the Law on Irrigation (Qanun-i-Abyari) was published, and provincial Departments of Irrigation (Riyasat-i-Abyari) were established.[31]

307. During two decades of war from 1979 to 2001, irrigation systems and water supply fell into disrepair, and traditional community-based water management declined. Since then the government, with support of the donor community, has begun to rehabilitate and upgrade irrigation and water supply systems, and to restore community-based water management.

[31] SMEC. 2008. "Balkh River Basin Management Plan. Report of Balkh River Integrated Water Resources Management Project". *ADB TA JFPR 9060-AFG.* Pp. 25.

8. Ethnicity

308. Afghanistan is a multi-ethnic society. It consists of Pashtuns, Tajiks, Uzbeks, Hazaras, Turkmen, Pashais, Balochis, Khirgyz, Aimaqs, and others. There are also a few thousand Afghans of Indian origin.

309. Pashtun is the dominant ethnic group in Kandahar province. Farsi speaking citizens and citizens of Indian origin are also living there.

310. The religion of the majority of the Afghan population is the Sunni branch of Islam (approximately 84%). This is followed by Shia branch of Islam, approximately 15% in the country. There are also followers of other religions including Hinduism, Sikhism, etc., estimated as 1% of the total population.[32]

9. Infrastructure

311. Kandahar International Airport serves as southern Afghanistan's main airport for domestic and international flights. It is also used as a major military base as well as shipping and receiving of supplies for the North Atlantic Treaty Organization (NATO) armies. Most international flights connect with Dubai, Germany, Turkey, Saudi Arabia, and Pakistan.

312. Kandahar is connected to Kabul by the Kabul-Kandahar Highway and to Herat by the Kandahar-Herat Highway.

10. Education

313. There were 303 schools and one university in Kandahar province in 2003. Table 21 shows types of schools and number of pupils and students. Current data was not available.

Table 21. Type of School and Number of Pupils, Students, and Teachers

School		Students / Pupils		Teachers	
Type	**Number**	**Sex**	**Number**	**Sex**	**Number**
Primary	220	Female	24,000	Female	425
Secondary	51	Male	161,000	Male	2,433
High School	32				
Total	**303**	**Total**	**185,000**	**Total**	**2,858**

Source: Department of Education, Kandahar province

314. Kandahar University, which was established in 1992, has faculties of agriculture, engineering and medicine. The Faculty of Agriculture has departments of Agronomy, Soil Science, Horticulture, Forestry, and Biology.

11. Health

315. Only 39% of the population in Kandahar province has access to health facilities. Only 6% of the female population has skilled birth attendance coverage. 37% of the population has access to safe drinking water. Table 22 shows trend and history of health facilities' establishment in Kandahar.

[32] JICA. 2004. The study on urgent rehabilitation support program of agriculture in Kandahar, Afghanistan.

Table 22. Health Establishments in Kandahar Province

Type	2004	2005	2006	2007	2008	2009	2010	2011	2012
Regional hospital	1	1	1	1	1	1	1	1	1
Provincial hospital	0	0	0	0	0	0	0	0	0
District hospital	5	2	2	1	1	1	1	1	1
Comprehensive health center	15	19	18	17	16	17	17	24	24
Basic health center	19	22	21	16	15	16	18	21	21
Sub-health center	0	0	0	0	0	2	2	2	2
Mobile health center	0	0	0	0	0	2	3	2	3

Source: MoPH HMIS Department, Situational Analysis of Provincial Health Services.
http://moph.gov.af/Content/files/HMIS%20Provincial%20Profile%201391%20(English%20Version).pdf

12. Agriculture, Livestock and Fishery

316. Before 1992, or the start of the civil war, there were 31 agricultural and one livestock cooperative in Kandahar province. These cooperatives were getting assistance from the government, NGOs, and international organizations. 17 cooperatives have been established in 2002 / 2003 with 2,300 members.[33]

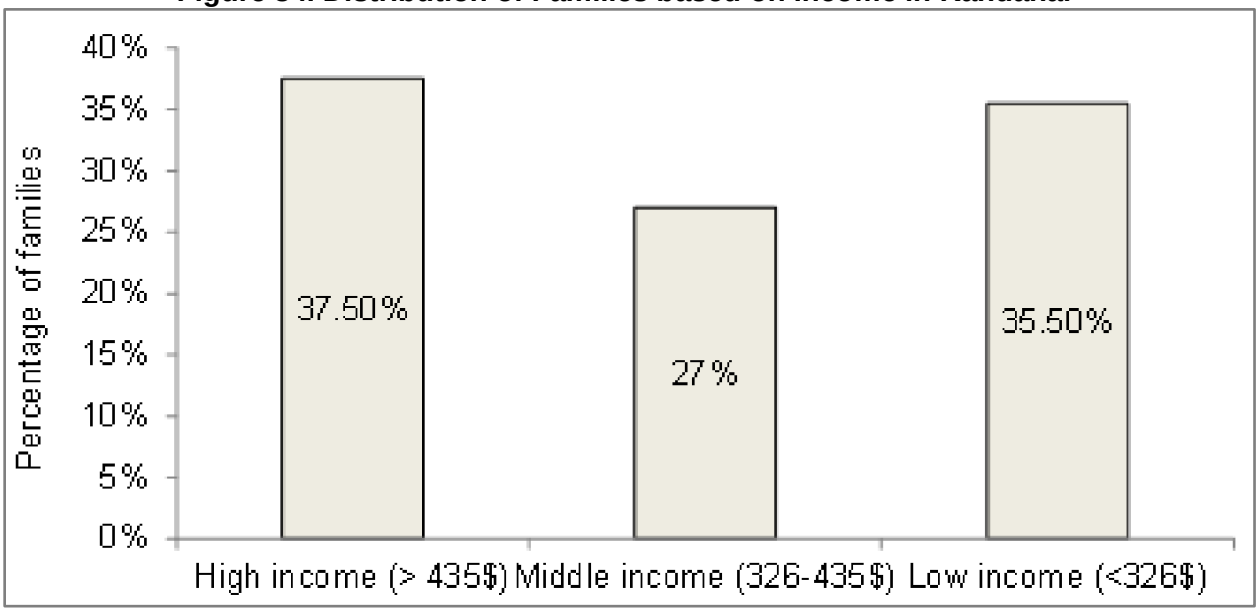
317. Fish caught in the dam are an additional source of income and food.[34] The following fish species are caught using fishing nets: Sheer mahi *(Clupisoma Naziri),* Common Carp *(Cyprinus carpio)* and Mola Carplet *(Amblypharyngodon mola).*

13. Monthly Income and Economic Status

318. The national average poverty line is 1,242 Afghani (AFN), i.e. ($27) per person per month and the per-capita expenditure is 920 AFN ($20).[35] Survey data from 2012 shows that about 35% of families living in Kandahar are categorized as low income (<$326/month).

[33] Directorate of cooperatives. Department of Agriculture and animal husbandry of Kandahar.
[34] Verbal communication, ASBA Kandahar
[35] European Union. 2009. National risk and vulnerability assessment 2007/2008: A profile of Afghanistan.

Figure 34. Distribution of Families based on Income in Kandahar



Sources: Consumption and Associated Factors in Kandahar city, Afghanistan. 2017. *Resources and Environment* 7(2). pp. 49-61. Distribution of Families Based on Income in Kandahar.

319. The main source of income in the study area is farming. The other key source of income includes carpentry, tailoring, and mechanics. The estimated level of income in 2004 is shown in the Table 23.

Table 23. Occupation and Income in the Study Area (2004)

Occupation	**Average Income/Day** (AFN)	**Monthly Income** (AFN)	**Monthly Income** (US$)
Mason	200 (4.0US$)	4,000 – 5,000	80 – 100
Tailor	140 (2.8US$)	1,200 – 3,000	24 – 60
Embroidery (women)	100 (2.0US$)	1,200 – 1,800	24 – 36
Carpenter	200 (4.0US$)	4,000 – 5,000	80 – 100
Mechanic	150 (3.0US$)	2,500 – 7,500	50 – 150

Source: JICA. 2004.The study on urgent rehabilitation support program of agriculture in Kandahar, Afghanistan – 50Afs = 1US$

320. There are three main sources of labor within villages: non-skilled labor (general agricultural labor and harvesting of grapes and wheat), semi-skilled labor (the pruning of grapevines) and non-farm work in skilled labor such as masonry and construction. The first two sources could be seen as off-farm work. According to data from 2017, the wages are in the range of US$120–150 per month, US$210 per month and US$240–420 per month respectively.[36]

321. In October 2018, a baseline socio-economic survey was carried out in the district of Shah Wali Kot on a sample of households selected by income group. Socio-economic data was gathered through interviews with households and focus group discussions were held with key representatives. In addition, qualitative assessments on poverty, social and gender issues were conducted using qualitative survey tools. A further socio-economic survey on 25% of the

[36] Minoia G. & Pain A. 2017. *Understanding rural markets in Afghanistan*. Working paper 58.

households affected by the expansion of the reservoir area is being carried out and the results will be integrated after finalization of the report.

14. Settlement Issues Adjacent to the Dam

322. The number of households and people directly affected by the raise of the dam wall, and the resettlement and compensation processes detailed for them is to be found in the Land Acquisition and Resettlement Framework. However, from the EIA perspective, there are a number of issues that are relevant regarding settlement adjacent and upstream of the dam. For a successful development and implementation of the anticipated “source protection” plan it will be necessary to change the current ways in which communities use and manage the land. An emphasis upon improved management of human waste at the household level, active stewardship of faunal habitat and revegetation areas, implementation of a long-term catchment management plan including greater care of free-range grazing, fuel-wood collection and the overarching associated revegetation and bioengineering initiatives which are envisaged for these areas will require active participation and ownership by the communities. It is recommended that the village mirabs play an important role in the development and implementation of these initiatives.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Methodology for Environmental Impact Assessment

Scoping

323. Before formally initiating the study, the EIA team carried out internal scoping of the assignment, in consultation with the design team. The scoping aimed to avoid duplication of effort by using the information and knowledge base already available within the design consortium. The scoping exercise included the following steps:

324. **Desk review**. The desk review compiled and reviewed all the known secondary and primary references. Data obtained from these sources was utilized extensively to establish data gaps in the preparation of this EIA report and for the purpose of preliminary design. Secondary research utilized the considerable body of work which has been produced by agencies regarding previous proposals to upgrade the Dahla Dam, including the now defunct Canadian CIDA investigations and partial implementation / rehabilitation of both the Dahla Dam and irrigation network, and the DFID funded Helmand River Basin Master Plan, a three-year study which specifically included the Arghandab River as a tributary. Simultaneously, the EIA team was drawing up the need to validate this information during its field surveys.

325. **Collaboration session**. The EIA team held meetings and discussions with design team colleagues. This meeting was geared towards introducing all team members with each other and bringing uniformity of expectations among all.

326. **Reconnaissance surveys**. Two brief reconnaissance surveys of the project area were conducted from during 2018. The TRTA team conducted visits to Dahla Dam in January–February by dam engineers and in July 2018 by environmental specialists. These site visits provided the TRTA team with valuable familiarization of physical site characteristics and condition and a first-hand opportunity to collect data. Further, the following surveys were conducted: (i) bathymetric survey to assess topography of bottom of Dahla Dam reservoir and estimate reservoir volume capacity in May 2018; topographic survey to refine reservoir volume capacity from September to December 2018; geotechnical survey to conduct sample tests on main dam, saddle dam 6, and borrow areas during September and October 2018; environmental ornithological and fish surveys in the Dahla reservoir area in November 2018; and environmental surveys to assess air quality (reservoir area, current highway) and water quality (reservoir, canal downstream and Kandahar groundwater wells). Subsequent to the site-based data gathering work, the TRTA team consulted and collaborated with relevant government agencies including implementation agencies in Kandahar and Kabul. Additionally, a Kandahar based TRTA coordinator has been providing information as required.

327. Although brief, these activities were aimed at achieving a common understanding on various issues of the EIA study. This included observing and determining the areas covered under the project area of influence as per the ADB Environmental Safeguards Good Practice Sourcebook (December 2012). This area of influence may span:

(i) **Primary project site and ancillary facility sites** that will be developed, operated or managed by the client or its contractors. Examples of ancillary facilities include access roads, borrow pits, spoil disposal areas, pipelines, canals, tunnels, depots and construction camps.

(ii) **Associated facilities not funded by the project** but whose existence and viability are entirely dependent on the project and whose services are essential to project operation.
(iii) **Areas and communities potentially affected by cumulative impacts** from further planned development of the project, other sources of similar impacts in the geographical area, any existing project or condition, and other project-related developments that are realistically defined at the time the assessment is undertaken.
(iv) **Area and communities potentially affected by induced impacts** from unplanned but predictable developments or activities caused by the project, which may occur later or at a different location.

328. During these field visits, team members were able observe existing environmental conditions. The visits also helped in verifying various pieces of information available in the secondary sources.

329. The area of influence was divided into several specific sub-areas. The following are the main parts of the area of influence:

(i) Construction Site: including the water body of the dam, the spillway, and canal;
(ii) Additional structures and immediate surroundings: (i.e. reuse of previous construction camp, potential borrow pits and disposal areas, etc.);
(iii) Affected Structures: To identify if there were any structures that could be physically affected as a result of project construction;
(iv) Project Footprint: this is the area directly related to dam, dykes, spillways, reservoir and canal ROW, canal, outlets, command area etc.;
(v) Surrounding settlement adjacent the footprint: familiarization with proximity of settlement and associated livelihoods and land use.
(vi) Status of upstream catchment: some familiarization with the issues related to catchment management, particularly relevant to the sedimentation rates.

330. **Collaborative meetings with partners and government agencies**. During the reconnaissance survey the team had very positive meetings with the key partners at the provincial level, including community representatives. These meetings were then followed up with reciprocating meetings with partners in Kabul.

331. **Drafting and identification of data gaps**. Following clarification and greater understanding which resulted from the reconnaissance survey, data gaps were established, the terms of reference for ARES was assembled, and the draft EIA was commenced by the consulting team.

332. A dedicated field TRTA team mission is scheduled for the summer of 2019 to conduct a part of the ARES and improve baseline data needs, specifically focused upon a more detailed environmental survey. This survey will ensure that all baseline data has been assembled and assessed to assist with the detailed design phase (e.g. detail on soils, water qualities, relevant seismic activity, appropriate flora and fauna detail including seasonality across the broader footprint beyond the existing dam), habitat for flora and fauna, details on revegetation. In addition, this survey will investigate the mechanics of instituting the two-tiered environmental flow concepts put forward in EIA.

333. **Potential impacts associated with the project**. The field visits identified potential impacts associated with the project in a range of categories, including physical, biological and socio-economic (such as occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods). The methodology adopted to analyze and assess both positive and negative impacts included utilization primary and secondary research methods. While assessment of the Dahla Dam aims to focus upon the actual footprint of construction, the function of the dam including the surface water flow through the catchment and subsequent flow beyond the dam wall is also given appropriate consideration. Presentation of the impacts has been categorized for (i) detailed design, (ii) construction, and (iii) operation, using a risk-based approach that offers impact significance with a rating.

334. Impacts identified and assessed in this section relate to the:

(i) Dahla Dam reservoir;
(ii) Upstream section of the Arghandab River above Dahla Dam;
(iii) Spillway channel from Dahla Dam;
(iv) Downstream stretch of the river below the dam;
(v) Construction lands and access roads.

335. Dahla Dam was constructed in 1952 to store 478 million m^3 of water mainly for irrigation and flood control purposes. During 66 years of dam operation, the Arghandab reservoir has lost about 40% of water storage due to sedimentation and is currently estimated to store about 288 million m^3 of water at full supply level of 1,135.4 m (WGS84 elevation).

336. The current proposal to raise the dam wall comes about after years of previous efforts by both the United States and Canadian government supported programs. Design needs to recognize the considerable on-site challenges which have both gone before and continue. This particularly includes the critical issue of upholding high standards of management during construction, implementation and longer-term infrastructure maintenance. To be successful, this EIA emphasizes that any initiatives require strong and vigorous ownership at the local community level. The positive impacts that the proposed construction can make on the health of the downstream river system, along with improvements in quality of life need to be in clear focus and balanced against at times high-risk environment from the security perspective.

B. Impacts During Detailed Design

337. **Source Protection:** Source protection is a very important issue to facilitate sustainable water quality of the reservoir in the long run, and the detailed design stage should incorporate appropriate planning for the implementation of same. Unfortunately, no Afghan law is currently available for the definition of protection zones. The European Union Water Framework Directive (EU 2000/60) requires protection zones for drinking water abstraction areas without any detailed specifications. The German Water Law (WHG § 51 and § 52) defines three water protection zones. Land use of these zones accepted under this law is site-specific and depends on the existing groundwater and soil conditions (soil cover and permeability for water endangering substances).

338. Three water protection zones can be established to protect Dahla Dam and to prevent eutrophication (pollution of the dam with dissolved nutrients): (i) zone 1 is the dam itself; (ii) zone 2 is the area where groundwater needs at least 50 days to reach the source in order to prevent bacterial contamination; and (iii) zone 3 is the whole catchment of the source. Identification of zone 2 would need an additional hydrological survey at each site. Since this

survey is not feasible under the TRTA, only two zones are suggested for an initial introduction of source protection. A water protection ordinance has to be developed by competent authorities (NEPA and MEW) for the reservoir according, but not limited, to the suggestions in Table 24.

Table 24. Establishment of Two Water Protection Zones at Dahla Dam

Issue	Zone 1	Zone 2
Spatial definition	Reservoir + 500 m	Whole catchment of the reservoir and Arghandab River upstream of Dahla Dam
When	Signing	Signing
Establishment of limitations	- no industry (e.g. chemical industry) - no settlement or laundry activity - no use of fertilizers and chemicals (e.g. pesticides) - no grave yards in the vicinity - no uncontrolled infiltration of human excrement - no waste dumps or waste disposal sites - no car repair shops and no car washing	Only supervised car repair shops Supervised storage of water endangering substances
Restrictions or prohibitions	No military training, no excavations in the vicinity of zone 1 No storage of water endangering substances	Settlements upstream of the source to be equipped with water tight cesspits in the long run

Source: TRTA Consultants, 2018

339. The reservoir will be used for water supply of Kandahar city and villages. Therefore, the reservoir must be protected against pollution:

(i) Human excrement of upstream settlements has to be collected in cesspits to prevent contamination of the river and the reservoir;
(ii) No washing of clothes in the river and in the reservoir;
(iii) No littering of the reservoir and the upstream river reaches with waste and hazardous substances;
(iv) Installation of cesspits in the upstream villages.

340. To adequately perform their function, cesspits need to be emptied regularly and the sludge needs to be disposed of in an appropriate manner. To raise the importance of this, a public awareness campaign is needed.

341. The importance of protecting water sources cannot be emphasized enough. Consideration should be given to recruiting the involvement of *mirabs* in an overall program of water protection, and they could assist in raising violations against citizens who offend.

342. Any storage of hazardous substances and fuel adjacent water source should require permission and environmental requirements of the competent authorities (e.g. NEPA) within the catchment of the reservoir. The storage of these substances needs to be supervised by competent authorities. Hazardous substances and fuel have to be stored in double walled tanks or in collection trays. Gas stations have to be equipped with sealed surface, sand trap and fuel separators. Annual technical supervision of storage tanks by an authorized company is mandatory.

343. Eutrophication and algal bloom are not expected if water protection measures are implemented.

344. **Historical and Cultural Artefacts**. An initial inspection of the site to identify any historical and cultural artefacts is of critical importance. Along with this is the need to map out procedures to follow should any construction work unearth similar. Unfortunately, there are negligible "as-built drawing information" of the existing dam wall. This situation requires the detailed design team to carry out additional site geotechnical investigation and make calculated assumptions on the findings of those investigations. The remedial works need to over-lay contemporary construction standards on the existing dam which presents a specification challenge with potential environmental impacts.

345. Issues considered during the detailed design phase need to include the adoption of measures to enhance the positive impact sand mitigate the negative impacts. The quantity and quality of materials used for the raising of the dam are examples. The specification of a 13.6 m raising of Dahla Dam wall will add an additional storage of 500 million m^3 to the existing 288 million m^3 reservoir. Considering a sedimentation rate of 2.7 million m^3/year, Dahla reservoir once raised should have a life of over 200 years.[37] The extension of the dam wall is proposed to be completed using similar material to the existing. One alternative source of material could be gained by removing existing sediment from the reservoir, however the cost of doing this is considered to be at \$3.00/m^3, well above the conventional excavation from a borrow pit.

346. The height of the dam wall will impact upon the surface area, thus potentially impacting upon existing informal settlement and associated subsistence level farming which is practiced around the perimeter of the dam's water body.[38] Likewise, the realignment position of the route bearer highway to the west of the dam will also be impacted, providing the opportunity for the road position and surface to be enhanced.

347. Detailed design could also include consideration of sedimentation flushing technology; however, it is understood that to retrospectively install this equipment is prohibitively expensive requiring a combination of diversion channels and modification to the existing dam wall. Although there may be some downstream benefits whereby sediment laden water could lessen impact of erosion and benefit farming land with fine sediment depositing upon land, the cost and difficulty of rehabilitating the existing configuration of the dam means this alternative is not viable.

348. **Upstream Catchment Stabilization**. Assessment through Google Earth and verified by flying over the Hindu Kush between Kabul and Kandahar indicates that the landscape supports limited grass and shrub plant material. Although it is unlikely that much can be done to stabilize the soil, it is suggested that at least a preliminary overview is undertaken in order to (i) define if particular areas are contributing large volumes of sediment to the Arghandab system, and (ii) assess if stabilization is feasible in some of these areas at least on a pilot basis. As stated, security can present a serious problem in much of the upper catchment, and this will need to be taken into account in defining whether such a component is feasible or not.[39] Detailed design should therefore highlight the need for appropriate survey work to be carried out to assess viability of longer-term catchment stabilization programs, and strategically identify where those programs should be best focused.

349. The planned rise of the dam wall and subsequent increase in the area inundated upstream is expected to have considerable impact on the upstream "jungle" area across 7 km^2.

[37] TRTA Feasibility Study Report: Component 1 - Raising Dahla Dam and Six Saddle Dams

[38] These issues are dealt with in a separate LARP document.

[39] If however, a peace agreement is reached during the project period, more detailed assessment could be considered.

Design stage will benefit from greater information regarding speciation, plant density and topography and it is recommended that the ARES include a dedicated interrogation of remote sensing data to reveal greater information regarding this riparian plant community.

350. Loss of what is considered to be established bird habitat along the course of the river will require the development of a substantial revegetation program, which at this stage is best recommended to be undertaken downstream of the dam wall. With appropriate project support, such a revegetation program can become a major initiative which would require years to plant out and maintain.

351. **Subsequent Flow Beyond the Dam Wall**. With an average annual rainfall of just over 170 mm, agricultural activity in the Kandahar region is totally dependent upon supplementary irrigation. While anticipated climate change impacts upon rainfall, combined with both variance in occurrence of snow and the speed of melt-down, will contribute to uncertainty regarding flows into the dam, the foreseeable impact of the construction is positive for downstream livelihoods immediately beyond the dam wall. Agronomic strategies to adapt to changing dynamics will be of value. The raising of the dam wall will increase the opportunity to manage with greater efficiency the dynamic nature of the surface water flows downstream of the dam wall.

352. **Environmental Flows**. Of major consideration to the detailed design stage is the resolution of environmental flows to the river. The strongest indicator of the sustainability of those flows is the status of the Sistan Basin wetlands in Iran. The Arghandab River contributes approximately 17% to the flows of the Helmand River, which in an ephemeral and arid-zone system is an important quotient. TRTA's Multi-sector Water Allocation Options Study sets out to define water releases from the dam for various uses and highlights that further study needs to be completed as part of the detailed design in order to determine appropriate environmental flows.

353. **Flows During Construction.** Detailed design stage will identify ways in which diversion canals can be used to maintain downstream water supply during construction with consideration given to livelihoods as well as flora and fauna.

354. TRTA performed two dam safety inspections, reviewed the dam failure reports prepared by USACE and prepared its own Dam Failure Analysis Report. Existing dam safety has to be further reviewed during detailed design phase and by an independent engineering panel to avoid any potential future disasters (e.g. floods, dam failure).

355. Quarry sites / borrow pits will be identified and agreed with NEPA and verified with community leaders during the design phase to prevent uncontrolled sourcing of construction material.

356. Soil/spoil disposal sites will be identified in advance and agreed with NEPA to mitigate any environmental impacts (e.g. erosion).

357. Standard construction environmental safeguard clauses will be part of the tender documents to avoid / mitigate construction related impacts (e.g. dust prevention, noise prevention).

358. Transportation routes for construction material and heavy machinery and parking areas for heavy machinery will be identified by the contractor before construction phase in order to avoid / mitigate environmental and social impacts. These routes have to be agreed with the local community, police and the local government in advance.

359. Detailed design shall identify suitable locations for construction work camps, stockpile areas, storage areas, and disposal areas and other facilities near to the project locations. However, if it is deemed necessary to locate elsewhere, sites to be considered shall not promote social instability and result in destruction of property, vegetation, irrigation, and water bodies. None of these temporary facilities shall be located within 500 m of residential areas and rivers. Though the contractor will be free to decide locations, a list of feasible locations shall be included in the design specifications and plan drawings for approval by the Project Management Unit (PMU). These potential locations will have been discussed with representatives of community groups.

360. Working hours during the construction phase have to be agreed with the police and the local government in advance, especially for residential areas. In general, construction works shall be implemented during the day (e.g. 07.00 – 19.00 hours) to avoid unnecessary disturbances. Working during day-time is recommended due to security and road safety reasons but all times are to be verified with local communities.

361. Non-objection-certificate (NOC) will be applied at NEPA before construction activities to avoid and mitigate any additional foreseen environmental impacts in advance. NEPA queries and comments will be reviewed and included in a revised EMP. EMP and EIA will be part of the tender documents and part the contract.

362. The EMP and the subsequent Site-Specific EMP (SSEMP) developed by contractor aims to prevent and / or mitigate any environmental impacts as listed in described in the EIA report and the EMP. It becomes the contractual responsibility of the contractor to implement and monitor the EMP through the SSEMP. Incorporated into the SSEMP, the contractor will assume responsibility for all occupational health and safety issues on the site. A detailed waste management plan will be a component of the SSEMP, and specifically focused on avoiding uncontrolled dumping of all construction waste, and domestic waste associated with construction camps.

363. **Risk-Based Management Approach**. The risks associated with the detailed design stage proposed raising of the dam wall are tabled and illustrated in Table 25. A recommendation of this EIA is that a review by a panel of experts at the 80% detailed design stage should be conducted to ensure quality control of engineering, operation and safety needs.

Table 25. Summary of Risk Management for Detailed Design and Pre-Construction Phase

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Deterioration of water quality in dam from upstream settlement			XXX	Design stage needs to clearly establish the steps to institute firm protection procedures.	**Low**
Key environmental assets not managed through lack of environmental flows			XXX	Design incorporate two-stage environmental flow concept which requires real-time data gathering from significant nodal points upstream and downstream.	**Low**
Planning for security of personnel and			XXX	Design team need to seek skilled advice on mechanisms	**Med**

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
infrastructure for life of project				and procedures to ensure safety and security during life of project.	
"Build-neglect-rebuild" cycle		XXX		Design recognizes that a difficult and insecure regime of inferior monitoring and maintenance currently prevails but will change in time.	**Low**
Loss of established vegetation and habitat on perimeter of dam.	XX			Develop revegetation program as required and constant vigilance essential for program success.	**Low**
Sedimentation of dam floor	XX			Given timeline, considered of minor significance, however major catchment management program required.	**Low**
Potential failure of dam wall	XX			(i) Develop enhanced specification and emergency response / contingency plan, and (ii) conduct independent review of by expert panel to ensure structural integrity and safety of dam at 80% into detailed design stage.	**Low**
Incidence of flooding increase due to rapid snow melt		XXX		Develop and apply early warning system for potential flooding based upon real-time monitoring.	**Low**
Incidence of tectonic and seismic activity in region	XX			As per USGS 2005, activity in Kandahar region is low. *	**Low**
Encroachment onto informal settlements surrounding dam		XX		Land Acquisition and Resettlement Plan or equivalent in place.	**Low**
Specific details on water quality, noise, dust	XX			Baseline data collated and monitoring system in place from day one of construction.	**Low**
Independent monitor to ensure compliance with EMP objectives			XXX	Appointment of independent "external environmental monitor" in contract implementation from day one.	**Low**
Inferior communication with local communities		XXX		Ongoing, routine and transparent two-way communication with communities and partners.	**Low**

[a] Wheeler et al, (2005) Seismotectonic Map of Afghanistan, with Annotated Bibliography. USGS (Afghanistan Project Product No. 011).

Source: TRTA Consultants, 2019

364. The NOC should provide the basis of a Residual Impact Statement whereby the design integrity, safety measures incorporated, the strength of liaison with all partners and the conditions and expectations placed upon contractors can be shared with all.

C. Impacts During Construction Phase

1. Introduction

365. On-site management of environmental impacts during construction require a comprehensive approach to be successful. Much of the day-to-day management needs to be the responsibility of the contractor, who is responsible for developing, implementing and closely monitoring the performance of an SSEMP. The scope of this document mirrors the following table, EMP and Mitigation Measure Summary. The contractor's SSEMP manifests as both a site management tool and a legal document. The implementation of the SSEMP will be managed by the contractor's dedicated Environmental Officer.

366. Important potential impacts requiring systematic management, and which are individually itemized in the EMP, range (chronologically) from the siting, detailing and maintenance of the construction camp including access roads, storage of materials including fuels, tools and machinery, management of quarrying and associated works excavation, transportation and stewardship of all goods across the footprint of the site, impacts from excavation including protocols for managing any archaeological and cultural artefact, loss of vegetation and incorporation of subsequent revegetation plans. Additional important considerations include the mitigation of noise, dust, effects to air quality, occupational health and safety, disturbance to water quality, aquatic and bird life.

367. **Excavated Material Required from the Adjoining / Quarried Area.** The amount of fill required for construction could present a considerable impact upon the site. About 7.3 million m^3 overall volume will be required from 'borrow areas'. The components include (i) clay core of 1.2 million m^3, (ii) sandy gravels of 4.8 million m^3, and (iii) riprap / filters 1.3 million m^3 in total. It has been identified within the feasibility study that material for the dam construction will be harvested from the extended reservoir area along existing route bearer highway and thus will be inundated when the dam level rises**.**

368. **Contractor's Camp.** No impact on the biological environment is expected due to the installation of the contractor's camp. The dedicate area has already performed a utility function and shows human impact (no trees, almost no vegetation, soil surface already paved). Access roads to the camp area and the dam already exist.

369. **Timing.** Construction will be implemented during the autumn and winter months when the water level of the reservoir is expected to be low. The existing foundations of the dam will be used as the foundation on which to raise the dam wall. It is not envisaged that any blasting at the existing dam structure will be required. Drilling and blasting will only be required for the route bearer highway and spillway 1 (old structure).

370. **Socio-economic Impacts and Employment Opportunities.** Overall, the socio-economic impact is expected to be positive. Wherever possible, priority will be given to employment of local people in the construction of the dam.

2. Impacts on the Biological Environment

371. Construction activity and the impact from that construction is highly localized around the perimeter of the dam wall and the subsequent larger footprint of the body of water when the dam fills. Most parts of the reservoir are not affected by construction activities. However, it can be assumed that flora and fauna in close vicinity of the dam will be affected by construction activities (turbidity, vibration, noise, inundation).

372. **Fish and Aquatic Life Within Reservoir.** The fish survey undertaken in 2018 caught more than 1,000 specimens of the predominant species. The catfish (Sheer mahi) is noted as being under serious threat from climate change, water pollution and overfishing.[40] Attempts at farm raising Sheer mahi in hatcheries are reported to be unsuccessful. This situation raises concerns regarding all aquatic life in the dam. Knowledge concerning other fish species which inhabit the reservoir and their preferred habitat (be it shallow shoreline or deeper waters) defined by temperature and less light could therefore be improved upon, and will be included in the subsequent ARES proposed for the summer of 2019.

373. Fish may be expected to occupy substitute habitats in a safe distance from the construction site and further expert opinion will be sought on this. The dam itself provides what has been assessed as a low-value fish habitat, where limited submersed vegetation nor areas for fish to shelter appear to exist (deadwood, roots, reed).

374. **Baseline Fish Survey.** The survey was conducted using three methods: (i) interviews of fisherman using a questionnaire on the fishing method used, time of the year, and main threats to fishing, (ii) meetings with aquaculture owners and related governmental organizations, and (iii) fish catches in nets at nine different sites of Dahla reservoir and one site downstream of Dahla Dam. On day one, the survey team surveyed deep water zones, on day two, deep and shallow, and on day three shallow zones including one zone downstream of the dam.

375. Three fish species were found in the dam reservoir as part of the 2018 TRTA survey. It has been observed that these species may be vulnerable to major construction and the disturbance in the water body adjacent the new walls. The ARES will specifically investigate this issue and make appropriate recommendations to mitigate. The three species concerned are: (i) Sheer Mahi (Clupisoma Naziri). Sheer Mahi was caught in all the fish nets used during the three days in different parts of the dam (shallow water zones and pelagic zones). The extent of occurrence of this species is high and exists in all parts of the dam. It mostly exists in the south-west part of the dam. (ii) Common Carp (Cyprinus carpio). The Common Carp was caught in four out of nine fish nets that were used to catch the fish in the dam. The specie mostly exists in the southern parts of the dam. No specimen was caught in the deep water zone. (iii) Mola Carplet (Amblypharyngodon mola). 1,092 Mola Carplet were caught in only three of the fish nets among all the nine nets (63% of the fishes caught) in the western part of the dam near the overflow and valve tower and eastern part of the dam. This species is likely to be most affected during the construction of the overflow and valve tower because the population of this species is very high in this part of the reservoir and is mostly found in this area.

376. Overall, the observations confirmed that Dahla Dam reservoir is an important area for fish and habitats.

[40] Construction of the Warsak dam in 1960 also blocked the upstream migration of this species.

377. **Flora.** The shore / edge of the dam includes some areas of 'volunteer' aquatic re-growth. It is assumed that these areas may provide valuable feeding and occasional habitat for aquatic life. During construction, all flora that is removed will be accounted for in a revegetation plan and be replanted at a minimum ratio of 1:5. Greater detail on species and propagation will be included in the ARES planned to be conducted by TRTA during summer 2019.

378. **Baseline Ornithological Survey:** The 2018 survey utilized two methods: (i) collecting data through direct observations; (ii) interviewing local hunters (three hunters from surrounding villages) using a specialized questionnaire. The questions concerned the presence of water birds, main threats, and hunting practices at Dahla Dam. Fourteen waterfowl species were identified, 17 individual birds from other species, and two mammals − Jungle cat (*Felis chaus*) and Golden Jackal (*Canis aureus*) (both in the Red List of Afghanistan).

379. The questionnaire investigations and direct observations showed that the inhabitants of the area extensively hunt waterfowl during fall and winter seasons. Spring and summer are breeding seasons, during which time hunting is uncommon.

380. Overall, the observations confirmed that Dahla Dam is an important area for waterfowl and other wildlife species in the south-west of Afghanistan. Water birds use this area as an aquatic habitat for shelter, foraging, roosting and breeding.

381. What the survey did not investigate was how the project may go about minimizing the impact of lost habitat during the construction of the dam. ARES will therefore specifically examine the possibilities of restoring habitat in what will be the high water mark of the new water body. The process will include analysis of speciation, soils, propagation techniques along with ideal timing.

382. The ARES will identify habitat associated with permanent and migratory bird species which are to be found in the area and wetlands. The ARES will aim to prepare details regarding the generation of alternative habitat. A major impact is that feeding and nesting habitats will be deliberately disrupted during the construction activities at the main dam. Due to sheer depth of the water body, the dam itself is not considered to be an ideal feeding nor breeding habitat. However, waterfowl can be expected to be affected by construction activities at the dam (such as noise, vibration, dust) and they may leave the site and search for alternative habitats in the vicinity of the reservoir. Without the survey, this impact on water fowl has been evaluated as "minor" and limited to the construction phase.

383. **Grouting or Bentonite Cut-off Wall Construction Works** for the reaches of the saddle dams will be implemented during the dry season. No impact on aquatic life is expected. The water body of the reservoir will be far from the construction site.

384. **Raising of the Dam Wall by 13.6 m** will result in an extension of the main dam and six saddle dams from an approximate length of 2,250 m to 3,000 m. The Terms of References of the ARES is specifically focused on determining the presence and status of wildlife, animal habitat and associated riparian vegetation which could be affected by the rise in the dam wall.[41]

385. As per Google Earth imageries and as verified/confirmed by NEPA Kabul and NEPA Kandahar, there will be no impact on existing vegetation at the reservoir and on the river

[41] Although NEPA Kabul and NEPA Kandahar confirmed that there will be no impact on existing vegetation at the reservoir and on river banks, and that negligible vegetation has been found in the close vicinity of the dam during the field surveys, this will be specifically verified by the ARES

banks,[42] as vegetation along the river has been routinely cleared for household use and/or grazed. Vegetation status is expected to be verified by the ARES planned for summer 2019.

386. **Water Quality Impacts.** Impact on water quality within the confines of the dam is likely during the construction phase. Turbidity will increase during construction works at the main dam. This impact is expected during the whole construction stage.

387. Geotextile bags will be applied to prevent construction material including rocks, stones, riprap and gravel from falling into the water to prevent increased turbidity. The impact will also be reduced as construction works will be carried out during the dry season as the water level of the reservoir will be low at that time. Construction works at the saddle dams will not intersect with the water body of the reservoir.

388. Generally, water quality of the river below the dam is not expected to be affected by construction activities, however short-term turbidity is expected in the river stretch below the dam during installation of turbines at the Dahla Dam substation.

389. There are a range of typical impacts associated with construction which are identified and listed in the risk table as well as the EMP. The mitigation measures include addressing the full range of typical construction phase impacts; stewardship of the use of all resources including machinery, care of the natural resources on the site (water, vegetation, flora and fauna), occupational health and safety of workers.

390. One important issue concerns the prevention and mitigation of soil erosion by the following measures:

(i) Covering of stockpiles to prevent wind erosion;
(ii) Proper storage of top soil and reuse for landscaping;
(iii) Planting / landscaping of slopes;
(iv) fixing of slopes using concrete, geotextile.

391. **Dust** will occur during construction phase at the dam but will be short-term, localized in nature and specifically itemized and managed by the SSEMP. Dust will impair the air quality but not the water quality of the reservoir.

392. Runoff from stockpiled materials and chemicals from fuels and lubricants during construction works can contaminate surface water quality (Arghandab River, reservoir, irrigation channels). Project area receives rainfall, although mostly confined during the winter and spring months. It is important that runoff from the construction areas, which may contain silt and chemical traces, does not enter these water bodies. Impact will be temporary but it needs to be mitigated. As per the SSEMP, the construction contractor will be required to:

(i) Ensure that all earthworks be conducted during the dry season (summer, autumn) to prevent the problem of soil runoff during winter months;
(ii) Implement stockpiling of earth fill in the dry season and cover by tarpaulins;
(iii) Prioritize reuse of excess spoils and materials in the construction works. If spoils will be disposed, only designated disposal areas shall be used;
(iv) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;

[42] TRTA communication with NEPA at ASBA office, Kandahar, July 2018

(v) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
(vi) Store fuel, construction chemicals etc., on an impervious floor, double walled tanks, also avoid spillage by careful handling;
(vii) Use collecting trays under containers / drums containing hazardous material;
(viii) Dispose any wastes generated by construction activities in designated sites; and
(ix) Conduct surface quality monitoring and inspection according to the SSEMP.

393. **Air Quality.** Construction work, especially from earthwork activities, coupled with dry and windy working conditions, material and debris transport, and works along the public roads carrying significant traffic, have high potential to generate dust. Emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality. Additional anticipated impacts include dust and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons. Dust generation will be significant during construction of route bearer highway. Increase in dust/ particulate matter in ambient air is detrimental and may have adverse impacts on health and environment. To mitigate the impacts, construction contractors will be required to adopt and follow procedures, all of which will be included in the SSEMP:

(i) Barricade the construction area in the vicinity of settlements;
(ii) Initiate site clearance and excavation work only after barricading of the site is done;
(iii) Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes etc.), to the barricaded area;
(iv) Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area;
(v) Implement water spray during construction on roads and the construction site;
(vi) Clean wheels of heavy machinery and trucks before they leave the construction site;
(vii) Use tarpaulins to cover loose material and soil.

394. **Noise and Vibration Impacts.** The works to be implemented are in a rural setting in the vicinity of the dam, with an absence of settlement and population. Noise and vibration impacts will mostly be attributed to blasting, rock cutting, pneumatic drills, excavation and construction activities for fill along the previous alignment of the route bearer highway.

395. However, construction of the newly aligned route bearer highway is located partially adjoining habitation areas in the vicinity of houses, religious places and close to business. The sensitive receptors are the general population in these areas. Increase in noise level may be caused by operation of construction equipment and the transportation of equipment, materials, and people. Vibration generated from construction activity, for instance from the use of pneumatic drills, will have impact on nearby houses/buildings but can be expected only over a short-term and will be done in consultation with the community elders. The negative impact is therefore expected to be short-term and reversible by mitigation measures. The construction contractor will be required to:

(i) Plan activities in consultation with the PMU and in collaboration with community so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
(ii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptor;

(iii) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
(iv) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
(v) Consult local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

396. **Impact on Waste Stream.** There will be an increase in waste generated from the construction camp combined with all the associated activity. The contractor will have full responsibility to incorporate a Waste Management Plan into the SSEMP for the life of the project. As the project becomes operational waste is not considered to be a major issue.

397. **Impacts on Community.** Overall impacts on community are considered to be positive. A small degree of agricultural activity which currently is conducted on land adjacent the high water mark of the dam will be affected with the rise in reservoir water level. Dedicated efforts to support farmers to find alternative lands and compensation will be managed as part of the Land Acquisition and Resettlement Plan (LARP). Impacts from road construction, quarrying and the dam wall construction are considered to be minimal as they are not close to settlement nor livelihoods areas.

398. **Impacts on Workers - Occupational Health and Safety**. The day-to-day construction work at the site will conform with contemporary best practice when it comes to occupational health and safety practices. Given that local people will be offered precedence on employment opportunities, this scenario offers a positive set of conditions for workers.

Table 26. Summary of Risk Management Procedures for Construction Phase

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Management of any potential impact of contractor's camp, machinery, fuel and oil spills.		XXX		All details regarding responsibility of contractor is to be detailed in the SSEMP.	Low
Inappropriate contractor management of use of heavy machinery, excavation, deposition of spoil, top soil, deposition and compaction of fill material during construction		XX		Detailed design will work with the SSEMP to clarify and specify all construction details.	Low
Harvesting of fill material could create major impact upon landscape.	X			A site for harvesting of material has been identified adjacent saddle dam 1 extension up to Shahjoi village which has low significance.	Low

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Water quality in and below the dam maybe compromised during construction.		XXX		Water quality monitoring will be conducted in the reservoir and river during dam construction and operation.	Low
On-site safety for all employees and community addressed.		XXX		Occupational health and safety will be specified in the SSEMP and be a core contractor responsibility	Low
Management of aquatic life, bird life, revegetation not adequate.	XX			ARES will identify key environmental assets with specific flora and fauna requirements.	Low
Disturbance to roads from haulage, dust, noise and air quality.	XX			Contractor will have specific guidelines to conform with regarding management and monitoring.	Low
Employment opportunity of local people not given preference.		XX		Preference will be given to local people for all employment opportunities.	Low
Contractor performance needs to be adequately monitored.		XX		Monthly reports and oversight of day-to-day management monitored by PIO.	Low

Source: TRTA Consultants, 2019

D. Impacts During Operation Phase

3. Impacts on the Physical Environment

a. Impacts on River Morphology, Spillway Channel, and Reservoir

399. **River Morphology.** Most of the Arghandab River bank structure in the reach from the tailrace to the reservoir is dominated by larger stones and boulders and thus is less at risk to bank erosion and slumping. Some bank erosion at sandy banks cannot be excluded entirely. Increasing erosion is not expected. The existing estuary of the river will be flooded and shifted upstream over the years. Erosion is not expected due to this change in river morphology.

400. **Spillway Channel.** No improvements to the existing spillway channel stability made of native rock material is proposed. The existing rock lining is sufficient for stability without installing any additional channel lining, cut-off wall, or similar type feature. The downstream channel has large cobble sized bed material and stable vegetated banks. For these conditions, stability is likely in the downstream channel between the dam and the spillway entrance.

401. In order to assess future risk, detailed monitoring of the spillway and the channel is recommended. The monitoring has to be implemented periodically after spillway flow in spring.

402. **Reservoir**. Approximately 72% of the basin has slopes greater than 30%.[43] Most sediment enters reservoirs as a consequence of rainfall erosion and subsequent transport by streams. The areas contributing the highest sediment yields are those with the steepest slopes that also have increased runoff rates and therefore more overland sheet and rill erosion. High sediment yields in these areas are expected as the terrain is mostly unvegetated and steep. In arid-zone rangeland conditions, amounts of sediment in surface water can also be accelerated where long-term and uncontrolled grazing of animals leaves areas denuded. The reservoir can basically be considered as a large sediment trap and the sediment captured in the reservoir is missing below the dam in Arghandab River. A long-term increase of sediments is expected in the future due to climate change and due to the increase in maximum discharge events (TRTA Hydrological Study Report, 2018). Greater sedimentation is predicted due to the anticipated increase in uncharacteristic weather events.[44]

403. With a sedimentation rate of 2.7 million m^3/year, Dahla reservoir once raised should have a life increase of over 200 years which is positive, but which could be enhanced further should techniques to arrest sedimentation be strategically introduced over time. It is anticipated that during high inflows, sedimentation flushing should be performed through irrigation outlets. The irrigation outlets should be kept fully open. During detailed design, consideration should be given to re-assess the discharge capacity and changing the type of the outlet channel.

404. Due to the lack of data in the Arghandab drainage basin, the erosion processes are not observed. Erosion is expected to continue after raising of the dam. The river banks below the dam have already been stabilized by stones and rocks to prevent erosion. Annual control of the river banks is suggested in the EMP, in order to mitigate and prevent future erosion of the river.

405. While in some situations, total annual rainfall may not change, one significant possibility will see rainfall of greater intensity, the results of which will erode and mobilize sediments. Improving stewardship of rangelands could mitigate these effects, but to implement such programs will require greater levels of security than presently exist.

406. Raising of the dam by 13.6 m will not significantly impact the landscape, as the dam is already in existence, however the surface area of the water body will increase from about 29 km^2 to around 45 km^2. The existing dam wall consists of stones, rock and concrete. The grey color of the raised dam will not be distinguished from its natural surroundings. No impact is therefore expected in terms of aesthetics.

407. **Water Quality.** Increasing the water depth in the reservoir after raising the dam can cause limited mixing of surface and deep reservoir waters, low dissolved oxygen content, and the generation of hydrogen sulfide on the bottom under anaerobic conditions. Changes in hydrology will cause major and sometimes permanent changes in water quality, aquatic life, and habitats. Fish and aquatic organisms will move to lower depths in case of low oxygen concentrations above the bottom of the reservoir especially in the summer months when high water temperatures and low oxygen concentrations are expected. Seasonal changes in temperature in spring and autumn and wind cause additional re-aeration of deep water layers of the dam lake.

408. Monitoring of the water quality of the reservoir at various depths has been suggested in the EMP.

[43] US Army Corps of Engineers, 2012. Waste water master plan Kandahar City, Afghanistan

[44] Details are provided in various section of the feasibility study report and in the hydrology report. Sedimentation rate in dam is 2.7 million m^3 per year as described in the feasibility report

409. Changes of the water quality of the river below the dam is not expected. Arghandab River is a mountain river characterized by high velocity, rapids, coarse gravel banks, and boulders linked to high self-purifying capacity. Oxygen concentration is expected to be high below the dam during operation of the turbines.

410. Monitoring of the water quality within the dam and below the dam will occur during construction and operation has been suggested in the EMP.

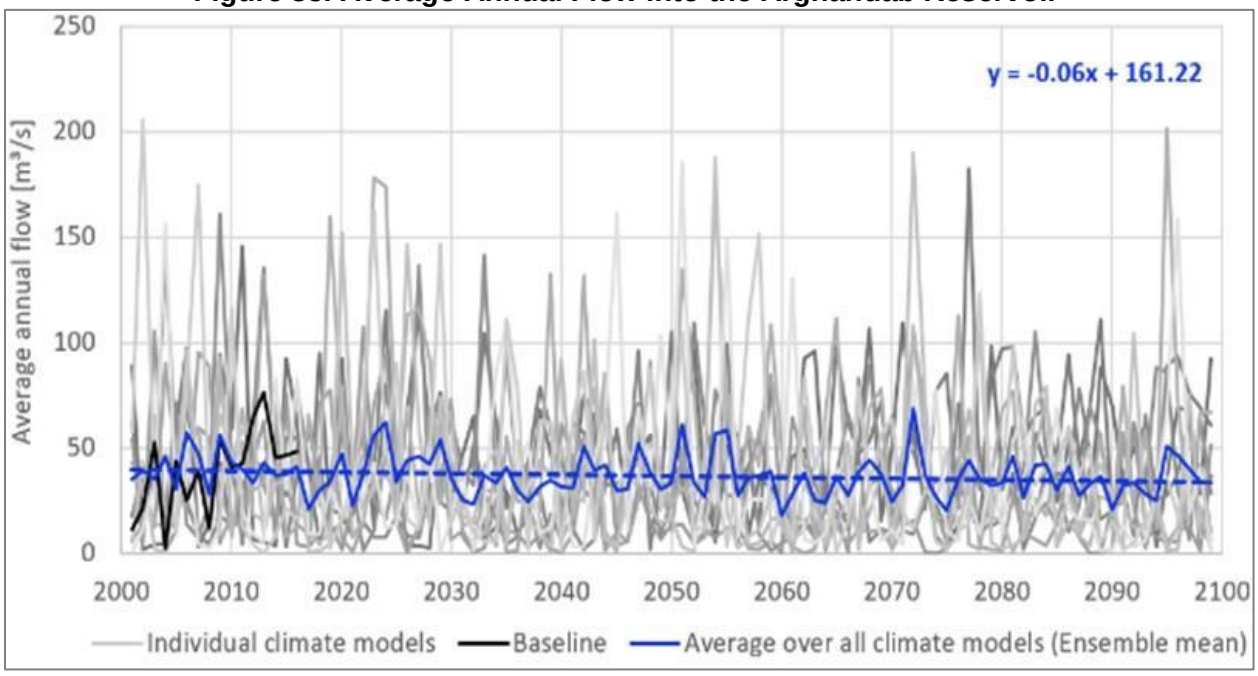
411. **Groundwater.** Raising of the dam will cause a rise of the groundwater table around the reservoir. The level of groundwater will change dependent on season, precipitation, water supply, hydropower production and irrigation activity. Groundwater quality in the vicinity of the reservoir will not be affected.

412. The groundwater level close to the river below the dam is not predicted to drop significantly during the dry season in average and in wet years due to provision of the environmental flow, and greater availability of water throughout the year. Groundwater quality is not expected to be affected. Decline of the ground water level is expected for dry years.

b. Impacts from Climate Change

413. The trends of the hydrological study show slightly decreasing average and minimum inflows to the reservoir and an increase in extreme inflow events. A change in the erosive force of the discharge events is expected.

Figure 35. Average Annual Flow into the Arghandab Reservoir



Source: Hydrological Study, TRTA, 2018

414. The occurrence of unexpected and changing weather patterns including heavy rain events and the incidence of drought can be expected to increase in future. For example, at the beginning of March 2019 heavy rain, wind and flash floods occurred in Kandahar District. All rivers and canals were full. Many houses were destroyed in Shah Wali Kot, Arghandab, Zheray, Panjwayi, and Dand districts including Kandahar city. Floods increased water level in Dahla

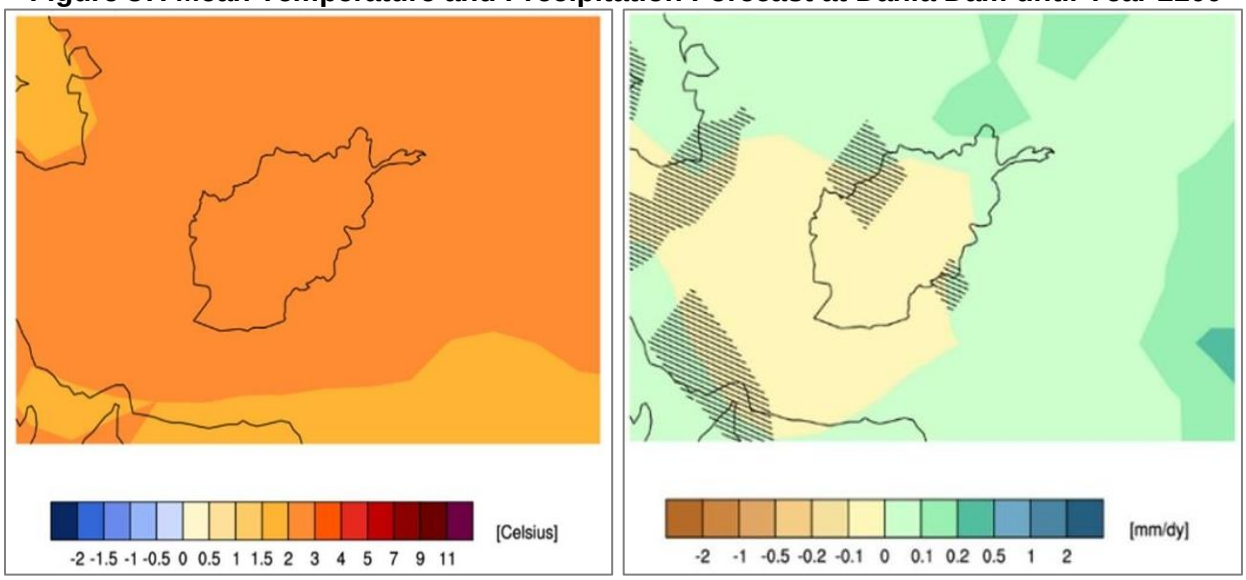
Dam around 2.31 m. Currently there is only around a 4 m gap between level of existing water level and spillway and the dam overflowed.

415. As a result of this weather event, the UN Office for the Coordination of Humanitarian Affairs (No 6) reported: "4,698 households (more than 33,000 people) have been identified as requiring humanitarian assistance as a result of flooding". Across eight provinces and Kandahar city, 1,855 houses have been destroyed and 2,841 houses have been partially damaged by flooding. There was further rain on 10 March, although no new flooding incidents have been reported.

Figure 36. Heavy Rain and Flood in Arghandab River Valley below the Dam, March 2019

Source: TRTA Consultants, 2019

Figure 37. Mean Temperature and Precipitation Forecast at Dahla Dam until Year 2100



Source: KNMI Explorer 2018. https://climexp.knmi.nl/start.cgi

416. The mean annual temperature has increased at a rate of +0.5°C per decade over the last 30 years. Future projections from global climate models suggest a strong increase in temperature. For the end of the century, a warming in the range of +2.1 to +5.6°C (compared to the reference period from 1971 to 2000) linked to an increase in evaporation is likely. Furthermore, a strong increase in the duration of heat waves as well as a medium-strong reduction in the length of cold spells is projected. As a result, the period over which melt-down occurs is becoming shorter, a phenomenon which will have a great influence upon river dynamics.

417. For the annual total rainfall amounts, no substantial changes were observed over the last 30 years. Climate models project no clear trends for future annual total precipitation, however globally it is recognized that an increase in uncharacteristic weather events will have greater incidence. For the end of the century, a change in annual total precipitation in the range of -12% to +8% (compared to the reference period from 1971 to 2000) is likely. Furthermore, projections suggest a tendency towards more intense and considerably more frequent heavy rainfall events as well as a slight increase in the duration of dry spells.

418. For the climatic water balance (precipitation and evaporation), a tendency towards a decrease is projected for the future in Afghanistan. Regarding annual mean wind speed, global climate model projections show a slight tendency towards a decrease, whereas for solar irradiance the projections suggest no clear trend over the 21st Century. However, the skill of the global models in reproducing mean wind speed and solar irradiance is limited.[45]

419. The following figures show climate graphs of KNMI climate explorer for Afghanistan. Changes in mean temperature and precipitation are shown. The climate projection is based on CMIP5 data ensemble. The periods during 1934–2018 and during 2018–2100 were compared (84 years into the past and 82 years into the future from 2018).

420. The following scenario is analyzed: RCP4.5 (Representative Concentration Pathway 4.5): quicker action to limit greenhouse emissions with emissions peaking in 2040 and strong decline until 2080.

421. Under the RCP4.5 scenario, a temperature increases of up to 2°C is expected for Afghanistan until the end of the 21st Century, linked to a slight decrease in precipitation.

422. It cannot be excluded that climate change, especially reduction of annual rainfall and temperature rise, will reduce biodiversity and initiate desertification in Afghanistan and in the project area. Worldwide reduction of greenhouse gas emissions could mitigate this scenario.

423. Afghanistan generates 44.7% of its electric energy from fossil energy sources (coal, wood and fuel[46]). A reduction of fossil energy sources and increase of renewable energy sources (wind and hydropower) would decrease the release of greenhouse gases (e.g. carbon dioxide).

424. With a dam raise of 13.6 m, the hydropower component will generate approximately 143,038 MWhr. Greenhouse gas savings will be 49,348.11 tons per year assuming that the import of electric power from Turkmenistan will be reduced. Electric power in Afghanistan is generated from fossil energy (natural gas) in Turkmenistan.

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[45] Climate Fact Sheet Afghanistan. 2018. Climate Service Centre Germany.

[46] Worldata.info. *Energy Consumption in Afghanistan*. https://www.worlddata.info/asia/afghanistan/energy-consumption.php

4. Impacts on the Biological Environment

425. The immediate watersheds surrounding the dam and its reservoir are seriously denuded and the upper catchments are completely degraded. This is understood to be the result of the practice of annual free-range grazing combined with an annual harvest of woody shrubs for fuel-wood. While a National Rangelands Management Strategy has been produced some considerable time ago, the challenges, resources and time required to implement such a strategy during a period of civil emergency has meant that although there are models of improved catchment management, they are unfortunately piecemeal.

426. No national, provincial or regional flora species of significance or their habitat were reported within the area potentially affected by the project. No registered wetlands are located within areas potentially affected by project activities according to information of NEPA Kandahar.

427. Waterfowl has been observed and assessed during the site visit of the dam and during the ornithological study in November 2018. Existing bird populations are used to seasonal changes in water level and habitats especially at the Arghandab estuary of the reservoir.

428. Raising the dam will flood existing wetlands and habitats. Over time, wetlands will develop due to siltation and sedimentation processes of the river, especially within the upstream estuary. The ARES will specifically explore ways to facilitate alternative habitat for birds pre-flooding of existing.

429. It is expected that fish, especially trout (*Salmo trutta oxenesus*) and sheer mahi (*Clupisoma naziri*) will migrate upstream between Qala -I-Bust (location where the Arghandab meets the Helmand) to a point below the dam wall during the spawning season in late winter and spring. Since the construction of the dam in 1952 migration from below to upstream of the dam has not been possible. The height of the dam wall makes it difficult to facilitate fish passages and although fish-friendly turbines will be installed, it is acknowledged that these devices fall short of providing a 100% migration. However, the ARES will specifically investigate the viability of a fingerling program initiated for the dam water, and providing fish stocks for the upper reaches of the river.

430. The ARES will investigate and assess mitigation measures which could be applied to the fish habitats in the existing river estuary. These areas will be flooded and similar habitat conditions will need to be replicated upstream in what will be a new ‘estuary’. Likewise, the ARES will also investigate and make recommendations as to whether downstream fish habitat can be enhanced with accelerated sedimentation in the suitable areas (e.g. shallow water zones, reeds).

431. Depending upon outfall source and relative temperature differentials, the increased flow throughout the year combined with environmental flows (after the raising of the Dahla Dam) will improve potential habitats below the dam compared to the existing situation.

432. Environmentally friendly management of the reservoir is required during operation to sustain breeding and feeding habitats of existing fish populations.

433. Monitoring of water quality is required, especially during dry years and in the dry season when water will be scarce. A water quality monitoring program has been suggested in the EMP.

434. Regular monitoring of oxygen concentrations is required.

435. Operation of the dam is linked to changes in water level of the reservoir.

436. While the existing aquatic fauna and waterfowl are already used to these changes, a water management plan has to be developed to address ecological requirements of the existing fauna. The management plan shall focus on the following:

(i) Minimum water level and volume required to satisfy the ecological requirements of the aquatic biocoenosis. The water level shall not drop below 6 m at the dam (immersion depth) according to information received from ASBA.
(ii) Minimum oxygen concentration of the water to guarantee the survival of aquatic organisms.

437. A fish biological study and an ornithological study will be implemented as part of the ARES during the detailed design, to assess existing bird and fish species and habitats throughout the year. The detailed fish survey shall cover the whole river. The survey shall be implemented at the start of the summer season to confirm preliminary survey findings. The ornithological study shall include monitoring of at least half a year because migratory birds are expected. Breeding habitats, feeding habitats, resting habitats, indicator species have to be monitored. Especially, breeding activities in spring and activities of migratory birds in autumn and spring have to registered. The detailed environmental study shall focus on species using the reservoir and the river as their habitat. In addition, breeding (shallow water zones) and feeding habitats shall be identified. The existing fish diversity and occurrence of fish shall be estimated.

5. Impacts on Socio-cultural Environment

438. **Raising of Dahla Dam.** Impacts on land use are expected. A rapid due diligence was conducted in collaboration with project APs, which revealed that for a 13.6 m dam raise and due to the expansion of the reservoir area, an estimated 22 villages with a population of approximately 6,500 will be affected. Approximately 596 out of a total of 778 houses in these villages will be affected.

439. It is also estimated that the inundation will cause a loss of about 800 hectares of arable land and 300 hectares of pasture land. The inundation will cause a loss of 643 orchards with 92,241 fruit trees and 16,000 wood trees. Resettlement activities will compensate losses of agricultural land and settlements.

440. The infrastructure on six saddle dams and two spillways will have no land acquisition or resettlement impacts as the proposed land is state owned land.

441. **Route Bearer Highway Realignment**. The proposed realigned highway is 9.3 km long and pass mostly through barren hilly terrain.

442. A rapid impact assessment was carried out in March 2019 on the proposed road realignment. The new route alignment crosses three villages:

(i) **Landai Showraw village** (Chainage 0+000 to 3+400): the route will cross rainfed and pastures land of the village (85 jeribs: 170,000m²). No structure, irrigated land and orchards will be affected.

Figure 38. Rainfed and pasture land of Landai Showraw village

Source: TRTA Consultants, 2019

(ii) **Lowar Arab village** (Chainage 5+300 to 9+300): the route will cross rainfed and pastures land of the village (100 jeribs: 200,000m²). No structure, irrigated land and orchards will be affected.

Figure 39. Rainfed and pasture land of Lowar Arab Village

Source: TRTA Consultants, 2019

(iii) **Shahjoi village** (Chaimage 3+500 to 5+300): the route will cross pasture land (Chainage 3+500 to 6+300, 25 jeribs: 50,000m²), agriculture land (Chainage 4+500 + 5+000, 12.5 jeribs: 25,000m²) and pomegranate orchard (Chainage 5+000 + 5+300, 7.5 jeribs: 15,000m²). No structure will be affected.

Figure 40. Rainfed Land, Irrigated Agricultural Land, and Orchards of Shahjoi Village

Source: TRTA Consultants. 2019

443. The 600m long strip of private agriculture land in the village of Shahjoi for the construction of the new road is seen in Figure 41.

Figure 41. Shahjoi Village and the Proposed Route Realignment

Source: TRTA Consultants. 2019

444. More precise data about the social and resettlement impacts will be gathered during the consultative workshops in April 2019 and at the detailed design stage.

6. Impacts on Physical Cultural Resources

445. Several cultural resources are found in Kandahar city and in its vicinity. The resettlement rapid due diligence showed that there will be a loss of cultural assets due to the expansion of the reservoir area on:

(i) Cemeteries;
(ii) *Karez* (water systems);
(iii) Mosques (in the villages being relocated, mosques will be required to be demolished and relocated to new resettlement sites);
(iv) Pastoralist sites (where *Kuchi* and other pastoralists lived and kept their animals).

446. Table 27 shows the cultural resources that known to be affected due to the expansion of the reservoir area.

Table 27. Location of Affected Cultural Resources

Village	Cemeteries	Karez/Water Systems	Mosques and Madrasas	Pastoralist sites
Karmullah	1	2	1	1
Kochani	1		1	
Khalil Qala/Sarwar Jan Kali	1			
Baitel/Haji Karim Dad		1		1
Sofi/Mohammad Qudos Kala		2	1	1
Siahsang		1	1	
Khawaja Zai/Zor			1	1
Haji Paiyo Kali			1	
Biana			1	
Lal Khan			1	
Sher Jan Kali			1	
Dad Mohammad				1
Shahjoi			1	
Anar Kali				1
Tehsildar			2	
Khali Qala			1	
Total	**3**	**6**	**13**	**6**

Note: There are several different pastoralist sites affected in each of the marked villages.
Source: TRTA Consultants, 2019.

447. Based on the TRTA consultations in March 2019 with APs Committee members and Kandahar Government officials, Dahla Dam upstream villages have a very long history. Dahla Dam is situated in a very strategic location that has always been used with the government of Afghanistan.

448. There is some evidence that the following cultural resources might be affected, but the exact location and number of these sites are presently unknown: stone age sites; prehistoric sites; caves and rock shelters containing cultural materials; mounds indicating the presence of villages and community structures; and open sites consisting of lithics, debitage, and ceramic scatters.

449. There are 10 identified archaeological monuments that are located to the east and south of the project area that will not be affected by the raising of the dam wall.

Table 28. Identified Archaeological Sites

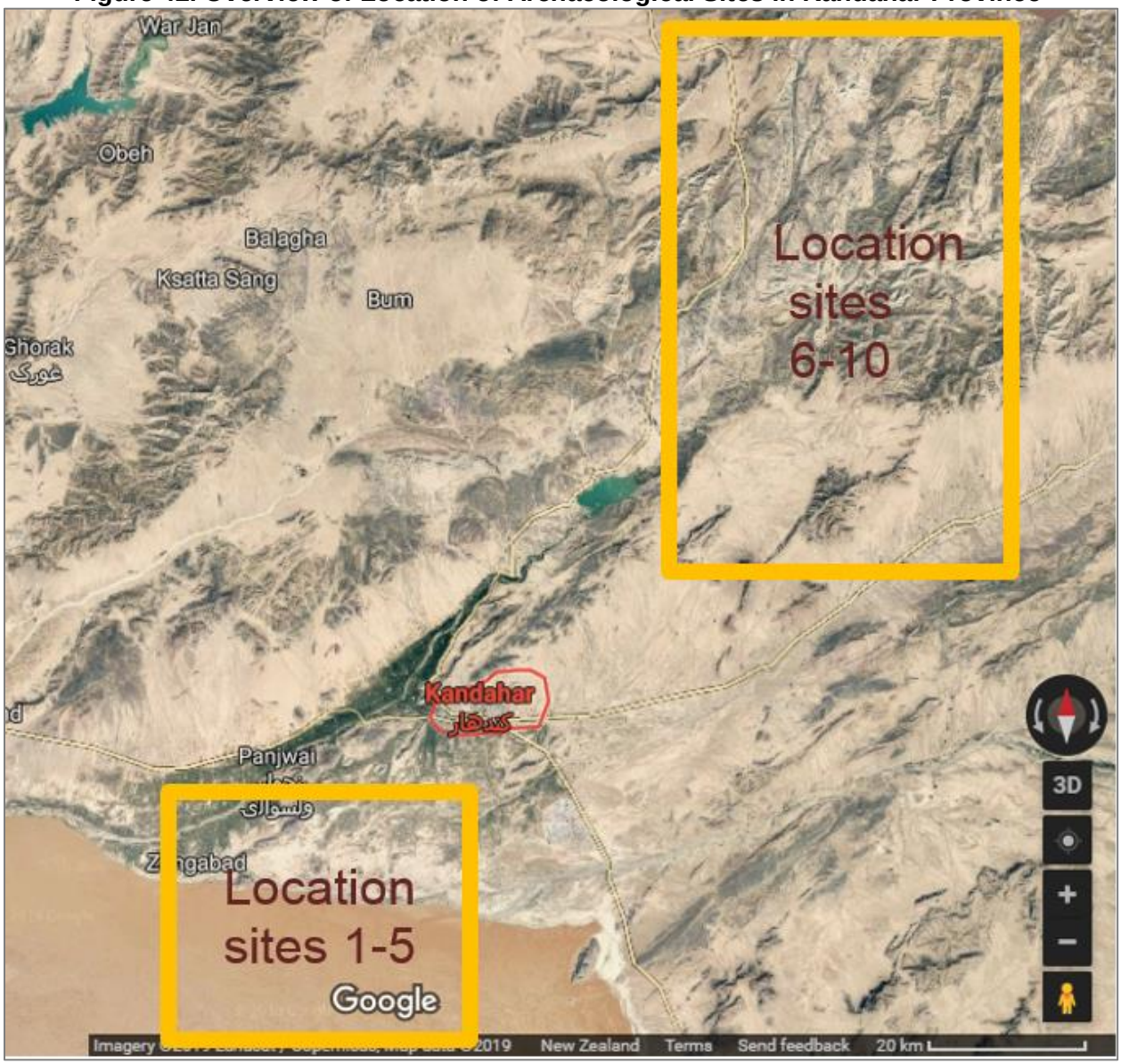
No	District	Area Name	Coordinate		Area cod
1	Arghandab	Baghpol Ghondy Shargah or	N 31◦37'	E 65◦34'	AIA 28.04.001
2	Arghandab	Sargo	N 31◦41'	E 65◦37'	AIA 28.04.002
3	Arghandab	Shoyan	N 31◦44'	E 65◦41'	AIA 28.04.003
4	Shawali Kot	Dahla	N 31◦51'	E 65◦53'	AIA 28.15.001
5	Shawali Kot	Khoshab	N 31◦30'	E 65◦49'	AIA 28.15.002
6	Shawali Kot	Razalyi Adrk	N 32◦281944000000003'	E65◦937777999999994'	AIA 28.15.003
7	Shawali Kot	Chahal Ghazy	N 32◦314444000000002'	E66◦099722'	AIA 28.15.004
8	Shawali Kot	Toutai	N 31◦881798'	E66◦0907732000000003'	AIA 28.15.005
9	Shawali Kot	Qula	N 31◦86960000000001'	E66◦14645000000000002'	AIA 28.15.006
10	Shawali Kot	Gulzar	N 31◦920113000000001'	E66◦165170000000003'	AIA 28.15.007

Source: TRTA Consultants, 2019

450. The Ministry of Culture and Information indicated to the TRTA that these existing 10 sites and locations are officially registered with the Ministry. However, the Ministry mentioned that they could not access in the past the upstream sites of Dahla Dam due to security concerns and that some other sites may exist. If the security situation allows it, the Ministry will plan during the detailed design to do a comprehensive survey and mark several archaeological historical sites of the dam area.

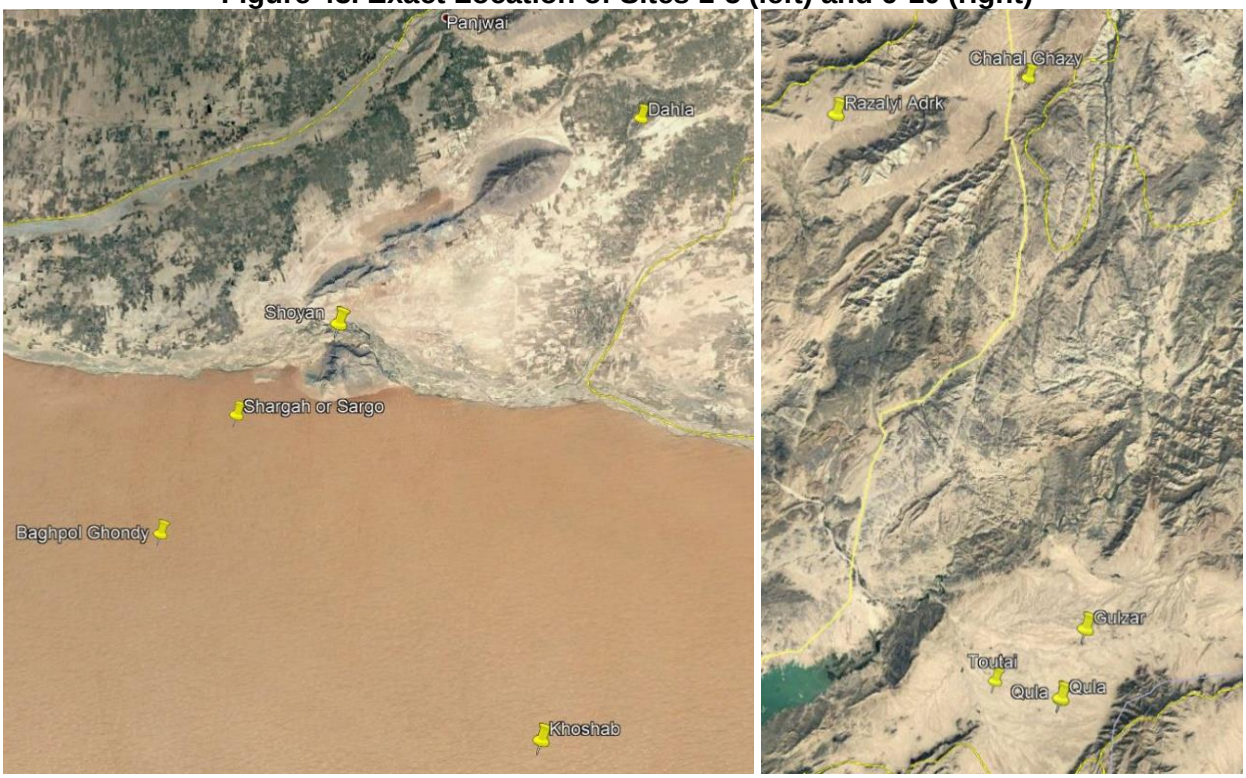
451. The following maps show 10 archaeological monuments in Kandahar province that are not expected to be affected by the raising of the dam wall due to distance from the project area according to information of the Archaeology Institute Kabul.

Figure 42. Overview of Location of Archaeological Sites in Kandahar Province



Source: Archaeology Institute Kabul and TRTA Consultants, 2019

Figure 43. Exact Location of Sites 1-5 (left) and 6-10 (right)



Source: Archaeology Institute Kabul and TRTA Consultants, 2019

452. Construction activities must be coordinated by local religious leaders and the Archaeology Institute Kabul before the construction phase. An archaeological survey will be required under the leadership of the Archaeology Institute Kabul.

453. **Landmines**. Afghanistan has more landmines than any other nation, and one difficult challenge has been clearing project surrounding areas. Topographic survey along the dam reservoir and proposed highway route had been performed successfully by the TRTA in 2018. Although no landmines were noted, the contractors must ensure that the sites are clear from landmines in close consultation with the relevant agencies. Previously air samples from the sites were collected and sent to labs, where mine detection dogs identified high priority areas for de-miners. It shall be the responsibility of the contractor to confirm that the technical survey/clearance of landmines/unexploded ordnances has been properly achieved. If it is not yet completed for any given section, the contractor shall request the Afghanistan Mine Action Centre Kandahar in due course to complete the remaining demining works for all sections. In addition, the contractor shall also submit requests to Afghanistan Mine Action Centre Kandahar for any additional survey/clearance of landmines/unexploded ordnances whenever and wherever it is deemed necessary for the safe conduct of his works.

454. **Impacts on Fish Catch.** Impacts on fish catch are not expected.

455. A **Water Management Plan** shall be developed after implementation of the detailed environmental study during detailed design stage. A minimum water volume will be provided throughout the year to sustain aquatic life and habitats. Fish catch will not be impaired after raise of the dam. Currently, ASBA maintains at least 6 m of water depth at the dam.

456. A **Fish Management Plan** shall be developed after raising the dam, including:

(i) Acceptable fish catches related to species (maximum annual catches in tons / year);
(ii) Closed season for different fish species in the dam lake;
(iii) Minimum mesh size;
(iv) Protected areas where fishing is not allowed (spawning habitats, breeding habitats);
(v) Fishing methods to be applied and not to be applied.

457. Water availability for downstream water users will depend on yearly flows and rainfall. Water availability for downstream users is expected to be low in dry years and even average years when the crops of upstream users are thirsty. Water user associations, Department of Agriculture, Irrigation, and Livestock (DAIL), and Department of Rural Rehabilitation and Development representatives and *mirabs* need to collaborate to get the best feasible water allocation for all water users.

458. **Increase in Water Borne Disease.** No increase of water borne diseases is expected due to the raising of the dam since water quality of the reservoir and below the dam will be monitored. While the surface area of the dam will increase and the opportunity for the incidence of malaria could follow, it is a reality in Kandahar that the current water borne health issues are more related to diarrhea associated with groundwater e-coli levels. Introduction of water protection zones will maintain water quality upstream of the dam and mitigate water borne diseases.

459. **Emergency Response.** In the event of any on-site accident or natural hazard occurring, it is necessary to have a prepared approach. In Appendix 8, a framework for the development of a plan is presented. The plan needs to be detailed by the PMU in collaboration with all implementing agencies, the contractor, and relevant communities.

Table 29. Summary of Risk Management Procedures for Operation Phase

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Environmental flows may be inadequate for downstream needs.		XXX		ARES to survey more rigorously the environmental needs along river. Sequential flow gauges to be installed to measure river and capacity building program with NEPA established to institute ongoing environmental flow management.	Low
Negative impact upon dam, the spillway or the channel after annual flows.		XX		A detailed water quality monitoring of the dam, spillway, channel and dam performance after each flow in the Spring.	Low
Continued erosion of river downstream during operation	XX			Annual control of the river banks is suggested in order to mitigate and prevent future erosion of the river.	Low

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Water Quality will vary with changes in hydrology, temperatures and winds.		XX		Monitoring of the water quality of the reservoir at various depths	Low
Farmers can interpret environmental flows as being available for their use.			XX	Ongoing education campaign to raise the understanding of environmental flows by all.	Low

Source: TRTA Consultants, 2019

E. Summary of Impacts

460. Impacts are summarized and listed in the EMP. Mitigation measures are proposed accordingly. The main impacts are as follow:

(i) Adverse impacts are related to the inundation of settlements, existing riparian vegetation including the “jungle”, and agricultural land adjacent to the dam lake. It is anticipated that there is only minor impact on wildlife and vegetation due to raising of the dam.

(ii) Impact on aquatic life (fish) and birds will be assessed by additional detailed environmental surveys. No major impact is expected as fish and birds are already used to changes in surface water level.

(iii) Impact on water quality due to raise of the dam will be monitored (reduction of oxygen content on the bottom of the reservoir).

(iv) Increased in seasonal surface water flows due to shorter melt-down periods, as well as associated increase in sedimentation and evaporation are expected due to climate change.

(v) Erosion in the channels below the spillways is not expected. Raising the dam will reduce flows over the spillways and increase the hydropower production.

(vi) Realignment and construction of route bearer highway will have a minor and short-lived impact on the environment.

(vii) The proposed phase one environmental flows are expected to positively contribute to aquatic habitats below the dam throughout the year and will have an overall positive impact on the river aquifer. However, they will be qualified and enhanced by findings and inputs from the detailed environmental survey to be conducted during the detailed design stage.

(viii) Impacts on the socio-cultural, physical and on the biological environment have been described. The impact with highest significance and highest magnitude will be loss of agricultural land and loss of settlements. Compensation measures including revegetation programs and relocating of residents have been taken into consideration.

(ix) Construction related impacts as noise generation and dust generation have been described as short-term limited to construction duration. Mitigation measures including installation of noise barriers and application of water spray, use of tarpaulins, cleaning of wheels have been suggested accordingly.

(x) Maintenance of good surface water quality during operation has been described. This will be implemented during operation of Dahla Dam through proper water management, source protection and water quality monitoring.

(xi) Community health and safety will be provided during construction and operation through provision of adequate health and safety equipment such as ear protection, helmets, inflammable working suits, safety shoes, breathing protection, and safety barriers.

F. Cumulative Impacts

461. The CIA process acknowledges that over time there will be, as a result of all the components of any project initiative, a compounding of both direct and indirect, positive and negative impacts on valued environmental and social components (VECs). These impacts are invariably operating at a level which is considered either outside of, or beyond the actual project footprint, or will emerge overtime. It is assumed with any CIA that mitigation measures applied at project level are successfully put in place and adhered to. The CIA aims to then assemble and scope the foreseeable impact the project can have at a macro level on VECs.

462. Multiple and successive environmental and social impacts from existing developments, combined with the potential incremental impacts resulting from proposed and/or anticipated future developments, may result in significant cumulative impacts that would not perhaps been identified nor expected in the case of a stand-alone development. Such impacts may include, for example:

(i) Increased pressure over time on the carrying capacity or the survival of an indicator species in an ecosystem, possibly an indirect result of project success;

(ii) Reduction of water flow in a watershed due to multiple withdrawals;

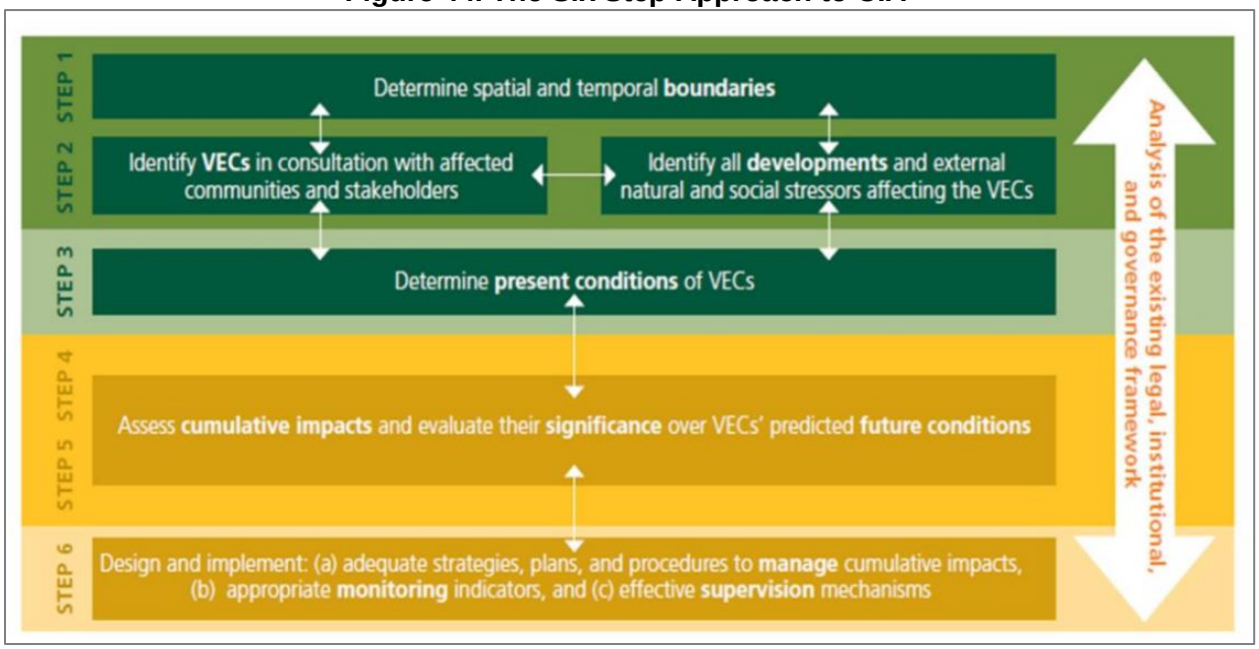
(iii) Secondary induced social impacts, such as in-migration, or greater traffic and accidents along community roadways owing to increases in transport activity in a project's area of influence.

463. The project and parallel investments for water supply and hydropower generation will have impacts upon (i) the ecosystem health, (ii) the sustainability of resource use, and (iii) the living conditions of people upstream and downstream of the Dahla Dam. The remodeling and operation of the Dahla Dam will initially result in the loss or at best, fracturing of existing habitat and this will have an incremental change in population carrying capacity of a habitat, merely as a result of a loss of habitat. This can then result in population size being forced into small areas which can have significant changes on predator prey relations and domination between different predators. Overtime, over population can also result in disease which will incrementally increase the mortality rate of fauna. It is critical to understand and to be able to measure what these changes mean.

464. To manage and positively overcome the above foreseen issues, multi-disciplinary approaches will be required. For any revegetation and re-establishment of renewed habitat to be sustainable, it will require careful establishment of alternative habitat, education programs regarding the importance of the birdlife, the aquatic life, the status of the catchment and importance of the multiple steps involved in achieving "source protection" etc. Over time, factors such as increasing and competing water use demands, threats to species biodiversity, degradation of ecosystem services, climate change and unpredictability of climate patterns as well as changing socio-economic circumstances all add complexity to risk assessment and management. All such variables will be part of a CIA.

465. The CIA process aims understand in a more systematized manner the interactions of these variables and the potential systemwide consequences resulting from the combination of individual effects of multiple actions overtime. The CIA is therefore an essential framework to improve risk management.[47] The IFC Good Practice Handbook lays out a six step process illustrated in Figure 44.

Figure 44. The Six Step Approach to CIA



Source: IFC Handbook Six Step Process for undertaking CIA.

466. This EIA process is currently still completing Steps 1-3 and has some indications as to Steps 4 and 5. In addition, the draft EIA has made some firm recommendations regarding the needs outlined in step 6, including strategies for improved understanding and stewardship to positively address catchment management, the adoption of an action-based research, monitoring and real-time data usage to refine the concept of environmental flows in the river, engagement of government partners and communities in the recommended "source protection" mechanisms. The EIA points to the need for long-term capacity building both within government and at the community level.

467. A number of examples of issues a CIA would be focused upon include mechanisms to achieve greater management of water against increase pressure upon the resource. output 4 promotes the need for careful stewardship of reticulated domestic water system thru user-pay mechanisms. Over the previous three years (2016-2018) the city of Kandahar has experienced a population growth average of 2.4%.[48] A considerable proportion of the growth has been attributed to in-migration due the war. However, should this growth continue there will be a doubling of population in 30 years, a scenario which places added pressure on the water resource. The "No increase in the irrigation command area" policy for is an example of directives which can promote greater resource stewardship and increased productivity; which in this case could be seen to be following the "more crop per drop" mantra. The hydropower investment will have some positive influence upon the current dependency on fossil fuel energy

[47] IFC (2013) Good Practice Handbook: Cumulative Impact Assessment and Management.
[48] worldpopulationreview.com/countries/afghanistan-population/

sources. The projected dam raise of 13.6 m will generate approximately 143,038 MWhr. Greenhouse gas savings will be 49,348.11 tons per year assuming that the import of electric power from Turkmenistan will be reduced. Afghanistan currently generates 44.7% of power from fossil energy (natural gas) in Turkmenistan. Reduced reliance on fossil fuels and increased utilization of renewable energy sources would reduce CO^2 emissions.

468. **Sistan Basin**. At the catchment level, the major VEC recognized thru an international agreement between Afghanistan and Iran is the Sistan Basin and the *hamouns* which require water.[49] To positively address such an issue requires an integrated intra-government approach, and previous projects including dams on the Helmand, as well as the Dahla Dam, have compromised the flows to the *hamouns*. Water impoundment developments across the Helmand River Basin over the last 70 years have provided water for irrigation, hydropower generation and, initiated in a few places, reticulated domestic water supply. The environmental impact and cost of these achievements, along with the processes to mitigate against them, is a very good example of the applicability of CIA. The evolving EF regime which is recommended for the Dahla Dam should aim to be contributing a minimum of 16% to the flow of the Helmand. Similar will be required for all dams. Government and regional planners have the ultimate responsibility for CIA, and projects such as the project can be a vehicle to create change.

469. **Summary**. A successful CIA process will identify and engage all relevant stakeholders to agree on VECs, and on each and all parties' responsibilities in the:

(i) management of the expected impacts on VECs;
(ii) monitoring and/or supervision of the overall condition of the VECs; and
(iii) appropriate implementation of agreed mitigation measures.

470. Direct and immediate impacts are identified as part of the current EIA process and the methodology for assessing the CIA from the project is reflected in this document. However, it is recommended that a longer-term perspective which scopes those issues that will be compounding over time, some of which the proposed project may have limited immediate ability to influence, will be a component of the ARES.

471. The planned ARES will be used, for example, to identify VECs and, combined with the feedback from both community consultation and relevant social data, will assist in identifying the critical key social issues which are inextricably linked to increased pressure upon those environmental components. The methodology for the CIA, particularly how the impact significance will be provided, will be detailed in the ARES terms of reference.

G. Limitations of the EIA

472. Project EIAs are generally limited to the direct impacts of the project. This approach directly distances itself from a wider range of impacts, including:

(i) **Cumulative impacts:** The environmental impacts of multiple plans, projects and other actions;

[49] Once the home of the Hamoun wetlands, an 800-square-mile (2,000-square-km) oasis fed by the Helmand River, has now become one of the driest in the world. Until the 1990s, the area was booming in agriculture and full of flora fauna. Located in southern Afghanistan, the Sistan Basin has been consistently dammed and used for irrigation for decades. That, coupled with one of the most severe droughts registered in the area ever, has turned the once thriving wetlands into a dust bowl. Precipitation has dropped 78%, and efforts to remedy the situation have been hampered by the war.

(ii) **Indirect, secondary or induced impacts:** These are impacts that occur several steps away from the original action;
(iii) **Global impacts:** Impacts that go beyond the local, project level, for instance climate change.

473. Cumulative impacts have been discussed. In addition, future environmental impacts in the project area could not be accounted for, due to fast population growth:

(i) Illegal settlements and increasing discharge of human excrement can affect water quality of the dam;
(ii) Deforestation; and
(iii) Illegal ground water and surface water abstraction.

474. The impacts of climate change have been assessed in this report. However, given the uncertainty around projections of climate change impacts in Afghanistan, it is difficult to model future environmental conditions (e.g. annual precipitation, intensity of rainfall patterns, temperature changes, and levels of atmospheric dust). The impact of climate change in the future is essential for water availability in the project area.

475. Ecological surveys such as the fish biological survey and the ornithological survey at the dam are snapshots of the baseline environment. They give only a good indication of the baseline environment. Additional indicator species (e.g. migratory birds) and their respective habitats might not have been assessed and will not be considered in the water management plan of the reservoir.

476. The security situation is an essential limiting factor of ecological surveys at the dam. There is high risk that assessment of habitats and wild life will be incomplete due to security reasons. Access to existing wetlands, shallow water zones, reed and the estuary of the river is limited or not possible.

477. Baseline information regarding the physical, biological and the socio-cultural environment is incomplete or not available. Data gaps have been recognized in the project area, such as:

(i) Data on flora and fauna including species lists;
(ii) Endangered species;
(iii) Sensitive and unregistered habitats;
(iv) Current flow data of Arghandab River and its tributaries;
(v) Water quality data of water courses (dam, canals, and the Arghandab River).

478. Identification of project impacts is limited and can be incomplete. A sustainable water management plan for the dam can be developed only after completion of detailed biological and ornithological surveys. Each survey has to be conducted for at least half a year to assess migratory birds, nesting habitats and breeding habitats for birds and fish. Any changes in the seasonal occurrence of species shall be recorded.

479. Impacts on the Arghandab and on the Helmand River Basin could not be identified due to a lack of data including:

(i) Registration of all water intakes;
(ii) Flow measurements and water consumption of existing water intakes;
(iii) Drainage and backflow into the river;
(iv) Registration of waste / human excrement discharge points.

480. As suggested in the following section, a master plan for the whole river basin is required.

VII. ENVIRONMENTAL MANAGEMENT PLAN

481. Impacts and proposed mitigation measures summarized and described above are itemized in the Environmental Management Plan and Mitigation Measure Summary. It is expected that the EMP will be reviewed and developed to a greater level of detail as required during the detailed design stage. Responsibilities for mitigation implementation (pre-construction to operation) are shown. The major responsibility for implementing construction mitigation measures will rest with the contractors selected to implement civil works packages. These contractors will work under the supervision and overall management of the PMU.

482. Mitigation of operation-phase impacts involves capacity building of responsible institutions (ASBA, DABS and MEW), and the implementation of mitigation measures by these strengthened institutions. Capacity building to implement operation-phase mitigation will be planned by MEW. The planned capacity building activities will be delivered by staff or contract trainers under their supervision to staff/members of the ASBA, who will be responsible for implementing operation-phase mitigation. A detailed program for capacity building will be developed during the detail design stage.

483. The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; sensitivity, scale, nature, and magnitude of its potential impacts. Significance (degree) and magnitude (geographical extent) of the impacts have been evaluated and included in the EMP. Further, the EMP provides adequate opportunities towards course correction to address any residual impacts during construction and operation.

A. Summary

Table 30. Environmental Management Plan and Mitigation Measure Summary

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
Detailed Design and Pre-construction						
Procedures to protect water source	Dahla Dam body of water needs protection from all potentially harmful agents	H	H	Commence steps to highlight procedures which will protect the water source from potential contamination by the construction, adjacent settlement, surrounding and upstream land-uses etc. both within and beyond the life of the project.	MEW, PIU Mirabs, NEPA	Part of detailed design
Identify historical artefact	Historical artefact discovered during construction phase will result in interruption of construction activities	L	L	Implement archaeological survey before the construction phase and identify procedures to follow should same be unearthed.	MEW, PIU, Archaeology Institute Kabul	Part of detailed design
Complete site geotechnical	Assessment should be made of the existing	H	H	Results from investigation to inform the structural and safety requirements of any upgrading of	MEW, PIU,	Part of detailed design

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
investigation	dam wall including structural requirements and safety of proposed wall			existing structure.		
Identification of borrow pits for construction material	The size of the material required for the dam walls will leave considerable cavity	M	M	Location of all borrow pits need to be canvassed with community leaders with a clear explanation of “impact and make-good” practices communicated.	MEW, PIU,	Part of detailed design
Construction activities	Impacts on environmental sensitive areas and on environment	H	H	Apply NOC at NEPA before construction activities.	NEPA, PIU, MEW, ASBA, DABS	Part of design costs
Define expected high-point of new water body	Existing informal settlement and agricultural activity will be impacted	H	H	LARP will be put into action.	MEW, PIU,	Part of detailed design
Realignment of route bearer highway	New route for Highway may present problems	L	L	New road alignment needs to be communicated with community.	MEW, PIU,	Part of detailed design
Transportation of construction material	Unorganized transportation of construction material will cause social impacts	H	J	Identification of transportation routes and parking areas for heavy machinery and truck.	MEW, PIU, contractor	Part of design costs
Consideration of sedimentation flushing technology	Technology which liberates sediment and provide positive downstream benefits	L	M	Investigate further if such technology can be cost-effective.	MEW, PIU,	Part of detailed design
Assess appropriate catchment management plan	Implementation of a plan to minimize surface sediment flows would be positive	L	M	Complete an assessment of potential catchment management plans as part of the ARES.	MEW, PIU,	Part of detailed design
Raising of water levels above existing	Assess and develop response to riparian vegetation loss	M	H	Complete interrogation of remote sensing data to quantify and qualify the “jungle” vegetation characteristics and determine appropriate site for rehabilitatory program.	ARES, NEPA, MEW	Part of detailed design

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
Bird hunting in Dahla reservoir and downstream	Birdlife diversity endangered	L	L	Propose effective way to strengthen enforcement of relevant regulations.	ARES, NEPA, ARAZI	Part of detailed design
Medium to longer-term change in downstream water conditions	Agronomic practices may benefit from greater levels of 'extension' and advice	L	L	Consideration given to practices which may assist farmers using modified systems.	MEW, PIU, DAIL	Part of detailed design
Flooding	Uncharacteristic weather events may increase including flooding	M	M	Assessment of vulnerability of downstream settlement and farming areas.	MEW, PIU,	Part of detailed design
Institute diversion canals	To avoid any cessation of water supply during construction	H	H	Design to incorporate diversion canals in order to maintain downstream water needs.	MEW, PIU,	Part of detailed design
Location of construction camps and storage facility	Construction camp and stockpile area need to be located where they will have minimal impact	M	M	Location of camps to be identified in consultation with community leaders during design phase. These sites are expected to be downstream of saddle dam 6 where previous construction camps where located.	MEW, PIU,	Part of detailed design
Working hours	The timing of activities may have social impact upon farming and community life	M	M	Design will incorporate the specific need to communication with community on all relevant issues. Construction sites are at least 1,000m away from any villages for the dam raise but only 150m away for one village for the route bearer highway realignment.	MEW, PIU, Contractor	Part of detailed design
Design of construction activities	Impacts on environmental sensitive areas and on environment	H	H	Standard construction environmental safeguard clauses will be part of the tender documents to avoid construction related impacts. Apply NOC at NEPA before construction activities.	NEPA, PIU, MEW, ASBA, DABS	Part of design costs
Construction activities	Uncontrolled disposal of waste	H	H	Preparation of SSEMP including waste management plan to manage proper disposal waste on designated landfill.	MEW, PIU, contractor	Part of design costs
Excavation of soil	Uncontrolled disposal of soil	H	H	Development of soil management plan as part of the SSEMP.	MEW, PIU, contractor	Part of design costs
Construction						

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
Operation of contractor's camp	Impact on groundwater, surface water, soil at the contractor's yard	M	H	Layout plan of the work camp including description of precautionary measures. SSEMP developed by contractor including workers sanitation management plan, comprehensive waste management plan. Description and layout of equipment maintenance area. Description of lubricant and fuel storage facilities area.	PIU, Contractor	Part of construction costs
Construction phase; Dahla Dam and six saddle dams	Historical, archaeological findings during excavation	M	M	Contractor shall have protocols in SSEMP regarding any excavation work, to ensure that any archaeological or culturally significant findings are recognized and measures are taken to ensure they are protected and conserved. This will involve: (i) Having excavation observed by a person with archaeological field training; (ii) Stop work immediately to allow further investigation if any findings are suspected; (iii) Calling the state archaeological authority if a finding is suspected and taking any action they require to ensure its removal or protection on-site.	Contractor, PIU	Part of construction costs
Construction site clearance including tree removal	Loss of ecological services and aesthetic value of trees removed from construction sites	M	M	Develop and implement revegetation strategy.	Contractor, PIU	Part of construction costs
Construction phase; Dahla Dam and six saddle dams	Impact on soil	L	L	Dispose roadway rubble on a waste disposal site. Avoid scheduling of excavation work during heavy rain. Complete the excavation and foundation during dry weather. In unavoidable circumstances, protect open trenches from entry of rain water by raising earthen bunds with excavated soil.	PIU, contractor	Part of construction costs
Construction phase; Dahla Dam and six saddle dams	Risk due to high-risk seismic intensity zone	M	M	Apply design and construction norms of low-risk seismic zone. Select appropriate material and design according to seismic intensity of project area.	Design consultant, contractor	Part of design costs
Construction phase; Dahla Dam	Loss of top soil	M	M	Top soil of approximately 0.3 m shall be removed and stored separately during excavation work,	PIU, contractor	Part of construction

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
and six saddle dams				and after construction the same soil shall be replaced on the top.		costs
Construction phase; Dahla Dam and six saddle dams	Erosion due to excavation/refilling	M	M	No vegetation shall be removed from the slopes; clearing of shrub, bushes and grass shall be limited to actual construction area only; no clearance is allowed for activities such as material/waste storage, concrete mixing, etc. as per SSEMP. Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer.	PIU, contractor	Part of construction costs
Construction phase; Dahla Dam and six saddle dams	Impact on ambient air quality due to dust generation	M	M	Cover or damp down by water spray on the excavated mounds of soil to control dust generation in populated areas as per SSEMP. Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process. Bring the material (aggregate and sand) as and when required. Ensure speedy completion of work and proper site clearance after completion. Damp down unsurfaced/bad condition roads to avoid dust generation while using for transport of waste/material. Use tarpaulins to cover loose material that is transported to and from the site by truck. Control dust generation while unloading the loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside barricaded area. Clean wheels and undercarriage of haul trucks prior to leaving construction site. Do not allow access in the work area except workers to limit soil disturbance and prevent access by fencing.	Contractor, PIU	Part of construction costs
Construction phase; Dahla Dam and six saddle dams	Impact on air quality due to emissions from construction equipment/	M	M	Ensure that all equipment and vehicles used for construction activity are in good condition and are well maintained as per SSEMP.	Contractor, PIU	Part of construction costs

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
	vehicles			Ensure that all equipment and vehicles confirms to emission and noise norms.		
Construction phase; Dahla Dam and six saddle dams	Removal of vegetation/trees for construction and impacts due to presence of open trenches	M	M	Avoid tree cutting and small changes of layout plan/alignment. In unavoidable cases, plant five trees of same species for each tree that is cut for construction as per SSEMP. Bushes and grasses shall be cleared only in actual construction area, all other preparatory works (material storage) shall be conducted on barren lands without vegetation.	Contractor, PIU	Part of construction costs
Construction phase; Dahla Dam and six saddle dams	Disturbance/nuisance/noise due to construction activity including haulage of material/waste	M	H	Plan transportation routes in consultation with rural authorities, road department, and Police as per SSEMP. Schedule transportation activities by avoiding peak traffic periods. Use tarpaulins to cover loose material that is transported to and from the site by truck. Control dust generation while unloading the loose material at the site by sprinkling water. Clean wheels and undercarriage of haul trucks prior to leaving construction site. Educate drivers: limit speed between 20-25 km/h in settlements and avoid use of horn. Earmark parking place in town for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement. Prepare a traffic guiding concept for the construction period. Provide prior information to local people about work. No night-time construction activities including material/waste haulage.	Contractor, PIU	Part of construction costs
Construction phase; Dahla Dam and six saddle dams	Socio-economic benefits from employing local people in construction work	H	H	To the extent possible labor force must be drawn from the local community.	Contractor, PIU	Part of construction costs
Construction phase; Dahla Dam	Safety risk – public and worker	H	H	Follow standard and safe procedures for all activities – such as provision of shoring in deep	Contractor, PIU	Part of construction

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
and six saddle dams				trenches (>2 m) as per SSEMP. Exclude public from the site – enclose construction area, provide warning and sign boards, security personnel. Provide adequate lighting to avoid accidents. Ensure that all workers are provided with and use appropriate Personal Protective Equipment - helmets, hand gloves, boots, masks, safety belts (while working at heights etc.). Maintain accidents records and report regularly.		costs
Construction phase; Dahla Dam and six saddle dams	Cumulative impacts – repeated disturbance to roads and people	M	M	Schedule the construction activities in harmony with the other ongoing works. Schedule works before road work.	Contractor, PIU	Part of construction costs
Construction phase; Dahla Dam and six saddle dams	Contamination of surface water	H	H	Store fuel tanks away from surface water on a safe location - minimum 50 m distance to surface water. Provide modern non-leaking equipment. Refuel engines at minimum distance of 50 m to surface waters. Provide adhesive agent for mineral oil. Excavation and disposal of waste and contamination.	Contractor, PIU	Part of construction costs
Extension of existing saddle dams and main dam wall by 13.6m	Existing reservoir area is about 29.54 sq. km, once raised, the reservoir area will be around 45.81 sq. km.	L	L	Construction material (stones, rocks, rip rap, gravel) will originate from adjacent licensed quarries - no impact on landscape expected. Any removed vegetation due to permanent inundation will be considered part of the revegetation program.		
Construction works during raise of the dam and saddle dams	Impact on water quality (turbidity)	L	M	Construction works to be implemented during dry season - no increase of turbidity at saddle dams as water body of reservoir will not touch saddle dams; geotextile bags provided at main dam to mitigate turbidity.		
Construction works during raise of the dam and saddle dams	Impact on existing aquatic life within dam (turbidity, vibration, noise)	L	L	Fish will migrate to untouched areas of the reservoir. No underwater blasting is expected to be required and no blasting is envisaged at the dam site at all. (Blasting maybe needed to quarry material along the existing route bearer highway).		

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
Construction works during raise of the dam and saddle dams	Impact on bird life (vibration, noise)	L	L	Birds will leave the construction site and search for habitats close to the reservoir, no mitigation measures are required.		
Construction roads	Crop damage from temporary construction roads, cutting of trees	H	H	Community consultation. road siting and timing. If significant impact, compensation to be implemented, if tree cutting is expected five trees of the same species will be planted.		
Operation of vehicles and equipment; generation of liquid and solid waste	Excessive noise, dust, air / water pollution, fuel/oil spills, pollution from improper liquid/solid waste disposal	M	M	Routine construction housekeeping measures per contractor all detailed and monitored in SSEMP.		
Operation and Maintenance						
Release of water below the dam into Arghandab River	Erosion of the river bed and embankments, sedimentation upstream of weirs	M	M	River bank structure from the tailrace to the reservoir is dominated by larger stones and boulders, regular inspection of the river bed in spring, sediments have to be excavated and stored, no flushing of sediments as sediments will clog the gap system of the river and destroy spawning habitats and aquatic habitats.	MEW PIU ASBA contractor	Included in MEW staff costs
Release of water over the spillway	Erosion of spillway channel	M	M	The existing rock lining is sufficient for stability, regular monitoring of the spillway required to prevent further risks, regular inspection of channels in spring.	MEW PIU ASBA contractor	
Recharge of the reservoir	Sedimentation of the reservoir and increased sedimentation due to climate change	M	M	Construction of upstream dam would reduce sedimentation (Hasanzay dam).	MEW	
Rise in dam wall	Flooding of existing bird habitats and wetlands	M	M	Ornithological survey will identify existing habitats and bird species, no impact expected as new wetlands will arise due to ongoing sedimentation, birds can move to estuary of Arghandab River.	MEW, PIU	
Rise in dam wall	Flooding of settlements, agricultural land	H	H	Compensation and resettlement due to resettlement action plan.	MEW, PIU	
Water depth of the reservoir will	Loss of oxygen on the bottom of the reservoir	M	M	Oxygen concentration on the bottom has to be monitored, concentration <4 mg/l threaten	MEW, contractor	

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
increase				aquatic organisms, fish will move to higher water layers where is more oxygen.		
Decrease in water level of the reservoir due to water release	Reduced water volume threatens aquatic organisms	H	H	Minimum water volume is required to keep aquatic organisms alive, minimum volume to be determined after fish survey.	ASBA MEW contractor	
Operation of turbines	Fish losses are expected during the passage through turbines	H	H	Sustainable environmental flow will create aquatic habitats below the dam.	ASBA, PIU	Part of construction costs
Operation of Dahla Dam	Contamination of water source, eutrophication of the dam lake	H	H	Installation of water protection zones. Elimination of point pollution sources alongside open water sources for example inflow pipes for street runoff water, other forms of wastewater and garbage disposal. No settlements at a distance of at least 500 m to the lake.	MEW, PIU, ASBA	
Construction of Route Bearer Highway						
Discovery of physical/ heritage resources	Destruction of physical/ cultural resources	M	M	Stop activity, prepare "chance" find procedures.	Contractor, PIU	Part of construction costs
Construction of route bearer highway	Erosion or sedimentation caused during clearing or earthworks	M	M	Implement water spray to prevent wind erosion, revegetation of cleared areas, protect side slopes use gabion baskets.	Contractor, PIU	Part of construction costs
Construction of route bearer highway	Soil contamination from spillage of oil or other chemical substances	M	M	Store chemicals in secure area / compound, with concrete floor and weatherproof roof. Ensure construction plant is maintained in good condition and any leaks are quickly repaired. Remediation of soil spills. Storage of hazardous substances at minimum distance of 100 m from water courses.	contractor	Part of construction costs
Construction of route bearer highway	Disposal of surplus soil, excavated material	L	L	Disposal at designated site (mining pits, mining galleries); storage of topsoil to be used for revegetation, reuse of surplus material for road construction.	Contractor, PIU	Part of construction costs
Construction of route bearer highway	Air pollution from dust or exhaust emissions (CO,	M	M	Implement dust suppression measures including watering of exposed surfaces. Cover all trucks carrying	Contractor	Part of construction costs

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
	NOx, SOx, etc)			dispersible materials to or from the construction site. Minimize size and duration of cleared areas. Ensure all construction vehicles and equipment are well maintained.		
Construction of route bearer highway	Interference with existing infrastructure (telecommunication., electricity, water, waste water)	M	M	Research of underground cables and pipes.	Contractor	Part of construction costs
Construction of route bearer highway	Exploitation of local resources incl. poaching	L	L	Poaching or felling trees that are not required to be cleared or removed by the project within the project areas will be forbidden. Contractor will impose sanctions on any worker for poaching for felling trees unnecessary for the project.	Contractor	
Construction of route bearer highway	Noise from construction machinery and equipment	M	M	Ensure all construction vehicles and equipment are well maintained. As far as possible limit noisy construction activities to day-time hours in the vicinity of houses and hospitals and to night-time hours in the vicinity of schools; construction activities from 7.00 am to 7.00 pm to be discussed with local stakeholders. Concrete and asphalt mixing stations must not be located nearby residential areas, schools and hospitals. Inform nearby community of schedule and duration of construction works. Provide workers with noise abatement equipment (ear-plugs etc).	Contractor, PIU	Part of construction costs
Construction of route bearer highway	Changes to road safety / traffic movements, property access			Install signage and lighting in vicinity of works on public roads. Install temporary access to affected properties. Rebuild good quality permanent access to affected properties on completion of construction works. Inform nearby community of schedule and duration of construction works. Limit construction vehicle	Contractor, PIU	Part of construction costs

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
				movements to main transport routes as far as possible. Development of a traffic control plan.		
Construction of route bearer highway	Interference with commercial activities on roadside	M	M	Install temporary access to affected properties. Rebuild good quality permanent access to affected properties on completion of construction works. Notify nearby community of schedule and duration of construction works not less than two weeks in advance of works.	Contractor, PIU	Part of construction costs
Construction of route bearer highway	Employment or livelihood benefits from employment of local people	H	H	Maximize the number of local people involved in the construction works.	Contractor, PIU	Part of construction costs
Construction of route bearer highway	Visual and landscape impacts	M	M	Revegetation measures, use of stored topsoil. Only material from licensed borrow pits to be used for construction; excavated material to be used as fill material for base layer and embankments if suitable to reduce volume of surplus material.	Contractor, PIU	Part of construction costs
Construction of route bearer highway	Risks to public or construction worker health or safety	M	M	Provide safety equipment to workers and train them in its use.		Part of construction costs
Construction of route bearer highway	Felling of fruit trees in Shahjoi village and adjacent agriculture land	H	H	Replant / replace fruit trees, five trees for each tree to be felled.	Contractor, PIU	Part of construction costs
Operation of Route Bearer Highway						
Operation of route bearer highway	Changes to road safety	H	H	Installation of road safety/speed limit signage where accidents are likely to occur.	PIU, contractor	Part of operation costs
Operation of route bearer highway	Environmental damage from accidents involving spills of chemicals or other hazardous substances	H	H	Install speed limits and warning signs in areas of difficult driving conditions; no transportation of hazardous substances in water protection areas; development of emergency plan.	PIU, contractor	Part of operation costs
Operation of route bearer highway	Changes in dust levels or air quality	M	M	Upgrade / rehabilitation of the road decreases dust generation. Vehicle emissions must be monitored according to national standards. Work with local authorities to	PIU, contractor	Part of operation costs

Project activity	Potential impacts	Mag	Sig	Proposed mitigation	Responsibility	Cost
				ensure regular cleaning of the road surface. Work with local authorities to implement regulations for trucks to wheel washing and covering of dispersible loads.		
Operation of route bearer highway	Erosion at water courses crossings (bridges and culverts), or in areas of fill or embankments	L	L	Implement stabilization and anti-scouring measures as required at bridges and culverts.	PIU, contractor	Part of operation costs
Operation of route bearer highway	surface water or groundwater pollution from contaminated road surface runoff	L	L	Undertake regular maintenance and cleaning of roads; construction of water retention measures. Work with local authorities to restrict movements of polluting vehicles. Maintenance of road drainage system.	PIU, contractor	Part of operation costs

H-High; M- Medium and L-Low; Mag-magnitude; Sig-significance
PIU: Project Implementing Unit
Source: TRTA Consultants, 2019

B. Environmental Monitoring

484. A program of monitoring will be required to ensure that all concerned agencies take the specified action to provide the required mitigation and assess whether the action has adequately protected the environment, and to determine whether additional measures may be necessary. Regular monitoring of mitigation measures by contractors will be conducted and overseen on behalf of MEW. Monitoring during the operation stage will be conducted by the contractor in line with ADB requirements.

485. Environmental monitoring involves: (i) sampling program for systematic collection of data/information relevant to environmental assessment and project environmental management; (ii) analysis of samples and data/information collected, and interpretation of data and information. Environmental monitoring is carried out before, during, and after the construction phase. Environmental monitoring will be implemented to detect changes in the key quality parameters. The results of the monitoring program are used to evaluate the following: (i) magnitude and significance of the environmental impacts; (ii) efficiency of the environmental protection measures.

486. Environmental monitoring includes a sampling program. The collected data will show whether objectives have been achieved (e.g. effectiveness of mitigation measures). The monitoring program has to consider its practicability considering the technical, financial, and capability of the institutions that will carry out the program and period of monitoring that will be needed to achieve the objectives.

487. The EMP includes implementing institutions. Locations and frequency of monitoring are also listed.

488. Most of the mitigation measures are standard methods of minimizing disturbance from building in rural and urban areas (maintaining access, planning work to minimize public inconvenience and traffic disruptions, finding uses for waste material, etc.). Monitoring of such measures normally involves making observations in the course of site visits, although some require more formal checking of records and other aspects.

489. The following tables show the proposed EMP for this project, which specifies various monitoring activities to be conducted. It describes: (i) mitigation measures, (ii) parameters to be monitored, (iii) location, (iv) measurement method, (v) frequency of monitoring and (vi) responsibility (for both mitigation and monitoring). Monitoring will be implemented on the following parameters: all design and construction related mitigation measures, water quality, air quality, ground water, noise, and flow of Arghandab River.

490. The water quality monitoring will detect trends of water quality and minimum and maximum values of water quality parameters. Needs for mitigation will be detected (e.g. for oxygen depletion). The focus of the water quality monitoring program will be to document the water quality changes resulting from the construction and operation of Dahla Dam. Monitoring during operation of the dam will be important for the judging whether the natural aeration of the dam will be sufficient, especially in dry years and during low water levels of the dam. A conventional water sampling and laboratory analysis approach is considered the most reliable monitoring method at this point.

491. Two monitoring locations are suggested at this stage in the area of influence of Dahla Dam: upstream and downstream of the dam. Parameters relevant to the oxygen and the eutrophication situation have been given priority.

492. A monthly monitoring frequency is recommended at this stage and might have to be adjusted during construction and operation. Monthly reports should present aggregate data in table and figure format, accompanied by narrative explanation and interpretation. A separate section should summarize the water quality situation and changes related to the project and project activities.

493. Monitoring will be implemented by an independent consultant. The consultant will prepare monthly monitoring reports during construction and operation. Reports will be submitted to NEPA for final approval.

494. Environmental training will be conducted before the beginning of construction activities. The training will involve the construction supervision, environmental engineers and work force. The training will focus on implementation of mitigation measures as listed in the EMP, waste management, storage of hazardous substances, oil spill prevention, noise and dust prevention soil management, noise and air quality monitoring, etc.

495. The Project Implementing Unit (PIU) will consist of responsible parties as ASBA, MEW, local government of Kandahar, DABS and the contractor.

Table 31. EMP Construction Phase – Dahla Dam

Mitigation measures	Parameters to be monitored	Location	Measurements	Frequency	Responsibility
All construction related mitigation measures	Implementation on-site	All construction sites	Observations on/off site; interviews with people and workers	Weekly	Contractor, PIU, MEW

All design related mitigation measures	Inclusion in the project design	-	Design review	As needed	Contractor, PIU, MEW
Water quality measurement during and after construction	Turbidity, pH, conductivity, temperature	Upstream and downstream of the dam		Before and during construction	Contractor, PIU, MEW
Mitigation measures related to air quality	Air quality monitoring (NO_2, SO_2, CO, $PM_{2.5}$, PM_{10})	Construction site, Camp site	According to WB – IFC standards	Monthly before and during construction	Contractor, PIU; MEW
Mitigation measures related to noise	Noise levels monitoring	Construction site, Camp site	According to WB – IFC standards	Monthly before and during construction	Contractor, PIU; MEW

Source: TRTA Consultants, 2019

Table 32. EMP Operation Phase – Dahla Dam

Mitigation measures	Parameters to be monitored	Location	Measurements	Frequency	Responsibility
Conduct water quality monitoring	Turbidity, conductivity, temperature, oxygen, transparency (Secchi-depth), BOD5, COD, heavy metal, color, Total Alkalinity (as CaCO3), Alkalinity P (as CaCO3), Alkalinity M (as CaCO3), Bicarbonate HCO3-, Carbonate-Hydroxide OH-, Chloride Cl-, Taste Sulphate SO4, Taste Sulfite SO3, Sulfide S2, Fluoride F, Fluorosis, Nitrate NO3-, Nitrite NO2-, Phosphate PO4, Boron B, Bromide Br-, Total Hardness: (as CaCO3), Calcium Hardness: (as CaCO3), Sodium Na+, Taste Potassium K+, Calcium Ca2+, Chromium Cr6+, Cancerogenic, Magnesium Mg2+,	Upstream and downstream of the dam, in the dam at water surface and on the bottom		Once per month	Contractor, ASBA

	Ammonium NH4+, **Odor - taste threshold**, Manganese Mn2+, Copper Cu total, Taste Aluminum, Total iron Fe2+ and Fe3+, Taste and odor, Total Arsenic				
Conduct groundwater monitoring	Ground water level	Wells of Kandahar Water Supply Agency		Monthly	Contractor, Kandahar Water Supply Agency
Monitoring of flow in Arghandab River basin	Flow	Gauging stations of MEW on the Arghandab River		Monthly	MEW
Planting of trees as compensation measure	Counting and assessment of planted trees	On-site	Qualified assessment of establishment	At planting and monitoring during establishment	Construction supervision

Source: TRTA Consultants, 2019

Table 33. EMP Construction and Operation – Route Bearer Highway

Mitigation measures	Parameters to be monitored	Location	Measurements	Frequency	Responsibility
Construction					
Conduct monitoring of quarries	Visual inspection to ensure quarry rehabilitation as per EMP	quarries	Visual inspection	Weekly	Environmental construction supervision, PIU
Conduct air quality monitoring in Shahjoi village	Monitoring baseline particulate to the standard PM2.5	At village which is 150m from the road realignment	PM2.5	Before works commence and weekly during construction	Environmental construction supervision, PIU
Ensure vegetation clearance has been minimized	Visual inspection of the vegetation	Material Storage Sites	Visual inspection	Weekly	Environmental construction supervision
Minimize erosion	Visual inspection of prevention measures per EMP and occurrence of erosion	Road corridor / slopes	Visual inspection	Weekly	Environmental construction supervision, PIU
Minimize / prevent rockfall	Visual inspection of rock fall sites	Active rock fall sections, steep slopes	Visual inspection	As required	Environmental construction supervision, PIU
Minimize soil and water contamination, storage in	Visual inspection of storage areas	Storage of hazardous substances, contractor's	Visual inspection	Weekly	Environmental construction supervision, PIU

double walled storage tanks / bins / drums. Provide collecting tray		camp			
Supervised proper waste management, provide waste management plan	Visual inspection of waste storage areas	Waste management	Visual inspection	Weekly	Environmental construction supervision, PIU
Minimize / prevent oil spills	Visual inspection of culverts and bridges	Surface Water Quality bridge sites, culverts	Visual inspection	As required	Environmental construction supervision, PIU
Location of plant out of residential areas > 500m away	Air quality	Asphalt plant	Visual inspection	monthly	Environmental construction supervision, PIU
	Dust suppression; PM	Road alignment	Visual inspection	Daily / weekly	Environmental construction supervision, PIU
dBA at sensitive areas as per EMP, use of silenced equipment, blasting and hammering, rock cutting to be implemented during the day	Noise and vibration	Construction site	Visual inspection of mitigation measures, monitoring of noise as per EMP	As required	Environmental construction supervision, PIU
Operation					
Noise mitigation measures: no night-time heavy vehicle traffic in residential areas	noise	Road alignment	noise	As required	Contractor
Air quality: regular road cleaning	Air quality	Road alignment	Air quality	Monthly, as required	Contractor
Erosion: regular inspection of slopes	Visual assessment of erosion resulting from project	Road alignment	erosion	Monthly, after rainfall	Contractor
Water quality	Road corridor and culverts during rainfall	Culverts and bridges	Water quality as per EMP		Contractor
Road safety	Road corridor	Road	Collect road	Twice / year	Contractor, PIU

		alignment	accident data	for 3 years or after complaint. Midterm monitoring	

Source: TRTA Consultants, 2018

C. Implementation Arrangements

496. The EMP is divided into the three critical stages of the project: (i) detailed design, (ii) construction / implementation and (iii) operation. It is critical for the success of the EMP that the contractors understand and implement the SSEMP with competence and conviction. Monitoring of the contractor will be the responsibility of the PIU, however the assumption behind the EIA is that there is a professional obligation which the contractor must assume for implementation to be successful. It is therefore critical that the contractor has the technical capability to develop and implement day-to-day management systems related to the complete range of physical and social issues.

D. Performance Indicators

497. The desired outcome from the implementation of the EMP is that there is both understanding and confidence that the full spectrum of potential issues foreseen during the project feasibility and formulation have been addressed. Table 34 summarizes and outlines a spectrum of indicators and targets which can be tracked over time.

Table 34. Performance Measurement Indicators

Issues	Inputs (resources)	Outputs (activities)	Intermediate outcome	Final outcome (environmental impact)
Construction mitigation measures on biophysical minimized	Baseline data sets established and monitored	Any variance in data established	Range of potential impact verified	Systematic evidence of success or otherwise through data
Contractor completes construction with attention to potential impacts	Implementation of SSEMP	Implement monitoring and inspections	Site variables managed appropriately	Foreseen Impacts resolved through SSEMP
Removal of vegetation and revegetation	Development of revegetation strategy	Replanting and establishment	New vegetation communities established	Vegetation begins to perform habitat functions
Water quality and quantity threatened during life of project	Diversion canals, water monitoring process	Water quality and quantity maintained and enhanced during life of project	All partners acknowledge success	Long-term source protection put in place
Steady involvement and participation by local community	Liaise with community groups and *mirabs*	Clear expectations and understanding with community	Involvement and commitment to success of project	Local ownership and support of construction process

Source: TRTA Consultants, 2019

E. Budget

498. The environmental monitoring costs covers the environmental monitoring for air, water quality and noise, on-site testing instruments, logistic support and maintenance costs. Total estimated costs for environmental monitoring implementation at Dahla Dam. The breakdown of monitoring costs of construction and operational phases of the dam are also calculated and shown in Table 35, Table 36 and Table 37.

Table 35. Cost Estimate for Environmental Monitoring Team

Position	Remarks	Number	Tentative salary (AFG)	Construction phase (36 months) (AFG)
Environmental expert	Engineer or scientist with sufficient experience dealing with environmental issues	1	45,340	1,632.24
Junior environmentalist	Engineer or Environmentalist having experience of dealing with environmental issues at project level	1	22,670	816.12
Administrative and support staff	One computer operator, one admin officer, one office assistant and one driver	4	40,000	5,760.00
	Total	**6**	**108,010**	**8,208.36**

Source: TRTA Consultants, 2019

Table 36. Environmental Monitoring Cost for Construction Phase (36 months)

Monitoring parameters	Monitoring locations/ sources	Monitoring frequency	No of sites	No of samples	Unit rate (AFG)	Total amount (M AFG)
Water Physiochemical and chemical parameters	Upstream and downstream of the dam	Monthly	2	72	5,668	408,096
Air quality Monitoring (NO_2, SO_2, CO, PM)	Construction site, Camp site	Monthly	7	252	5,668	1,428,336
Noise levels monitoring	Construction site, Camp site	Monthly	7	252	850	214,200
					Total	**2,050,632**

Source: TRTA Consultants, 2019

Table 37. Environmental Monitoring Cost for Operational Phase (5 Years)

Monitoring parameters	Monitoring locations/ sources	Monitoring frequency	No of monitoring sites	No of samples	Unit rate (AFG)	Total amount (M AFG)
Water quality physiochemical and chemical parameters	Dam	Monthly	3	120	5,668	680,160
					Total	**680,160**

Source: TRTA Consultants, 2019

VIII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Ongoing Consultations

499. Project communities have been consulted and informed in an ongoing, continuous process involving meetings with heads of villages and discussions with individual persons. The consultation process will continue throughout the project implementation phases. A similar procedure will be carried out throughout all project phases.

500. The team of environmental and social experts have been and will continue to conduct public consultations. Consultations have been arranged with the consent of the local stakeholders and according to the Afghan Administrative Guidelines for the Preparation of Environmental Impact Assessments (Jun 2008), the Environment Law (Article 19), and ADB's Public Communications Policy (2011). People have the right to be informed about and to participate in ADB projects.

501. Three consultative workshops and stakeholder meetings were held on Dahla Dam Multi-Sector Water Allocation Options in Kandahar and Kabul in November 2018, December 2018 and January 2019; during which environmental concerns were raised by participants.

502. The key environmental concerns raised by participants during the workshops can be summarized as follows:

(i) The participants thought that they are already facing water shortages;
(ii) Most of the biodiversity is found upstream and in or around the dam, where water is available during all months of the year;
(iii) Downstream lands are mostly private and people irrigate their crops when they need using their own boreholes;
(iv) Some species of birds living downstream fly to the upstream areas, when there is no water in the downstream areas. When an amount of water is allowed in the river for the environment, people will use that amount for irrigation;
(v) The participants thought that unless a strong water management system is created, environment flows will not be effectively utilized;
(vi) The Dahla Dam area is a picnic spot, families from all Kandahar city gather there on Thursdays. Participants requested the project to further improve the recreational area. For financial sustainability of the project, the government should collect a fee for admission to the park;
(vii) Conduct awareness campaign on the environmental issues and raise the awareness of people;
(viii) Train law enforcement agencies on environmental issues and enforcement, for example people illegally cutting trees and hunting protected species of birds.

503. A Consultative Workshop on output 1 Key Land Acquisition and Resettlement, Environmental Impacts is planned for 6-9 April in Kandahar city. The project's anticipated environmental impacts and extent of impacts will be presented to APs representatives and other stakeholders and public concerns will be discussed and evaluated. Further consultation sessions to be held during the detailed design and construction phase will be agreed upon during the workshop.

504. Baseline socio-economic surveys for all investment project components (including water supply and hydropower) have included household level questions to gauge how much people agreed or disagreed with the following statements:

(i) I am worried that water pollution may be affecting the health of my family;
(ii) Litter and garbage are a big problem in the area where I live;
(iii) I am worried that air pollution (either inside my house, or outdoors) may be affecting the health of my family;
(iv) I want to learn more about what I can do to make the environment better for myself and my family;
(v) People in my community are not aware of or concerned about the environment;
(vi) Climate change is making it more difficult for me to earn a livelihood.

B. Consultations During the Detailed Engineering Design Stage

505. The following criteria and methodology will be used for carrying out public consultations according to ADB's Public Communications Policy:

(i) Local communities and individuals who are directly or indirectly affected, are identified;
(ii) The local communities will be informed through public consultation, with briefings on the project interventions, including its benefits;
(iii) The environmental concerns and suggestions made by the participants are be listed, and discussed, and suggestions accordingly incorporated into the EMP.
(iv) Some other disclosing information methods to be considered are:
(v) Information campaigns, the media;
(vi) Public meetings;
(vii) Focus group discussions;
(viii) Household/individual interviews/discussions;
(ix) Workshops/seminars;
(x) Project websites; and
(xi) Local information boards.

506. The most commonly used approaches to consultations, information sharing and engagement with stakeholders are outlined as follows:

(i) Wide community consultations include a broad representation of the communities;
(ii) Targeted Stakeholders Consultations include specific groups of APs such as affected business owners, APs losing agricultural land, etc.
(iii) Workshops include representatives of local authorities and representatives of the project communities;
(iv) Focus group discussions include representatives of local authorities, communities, women groups, youth groups, and any other third parties to discuss specific project-related issues and gather participants' opinions, suggestions and concerns.
(v) Key informant interviews are conducted mostly during the project preparation phase to generate information and ideas about project.

(vi) Face-to-face meetings with the APs are held to clarify confidential information on the compensation amount, particular entitlements related to the APs' affected assets, complaints or concerns related to the project, as needed.
(vii) Questionnaires/interviews may include socio-economic questionnaires, census questionnaires, poverty assessments, gender-related interviews, etc.

507. Consultation proceedings should be properly documented. The essential documents should include:

(i) Summary,
(ii) List of the key issues raised by the participants,
(iii) Agreed actions,
(iv) Photographic records, and
(v) List(s) of participants.

508. Careful coordination and cooperation among the various stakeholders in the project will be necessary. Key stakeholders include the Government of Islamic Republic of Afghanistan, MEW, MAIL, DABS, ASBA, NEPA, Archaeology Institute Kabul, AUWSSC, Afghan Land Authority (ARAZI), and the Governor of Kandahar. Additional key stakeholders will include directly project APs, farmers of the area to be inundated, and residences who will suffer from inundation. NEPA will supervise compliance of environmental standards during the construction phase and operation phase (noise, air quality, water quality).

509. The minutes of the consultations, together with scanned signatures of the participants should be included in the monthly reports. The data should be disaggregated by gender, with the key information recorded at the top of the minutes, stating the number of participants, the number of men and the number of female participants.

510. The active involvement of NGOs and organizations representing women and other vulnerable groups is seen by MEW as essential in fostering positive community participation in the program and ensuring that the views and wishes of the disadvantaged are heard and acted upon.

C. Public Disclosure

511. ADB SPS (2009) requires the provision of relevant project information in a timely manner, at an accessible place and in a form and language(s) understandable to the APs and other stakeholders. Information disclosure involves delivering information about a proposed project to the APs and other stakeholders. The purpose of the information disclosure requirements specified under ADB SPS (2009) is to facilitate engagement of people so that a constructive relationship between the parties is established at the outset and maintained over the life of the project. Special efforts should be made to reach vulnerable groups lacking access to public media and information exchange.

512. A copy of the final, MEW and ADB approved EIA in English will be disclosed on ADB's website, while a copy of the final LARP in Pashto will be disclosed on the MEW website and at the District Governor's and other local authorities' offices. The LARP in Pashto will also be disclosed to the APs at the relevant local elders' offices in the project communities.

513. The public consultation and disclosure program with all interested and affected partied will remain a continuous process throughout the project implementation during pre-design, design and construction phase.

IX. GRIEVANCE REDRESS MECHANISM

514. **The Afghan Law on Land Acquisition 2017,** Article 34, 'Objection against Decision of Technical Panel' stipulates the grievance redress mechanism as follows:

(i) Whenever the owner or his/her legal representative is not satisfied regarding compensation of the expropriated property, he/she may present his/her objection statement with the reasons, within (60) days after the date of receiving information about compensation, to the Expropriating Authority.
(ii) The Expropriating Authority shall assess the objection stated in paragraph (1) of this article within 30 days and take appropriate decision.
(iii) Whenever the claimant is not satisfied with the decision of the Expropriating Authority, the issue shall be referred to a jury. The jury consists of: representative of relevant Union of Engineers, representative of Afghanistan Chamber of Commerce and Industries and representative of the people of the expropriated area.

515. The decision of the jury is final if the parties agree; otherwise the issue shall be referred to a competent court.

516. The existing grievance redress system may be used in conjunction with the project-related grievance redress mechanism (GRM). A project-specific GRM will be established to receive, evaluate, and facilitate the resolution of affected parties' concerns, complaints, and grievances about the social and environmental performance at the level of the project. The GRM will function during all phases of the project implementation. The GRM will aim to provide a time-bound and transparent mechanism to address and resolve social and environmental concerns linked to the project.

517. The GRM is a formalized way for the PMU (MEW) to identify and resolve concerns and people's grievances. It offers the displaced and APs a forum to voice their concerns, seek clarifications to their queries, or register complaints related to the project's performance. The scope of the GRM addresses issues related to involuntary resettlement, social and environmental performance, and information disclosure.

518. The displaced people (DP) will have the right to file complaints and/or queries on any aspect of the project, including land acquisition and resettlement. Under the adopted grievance mechanism, the DPs may appeal any decision, practice or activity related to the project. All possible avenues will be made available to the DPs to voice their grievances. The PMU will ensure that grievances and complaints on any aspect of the project are addressed in a timely and effective manner.

519. The fundamental objectives of the GRM are:

(i) To reach mutually agreed solutions satisfactory to both, the project and the DPs, and to resolve any grievances locally, in consultation with the aggrieved party;
(ii) To facilitate the smooth implementation of the LARP, particularly to cut down on lengthy litigation processes and prevent delays in project implementation;
(iii) To facilitate the development process at the local level, while maintaining transparency as well as to establish accountability to the APs.

520. The GRM will cover issues related to social, environmental and other safeguard issues under the ADB safeguard covenants and Afghan law. The APs will be fully informed of their rights and of the procedures for addressing complaints whether orally or in writing during the

consultations and surveys. Care will be taken to prevent grievances rather than relying solely on the redress process. This will be achieved through careful design and implementation, by ensuring full participation and consultation with the APs and by establishing extensive communication and coordination between the affected communities, the executing agency, and local governments in general.

521. The GRM consists of the project-specific systems which will be established at the project and district levels and as a regular system established at MEW. Grievance Redress Committees (GRC) will function for the duration of project implementation.

522. MEW follows ADB's Grievance Redress Procedure to address any dissatisfaction and complaints by residents regarding its activities. This procedure will be applied to address any complaints or grievances during the implementation of the project.

523. The project will establish a GRM to ensure greater accountability immediately after the loan becomes effective. MEW will prepare a GRM, acceptable to ADB, and establish a special committee to receive and resolve complaints/grievances or act upon reports from stakeholders on misuse of funds and other irregularities, including grievances due to resettlement. The special committee will (i) make public the existence of this GRM; (ii) review and address grievances of stakeholders of the project, in relation to either the project, any of the service providers, or any person responsible for carrying out any aspect of the project; and (iii) proactively and constructively respond to them.

524. The GRM will be established at three levels: (i) Project/District level; (iii) Province level and (iii) General Governor's Office level. If the complaint cannot be resolved at these three levels, a complaint will have a choice to lodge his/her complaint at the related court. MEW is oriented towards resolving complaints at the project level through negotiations with community leaders and representatives of APs. These discussions will be conducted by the PMU and will involve the affected groups and members of the relevant GRC, and the site manager and chief engineer of the construction contractor, if necessary. If a case cannot be resolved in this way it will be submitted to MEW GRC, led by the PMU Director. The GRM for the project is outlined below and consists of three levels with time-bound schedules for addressing grievances.

525. The committee consists of representatives of the community districts, elders and *mirabs*; and representatives of the governmental offices in Kandahar, such as ASBA Kandahar, MEW, *Shura* (community development council), PMU, Supervision Engineer site manager, social and environmental safeguard officer's complaint officer.

526. The first level and most accessible and immediate venue for the fastest resolution of grievances is the *Shura* and the District Governor representative. The District Governor representative with help of *Shura* and other GRC members, convenes a meeting of the GRC in the project area and conducts proceedings informally to reach an amicable settlement between the parties. The report of the committee is recorded in writing, and copies are provided to the parties involved. For this program, the GRC will be required to meet and reach a decision within 14 days of receiving a complaint (verbally or in writing) from an AP or his representative.

527. Should the grievance remain unresolved or the AP is not satisfied with the decision, the grievance can be lodged with the Province Governor office which will make a decision within 45 days.

528. If a person is dissatisfied with the ruling of the Province Governor Office decision, s/he or her/his representative may lodge their grievance with the General Governor's Office in Kabul

which will make a decision within 60 days. If the appellant is still not satisfied, s/he has the right to take his case to the public courts.

529. At the project level, the PMU environmental/social officer will be responsible for processing and placing all papers before the PMU GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued, and decisions carried out. In the event that a grievance is not addressed at the previous levels, the AP can seek legal redress of the grievance in the appropriate courts. Table 38 summarizes the envisaged grievance resolution process.

Table 38. Grievance Resolution Process

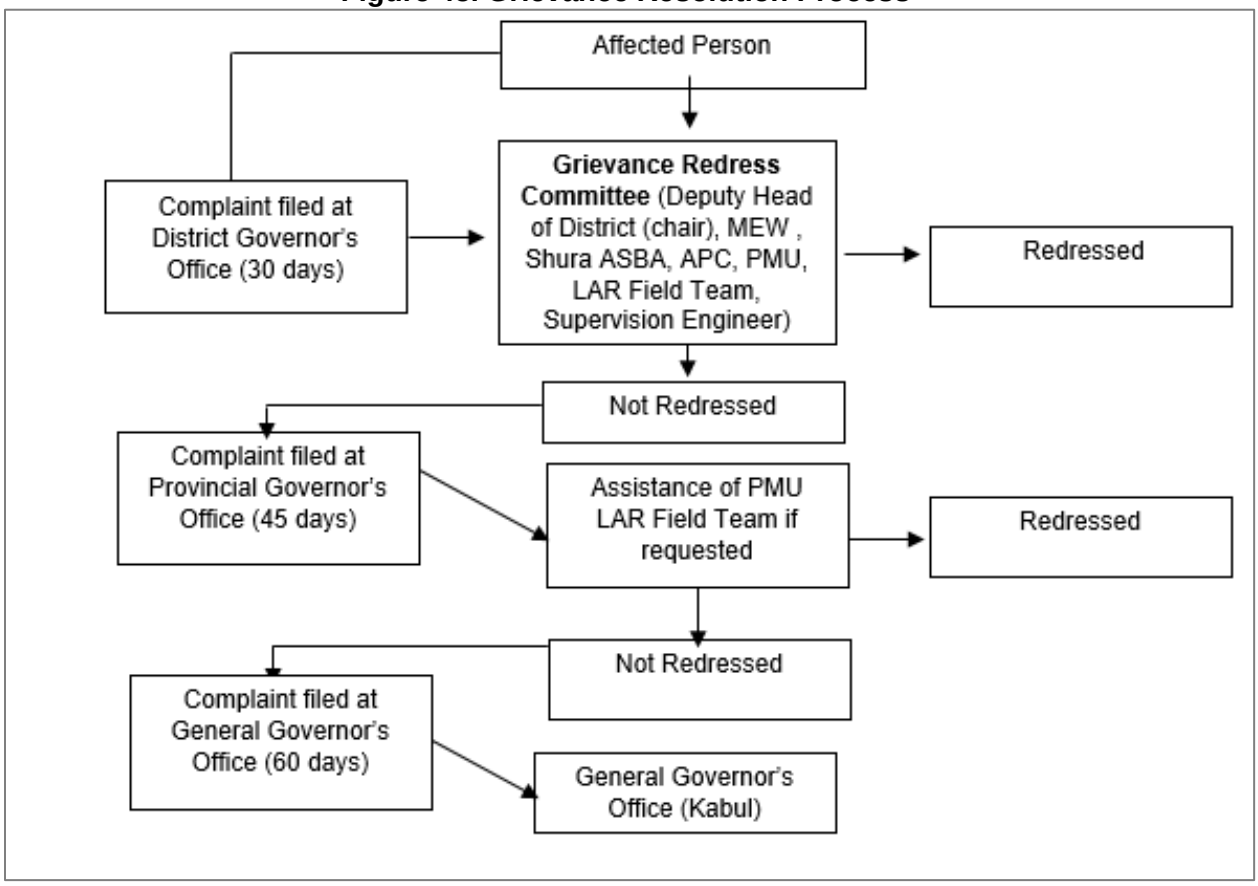
Steps	Process
Level 1	The complaint is informally reviewed by the GRC at the District Governor office with assistance of *Shura*, APs' representative and other GRC members, which takes all necessary measures to resolve the dispute amicably.
Level 2	• If the grievance is not solved at the previous level, the GRC at the Provincial Governor's Office will review the grievance and make a decision within 45 days. • The decisions will be issued by the conveyor and signed by other members of the GRC. The case record will be communicated to the complainant by the GRC at the provincial level. The grievance redress at this stage shall be completed within 45 days.
Level 3	If the aggrieved person is unsatisfied with the GRC decision at the provincial level, the next option will be to lodge grievances with the GRC at the General Governor's Office (Kabul). The Governor's Office will convey its decisions to the aggrieved person within 60 days after receiving the complaint.
Level 4	If the decision fails to satisfy the aggrieved person/s, they can pursue further action by submitting their case to the appropriate court of law (local courts) without reprisal. The aggrieved person can take legal action over the amount of compensation or any other issues, e.g. occupation of their land by the contractor without their consent, damage or loss of their property, restrictions on the use of land/assets, environmental concerns such as dust caused by the contractor's machinery, etc.

Source: TRTA Consultants, 2019

530. In addition, the complainant can appeal the decision and bring the case to the ADB Accountability Mechanism. The project level GRM does not in any way, impede the access of the complainants to the ADB Accountability Mechanism[50] or the country's judicial or administrative remedies. Should the complainant wish to register a complaint with the ADB AM, the focal person should provide the complainants the ADB Accountability Mechanism contact information. The grievance redress process is shown in Figure 45.

[50] ADB. 2017. "ADB Accountability Mechanism: Annual Report". Manila. Accessible at: www.adb.org/site/accountability-mechanism/main

Figure 45. Grievance Resolution Process



Source: TRTA Consultants. 2019

X. CONCLUSIONS AND RECOMMENDATIONS

531. The environmental impacts of output 1 have been assessed and described in the previous sections of this document. Potential impacts were identified in relation to detailed design, construction and operation of the components. Mitigation measures have been developed to reduce potential identified negative impacts to acceptable levels.

532. Major mitigation measures identified have been categorized into three phases: detailed design, construction and operation of the dam. The critical matters can be summarized as:

(i) Mechanisms to protect the water resource, the catchment and the associated biophysical elements associated and potentially impacted by the project;
(ii) Implementation of additional ARES biophysical survey to strengthen baseline data required for the detailed design phases (including existing aquatic populations and their migration and habitat requirements, flora surveys across riparian and surrounding catchment, and a bird survey to include increased details regarding migratory species and their habitat requirements);
(iii) Ensuring contractor has the capacity and management skills to produce, monitor and deliver on an SSEMP;
(iv) Targeted releases of environmental flows for aquatic habitats;
(v) Development, refinement and maintenance of appropriate environmental flows to ensure river aquifer recharge and sustainability of important ecological services provide by the river are established;
(vi) Long-term monitoring of water quality in the reservoir and beyond to preserve aquatic life;
(vii) Application of appropriate occupational health and safety for all workers associated with the construction;
(viii) Addressing of social concerns including loss of property (settlement and agricultural land) and enterprise opportunity, and appropriate compensation instituted same and addressed through the LARP;
(ix) consultation to establish clear communication with the community regarding management of working times, dust, noise and impacts from vehicular movements;
(x) Avoiding night-time construction activities;
(xi) Additionally, social consideration is given to maximizing work opportunities for local communities.

533. Irrespective of the actions taken during the EIA process and in the design of the project, it is anticipated that there will still be impacts on the environment during construction. However, the appropriate avoidance, monitoring, mitigation and enhancement measures put in place will assist to minimize and manage these foreseen impacts. These steps have been summarized in the EMP.

534. The EMP deals with a range of typical impacts associated with construction which are also identified and listed in the risk management tables. The mitigation measures include addressing the full range of construction phase impacts; stewardship of the use of all resources including machinery, care of the natural resources on the site (water, vegetation, flora and fauna), occupational health and safety of workers.

535. When it is in operation, the new dam will have overall beneficial impacts to the environment and livelihood of farmers compared to the existing situation. The following preconditions have to be followed up for a sustainable operation of the dam:

(i) Introduction of a waste collection system in villages and settlements around the dam (waste segregation, safe disposal of waste without endangering water resources, design of waste concept, and introduction of waste fees);
(ii) Registration and safe disposal of existing waste dumps;
(iii) Enhancement of waste management, especially littering of waste in open water courses to be addressed through the process of long-term education campaigns;
(iv) Long-term measures through awareness campaigns to protect vegetation and water resources including source protection. Implementation of management steps to monitor and improve vegetation and water quality downstream (e.g. prohibition of laundry in the Arghandab River and irrigation canals);
(v) Appropriate disposal and treatment of human excrement (design of decentralized technical simple solutions like reed beds, wetlands, septic tanks with gravity-based systems);
(vi) Reuse of untreated sewage sludge as fertilizer in agriculture will lead to a reduction of commercial fertilizers and a reduction of risks of nutrients (phosphate, nitrate, bacteria) to contaminate the groundwater.

536. Project EIAs are generally limited to the direct impacts of the project. This approach directly distances itself from a wider range of impacts, including:

(i) Cumulative impacts: the environmental impacts of multiple plans, projects and other actions;
(ii) Indirect, secondary or induced impacts: these are impacts that occur several steps away from the original action;
(iii) Global impacts: impacts that go beyond the local, project level, for instance climate change.

537. The impacts of climate change have been assessed. However, given the uncertainty around projections of climate change impacts in Afghanistan, it is difficult to model future environmental conditions (e.g. annual precipitation, intensity of rainfall patterns, temperature changes, and levels of atmospheric dust). The impact of climate change in the future is essential for water availability in the project area.

538. Baseline information regarding the physical, biological and the socio-cultural environment is incomplete or not available. Data gaps have been recognized in the project area, such as:

(i) Data on flora and fauna including species lists;
(ii) Endangered species;
(iii) Sensitive and unregistered habitats;
(iv) Current flow data of Arghandab River and its tributaries;
(v) Water quality data of water courses (dam, canals, and the Arghandab River).

539. Impacts on the Arghandab and on the Helmand River Basin could not be identified due to a lack of data including:

(i) Registration of all water intakes;
(ii) Flow measurements and water consumption of existing water intakes;
(iii) Drainage and backflow into the river;
(iv) Registration of waste / human excrement discharge points.

540. The recommended ARES to be conducted during the detailed design in 2019 shall address data gaps and allow for an update of the EIA. These gaps include more detailed information on habitat, viability, propagation, management and protection of flora, fauna, aquatic

and terrestrial species, as well as the broader-acreage physical and social issues associated with enhanced catchment management. Additional information concerning potential community mobilization to implement programs such as revegetation establishment and protection of the biophysical elements is also a component of the ARES. The terms of references are in Appendix 7.

541. A master plan for the whole river basin is required and shall be developed. A sustainable water management plan for the dam shall be developed after completion of detailed biological and ornithological surveys during the summer season.

542. It is highly recommended that the two-stage process to establish environmental flows is implemented: establish and verify pilot environmental flows and then refine the data gathering process during the dam operation phase. Not only does this approach recognize the current limitations and the biophysical challenges, it needs to reap the benefits of local participation and ownership.

543. The challenges and limitation of working in Afghanistan cannot be underestimated. Afghanistan is recognized as being one of the most insecure environments in which such a study can be conducted. Although there has been generous cooperation between the TRTA, partners and government agencies, the insecurity has been a major driver in determining the limitations of what could be done. Firmly associated with both the insecurity and the lengthy period of the civil war, is the lack of contemporary data on which analysis and conclusions can be made. While government agencies are willing partners in assisting with the TRTA, both their human resource capacity and lack of physical resource add to the general state of inferior data. These issues can be overcome but they require longer time than what logical planning would determine. This EIA has been a victim of such shortfalls.

IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex 6: CI Project Implementation Manual (PIM)

Document Date:	22/10/2019
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Asia and the Pacific Division
Programme Management Department

DRAFT

Project Administration Manual

Project Number: 48096-002
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August 2019

Islamic Republic of Afghanistan: Arghandab Integrated Water Resources Development Project

ABBREVIATIONS

ABE	–	agribusiness enterprise
ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
AIS	–	Arghandab Irrigation System
AISC	–	Agriculture implementation support consultant
ANCOLD	–	Australian National Committee on Large Dams
BOQ	–	Bill of Quantities
ASBA	–	Arghandab Sub-Basin Agency
CDC	–	community development contracting
CPMO	–	central program management office
CPP	–	community participation in procurement
DAIL	–	Department of Agriculture Irrigation and Livestock
DRR	–	disaster risk reduction
DRRD	–	Department of Rural Rehabilitation and Development
EIA		environmental impact assessment
EMP	–	environmental management plan
EPCS	–	Engineering, procurement, construction supervision
EU	–	European Union
FCAS	–	fragile and conflict-affected situations
FMA	–	Financial management assessment
GRM	–	Grievance Redress Mechanism
ha	–	Hectares
ICOLD	–	International Commission on Large Dams
IEE	–	Initial Environmental Examination
IFAD	–	International Fund for Agricultural Development
km	–	Kilometer
LARF	–	Land Acquisition and Resettlement Framework
LARP	–	Land Acquisition and Resettlement Plan
m	–	Meter
MAIL	–	Ministry of Agriculture, Irrigation and Livestock
MCE	–	maximum credible earthquake
masl	–	meter above sea level
MCM	–	million cubic meter
MDE	–	maximum design earthquake
MEW	–	Ministry of Energy and Water
MOF	–	Ministry of Finance
MRRD	–	Ministry of Rural Rehabilitation and Development
NEPA	–	National Environmental Protection Agency
O&M	–	operations & maintenance
OBE	–	operating basis earthquake
OCB		open competitive bidding
PAM	–	project administration manual
PIU	–	project implementation unit
pm	–	person-months
POE	–	Panel of experts
PPMS	–	Project performance monitoring system
QCBS	–	quality- and cost-based selection
RFQ	–	request for quotation
RRP	–	report and recommendation of the President

SAEMR	–	Semi-Annual Environmental Monitoring Reports
SSEMP	–	Site-Specific Environmental Management Plans
SIP	–	subproject investment proposal
SOE	–	statement of expenditures
SPV	–	Special purpose vehicle
SSS	–	Single-source selection
TOR	–	terms of reference
TRTA	–	transaction technical assistance
USACE	–	United States Army Corps of Engineers

CONTENTS

Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with the policies and procedures of the government and Asian Development Bank (ADB). The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The Ministry of Finance (MOF) as executing agency, and the implementing agencies Ministry of Energy and Water (MEW), Ministry of Agriculture Irrigation and Livestock (MAIL), Ministry of Rural Rehabilitation and Development (MRRD), are wholly responsible for the implementation of ADB-financed projects, as agreed jointly between the recipient and ADB, and in accordance with the policies and procedures of the government and ADB. ADB staff is responsible for supporting implementation including compliance by MOF, MEW, MAIL and MRRD of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At grant negotiations, the borrower and ADB shall agree to the PAM and ensure consistency with the grant agreements. Such agreements shall be reflected in the minutes of the grant negotiations. In the event of any discrepancy or contradiction between the PAM and the grant agreements, the provisions of the grant agreements shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP), changes in implementation arrangements are subject to agreement and approval pursuant to relevant government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval, they will be subsequently incorporated in the PAM.

I. PROJECT DESCRIPTION

1. Water availability in the Islamic Republic of Afghanistan is highly seasonal and erratic with frequent and worsening droughts affecting agriculture, living standards, and the local economy. The project will improve the availability and management of water resources in the Arghandab sub-basin and the Kandahar region by (a) increasing the storage capacity of the existing Dahla Dam by raising its height; (b) increasing reliability of irrigation water supplies downstream of the dam; (c) improving agriculture water productivity by providing on-farm support to farmers to improve crop production; and (d) strengthening institutions in water resource management. Additional benefits associated with the dam raising include hydropower generation and urban and industrial water supply to Kandahar city and its surroundings to be undertaken by the private sector and World Bank respectively.

II. THE PROJECT

A. Rationale

2. Afghanistan is a conflict affected state and one of the least-developed countries in the world. In 2016, its poverty rate was 55%, while 44.6% of its inhabitants were considered food insecure.[1] With the country's average annual per capita gross domestic product (GDP) of $610 between 2011 and 2017, Afghanistan ranked 167th out of 183 countries in terms of GDP according to the World Bank (2017).[2] Agriculture is Afghanistan's major source of livelihood, employing 62.2% of the national workforce of 10.9 million people in 2017 and contributing 21.1% of the national GDP, with sector value addition of $4.1 billion in 2016.[3] Crop yields are below the world average. For example, the average wheat yield in 2017 was 2.0 tons/hectare (ha), compared with a world average of 3.5 tons/ha.[4] Within the agriculture sector, horticulture accounts for 34% of the sector GDP. The diverse geographical and climatic conditions of Kandahar province enable a wide range of crops to be produced at different times of the year. These include apricots, pomegranates, grapes and cereal crops, like wheat. Whilst horticulture provides a comparative advantage in terms of revenue for farmers, it requires sufficient availability and reliability of irrigation water supplies.

3. **Water resources.** Afghanistan is a dry country with low precipitation. The average annual precipitation in Kandahar is 176 millimeters. Limited access to reliable irrigation water is a key constraint to agricultural productivity, besides low-quality inputs and traditional agricultural practices. High summer temperatures, low humidity and lack of rainfall between April and November mean that without irrigation, few crops can produce profitable yields. The Dahla Dam, constructed in 1952, is the second largest dam in Afghanistan with a height of 55 meters (m) and a crest length of 535 m.[5] It is located in the Shah Wali Kot District of Kandahar Province in Afghanistan, approximately 40 kilometers (km) north east of the provincial capital Kandahar. Its design capacity of 478 million cubic meters (MCM) of water provides irrigation supplies to the downstream Arghandab Irrigation System (AIS), which delivers water to 55 community irrigation schemes, and a further 60 riparian community irrigation schemes, covering almost 5 districts of Kandahar province including Kandahar city. Presently, Dahla Dam provides no water supply to downstream urban communities, and the hydropower potential has

[1] Government of Afghanistan, Central Statistics Organization. 2017. *Afghanistan Living Conditions Survey (2016–2017*). Kabul.
[2] World Bank. *World Development Indicators* (accessed 2 April 2019).
[3] The Global Economy.com. *Afghanistan: GDP share of agriculture* (accessed 2 April 2019).
[4] FAO. Food and agriculture data (accessed on 5 June 2019).
[5] In the periphery of the dam, six saddle dams have been built which together measure 2,040 m.

not been developed.

4. The Dahla Dam reservoir stores and controls irregular and short duration snowmelt flow from the Hindu Khush mountains. However, the reservoir has lost 40% of its storage capacity due to siltation, and its ability to provide regulated flow to downstream has been seriously constraint. This results in (a) reduction in cropped area, with only 47% of the command area being regularly irrigated; (b) expansion constraints for high value cropping; (c) increased reliance on groundwater for more reliable irrigation water supplies—this has impacted on the groundwater table and cost of pumping which is borne by farmers; and (d) cropping patterns which are biased to winter and forage crops of lower value cereal to reduce risk from water shortage. Lack of water storage regulation also results in increased risk of flood events.

5. The AIS has also suffered deterioration, reducing water conveyance efficiency and losing water distribution control. Besides, among farmers, there is limited awareness and low adoption of water-efficient on-farm technologies such as laser levelling and drip irrigation, contributing to low yields and unproductive use of limited water resources. Current yields of irrigated crops in the project area average 30% of good agricultural practice.

6. **Climate change impacts.** Current models indicate significant warming across all regions of Afghanistan, and a decrease in precipitation, particularly spring rainfall.[6] Their increasing frequency, extreme weather events, and a raising of the ambient Afghanistan climatic temperature by 4°C to 6°C are predicted over the next 50 years. This further highlights the relevance of improved water resources management, including improving storage capacities.[7] Afghanistan has identified among its key climate change adaptation priorities: (a) rehabilitation of small- to large-scale water resources infrastructure, (b) increasing irrigated agricultural land area, (c) strengthening hydrological meteorological monitoring networks, and (d) improved watershed management.[8] Ahead of project formulation, the Asian Development Bank (ADB) undertook a climate change assessment for the agriculture and water resources sectors and consultation with key government stakeholders including the Ministry of Energy and Water (MEW) and the Ministry of Agriculture, Irrigation and Livestock (MAIL) on adaptation investment needs. It particularly identified multi-purpose dams with climate-resilient irrigation, hydropower, and water resources management as priority project investments to mitigate risks associated with a changing climate (e.g. drought and floods).[9]

7. The Arghandab Sub-basin Agency (ASBA), under MEW, is responsible for the management of river flows and operation of Dahla Dam, and management of the AIS main canal system. Community irrigation schemes are managed by community-assigned water bailiffs (mirabs) for the various subdivisions and individual farms within the community irrigation schemes. The government recognizes the need for effective operating capacity for the Dahla Dam and the AIS. To improve AIS management, it intends to establish a two special purpose vehicles for water delivery services and revenue collection, one each for Dahla Dam operations and the other for AIS operations, to be developed by the project for implementation by MEW. This requires restructuring support and capacity building, including provision of suitable equipment for infrastructure maintenance. MEW also has limited capacity to forecast water

[6] Stockholm Environment Institute. 2008. *Socio-Economic Impacts of Climate Change in Afghanistan*. Oxford.
[7] Transaction technical assistance for the Preparation of the Arghandab Integrated Water Resource Development Project. 2018. *Arghandab Sub-Basin Hydrology Study.*
[8] Islamic Republic of Afghanistan. 2015. *Intended Nationally Determined Contribution. Submission to the United Nations Framework Convention on Climate Change.* Kabul.
[9] ADB. 2016. *Economics of Climate Change in Central and West Asia – Adaptation Component: Final Report*. TA Consultant's Report. Manila (TA 8119-REG).

availability and coordinate delivery to meet irrigation demand. Strengthening capacity and regulatory development will enable improved management of AIS and increased reliability of irrigation water supplies to farmers' fields.

8. By increasing the storage capacity of Dahla Dam and its improved operations, combined with modernization and improved management of the AIS and strengthening farmers' capacity and skills for more productive agriculture, it is expected that the current area under irrigation will expand from an average of 54,000 ha to between 65,000 ha and 81,300 ha (depending on the dam storage and associated flow releases).[10] The increase in storage capacity will also provide water for municipal supply to Kandahar city, hydropower and environmental flows for the Arghandab river.

9. About two-thirds of employed women in Afghanistan are engaged in agriculture. This is mainly in horticulture, livestock raising and agro-processing activities. Cultural restrictions limit women's mobility and gender segregation curbs access to inputs and agriculture extension services. Very few women own land or have water rights which further impedes their ability to contribute to improved land and water management. The project will provide capacity building of women agriculture extension workers to access women farmers, provide scholarships to women government officers to complete a Master of Science degree in Integrated Water Resource Management; and provide women farmers with grants for improvements in agricultural productivity and economic opportunities. Afghanistan is demographically young with a very high dependency ratio and has one of the world's highest rates of stunting and wasting, the extreme manifestation of severe acute malnutrition. The project will specifically create employment opportunities for youth and will contribute to dietary diversity and improved nutrition.

10. **Enabling policy environment.** The Supreme Council for Land and Water is responsible for coordinating water-related tasks of national institutions, recommending development plans and strategies for cabinet approval, recommending drafted legislation and regulations for approval, monitoring the implementation of plans by line ministries, resolution of water-related disputes between ministries, and ensuring compliance of the Water Law[11] by relevant ministries and agencies. The water law states that 'water is free', which has constrained progression to implement water delivery service charges and, therefore, sustainable budget for operation and maintenance (O&M). Not contradicting this principle, amendments to the Water Law explicitly allowing for the charging of water delivery services has been agreed by the Office of the President, and legislative changes are in motion.

11. **Government strategies.** Government policy for productive water resources is outlined in the Strategic Framework for the Water Sector, which provides directions for the water sector in Afghanistan.[12] The Afghanistan National Peace and Development Framework, 2017–2021 supports increased jobs and GDP growth through improved management and use of water resources. Other key policies are the National Comprehensive Agricultural Sector Development and Reform Strategic Framework,[13] and the draft National Irrigation Policy.[14] This highlights critical issues for the sector, including: (a) land and water productivity in irrigated agriculture not

[10] The agricultural (and urban) demand is highest in the summer months, and irrigation flow varies according to availability and crop water demands.
[11] Water Law. Official Gazette. Ministry of Justice. Islamic Republic of Afghanistan. Issue # 980. 26 April 2009 currently being revised.
[12] Government of Afghanistan. 2006. *Strategic Framework for the Water Sector*. Kabul.
[13] Government of Afghanistan, Ministry of Agriculture, Irrigation and Livestock. 2009. *National Agriculture Development Framework*. Kabul.
[14] Government of Afghanistan, Ministry of Agriculture, Irrigation and Livestock. 2018. *National Irrigation Policy*. Kabul.

reaching its potential; (b) irrigation management institutions (governmental and community-based), are weak; (c) capacity constraints across public and private stakeholders; and (d) legal framework governing the irrigation sub-sector requires updating to further clarify mandates, functions and responsibilities.

12. The National Water and Natural Resources Development Program (2010–2013, but continuing), with a budget of $1.1 billion, targets improved access to irrigation, and establishing and strengthening water basin agencies. The National Irrigation Program (2016–2025), with an investment requirement estimated at $1.5 billion, aims to improve and rehabilitate irrigation services, enhance agricultural extension services; and improve on-farm water management, operation, and maintenance.

13. Since 1966, ADB has invested about $545 million into water resources, mainly for irrigation. ADB operations have resulted in 140,000 ha of irrigated land improved, with more than 225,000 ha under development. Key areas of assistance in ADB's country operations business plan for Afghanistan, 2019–2021[15] are: irrigation and water resources, agriculture market infrastructure, value chain development, management of integrated water resources, institutional strengthening and reforms, and increased participation of women in agriculture.

14. ADB has financed the Western Basins Water Resources Management Project,[16] the Agriculture Market Infrastructure Project,[17] the Water Resources Development Investment Program,[18] the Community-Based Irrigation Rehabilitation and Development,[19] the Northern Flood-Damaged Infrastructure Recovery Project,[20] the Panj-Amu River Basin Sector Project,[21] the Horticulture Value Chain Development Sector Project,[22] and the regional technical assistance for Strengthening Integrated Water Resources Management in Mountainous River Basins.[23] Lessons learned from these interventions highlight the need for an integrated approach water resources allocation between competing users, increasing water productivity, adapting to climate change and disaster risk impacts, strengthening and developing agricultural value chains for inclusive and equitable development impact, and use of national contractors to the extent possible.

15. The International Fund For Agricultural Development (IFAD) has financed three projects in Afghanistan including the Rural Micro-Finance and Livestock Support Project, Support to National Priority Program - Phase 2[24] and Community Livestock and Agriculture Project.[25]

[15] ADB. 2018. *Country Operations Business Plan: Afghanistan, 2019–2021*. Manila.
[16] ADB. 2005. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Western Basins Water Resources Management Project*. Manila.
[17] ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Agriculture Market Infrastructure Project*. Manila.
[18] ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Water Resources Development Investment Program.* Manila.
[19] ADB. 2012. *Grant Assistance Report: Proposed Administration of Grant to the Islamic Republic of Afghanistan for the Community-Based Irrigation Rehabilitation and Development*. Manila.
[20] ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Northern Flood-Damaged Infrastructure Recovery Project*. Manila
[21] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Panj-Amu River Basin Sector Project.* Manila.
[22] ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Horticulture Value Chain Development Sector Project.* Manila
[23] ADB 2016. *Technical Assistance for Strengthening Integrated Water Resources Management in Mountainous River Basins.* Manila.
[24] IFAD. 2015. *President's Report: Proposed grant to the Islamic Republic of Afghanistan for the Support to National Priority Programme 2*. Rome.
[25] IFAD. 2012. *President's Report: Proposed grant to the Islamic Republic of Afghanistan for the Community Livestock and Agriculture Project 2*. Rome.

Lessons learned from these intervention suggests that community organization, participatory water resource management and maintenance and linking small-holders farmers through contract farming and partnership creates sustainable income opportunities for farmer, landless and women. The current IFAD financed project are covering seven provinces including Kabul, Parwan, Baghlan, Balkh, Heart, Nangarhar and Logar with a total of 280,000 households being benefited. Under these projects about 83,000 ha of land will improved irrigation by rehabilitation of related infrastructure.

16. Development partners have contributed to water resources and agriculture development and management, with irrigation and horticulture subsectors being the main beneficiaries.[26] Development partners also have contributed to the agriculture sector. The Arghandab Irrigation Rehabilitation Project (2008–2012, financed by the Canadian International Development Agency) resulted in improved irrigation to about 30,000 ha, as well as clearing mines around the Dahla Dam.[27] Ongoing relevant projects from the World Bank include the National Horticulture and Livestock Project.[28]

17. The project is consistent with ADB's country partnership strategy, 2017–2021, through the development of agriculture and water resources, which supports the government's strategic priorities, and is included in ADB's country operations business plan, 2017–2019.[29] The project is aligned with the objectives of Strategy 2030[30] through the operational priority of promoting rural development and food security, and the guiding principles of promoting innovative technology and delivering integrated solutions. The project is aligned with ADB's operational plan for agriculture and natural resources, 2015–2020[31] and ADB's water operational plan, 2011–2020. [32]

18. During project preparation, a fragile and conflict-affected situation (FCAS) sensitive approach was adopted. Fundamental in the design planning was that (a) extensive local consultations were undertaken, despite security difficulties, to ensure local voices were heard and considered; and (b) an integrated approach to water resource development was taken so that conflicts over water would be minimized and all segments of the community would, to the extent possible, be beneficiaries. Fundamental in the implementation arrangements is that (a) high priority is placed on achieving fair and equitable resettlement of affected persons; (b) civil works contract packaging has been designed to allow maximum opportunity for national, and preferably local, contractors; (c) there is extensive empowerment of farmer beneficiaries through community contracting and matching grant programs; and (d) significant efforts will be placed on effective communication by each of the implementing agencies.

B. Project Description

19. The project is aligned with the following impact: increased jobs and GDP growth.[33] The

[26] Development Coordination (accessible from the list of linked documents in Appendix 2).
[27] Canadian International Development Agency. 2014. *The Arghandab Irrigation Rehabilitation Project - Evaluation Report (Draft). Ottawa*.
[28] World Bank. 2016. *Project Information Document for National Horticulture and Livestock Project*. Washington, DC.
[29] ADB. 2017. *Country Partnership Strategy: Afghanistan, 2017–2021.* Manila; and ADB. 2017. *Country Operations Business Plan: Afghanistan, 2019–2021*. Manila.
[30] ADB, 2018. STRATEGY 2030, Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific. Manila.
[31] ADB. 2015. *Operational Plan for Agriculture and Natural Resources:* Manila.
[32] ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.
[33] Islamic Republic of Afghanistan. 2016. *Afghanistan National Peace and Development Framework (2017–2021)*. Kabul.

project will have the following outcome: improved management and use of water resources in the Arghandab River basin.[34] The project has four outputs:

20. **Output 1: Dahla Dam capacity increased.** This will be delivered through three key activities: (a) civil works to raise the main dam, six saddle dams, spillways and other associated structures line and intake tower, which will increase the full reservoir level by 13.6 m and storage capacity from 288 MCM to 782 MCM, and to install monitoring equipment; (b) road realignment of 9.6 km to allow an alignment above the new full reservoir water level; and (c) capacity improvement in dam operation and management. During the construction, works are planned to have limited or no effect on irrigation water supplies. The construction planning will be coordinated with ASBA, so that works could be executed as far as possible during August to February when there is minimum irrigation water demand. A recreational facility for families will be developed to provide an area for community participation and women's inclusion. Increased dam capacity will reduce flood risks to downstream areas. Dam operation rules reflecting multiple water use requirements and operation and maintenance manuals will be developed under the project. The project will also provide training to dam operators to improve their capacity in timely and appropriate dam operation.

21. **Output 2: Reliability of irrigation water supply increased** through irrigation infrastructure modernization including canal and structures upgrading, introducing monitoring and control systems on the AIS and community-managed systems. Improved water ordering will allow water on demand to be introduced on AIS systems. There are two key activities: (a) modernization of the AIS infrastructure and procurement of maintenance equipment for the ASBA so that the irrigation operating entity can assure timely delivery of irrigation services to community systems; and (b) support to village communities, including women, for improvement of community irrigation infrastructures through community contracting.

22. **Output 3: Agricultural water productivity improved.** Capacity of farmers will be strengthened to improve farm management, adopt climate-smart irrigation and agricultural technologies and practices to improve production and sustainability. This will be delivered through demonstration of innovative agricultural practices and investment options, including support for agricultural extension services, conducting on-farm demonstrations, providing training and advisory services to farmers, and a matching grant scheme[35] to facilitate investment in technologies to improve water productivity. Women farmers and youth will have equitable access to agricultural extension services, training opportunities, technology transfer and advisory services. Women will be trained as local resource persons and separate training courses for women farmers will be arranged as well as awareness raising on nutrition.

23. **Output 4: Capacity in water resource management and use strengthened.** The project will (a) support development of policy, legislation and regulatory options for a system of water entitlements and allocation to allow improved management of water resources and multi-purpose dams, as well development of regulations and business structure to charge fees for water delivery services—this will strengthen financial sustainability and drive transformation to improved water resources management, resulting in improved irrigation productivity; (b) provide water resources management training for government staff including women; and (c) establishment of a National Hydrological Modelling Platform for integrated water resources policy, planning, operations and management to strengthen water resources management.

[34] The design and monitoring framework is in Appendix 1.
[35] The matching grant scheme is a simplified version of the matching grant scheme used in the ADB funded Horticulture Value Chain Development Sector Project, currently under implementation.

24. An integrated approach will be adopted in the implementation of the project outputs. The activities related to water availably, its use, agriculture productivity, value addition and marketing activities will be implemented in an integrated manner.

II. IMPLEMENTATION PLANS

A. Project Readiness Activities

Table 1: Project Readiness

Indicative Activities	2019							Responsible Individual/ Unit/Agency/Government
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Advance actions:								
Consultant recruitment (MEW-CS-01, 06, MAIL-CS-01)[1]	√	√	√	√	√	√	√	MEW, MAIL
Project implementation arrangements:								
Additional PMO staff recruitment			√	√	√	√	√	MEW, MAIL, MRRD
Recruit PIU staff			√	√	√	√	√	MEW, MAIL, MRRD
Set-up physical offices			√	√	√	√	√	MEW, MAIL, MRRD
ADB Board approval[2]				√				ADB
Grant signing					√			ADB, MOF
Government legal opinion provided					√			MOF
Government budget inclusion					√			MOF
Grant effectiveness							√	ADB, MOF

ADB = Asian Development Bank; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MOF = Ministry of Finance; MRRD = Ministry of Rural Rehabilitation and Development PIU = project implementation unit; PMO = project management office.
Source: Asian Development Bank.

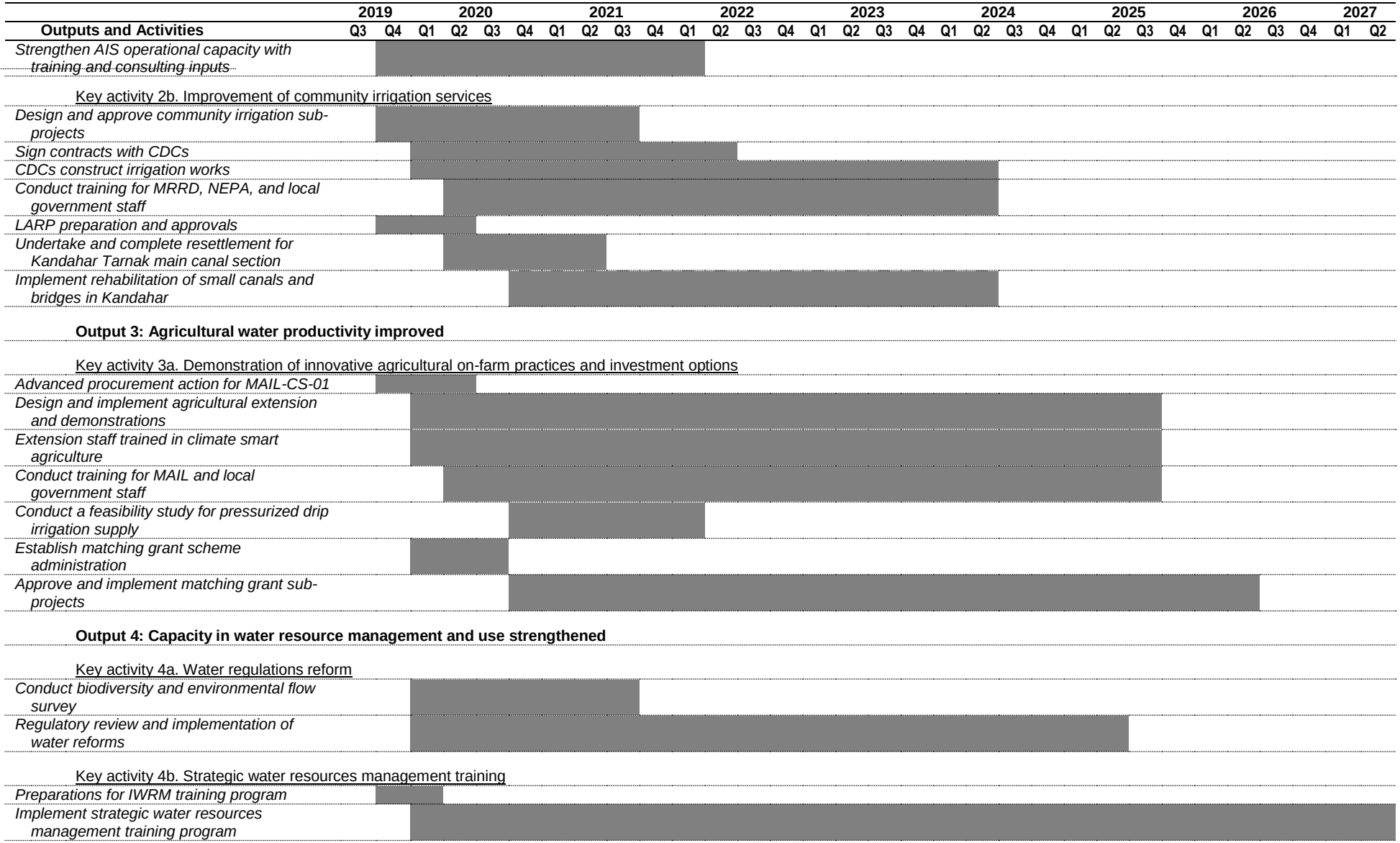
[1] Please refer to the complete package name in Tables 17 and 18.
[2] The IFAD board consideration and effectiveness dates are running about 2 months after the ADB timeline.

B. Overall Project Implementation Plan

23. Table 2 presents outputs with key implementation activities. It will be updated annually to prepare contract and disbursement projections for the following year that will be submitted to ADB. Table 3 summarizes the final responsibility by key activities under each output. Specific responsibilities and implementation arrangements are elaborated below.

Table 2: Project Implementation Schedule

Outputs and Activities	2019		2020				2021				2022				2023				2024				2025				2026				2027	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
A. DMF																																
Output 1: Dahla Dam capacity increased																																
Key activity 1a. Main dam and six saddle dams raised																																
Procurement of MEW-CS-01																																
LARP preparation and approvals																																
Undertake and complete resettlement for dam civil works																																
Detailed design of civil works (main dam, intake tower, tunnel lining, trash rack, and spillways). Detailed design of dam civil works																																
Bidding, bid evaluation of MEW CW packages																																
Award of contracts of MEW CW packages																																
Staff colony and security fence constructions																																
Recreation area construction																																
Saddle dam raising works																																
Civil works for raising main dam, intake tower, tunnel lining, and trash rack																																
Install electrification along dam																																
Install technical monitoring equipment																																
Spillway raising works																																
Start of reservoir filling																																
Key activity 1b. Road realignment																																
LARP preparation and approvals																																
Undertake and complete resettlement for road alignment																																
Detailed design for the road alignment																																
Road realignment construction																																
Key activity 1c. Capacity in dam operation and flow management improved																																
Conduct training for MEW, NEPA, and local government staff																																
Development of a reservoir operation management plan																																
Dam operation and safety training																																
Output 2: Reliability of irrigation water supply increased																																
Key activity 2a. Modernization of AIS																																
Establish and equip AIS works center																																
Design and undertake rehabilitation and modernization works of AIS																																


2019
2020
2021
2022
2023
2024
2025
2026
2027
Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2
Outputs and Activities
Strengthen AIS operational capacity with training and consulting inputs
Key activity 2b. Improvement of community irrigation services
Design and approve community irrigation sub-projects
Sign contracts with CDCs
CDCs construct irrigation works
Conduct training for MRRD, NEPA, and local government staff
LARP preparation and approvals
Undertake and complete resettlement for Kandahar Tarnak main canal section
Implement rehabilitation of small canals and bridges in Kandahar
Output 3: Agricultural water productivity improved
Key activity 3a. Demonstration of innovative agricultural on-farm practices and investment options
Advanced procurement action for MAIL-CS-01
Design and implement agricultural extension and demonstrations
Extension staff trained in climate smart agriculture
Conduct training for MAIL and local government staff
Conduct a feasibility study for pressurized drip irrigation supply
Establish matching grant scheme administration
Approve and implement matching grant sub-projects
Output 4: Capacity in water resource management and use strengthened
Key activity 4a. Water regulations reform
Conduct biodiversity and environmental flow survey
Regulatory review and implementation of water reforms
Key activity 4b. Strategic water resources management training
Preparations for IWRM training program
Implement strategic water resources management training program

Outputs and Activities	2019		2020				2021				2022				2023				2024				2025				2026				2027	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Key activity 4c. Establishment of a National Hydrological Modelling Platform																																
Establish National Hydrological Management Platform																																
Implement training events for Government staff																																
B. Management Activities																																
Recruit CPMO & PIU staff																																
Recruit international supervision consultants																																
Recruit dam safety and safeguard supervision consultants																																
Establish PPMS																																
Recruit auditors																																
Train village construction supervisors																																
Monitor project activities																																
Prepare and execute a communication, consultation and participation plan																																
Submit PPMS monitoring reports regularly																																
Undertake project completion survey																																
Prepare project completion report																																

AIS = Arghandab Irrigation System; CDC = community development contracting; CPMO = central program management office; CW = contracts and works; IWRM = integrated water resources management; LARP = land acquisition and resettlement plan; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; NEPA = National Environmental Protection Agency; PIU = project management unit; PPMS = project performance management system; q = quarter.
Source: Asian Development Bank.

AIS = Arghandab Irrigation System; CDC = community development contracting; CPMO = central program management office; IWRM = integrated water resources management; LARP = land acquisition and resettlement plan; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; NEPA = National Environmental Protection Agency; PIU = project management unit; PPMS = project performance management system; q = quarter.
Source: Asian Development Bank.

24. A summary of the institutional responsibilities by project outputs and key activities are in Table 3.

Table 3: Summary of Institutional Responsibilities by Outputs and Key Activities

Outputs and Key Activities	Responsible Agencies
1. Dahla Dam capacity increased	
1a. Raising of main dam and six saddle dams	*MEW*
1b. Realignment of Route Bearer Highway road sections	*MRRD*
1c. Improvement of capacity in dam operation and flow management	*MEW*
2. Reliability of irrigation water supply increased	
2a. Modernization of the AIS	*MEW*
2b. Improvement of community irrigation services	*MRRD*
3. Agricultural water productivity improved	
3a. Demonstration of innovative agricultural on-farm practices, extension support, and matching grant scheme to facilitate investment in technologies to improve on-farm water productivity.	*MAIL*
4. Capacity in water resource management and use strengthened	
4a. Introduction of water regulations reform	*MEW*
4b. Establishment of a National Hydrological Modelling Platform	*MEW*
4c. Provision of strategic water resources management training	*MEW*

AIS = Arghandab Irrigation System; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development.

Output 1: Dahla Dam capacity increased

25. The MEW central project management office (CPMO) will implement outputs 1a and 1c with support from the Engineering, Procurement, Construction Supervision (EPCS) consultants. The CPMO will also recruit and supervise the third party independent environmental monitoring, and the independent panel of experts (POE) for dam construction and operational safety.[36]

26. **Key activity 1a. Main dam and six saddle dams raised.** MEW will supervise the design, procurement and construction required to increase the capacity of Dahla Dam full reservoir level by 13.6 m and increasing the storage from its current 290 MCM to 780 MCM. There will be three phases: (i) ongoing assessment and resettlement of people affected by the dam raise and road realignment; (ii) design and pre-construction planning; and (iii) construction and completion of works. MEW will supervise: (i) raising the main dam, intake tower, tunnel lining, trash rack, and spillways; (ii) raising and extension of six saddle dams; (iii) installing technical instrumentation; (iv) construction of staff colony and site security fencing; (v) electrification along the dam; (vi) land acquisition and resettlement; and (vii) park construction. During the dam construction, all main construction works are planned in such a way that these works should have limited or no effect on the irrigation supplies except raising the intake tower, trash rack and tunnel lining. The need to minimize disruption to irrigation has been carefully considered and the construction planning of these structures will be coordinated with ASBA during dry months from July to December when there will be limited or no demand for irrigation water supply.

27. **Key activity 1b. Road realignment.** A 9.3 km long section of the Bamiyan–Kandahar

[36] Technical details and engineering drawings have been submitted to MEW in the Arghandab Integrated Water Resources Development Investment Program (AIWRDIP) *Feasibility Study Report Component 1: Part A: Raising Dahla Dam and Six Saddle Dams, Part B: Route Bearer Highway Realignment* (April 2019).

highway in Shah Wali Kot will be realigned to a safe level above Dam Crest Flood height of 1,154 m above sea level. The Ministry of Rural Rehabilitation and Development (MRRD) will implement the design and construction of the road realignment, including 23 culverts and two passages along the route. Construction activities will start once the final design of the dam raising has been confirmed. MEW will implement and complete the land acquisition and resettlement of affected persons.

28. **Key activity 1c. Capacity in dam operation and flow management improved.** Policy and regulatory reform efforts will examine options for the development of a system of water entitlements and allocation. The Hydrological Modelling Platform Consultants will support MEW in the development of a rule curve for the operation of Dahla Dam, for MEW to implement. Consultants will also advise on the creation of two special purpose vehicles, under MEW, for Dahla Dam and AIS management and operations, including legal and operational structuring, financial modelling and governance arrangements. After dam construction works are substantially completed, MEW will supervise the training of ASBA staff responsible for the initial dam operation, dam safety, maintenance, and the hydrological planning and management to ensure dam releases meet the flow requirements for water allocations to the different users including urban water supply, hydropower, irrigation and environmental flows. An app will be developed which will allow irrigators to order water from ASBA as the entity responsible for delivering water suppliers.

29. For improved sustainability, the annual O&M costs for the dam, estimated at $1.08 million, should be funded through a special purpose vehicle established for Dahla Dam water delivery services and revenue collection. A feasibility study with business structure and model will be developed for MEW by project implementation consultants. The revenue model will be facilitated by anticipated changes to the Water Law, which are explicit in allowing charges for water delivery services. To ensure funding sustainability, transition arrangements are covenanted in the grant agreement.

Output 2: Reliability of irrigation water supply increased

30. **Key activity 2a. Modernization of AIS.** MEW will implement the modernization of the AIS and ASBA. Prioritized infrastructure types requiring rehabilitation or replacement include flow control and flow monitoring capacity, gates, canal restoration, bridges, drainage works, de-siltation, extension of Babawali waste way, and canal safety measures.[37] MEW CPMO will procure for the ASBA: (i) heavy equipment, and (ii) upgrade of its central workshop (details in the Feasibility Study prepared under the transaction technical assistance [TRTA]). This will give the ASBA the capacity to carry out irrigation system civil works using its existing engineers and staff. ASBA will explore with community irrigation groups to implement a labor contribution scheme for suitable works on the sections of main canals that provide water to the groups' farmlands.

31. For improved sustainability, the annual O&M costs for the AIS, estimated at $0.55 million, should be funded through a special purpose vehicle established for AIS water delivery services and revenue collection. A feasibility study with business structure and model will be developed for MEW by project implementation consultants. The revenue model will be facilitated by anticipated changes to the Water Law, which are explicit in allowing charges for water

[37] Engineering drawings, locations, quantity and cost estimate tables for these priority works have been prepared under TA:9273-AFG and submitted to MAIL in the AIWRDIP *Outputs 2-4 Feasibility Study: Climate Resilient and Productive Use of Water in Agriculture* (April 2019).

delivery services. To ensure funding sustainability, transition arrangements are covenanted in the grant agreement.

32. Furthermore, with proposed changes in the Water Law (2009), the management of the AIS may be transferred from MEW to MAIL, who have agreed that they would then oversee the transition of AIS management from MAIL to a legal entity owned and operated by AIS farmers/farmer groups.[38] The new, farmer-managed AIS entity will be able to generate revenue for its O&M. The government also confirmed that equipment procured under the project for the AIS will be handed over to the new entity after it has been formally established. Capacity building support to the new entity will include asset management and a water ordering and supply system aimed at delivering water on demand. In this eventuality, implementation arrangements of the project may be adjusted in line with the new management arrangement of the AIS.

33. **Key activity 2b. Improvement of community irrigation services.** MRRD CPMO will liaise with community irrigation groups to execute community irrigation infrastructure improvement works and prioritize each group's works. MRRD will use community contracting procurement. The indicative basis will be $160/ha of each for each farmer's registered irrigated land in the AIS, and $285/ha for off-AIS (riparian) irrigated land. Priority works for 115 community systems identified in a survey are listed in the Feasibility Study prepared during the TRTA.

34. MRRD CPMO will also implement works on the Tarnak Main Canal where is transects Kandahar city: (i) recreational use section between stations 19+400 and 21+720 (Aino Mina suburb); and (ii) six bridges (details in Feasibility Study). MEW will implement and complete all resettlement activities for this key activity.

Output 3: Agricultural water productivity improved

35. **Key activity 3a. Demonstration of innovative agricultural on-farm practices and investment options.** Agriculture and irrigation implementation support consultants (AISCs) attached to the MAIL CPMO and the Department of Agriculture, Irrigation and Livestock (DAIL). The project implementation unit (PIU) will collaborate with DAIL to select demonstration sites and participating farmers, design demonstrations, training program, and advise on works and equipment for demonstration sites. Demonstrations will include technologies and good practices for irrigation water application and management, annual and perennial cropping and aquaculture.[39] Where possible, to build local capacity, local firms and entities will be engaged to establish and commission technology demonstrations, as well as engage with private sector under contract farming models, leveraging experience from the IFAD initiative with MAIL in Afghanistan. The MAIL CPMO will also contract training and advisory support services to farmers, for example: farmer field school facilitation, and subscription to the e-Afghan Ag mobile application (already established in Kandahar for basic farm technical and advisory information), and the Afghanistan Farm Service Alliance, which has established a Farm Service Center in Kandahar (http://www.cnfa.org/program/afghanistan-farm-service-alliance/). A matching grant scheme will facilitate investment in technologies to improve on-farm water productivity, for example purchase of drip irrigation systems, and financing of laser levelling services. The

[38] The entity structure will be determined with input from the MAIL irrigated agriculture implementation support consultants (AISCs), for example, it may be a registered entity owned by a federation of community irrigation groups.
[39] Source: Afghanistan Agriculture Development Fund.

scheme is modelled on a simplified version of the matching grant scheme used in the ADB funded Horticulture Value Chain Development Sector Project,[40] currently under implementation, and also implemented by MAIL under IFAD-funded projects. The draft process for sub-project selection, appraisal, approval and regulation are in Annex 1: Draft Subproject Selection, Appraisal, and Approval Process. The project will provide 80% of the investment cost and farmers 20% of the investment cost for approved investments.

36. The project is an integrated intervention, particularly the linkages between outputs 2 and 3. Therefore, MAIL will design and implement a comprehensive annual monitoring and impact evaluation plan using baseline and annual survey of control and beneficiary groups commencing on 1 October each year, with 2021 as the commencement year. The data collected will include, but not be limited to the design and monitoring framework (DMF) performance indicators: (i) timeliness of irrigation water delivery to farmers; (ii) improved skills and adoption of climate-smart technologies in irrigated production by farmers; (iii) increased on-farm water productivity ("more crop per drop"); (iv) gender-disaggregated participation in demonstration and upscaling activities and (v) increase in farmers' incomes.

Output 4: Capacity in water resource management and use strengthened

37. **Key activity 4a. Water regulations reform.** Policy specialists, attached to the MEW CPMO, will conduct a review of the Water Law and will undertake consultations based on which policy, legislation and regulatory options for a system of water entitlements and allocation of water will be developed for consideration by government to allow improved management of water resources and multi-purpose dams. The State is committed to introducing cost-recovery mechanisms in order to financially sustain water delivery services, and to drive the transformational awareness change among water suppliers and water users that water and its reliable delivery service is highly valuable. Regulations will be prepared governing the State, its authorized agents, and water delivery service entities to charge fees for water delivery services to entitled users. A biodiversity and environmental flow study will also be conducted. In addition, consultants will also advise on the creation of special purpose vehicle/s, under MEW, for Dahla Dam and AIS management and operations, including legal and operational structuring, financial modelling and governance arrangements, for the purpose of creating a sustainable business model for operation of a multi-purpose dam and AIS operation. The reform process will be consultative and will take into account the historical community perspective into consideration.

38. **Key activity 4b. Strategic water resources management training.** The project will provide continued support to higher-level capacity building through the degree of Masters in Science, major in Integrated Water Resource Management, established by MEW with the Kabul Polytechnic University.[41] Each student's costs of about $30,000 for the required study period of 3 years will be supported by a training budget managed by MEW CPMO. The placement availability slots will initially be split equally among the government's five water related agencies (MEW, MAIL, MRRD, National Environment Protection Agency [NEPA] and the Afghanistan Urban Water Supply and Sewerage Corporation). If a particular ministry is unable to fill its

[40] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Horticulture Value Chain Development Sector Project.* Manila.

[41] The course is run by the Kabul Polytechnic University in collaboration with Griffith University and International Water Centre (IWC), Brisbane, Australia. Australia's experience/knowledge of managing drought and flood is very relevant to the needs of the Afghan water sector. In addition, the IWC brings the opportunity to align with the Australian government's SWaRMA project and eWater's work on water resource assessment that ADB is co-funding. These strategic value-add opportunities ensure the multisector integrated water resource management curriculum aligns with and complements other capacity building initiatives.

quota, the placement slots will be made available to other water related agencies seeking additional availability slots. If government agencies do not take up all the availability slots, persons from non-government organizations who meet eligibility requirements will be accepted to make up cohort quota. Additional training programs, including high level professional training / development can also be supported.

39. **Key activity 4c. National Hydrological Modelling Platform.** The MEW CPMO will manage implementation of the "Source" National Hydrological Modelling Platform, designed to simulate all aspects of water resource systems to support integrated planning, operations, policy and governance from urban, rural, catchment and river basin scales including human, climate and ecological influences. The platform provides a consistent hydrological and water quality modelling and reporting framework to support transparent urban, catchment and river management decisions, and can accommodate the diverse climatic, geographic, water policy and governance settings experienced in different river basins in Afghanistan. Within the training, a rule curve for the operation of Dahla Dam will be developed which operates within the Source program. The project will continue and expand the on-going training of MEW staff by eWater to develop and use the Source Platform. The project will also support in-service training of technically qualified government staff through placement of two persons on a secondment of up to one year with the eWater organization, in order to gain full competency with integrated water resource management using the Source software modelling system.

III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations: Roles and Responsibilities

Table 4: Project Implementing Organizations

Organization	Management Roles and Responsibilities
Executing agency: MOF	• Signing grant agreements; • Procurement approval authority; • Timely provision of agreed counterpart funds for project activities; • Ensuring timely submission of one audit report which covers activities of MEW, MAIL, and MRRD; and • Allocate one staff for more efficient processing of payments under the community participation contracts.
Implementing agency 1: MEW	• Allocate office space for the CPMO in Kabul and PIU in Kandahar; • Recruit staff for the CPMO and PIU; • Establish roles and responsibilities to ensure the successful implementation of output 1 (Dahla Dam capacity increased) and key activity 2a (Modernization of AIS); • Establish and be accountable and responsible for the use of funds in an ADF advance account; • Prepare, review, and submit withdrawal applications withdrawal applications to ADB; • Prepare project performance monitoring system (for MEW activities); • Prepare Communication, Consultation and Participation plan (for MEW activities); • Complete all required resettlement; • Conduct all procurement required for key activities 1a, 1c, and 2a; • Supervise EPCS consultant; • Coordinate with ADB in the recruitment and supervision of the Independent Panel of Experts for dam construction; • Coordinate with MRRD on the realignment of the route bearer highway;

Organization	Management Roles and Responsibilities
	• Build operational capacity of ASBA to operate and maintain Dahla Dam; • Establish roles and responsibilities to ensure the successful implementation of output 4 (capacity in water resources management and use strengthened); • Recruit and supervise consultants for output 4a (water regulation reform); • Implement output 4b (strategic water resources management training), through Griffith and Kabul Polytechnic University, and collaborate with MAIL, MRRD, AUWSSC and NEPA in the selection of trainees; • Implement output 4c (establishment of a national hydrological management platform); • Recruitment of ARES consultants for riverine environment studies to be managed by NEPA; • Compliance with national environmental regulations as well as with ADB Safeguards Policy Statement (2009); • Coordinate with NEPA in review of Semi-Annual Environmental Monitoring Reports and site visits; • Conduct timely financial audits as per agreed timeframe and taking recommended actions; • Establish strong financial management system and submitting timely withdrawal applications; • Ensure compliance with grant covenants (social, environmental, financial, economic, and others); • Monitor and evaluate project activities and outputs including periodic review, Gender Action Plan, FCAS Action Plan, preparation of review reports, and reflecting issues and time-bound actions; • Undertake Project Completion Report; and • Public disclosure of project outputs and role of national supervisory consultants.
Implementing agency 2: MAIL	• Allocate office space for the CPMO in Kabul and PIU in Kandahar; • Recruit staff for the CPMO and PIU; • Establish roles and responsibilities to ensure the successful implementation of output 3 (agricultural water productivity improved); • Establish and be accountable and responsible for the use of funds in three advance accounts: ADF grant, IFAD grant funds; • Prepare, review, and submit withdrawal applications withdrawal applications to ADB; • Conduct all procurement required for output 3; • For the first five matching grants, confirm subproject selection, feasibility studies and submit to ADB for “no-objection”; • For subsequent matching grants, approving and certifying subprojects’ compliance with the eligibility criteria; • Recruit and supervise the consultants for irrigated agriculture; • Coordinate with MEW and MRRD on civil works at the interface between AIS and community irrigation; • Prepare project performance monitoring system (for MAIL activities); • Design and implement a comprehensive Impact Monitoring and Evaluation using groups of control and beneficiary farmers; • Prepare Communication, Consultation and Participation plan (for MAIL activities); • Conduct timely financial audits as per agreed timeframe and taking recommended actions; • Establish strong financial management system and submitting timely withdrawal applications;

Organization	Management Roles and Responsibilities
	• Ensure compliance with grant covenants (social, environmental, financial, economic, and others); • Compliance with national environmental regulations as well as with ADB Safeguards Policy Statement (2009); • Monitor and evaluate project activities and outputs including periodic review, Gender Action Plan, FCAS Action Plan, preparation of review reports, and reflecting issues and time-bound actions; • Undertake Project Completion Report; and • Public disclosure of project outputs and role of national supervisory consultants.
Implementing agency 3: MRRD	• Allocate office space for the CPMO in Kabul and PIU in Kandahar; • Recruit staff for the CPMO and PIU; • Establish roles and responsibilities to ensure the successful implementation of output 1b (road realignment), and output 2b (improvement of community irrigation services); • Establish and be accountable and responsible for the use of funds in two advance accounts: one each for ADF grant and IFAD grant funds; • Prepare, review, and submit withdrawal applications withdrawal applications to ADB; • Prepare project performance monitoring system (for MRRD activities); • Prepare Communication, Consultation and Participation plan (for MRRD activities); • Conduct all community contracting procurement required for key activity 2b; • Coordinate with MEW on implementation of key activities 1c (road realignment) and 2b (improvement of community irrigation services); • Compliance with national environmental regulations as well as with ADB Safeguards Policy Statement (2009); • Conduct timely financial audits as per agreed timeframe and taking recommended actions; • Establish strong financial management system and submitting timely withdrawal applications; Ensure compliance with grant covenants (social, environmental, financial, economic, and others); • Monitor and evaluate project activities and outputs including periodic review, Gender Action Plan, FCAS Action Plan, preparation of review reports, and reflecting issues and time-bound actions; • Undertake Project Completion Report; and • Public disclosure of project outputs and role of national supervisory consultants.
ADB	• Examine the detailed designs for major civil works with regard to costs and safeguard requirements; • Review the first five community contracts from MRRD before contract signing between MRRD and community development councils; • Review all contracts prior to PCSS issuance; • Examine works contract bidding documents, requests for proposal, and bid evaluation reports; • Conduct review missions per annum; • Review implementing agencies' project completion report; and • Prepare ADB project completion report.
IFAD	• Signing financing agreement and participation in project startup workshop; • Participate in the supervision mission, mid-term evaluation and end-line evaluation; • Policy support for farmer organization and facilitating coordination with

Organization	Management Roles and Responsibilities
	existing projects; • Review of progress reports and project completion reports; • Prepare IFAD completion report; and, • Provide assistance as may be requested by ADB/Government of Afghanistan.

ADB = Asian Development Bank; ADF = Asian Development Fund; AIS = Arghandab Irrigation System; ARES = Arghandab River Environment Study; ASBA = Arghandab Sub-Basin Agency; AUWSCC = Afghanistan Urban Water Supply and Sewerage Corporation; CPMO = central program management office; EPCS = Engineering, Procurement, Construction Supervision; FCAS = fragile and conflict-affected situations; IFAD = International Fund For Agricultural Development; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MOF = Ministry of Finance; MRRD = Ministry of Rural Rehabilitation and Development; NEPA = National Environmental Protection Agency; PCSS = procurement contract summary sheet; PIU = project implementation unit.
Source: Asian Development Bank and IFAD

B. Key Persons Involved in Implementation

Executing Agency

Ministry of Finance	Mr. Zahid Hamdard Alternate Governor for Islamic Republic of Afghanistan in the Asian Development Bank & Deputy Minister for Finance, Ministry of Finance of the Islamic Republic of Afghanistan, Kabul, Afghanistan Mobile #: +93 (0) 799130034 Landline #: +93 (0) 20 210 3271 Email address: Zahid.hamdard@mof.gov.af

Implementing Agencies

Ministry of Energy and Water	Engr. Khan Mohammad Takal Deputy Minister of Water Telephone: 0748237778 Email address: khan.takal@gmail.com Office Address: Darullaman Road Kabul Afghanistan
Ministry of Agriculture, Irrigation and Livestock	Mr. Hashmatullah Ghafoori Deputy Minister Telephone: +93700222107 Email address: h.ghafoori@mail.gov.af Office Address: Jamal Mena, Kabul
Ministry of Rural Rehabilitation and Development	Mr. Mohammad Eesa Qudrat Deputy Minister, Programs Telephone: +93799-183-557 Email address: eesa.gudrat@mrrd.gov.af Office address: Darul Aman road, Ministry of Rural Rehabilitation and Development Mr. Baryalai Helali Program Director, Regional Programs Telephone: +93700-350-830 Email address: baryalai.helali@mrrd.gov.af

	Office address: Darul Aman road, Ministry of Rural Rehabilitation and Development
Asian Development Bank	
Environment, Natural Resources and Agriculture Division (CWER)	Donneth A. Walton Director Tel No. +63 2 632 5847 dwalton@adb.org
Mission Leader	Hans Woldring Principal Natural Resources and Agriculture Specialist Tel No. +63 2 683 1473 hswoldring@adb.org
International Fund for Agriculture Development Asia and Pacific Division	Hubert Boirard Country Director – Afghanistan Tel No. +393383202446 h.boirard@ifad.org

C. Project Organization Structure

40. The Ministry of Finance (MOF) will be the executing agency for the project. MEW, MAIL, and the MRRD will be the implementing agencies supported by CPMO for each. PIUs reporting to the CPMOs will be established in Kandahar. The overall project organization structure is in Chart 1.

41. Project management and implementation will be embedded in existing government structures to prevent setting up parallel structures, which will help strengthen government institutional capacity, as per Table 3. At the CPMO level, the project will build on structures set-up under the ADB Water Resources Development Investment Program and the Panj-Amu River Basin Sector Project to the extent possible. In addition, the project design has carefully defined roles and responsibilities between the implementing agencies, again to avoid duplication and minimize implementation complexity. A project steering committee (PSC), chaired by MOF, will be established to provide for a formal coordinating structure. An ongoing coordination platform already exists between the three implementing agencies, MEW, MAIL, and MRRD including via the Supreme Council for Land and Water which includes representatives from these ministries and is chaired by the First Vice-President of the Islamic Republic of Afghanistan. Ongoing coordination between MEW, MAIL and MRRD will be strengthened, so that any overlaps can be avoided, synergies realized, and policy gaps identified and addressed. In case of disagreement between the implementing agencies, the MOF in the role of the executing agency and Chair of the PSC will have a coordination role.

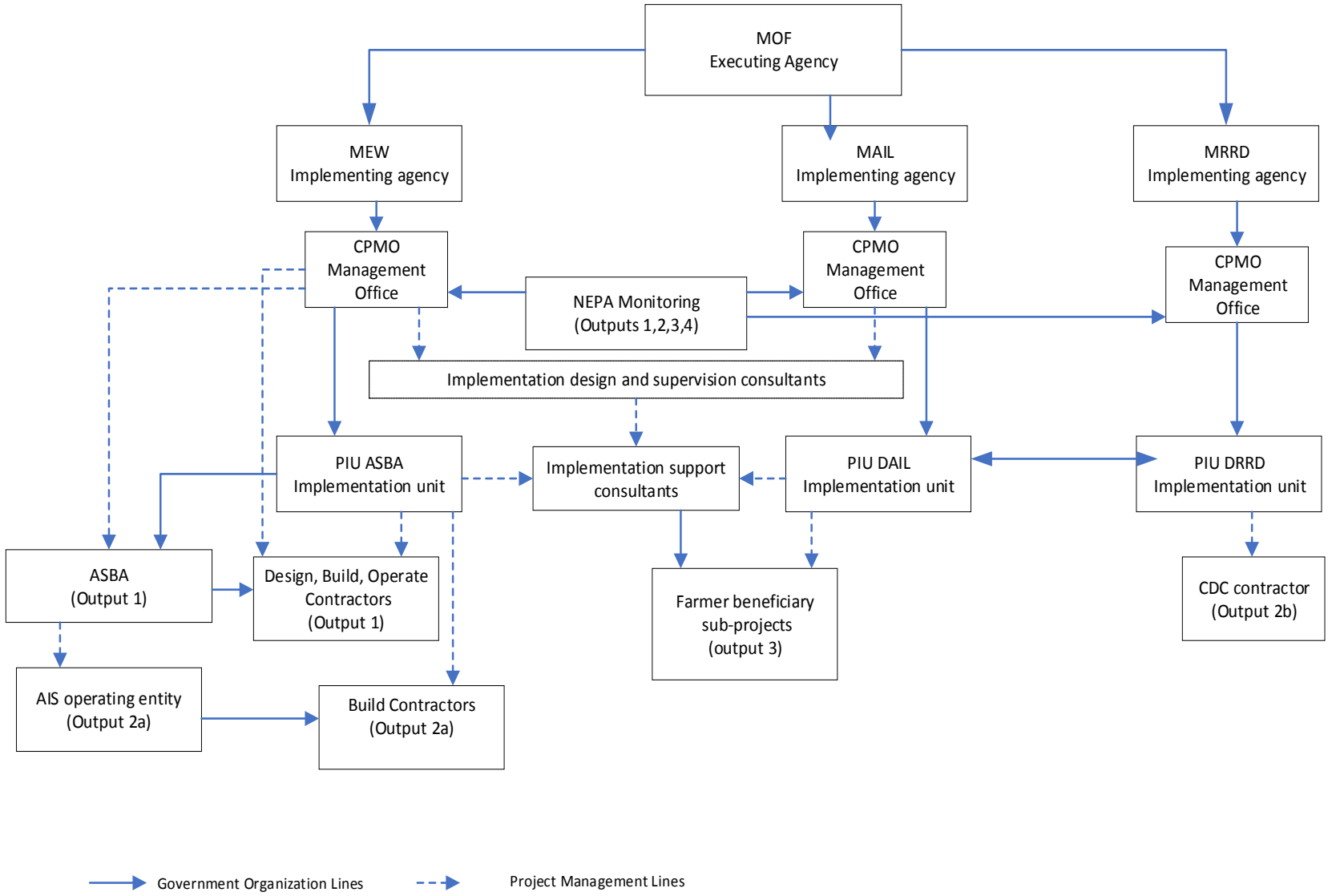
42. MEW will be responsible to oversee the implementation of outputs 1a and 1c (Dahla Dam capacity increased and its operation plan and capacity development), 2a (modernization of AIS), and output 4 (capacity in water resource management and use strengthened). MEW will also be responsible for implementing all environmental and social safeguards, resettlement and establishing the overall project performance monitoring system (PPMS). It will expand the CPMO in the MEW main office responsible for all ADB projects and programs (Chart 2). MEW will set up a PIU in the ASBA in Kandahar, embedded within the ASBA office to avoid setting up

a parallel structure and to strengthen government institutional capacity.

43. MAIL will be responsible for implementation of output 3 (Agricultural water productivity improved). MAIL will similarly expand the CPMO in the MAIL main office (Chart 2), being part of the overall ADB CPMO responsible for all ADB projects and programs implemented by the ministry. It will set up a PIU in the DAIL office in Kandahar.

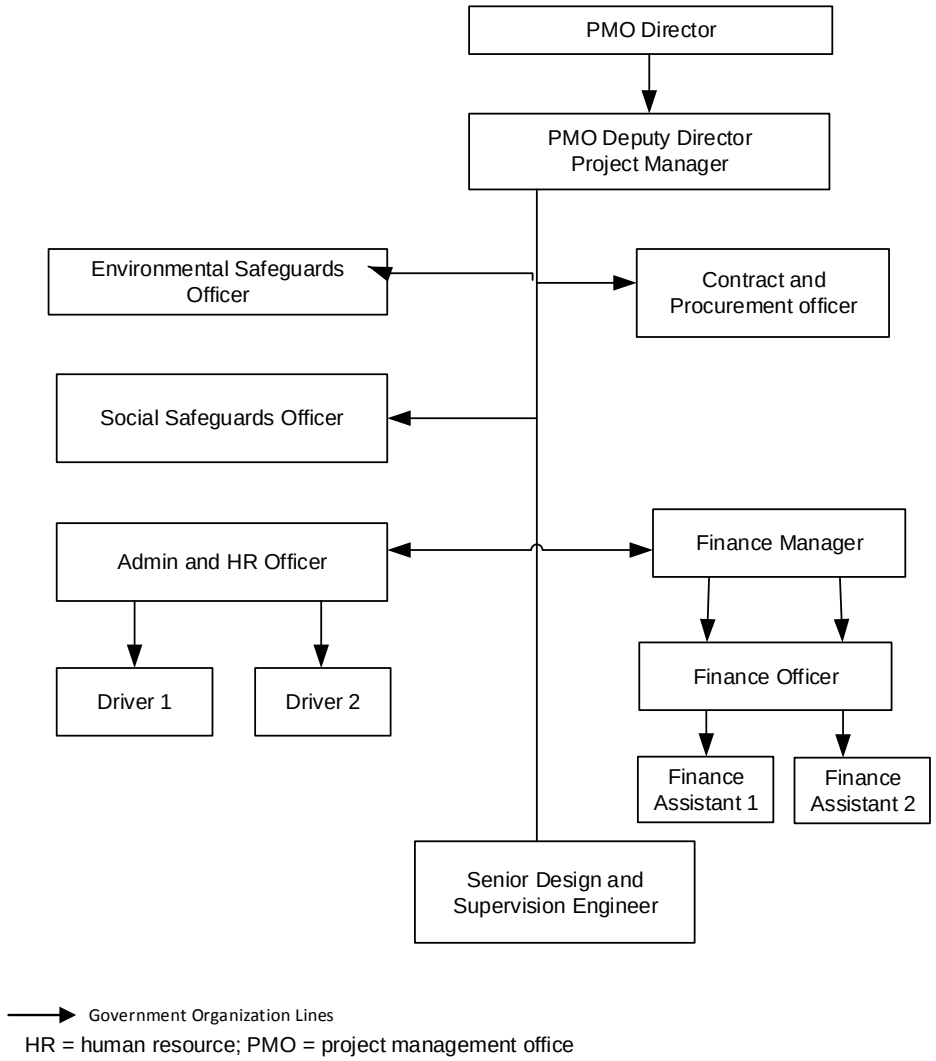
44. MRRD will be responsible for implementation of output 1b (road realignment), and output 2b (support to community development councils for improvement of community irrigation services). MRRD will liaise closely with MEW and MAIL and AIS for implementation. MRRD will expand a CPMO in the existing ADB CPMO main office responsible for all ADB projects and programs implemented by the Ministry (Chart 2). It will set up a PIU in the Department of Rural Rehabilitation and Development office in Kandahar, to avoid setting up a parallel structure and to strengthen government institutional capacity.

Chart 1: Overall Project Organization Structure



AIS = Arghandab Irrigation System; ASBA = Arghandab Sub-Basin Authority; CDC = Community Development Council; CPMO = central program management office; DAIL = Department of Agriculture, Irrigation and Livestock; DRRD = Department of Rural Rehabilitation and Development; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MOF = Ministry of Finance; MRRD = Ministry of Rural Rehabilitation and Development; NEPA = National Environmental Protection Agency; ; PIU = project implementation unit.

Chart 2: Project Management Office (PMO) Structure
(all implementing agencies)



HR = human resource; PMO = project management office

45. Indicative CPMO and PIU staff requirements are in Table 5. Each implementing agency already has a CPMO established with a Program Director who supervises all ADB projects implemented by that agency.

Table 5. Indicative CPMO and PIU staff requirements

Indicative CPMO and PIU Staffing Requirement Position	Number of positions		
	MEW	MAIL	MRRD
Kabul CPMO (MEW positions 84 pm; MAIL up to 72 pm; MRRD 40 pm)			
Project Manager	1	1	1
Deputy Project Manager – Chief Engineer (dam, irrigation)	1		1
Design Supervision Engineer	1		
Surveyor	1		
Deputy Project Manager - Agriculture (MAIL only)		1	
Finance Manager	1	1	1
Finance Assistant	2	2	2
Finance Officer	1	1	1
Matching Grants Manager (MAIL only)		1	
Grants Technical Assessment Officer (MAIL only)		2	
Grant Business Finance Assessment Officer (MAIL only)		2	
Information Technology Officer	1	1	1
Procurement Officer	1	1	1
Procurement Assistant	1	1	1
Operations/Transport Officer	1	1	1
Admin Assistant (human resources)	1	1	1
Office Assistant & Reception	1	1	1
Cleaner	2	2	2
Monitoring & Evaluation Reporting Specialist	1	1	1
Social, Gender, and Environment Specialist	1		1
Security Advisor	1	1	1
Resettlement Specialist	3		
Unallocated	2	2	6
Subtotal	**24**	**23**	**23**
Kandahar PIU (MEW positions 84 pm; MAIL positions up to 72 pm; MRRD positions 40 pm)			
Head of Project Implementation Unit	1	1	1
Admin/Finance Officer	2	2	2
Quality Control/Monitoring Engineers	1		1
Design and Survey Engineer (ASBA)	2		
Design and Survey Engineers (MRRD)			22
Agriculture Officer (DAIL only)		2	
On-farm Water Management Specialist (DAIL only)		1	
Grants Technical Support Officer (DAIL only)		1	
Grant Business Support Officer (DAIL only)		1	
Community Awareness Campaign and Training Officer	2	2	1
Monitoring & Evaluation Officer	1	1	1
Resettlement Officers (DEW/ASBA)	25		
Social safeguards and gender Officer	1	1	1
FCAS Officer	1	1	1
Environment Officer	1	1	1
Security Advisor	1	1	1
Unallocated	5	5	5
Sub-total	**43**	**20**	**37**

ASBA = Arghandab Sub Basin Agency; CPMO = central program management office; DAIL = Department of Agriculture, Irrigation and Livestock; DEW = Department of Energy and Water; FCAS = fragile and conflict-affected situations; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; PIU = project implementation unit; pm = person-months.
Source: Asian Development Bank.

IV. COSTS AND FINANCING

A. Key Assumptions

46. The following key assumptions underpin the cost estimates and financing plan:

(i) Exchange rate: AFN 80.71 = $1.00 (as of 20 June 2019).
(ii) Price contingencies based on expected cumulative inflation over the implementation period are as follows:

Table 6: Escalation Rates for Price Contingency Calculation

Item	2019	2020	2021	2022	2023	2024	2025	2026	Average
Foreign rate of price inflation	1.5%	3.0%	4.6%	6.3%	8.0%	9.7%	11.5%	13.3%	7.2%
Domestic rate of price inflation	0.6%	2.4%	6.0%	10.2%	14.6%	19.2%	24.0%	29.0%	13.3%

Sources: Asian Development Bank estimates.

B. Detailed Cost Estimates by Expenditure Category

47. Detailed cost estimates by expenditure category are in Table 7.

Table 7: Detailed Cost Estimates by Expenditure Category
($ million)

	Total Costs						% Total
	AFG			US$			Base costs
	Local	Foreign	Total	Local	Foreign	Total	
A. INVESTMENT COSTS							
1 Civil Works							
1 Dahla Dam capacity increased	2878.54	11514.162	14392.702	35.662	142.649	178.311	52.5%
2 Reliability of irrigation water supply increased	200.143	800.57	1000.713	2.48	9.918	12.398	3.6%
3 Agricultural water productivity improved	.	.	.	.	.	.	0.0%
4 Capacity in water resource management and use strengthened	.	.	.	.	.	.	
Sub-total:	**3078.683**	**12314.732**	**15393.415**	**38.142**	**152.567**	**190.709**	**56.1%**
2 Goods and Equipment							
1 Dahla Dam capacity increased	32.713	130.854	163.567	.405	1.621	2.026	0.6%
2 Reliability of irrigation water supply increased	29.429	117.715	147.144	.365	1.458	1.823	0.5%
3 Agricultural water productivity improved	61.595	246.38	307.975	.763	3.052	3.815	1.1%
5 Capacity in water resource management and use strengthened	.	.	.	.	.	.	0.0%
Sub-total:	**123.737**	**494.948**	**618.686**	**1.533**	**6.132**	**7.665**	**2.3%**
3 Community Contracting							
1 Dahla Dam capacity increased	.	.	.	.	.	.	0.0%
2 Reliability of irrigation water supply increased	431.527	1726.108	2157.635	5.346	21.385	26.731	7.9%
3 Agricultural water productivity improved	617.928	2471.711	3089.638	7.656	30.622	38.278	11.3%
4 Capacity in water resource management and use strengthened	.	.	.	.	.	.	0.0%
Sub-total:	**1049.455**	**4197.818**	**5247.273**	**13.002**	**52.007**	**65.008**	**19.1%**
4 Consulting Services							
1 Dahla Dam capacity increased	292.908	1171.633	1464.542	3.629	14.515	18.144	5.3%
2 Reliability of irrigation water supply increased	.	.	.	.	.	.	0.0%
3 Agricultural water productivity improved	117.928	471.713	589.642	1.461	5.844	7.305	2.1%
4 Capacity in water resource management and use strengthened	38.326	153.303	191.629	.475	1.899	2.374	0.7%
Sub-total:	**449.162**	**1796.65**	**2245.812**	**5.565**	**22.259**	**27.823**	**8.2%**
5 Training and Workshops							
1 Dahla Dam capacity increased	3.422	13.688	17.11	.042	.17	.212	0.1%
2 Reliability of irrigation water supply increased	1.369	5.475	6.844	.017	.068	.085	0.0%
3 Agricultural water productivity improved	3.422	13.688	17.11	.042	.17	.212	0.1%
4 Capacity in water resource management and use strengthened	50.645	202.579	253.224	.627	2.51	3.137	0.9%
Sub-total:	**58.857**	**235.43**	**294.287**	**.729**	**2.917**	**3.646**	**1.1%**
6 Safeguards							
1 Dahla Dam capacity increased	1688.688	.	1688.688	20.921	.	20.921	6.2%
2 Reliability of irrigation water supply increased	554.992	.	554.992	6.876	.	6.876	2.0%
3 Agricultural water productivity improved	.	.	.	.	.	.	0.0%
4 Capacity in water resource management and use strengthened	.	.	.	.	.	.	0.0%
Sub-total:	**2243.68**	**.**	**2243.68**	**27.797**	**.**	**27.797**	**8.2%**
Subtotal (A)	**7003.575**	**19039.579**	**26043.154**	**86.767**	**235.881**	**322.648**	**95.0%**
B. RECURRENT COSTS							
Salaries	704.622	.	704.622	8.73	.	8.73	2.6%
Running costs	549.549	.	549.549	6.808	.	6.808	2.0%
Office equipment	33.946	.	33.946	.421	.	.421	0.1%
Office security and renovation	96.199	.	96.199	1.192	.	1.192	0.4%
Subtotal (B)	**1384.316**	**.**	**1384.316**	**17.15**	**.**	**17.15**	**5.0%**
Subtotal (A+B)	**8387.891**	**19039.579**	**27427.47**	**103.918**	**235.881**	**339.799**	**100.0%**
C. CONTINGENCIES AND CHARGES							
1 Physical Contingency	.	.	2310.179			28.621	**8.4%**
2 Price Contingency	.	.	1119.63			13.871	**4.1%**
Security (contractors)	.	.	1308.825			16.215	**4.8%**
ADB Administrative Charges	.	.	63.307			.784	**0.2%**
Subtotal (C)	**.**	**.**	**4801.942**			**59.491**	**17.5%**
Total Project Costs	**.**	**.**	**32229.411**			**399.29**	**117.5%**

C. Allocation and Withdrawal of Grant Proceeds

ADF/DRR Financing

	Item	Total Amount Allocated for ADB Financing		Percentage and Basis for Withdrawal from the Grant Account
		USD		
		Category	Subcategory	
A. INVESTMENT COSTS				
1	**Civil Works**	**190,708,941**		
	MEW (Activities 1a, 2a: dam raising, AIS rehabilitations)		*174,797,829*	*100% of total expenditure claimed*
	MRRD (Activity 1b: road re-alignment)		*15,911,111*	*100% of total expenditure claimed*
2	**Goods and Equipment**	**3,849,393**		
	MEW (Activities 1a, 2a: dam raising, AIS rehabilitations)		*3,849,393*	*100% of total expenditure claimed*
3	**Community Contracting**	**30,622,010**		
	MAIL (Activity 3a: onfarm matching grants)		*30,622,010*	*100% of total expenditure claimed*
4	**Consulting Services**	**26,466,733**		
	MEW (Activities 1a, 1b, 1c, 4c EPCS, POE, EWTR, Environment and social safeguards)		*19,161,667*	*100% of total expenditure claimed*
	MAIL (Activity 3a: AISC)		*7,305,066*	*100% of total expenditure claimed*
5	**Training and Workshops**	**3,645,922**		
	MEW (Activities 1a, 4a, 4b)		3,221,977	*100% of total expenditure claimed*
	MRRD (Activities 1b, 2b)		211,972	*100% of total expenditure claimed*
	MAIL (Activities 3a)		211,972	*100% of total expenditure claimed*
6	**Safeguards**	**27,796,945**		
	MEW (Resettlement costs under 1a, 1b, 2b, 3a)		*27,796,945*	*100% of total expenditure claimed*
7	**Project Management**	**13,394,994**		
	MEW (Salaries, running costs, office equipment, office security and renovation)		*3,862,133*	*100% of total expenditure claimed*
	MRRD (Salaries, running costs, office equipment, office security and renovation)		*4,974,305*	*100% of total expenditure claimed*
	MAIL (Salaries, running costs, office equipment, office security and renovation)		*4,558,555*	*100% of total expenditure claimed*
UNALLOCATED		***52,295,064***		
	Physical and price contingencies		*36,080,041*	*100% of total expenditure claimed*
	Security (contractors)		*16,215,024*	*100% of total expenditure claimed*
	Total	**348,780,000**		

IFAD (grant) Financing

	Item	Total Amount Allocated for IFAD Financing		Percentage and Basis for Withdrawal from the Grant Account
		USD		
		Category	Subcategory	
A. INVESTMENT COSTS				
2	**Goods and Equipment**	**3,815,499**		
	MAIL (Activity 3a: onfarm demonstrations)		*3,815,499*	*100% of total expenditure claimed*
3	**Community Contracting**	**28,405,565**		
	MRRD (Activity 2b: canal and bridge rehabiliations)		*25,534,752*	*100% of total expenditure claimed*
	MAIL (Activity 3a: onfarm matching grants)		*2,870,813*	*100% of total expenditure claimed*
4	**Consulting Services**	**1,356,622**		
	MEW (Activity 4a: WREG)		*1,356,622*	*100% of total expenditure claimed*
UNALLOCATED		***6,422,313***		
	Physical and price contingencies		*5,638,000*	*100% of total expenditure claimed*
	ADB Administrative Charges		*784,314*	
	Total	**40,000,000**		

48. Category 1 (Works) of the Allocation and Withdrawal of Grant Proceeds table are subject to the conditions for withdrawal specified in paragraph 64.

49. Category 3 (Community Contracting) of the Allocation and Withdrawal of Grant Proceeds table are subject to the condition for withdrawal described in paragraph 63. The IFAD grant resources in this cost category will only be used for matching grants to farmer groups/organizations.

50. Category 6 (Safeguards) is subject to the conditions for withdrawal specified in paragraph 64(i) and (ii).

51. The Safeguards Cost investment cost category is for resettlement costs.

52. The disaster risk reduction (DRR) fund will support the government to strengthen its capacity to manage climate change related risks, in particular related to the management and use of its water resources. Funding is provided for (i) training activities for the MEW and MRRD under (key activities 4a and 2b, respectively), including surveys and capacity development of NEPA staff on environmental flows, (ii) the Integrated Water Resources Management graduate program of the Kabul Polytechnic University (key activity 4b), and (iii) the establishment of a national hydrological management and monitoring platform (key activity 4c). The DRR support will complement the overall efforts by the project to improve water availability and allocation and reduce water related risks (e.g. droughts and floods).

D. Detailed Cost Estimates by Financier

53. Table 8 identifies the types of expenditure included in the overall project cost.

Table 8: Detailed cost estimates by financier

($ million)

	ADF/DRR Financing		IFAD (grant) Financing		Government Contribution		Beneficiaries Contributions		Total Costs
	Amount	%	Amount	%	Amount	%		%	Amount
Civil Works	***190.709***		***.***		***.***		***.***		**190.709**
MEW (Activities 1a, 2a: dam raising, AIS rehabilitations)	*174.798*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	174.798
MRRD (Activity 1b: road re-alignment)	*15.911*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	15.911
Goods and Equipment	***3.849***		***3.815***		***.***		***.***		**7.665**
MEW (Activities 1a, 2a: dam raising, AIS rehabilitations)	*3.849*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	3.849
MAIL (Activity 3a: onfarm demonstrations)	*.*	*0%*	*3.815*	*100%*	*.*	*0%*	*.*	*0%*	3.815
Community Contracting	***30.622***		***28.406***		***.***		***5.981***		**65.008**
MAIL (Activity 3a: onfarm matching grants)	*30.622*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	30.622
MRRD (Activity 2b: canal and bridge rehabiliations)	*.*	*0%*	*25.535*	*100%*	*.*	*0%*	*.*	*0%*	25.535
MAIL (Activity 3a: onfarm matching grants)	*.*	*0%*	*2.871*	*100%*	*.*	*0%*	*.*	*0%*	2.871
MRRD (Activity 2b: in-kind support)	*.*	*0%*	*.*	*0%*	*.*	*0%*	*1.196*	*100%*	1.196
MAIL (Activity 3a: matching grant contributions)	*.*	*0%*	*.*	*0%*	*.*	*0%*	*4.785*	*100%*	4.785
Consulting Services	***26.467***		***1.357***		***.***		***.***		**27.823**
MEW (Activities 1a, 1b, 1c, 4c EPCS, POE, EWTR, Environment and social safeguards)	*19.162*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	19.162
MAIL (Activity 3a: AISC)	*7.305*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	7.305
MEW (Activity 4a: WREG)	*.*	*0%*	*1.357*	*100%*	*.*	*0%*	*.*	*0%*	1.357
Training and Workshops	***3.646***		***.***		***.***		***.***		**3.646**
MEW (Activities 1a, 4a, 4b)	*3.222*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	3.222
MRRD (Activities 1b, 2b)	*.212*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	.212
MAIL (Activities 3a)	*.212*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	.212
Safeguards	***27.797***		***.***		***.***		***.***		**27.797**
MEW (Resettlement costs under 1a, 1b, 2b, 3a)	*27.797*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	27.797
Subtotal (A)	***283.09***	*87.7%*	***33.578***	*10.4%*	***.***	*0.0%*	***5.981***	*1.9%*	***322.648***
Project Management	***13.395***		***.***		***3.755***		***.***		**17.15**
MEW (Salaries, running costs, office equipment, office security and renovation)	*3.862*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	3.862
MRRD (Salaries, running costs, office equipment, office security and renovation)	*4.974*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	4.974
MAIL (Salaries, running costs, office equipment, office security and renovation)	*4.559*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	4.559
MEW (Government staff, meeting rooms, utilities, others)	*.*	*0%*	*.*	*0%*	*1.164*	*100%*	*.*	*0%*	1.164
MRRD (Government staff, meeting rooms, utilities, others)	*.*	*0%*	*.*	*0%*	*1.322*	*100%*	*.*	*0%*	1.322
MAIL (Government staff, meeting rooms, utilities, others)	*.*	*0%*	*.*	*0%*	*1.269*	*100%*	*.*	*0%*	1.269
Subtotal (B)	***13.395***	*78.1%*	***.***	*0.0%*	***3.755***	*22%*	***.***	*0.0%*	17.15
Subtotal (A+B)	***296.485***	*87.3%*	***33.578***	*9.9%*	***3.755***	*1.1%*	***5.981***	*1.8%*	**339.799**
Physical Contingency	*23.989*	*83.8%*	*4.127*	*14.4%*	*.505*	*1.8%*	*.*	*0.0%*	28.621
Price Contingency	*12.091*	*87.2%*	*1.511*	*10.9%*	*.*	*0.0%*	*.269*	*1.9%*	13.871
Security (contractors)	*16.215*	*100%*	*.*	*0.0%*	*.*	*0.0%*	*.*	*0.0%*	16.215
ADB Administrative Charges	*.*	*0.0%*	*.784*	*100%*	*.*	*0.0%*	*.*	*0.0%*	.784
Subtotal (C)	***52.295***	***87.9%***	***6.422***	***10.8%***	***.505***	***0.8%***	***.269***	***0.5%***	***59.491***
Total Project Costs (A+B+C)	**348.78**	87.4%	**40.00**	10.0%	**4.26**	1.1%	**6.25**	1.6%	**399.29**

Note: Numbers may not sum precisely because of rounding.
Source(s): ADB

E. Detailed Cost Estimates by Outputs and/or Components

Table 9: Detailed costs by outputs

($ million)

Outputs:	Dahla Dam capacity increased	Reliability of irrigation water supply increased	Agricultural water productivity improved	Capacity in water resource management and use strengthened	Project management	*Total Costs*
A. INVESTMENT COSTS						
1 Civil Works	178.31	12.40	.00	.00	.00	*190.71*
2 Goods and Equipment	2.03	1.82	3.82	.00	.00	*7.66*
3 Community Contracting	.00	26.73	38.28	.00	.00	*65.01*
4 Consulting Services	18.14	.00	7.31	2.37	.00	*27.82*
5 Training and Workshops	.21	.08	.21	3.14	.00	*3.65*
6 Safeguards	20.92	6.88	.00	.00	.00	*27.80*
Subtotal (A)	***219.61***	***47.91***	***49.61***	***5.51***	.00	***322.65***
B. RECURRENT COSTS						
Salaries	.00	.00	.00	.00	8.73	*8.73*
Running costs	.00	.00	.00	.00	6.81	*6.81*
Office equipment	.00	.00	.00	.00	.42	*.42*
Office security and renovation	.00	.00	.00	.00	1.19	*1.19*
Subtotal (B)	***.00***	***.00***	***.00***	***.00***	***17.15***	***17.15***
Subtotal (A+B)	***219.61***	***47.91***	***49.61***	***5.51***	***17.15***	***339.80***
C. CONTINGENCIES AND CHARGES						
1 Physical Contingency	18.70	5.35	1.52	.74	2.30	*28.62*
2 Price Contingency	8.94	1.85	2.23	.25	.60	*13.87*
Security (contractor)	15.63	.00	.58	.00	.00	*16.22*
ADB Administrative Charges	.00	.60	.15	.03	.00	*.78*
Subtotal (C)	***43.27***	***7.80***	***4.49***	***1.02***	***2.91***	***59.49***
Total Project Costs	***262.88***	***55.72***	***54.10***	***6.53***	***20.06***	***399.29***

Table 10: Detailed costs by Outputs and Ministries

($ million)

Outputs / Key activities	MEW				MRRD				MAIL				Total by Financier				Total costs
	ADF/ DRR	IFAD (grant)	Govern- ment	Benefi- ciaries	ADF/ DRR	IFAD (grant)	Govern- ment	Benefi- ciaries	ADF/ DRR	IFAD (grant)	Govern- ment	Benefi- ciaries	ADF/ DRR	IFAD (grant)	Govern- ment	Benefi- ciaries	
	ADF/DRR	IFAD (grant)	Government	Beneficiaries	ADF/DRR	IFAD (grant)	Government	Beneficiaries	ADF/DRR	IFAD (grant)	Government	Beneficiaries	ADF/DRR	IFAD (grant)	Government	Beneficiaries	
A. INVESTMENT COSTS																	
1 Dahla Dam capacity increased	**203.58**	**.00**	**.00**	**.00**	**16.04**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**219.61**	**.00**	**.00**	**.00**	**219.61**
1a *Raise the main dam and six saddle dams*	*199.87*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*199.87*	*.00*	*.00*	*.00*	*199.87*
1b *Road realignment*	*2.11*	*.00*	*.00*	*.00*	*16.04*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*18.15*	*.00*	*.00*	*.00*	*18.15*
1c *Capacity in dam operation and flow management improved*	*1.59*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*1.59*	*.00*	*.00*	*.00*	*1.59*
2 Reliability of irrigation water supply increased	**21.10**	**.00**	**.00**	**.00**	**.08**	**25.53**	**.00**	**1.20**	**.00**	**.00**	**.00**	**.00**	**21.18**	**25.53**	**.00**	**1.20**	**47.91**
2a *Modernization of AIS*	*14.22*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*14.22*	*.00*	*.00*	*.00*	*14.22*
2b *Improvement of community irrigation services*	*6.88*	*.00*	*.00*	*.00*	*.08*	*25.53*	*.00*	*1.20*	*.00*	*.00*	*.00*	*.00*	*6.96*	*25.53*	*.00*	*1.20*	*33.69*
3 Agricultural water productivity improved	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**38.14**	**6.69**	**.00**	**4.78**	**38.14**	**6.69**	**.00**	**4.78**	**49.61**
3a *Demonstration of innovative agricultural on-farm practices and investment options*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*38.14*	*6.69*	*.00*	*4.78*	*38.14*	*6.69*	*.00*	*4.78*	*49.61*
4 Capacity in water resource management and use strengthened	**4.15**	**1.36**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**4.15**	**1.36**	**.00**	**.00**	**5.51**
4a *Water regulations reform*	*.17*	*1.36*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.17*	*1.36*	*.00*	*.00*	*1.53*
4b *Strategic water resources management training*	*2.97*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*2.97*	*.00*	*.00*	*.00*	*2.97*
4c *Establishment of a National Hydrological Modelling Platform*	*1.02*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*1.02*	*.00*	*.00*	*.00*	*1.02*
Sub-total (A):	**228.83**	**1.36**	**.00**	**.00**	**16.12**	**25.53**	**.00**	**1.20**	**38.14**	**6.69**	**.00**	**4.78**	**283.09**	**33.58**	**.00**	**5.98**	**322.65**
B. RECURRENT COSTS																	
5 Project management	**3.86**	**.00**	**1.16**	**.00**	**4.97**	**.00**	**1.32**	**.00**	**4.56**	**.00**	**1.27**	**.00**	**13.39**	**.00**	**3.76**	**.00**	**17.15**
Total Base Costs:	**232.69**	**1.36**	**1.16**	**.00**	**21.10**	**25.53**	**1.32**	**1.20**	**42.70**	**6.69**	**1.27**	**4.78**	**296.48**	**33.58**	**3.76**	**5.98**	**339.80**
C. CONTINGENCIES AND CHARGES	**43.82**	**.28**	**.16**	**.00**	**4.35**	**5.18**	**.18**	**.05**	**4.13**	**.96**	**.17**	**.22**	**52.30**	**6.42**	**.50**	**.27**	**59.49**
1 Physical Contingency	20.24	.18	.16	.00	2.13	3.43	.18	.00	1.62	.51	.17	.00	23.99	4.13	.50	.00	28.62
2 Price Contingency	9.22	.06	.00	.00	.95	1.15	.00	.05	1.92	.30	.00	.22	12.09	1.51	.00	.27	13.87
Security (contractors)	14.36	.00	.00	.00	1.27	.00	.00	.00	.58	.00	.00	.00	16.22	.00	.00	.00	16.22
ADB Administrative Charges	.00	.03	.00	.00	.00	.60	.00	.00	.00	.15	.00	.00	.00	.78	.00	.00	.78
Total project costs:	**276.50**	**1.63**	**1.32**	**.00**	**25.45**	**30.72**	**1.50**	**1.25**	**46.83**	**7.65**	**1.44**	**5.00**	**348.78**	**40.00**	**4.26**	**6.25**	**399.29**

F. Detailed Cost Estimates by Year

Table 11: Detailed cost estimates by year

($ million)

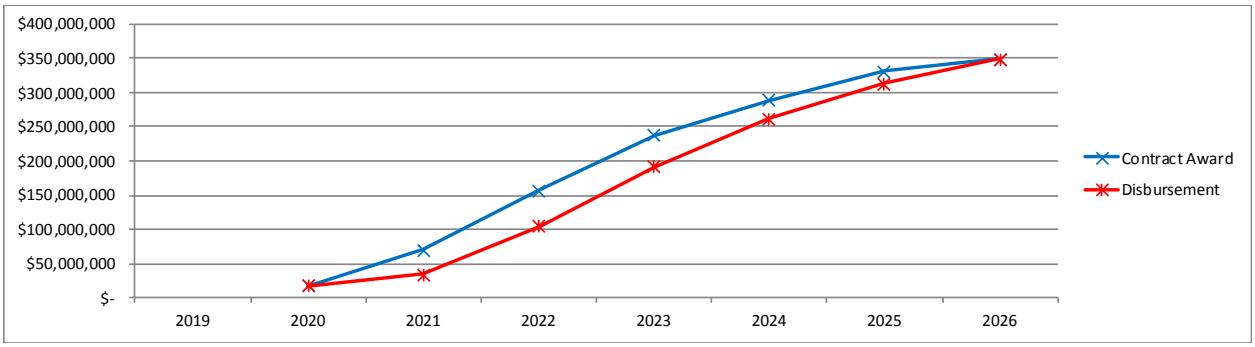
Output / Subcomponent	Total Costs	Year 0 (2019)	Year 1 (2020)	Year 2 (2021)	Year 3 (2022)	Year 4 (2023)	Year 5 (2024)	Year 6 (2025)	Year 7 (2026)
A. INVESTMENT COSTS									
1 Dahla Dam capacity increased									
1a Raise the main dam and six saddle dams	199.875		19.987	29.981	43.972	45.971	29.981	19.987	9.994
1b Road realignment	18.152		1.815	2.723	3.993	4.175	2.723	1.815	.908
1c Capacity in dam operation and flow management improved	1.588		.159	.238	.349	.365	.238	.159	.079
Sub-total:	***219.615***		***21.961***	***32.942***	***48.315***	***50.511***	***32.942***	***21.961***	***10.981***
2 Reliability of irrigation water supply increased									
2a Modernization of AIS	14.221		1.422	2.133	3.129	3.271	2.133	1.422	.711
2b Improvement of community irrigation services	33.692		3.369	5.054	7.412	7.749	5.054	3.369	1.685
Sub-total:	***47.912***		***4.791***	***7.187***	***10.541***	***11.02***	***7.187***	***4.791***	***2.396***
3 Agricultural water productivity improved									
3a Demonstration of innovative agricultural on-farm practices and investr	49.61		4.961	7.442	10.914	11.41	7.442	4.961	2.481
Sub-total:	***49.61***		***4.961***	***7.442***	***10.914***	***11.41***	***7.442***	***4.961***	***2.481***
4 Capacity in water resource management and use strengthened									
4a Water regulations reform	1.526		.153	.229	.336	.351	.229	.153	.076
4b Strategic water resources management training	2.968		.297	.445	.653	.683	.445	.297	.148
4c Establishment of a National Hydrological Modelling Platform	1.017		.102	.153	.224	.234	.153	.102	.051
Sub-total:	***5.511***		***.551***	***.827***	***1.212***	***1.268***	***.827***	***.551***	***.276***
Sub-total (A):	***322.648***		***32.265***	***48.397***	***70.983***	***74.209***	***48.397***	***32.265***	***16.132***
B. RECURRENT COSTS									
5 Project management									
Sub-total (B):	***17.15***		***1.715***	***2.573***	***3.773***	***3.945***	***2.573***	***1.715***	***.858***
Total Base Costs (A+B):	**339.799**		**33.98**	**50.97**	**74.756**	**78.154**	**50.97**	**33.98**	**16.99**
C. CONTINGENCIES AND CHARGES									
1 Physical Contingency	28.621		2.862	4.293	6.297	6.583	4.293	2.862	1.431
2 Price Contingency	13.871		1.387	2.081	3.052	3.19	2.081	1.387	.694
Security (contractors)	16.215		1.622	2.432	3.567	3.729	2.432	1.622	.811
ADB Administrative Charges	.784	.	.078	.118	.173	.18	.118	.078	.039
Subtotal (C)	***59.491***		***5.949***	***8.924***	***13.088***	***13.683***	***8.924***	***5.949***	***2.975***
Total project costs:	**399.29**		**39.929**	**59.894**	**87.844**	**91.837**	**59.894**	**39.929**	**19.965**

Source: Asian Development Bank.

G. Contract and Disbursement S-Curve

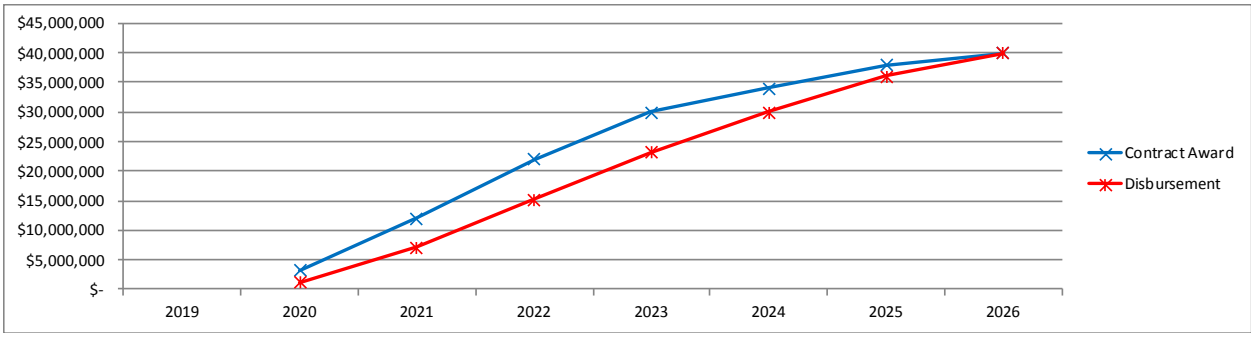
ADF/DRR (grant)

Year	Contract Award Q1	Q2	Q3	Q4	Total	Disbursement Q1	Q2	Q3	Q4	Total
2019	.	.	.	.	.	.	.	.	.	.
2020	1.74	3.49	5.23	6.98	17.44	1.74	3.49	5.23	6.98	17.44
2021	5.23	10.46	15.70	20.93	52.32	1.74	3.49	5.23	6.98	17.44
2022	8.72	17.44	26.16	34.88	87.20	6.98	13.95	20.93	27.90	69.76
2023	8.02	16.04	24.07	32.09	80.22	8.72	17.44	26.16	34.88	87.20
2024	5.23	10.46	15.70	20.93	52.32	6.98	13.95	20.93	27.90	69.76
2025	4.19	8.37	12.56	16.74	41.85	5.23	10.46	15.70	20.93	52.32
2026	1.74	3.49	5.23	6.98	17.44	3.49	6.98	10.46	13.95	34.88
Total					**348.78**					**348.78**

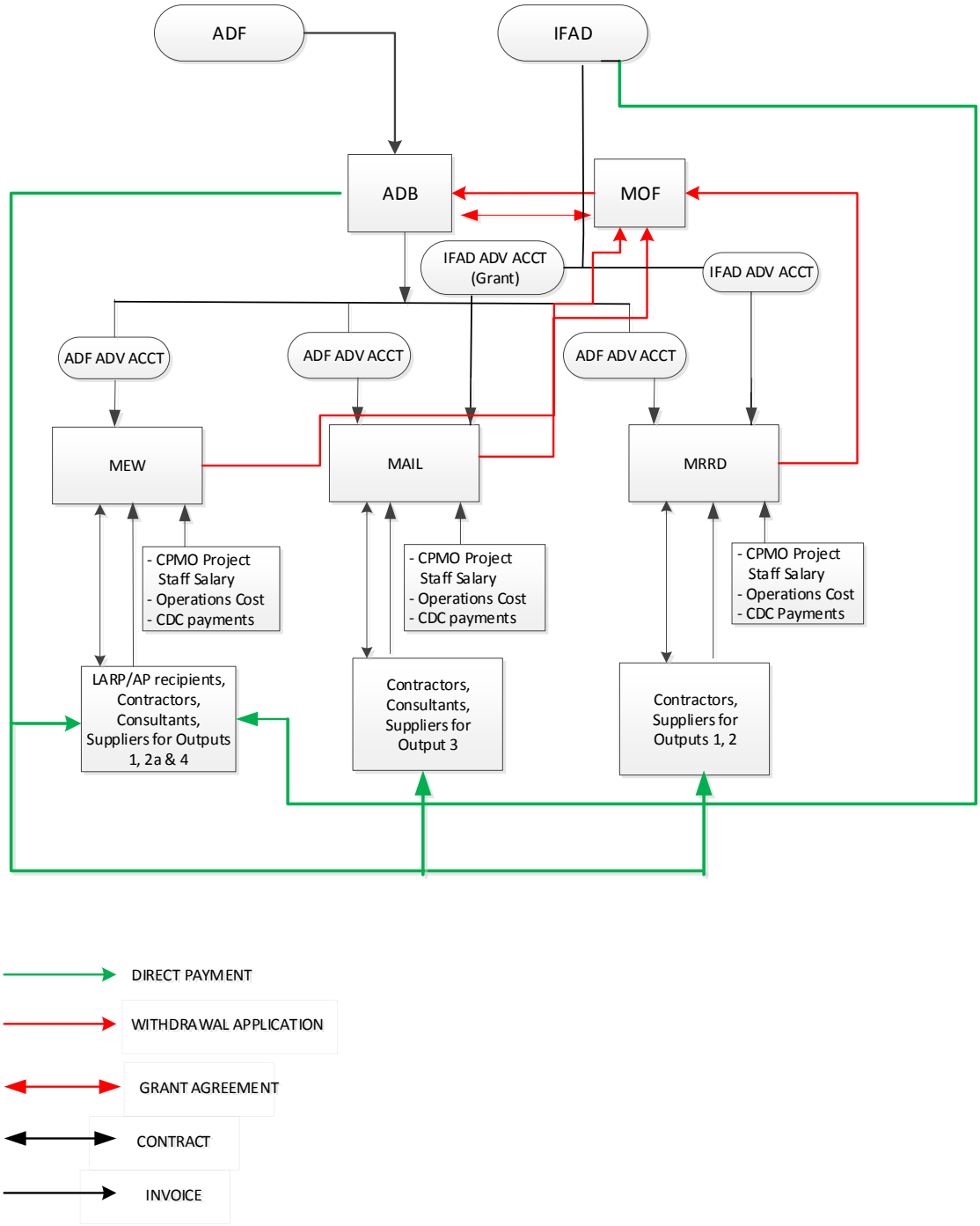


IFAD (grant)

Year	Contract Award Q1	Q2	Q3	Q4	Total	Disbursement Q1	Q2	Q3	Q4	Total
2019	.	.	.	.	.	.	.	.	.	.
2020	.32	.64	.96	1.28	3.20	.12	.24	.36	.48	1.20
2021	.88	1.76	2.64	3.52	8.80	.60	1.20	1.80	2.40	6.00
2022	1.00	2.00	3.00	4.00	10.00	.80	1.60	2.40	3.20	8.00
2023	.80	1.60	2.40	3.20	8.00	.80	1.60	2.40	3.20	8.00
2024	.40	.80	1.20	1.60	4.00	.68	1.36	2.04	2.72	6.80
2025	.40	.80	1.20	1.60	4.00	.60	1.20	1.80	2.40	6.00
2026	.20	.40	.60	.80	2.00	.40	.80	1.20	1.60	4.00
Total					**40.00**					**40.00**



H. Fund Flow Diagram



V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

52. All three implementing agencies have significant experience in the implementation of projects financed by ADB, IFAD, the World Bank, the European Union, and other international development agencies. The existing financial management arrangements in place with ADB and IFAD funded projects, current, in the case of MEW and MAIL, or recent in the case of MRRD, are appropriate for the proposed project.

53. While control risk at IAs and project level is moderate for MEW, MAIL and MRRD because CPMOs are well established and experience with ADB projects, inherent risk at country level is substantial due to weak financial reporting and weak line ministries' internal audit which focus more on financial compliance rather than adequacy and effectiveness of control environment.

54. Therefore, it is concluded that the overall pre-mitigation financial management risk of MEW, MAIL, and MRRD is substantial. All three agencies have adequate capacity to administer advance account procedures with the 6 month-expenditure limit and the statement of expenditures (SOE) procedures with the proposed ceiling for individual transaction limit. Each of the three agencies has agreed to implement an action plan of key measures to address the deficiencies, with assistance of the AISCs. Key actions to address each agency's financial management limitations during project implementation are provided in Table 12.

55. The following actions shall be taken, as outlined in Table 13.

Table 13: Financial Management Action Plan

Risk descriptions	Actions	Responsibility	Timeline
MEW			
Incompleteness and accuracy of financial transactions due to using spreadsheet to capture financial transactions	Rollout accounting software timely for the project	MEW	Within 6 months after effectiveness
Delay in submission of APFS due to limited qualified audit firms and security consideration in the country	Start a recruitment process to engage private audit firm at least 4 months before financial year end (recommend having a maximum of 3 years contract)	MEW	4 months before financial year end
Delay in prepare financial reporting and financial recording due to lack of staff	Fill up Finance Manager position and reassess finance resources during project implementation for additional finance staff	MEW	Within 6 months after effectiveness
Inadequate budget for O&M results in AIS asset deterioration	Creation of two special purpose vehicles for water delivery services and revenue collection, one each for Dahla Dam and the AIS	MEW	By 31 December 2023
MAIL			
Incompleteness and accuracy of financial transactions due to using	Select and implement relevant accounting software for the project	MAIL	Within 6 months after effectiveness

Risk descriptions	Actions	Responsibility	Timeline
spreadsheet to capture financial transactions			
Delay in submission of APFS due to limited qualified audit firms and security consideration in the country	Commence recruitment to engage private audit firm at least 4 months before financial year end (recommend having a maximum of 3 years contract)	MAIL	4 months before financial year end
Delay in prepare financial reporting and financial recording due to lack of staff	Fill up two vacant financial positions	MAIL	Within 6 months after effectiveness
MRRD			
Delay in submission of APFS due to limited qualified audit firms and security consideration in the country	Start a recruitment process to engage private audit firm at least 4 months before financial year end (recommend having a maximum of 3 years contract)	MRRD	4 months before financial year end
Delay in implementing the project due to unavailable staff	Appoint Financial Management staff (1 Finance Manager, 1 Finance Officer, 2 Finance Assistants) in MRRD who had experiences in recent ADB-funded projects to CPMO	MRRD	Within 6 months after effectiveness
Incompleteness and accuracy of financial transactions due to using spreadsheet to capture financial transactions	Implement accounting software, which was previously used, for ADB-funded projects	MRRD	Within 6 months after effectiveness

ADB = Asian Development Bank; AIS = Arghandab Irrigation System; APFS = audited project financial statements; CPMO = central program management office; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; O&M = operation and maintenance.

B. Disbursement

Disbursement Arrangements for ADB and ADB-administered co-financier Funds

56. **IFAD resources.** ADB will partially administer the IFAD grant funds. The borrower will submit to ADB a withdrawal application which will be processed and then sent to IFAD for disbursement directly to the borrower. The Withdrawal and Allocation Table specifies the breakdown between expense categories and funding source. ADB and IFAD will finance separate expenditure items.

57. **Advance fund procedure.** ADB and IFAD proceeds will be disbursed in accordance with ADB's Loan Disbursement Handbook (June 2017, as amended from time to time). Online training for project staff on disbursement policies and procedures is available at: http://wpgr4.adb.org/disbursement_elearning. Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

58. To expedite implementation of the project through the timely release of funds, five U.S. dollar advance accounts will be established, three for the grant from the ADF (one each at MEW, MAIL and MRRD), and two for the grant fund from IFAD (MRRD and MAIL), at Da Afghanistan Bank (DAB, the Central Bank of Afghanistan) for exclusive use and to be

administered by the three CPMOs at MEW, MAIL and MRRD The currency of the advance account is the U.S. dollar. The advance accounts are to be used exclusively for ADB's and IFAD's share of eligible expenditures respectively. The advance accounts will be managed, replenished, and liquidated in accordance with ADB's Loan Disbursement Handbook, and detailed arrangements agreed to by the Recipient and ADB. The ceiling on each advance account shall be $3,000,000. Replenishment should be made as frequently as possible, subject to the minimum withdrawal application (WA) amount.

59. MEW, MAIL, and MRRD, who will administer advance accounts for ADF and IFAD, will establish the advance accounts in their names and shall be accountable and responsible for proper use of advances to the advance accounts. The request for initial and additional advances to the advance account should be accompanied by an Estimate of Expenditure Sheet setting out the estimated expenditures to be financed through the account for the forthcoming 6 months. The ADB's project team responsible for project administration, will review the reasonableness of the 6-month estimates provided by MAIL, MEW and MRRD, including expected expenses associated with the implementation of land acquisition and resettlement plans (LARPs). Supporting documents should be submitted to ADB or retained by MAIL, MEW and MRRD in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time) when liquidating or replenishing the advance account.

60. **Statement of Expenditure Procedure.** The SOE procedure may be used for reimbursement of eligible expenditures or liquidation of advances to the advance account. Supporting documents and records for the expenditures claimed under the SOE should be maintained and made readily available for review by ADB's disbursement and review missions, upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit. The SOE ceiling limit is set to $100,000 equivalent per individual payment. Reimbursement and liquidation of individual payments in excess of the SOE ceiling should be supported by full supporting documents when submitting the WA to ADB.

61. **Direct Payment.** Direct payments to contractors and consultants will be made in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time).

62. Before the submission of the first WA, the recipient should submit to ADB, sufficient evidence of the authority of the persons who will sign the WAs on behalf of the government, together with the authenticated specimen signatures of each authorized person. The minimum value per WA is stipulated in the Loan Disbursement Handbook (2017, as amended from time to time). Individual payments below such amount should be paid (i) by any of the three implementing agencies and subsequently claimed to ADB through reimbursement; or (ii) through the advance fund procedure, unless otherwise accepted by ADB. The recipient should ensure sufficient category and contract balances before requesting disbursements. Use of ADB's Client Portal for Disbursements system is encouraged for submission of WAs to ADB.

63. **Conditions for Matching Grant Disbursement.** No disbursement for the matching grants under key activity 3a shall be disbursed by MAIL to beneficiaries until (i) Guidelines for Evaluation of Subproject Investment Proposals have been prepared in form and substance acceptable to ADB; and (ii) MAIL have trained relevant project staff in using the Guidelines. Matching grant liquidations must include verification of payments made under the matching grant program, and the corresponding relevant page/s from the sub-project agreement. This will apply to both the ADB And IFAD grants resources used for the matching grant program.

64. **Conditions for disbursement for works contracts during LARP implementation.** No

disbursement will be made for a works contract where the activities under that contract will take place on a subsection/component of the Project that is covered by a LARP until: (i) the government has prepared and submitted to ADB the final LARP for that subsection/component of the Project, based on the detailed design of such subproject/component and obtained ADB's clearance of such LARP; (ii) such final LARP has been disclosed; (iii) compensation and other entitlements have been provided to affected people in accordance with the LARP for that subsection/component; and (iv) a comprehensive livelihood and restoration program has been established in accordance with the LARP for that subsection/component.

65. MEW will provide verification to ADB of compliance with the aforementioned paragraph through external monitor reports.

66. Liquidation of any amount paid for LARP implementation for non-land assets will require (i) the compliance report or validation certificate issued by the third party appraiser engaged by the MEW to carry out LARP implementation surveys; and (ii) the results of the detailed measurement survey (DMS) and individual compensation plan signed by the affected household (signature and thumbprint), and that receipt of compensation payment is acknowledged by the affected household (signature and thumbprint).

C. Accounting

67. Each implementing agency (IA), MEW, MAIL and MRRD, will maintain or cause to be maintained, separate books and records by funding source for all expenditures incurred on the project following International Public Sector Accounting Standards for cash-based accounting. Each IA will prepare project financial statements in accordance with the government's accounting laws and regulations which are consistent with international accounting principles and practices.

D. Auditing and Public Disclosure

67. The executing agency, through the IAs, will prepare one set of detailed project financial statements to be audited in accordance with International Standards on Auditing, by an independent auditor acceptable to ADB. The audited project financial statements together with the auditor's opinion will be presented in the English language to ADB within 6 months from the end of the fiscal year by each IA.

68. The audit report for the project financial statements will include a management letter and auditor's opinions, which cover (i) whether the project financial statements present an accurate and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting standards; (ii) whether the proceeds of the grant were used only for the purpose(s) of the project; and (iii) whether the executing agency and implementing agencies were in compliance with the financial covenants contained in the legal agreements (where applicable).

69. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

70. The government, MOF, MEW, MAIL and MRRD, have been made aware of ADB's

approach to delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements.[42] ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

[42] ADB's approach and procedures regarding delayed submission of audited project financial statements: (i) When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (a) the audit documents are overdue; and (b) if they are not received within the next 6 months, requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed; (ii) when audited project financial statements are not received within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters. ADB will (a) inform the executing agency of ADB's actions; and (b) advise that the grant may be suspended if the audit documents are not received within the next 6 months; and (c) When audited project financial statements are not received within 12 months after the due date, ADB may suspend the grant.

71. Public disclosure of the audited project financial statements, including the auditor's opinion on the project financial statements, will be guided by ADB's Access to Information Policy. After the review, ADB will disclose the audited project financial statements and the opinion of the auditors on the project financial statements no later than 14 days of ADB's confirmation of their acceptability by posting them on ADB's website. The management letter, additional auditor's opinions will not be disclosed.[43]

[43] This type of information would generally fall under public communications policy exceptions to disclosure. ADB. 2011. *Public Communications Policy* Paragraph 97(iv) and/or 97(v).

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting and Retroactive Financing

72. All advance contracting and retroactive financing, whether funded from ADB or IFAD resources, will be undertaken in conformity with ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time). The issuance of invitations to bid under advance contracting and retroactive financing will be subject to ADB approval. The recipients, MAIL, MEW and MRRD have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the project.

73. **Advance contracting.** No contract will be awarded until after grant effectiveness. However, to ensure smooth implementation startup, recruitment process for the project implementation support consultant will be initiated after the fact-finding mission, which entails advertising to call for expressions of interest, shortlisting, issuing request for proposals, and proposal evaluation. Advance actions for procuring civil works which includes preparation of tender documents, invitation for bids, and bid evaluation will also be done.

74. **Retroactive financing.** Withdrawal from the Grant account may be made to finance eligible expenditures incurred under the Project before the effective date, but not earlier than 12 months before the date of the Special Operations (ADF) Grant Agreement in connection with the early establishment of Project offices and initial resourcing of irrigation rehabilitation using community contracting, subject to a maximum amount equivalent to 20% of the Grant amount. Retroactive financing may be used for consulting services and project management cost categories.

B. Procurement of Goods, Works, and Consulting Services

75. For procurement of goods, works, non-consulting services, and consulting services in the project, ADB Procurement Policy (2017, as amended from time to time), Procurement Regulations for ADB Borrowers (2017, as amended from time to time) and the associated Staff Instructions/Project Administration Instructions shall apply.

76. Open Competitive Bidding (OCB) procedures with international advertising will be used for civil works contracts estimated to cost $222.63 million and for goods estimated to cost $4.25 million. OCB procedures with national advertising will be used for civil works and goods contracts estimated to cost $8.94 million. Request for Quotations will be used for contracts for procurement of works and goods less than $100,000. Community contracts and Community labor working contracts estimated to cost $35 million involving local materials and community participation.

77. An 18-month procurement plan indicating threshold and review procedures, goods, works, and consulting service contract packages and national competitive bidding guidelines is in Section C.

78. Whether funded from ADB or IFAD resources, all consultants (and nongovernment organizations) if appropriate will be recruited according to ADB's Procurement Policy (2017, as

amended from time to time).[44] The terms of reference for all consulting services are detailed in Section C and Annex 2-8.

[44] Checklists for actions required to contract consultants by method available in e-Handbook on Project Implementation at: http://www.adb.org/documents/handbooks/project-implementation/.

79. An estimated 1856 person-months (pm) (496 international, 1360 national) of consulting services are required to (i) facilitate project management and implementation, (ii) survey (geological, seismological) and design, (iii) capacity building and training, (iv) strengthen the agricultural value chains and improve water productivity on farms; and (v) resettlement and safeguards plans implementation and monitoring. Consulting firms will be engaged using the quality- and cost-based selection (QCBS) method with a standard quality–cost ratio of 90:10, consultant- qualification-based selection (CQS), and Single Source Selection (SSS). Advance contracting and retroactive financing will be undertaken in conformity with ADB Procurement Policy (2017, as amended from time to time) and ADB's Staff Instructions – Borrower Administered Consulting Services (2017, as amended from time to time). The issuance of invitations to bid under advance contracting and retroactive financing will be subject to ADB approval. The recipient, MOF (executing agency) and implementing agencies (MAIL, MEW, MRRD), have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the project.

C. Procurement Plan

80. The procurement plan is prepared in accordance with the generic or country-specific templates prepared by the Procurement, Portfolio, and Financial Management Department.

Table 14. Procurement Plan Basic Data

<table>
<tr><th colspan="3">Basic Data</th></tr>
<tr><td colspan="3">Project Name: Arghandab Integrated Water Resources Development Project</td></tr>
<tr><td>Project Number: 48096-002</td><td colspan="2">Approval Number: TBD</td></tr>
<tr><td>Country: Afghanistan</td><td colspan="2">Executing Agency: Ministry of Finance</td></tr>
<tr><td>Project Procurement Classification: A</td><td colspan="2" rowspan="2">Implementing Agencies: Ministry of Energy and Water; Ministry of Rural Rehabilitation & Development; Ministry of Agriculture, Irrigation & Livestock</td></tr>
<tr><td>Procurement Risk: TBD</td></tr>
<tr><td>Project Financing Amount: $399.29 million
ADB Financing: $348.78 million
Cofinancing (ADB Administered): $40.0 million
Non-ADB Financing: Nil</td><td colspan="2">Project Closing Date: 31 May 2027</td></tr>
<tr><td>Date of First Procurement Plan: TBD</td><td colspan="2">Date of this Procurement Plan: TBD</td></tr>
<tr><td>Procurement Plan Duration: 18 months</td><td>Advance contracting: Yes</td><td>eGP: No</td></tr>
</table>

D. Methods, Review and Procurement Plan

81. Except as ADB may otherwise agree, the following methods shall apply to procurement of goods, works, non-consulting services, and consulting services.

Table 15. Procurement of Goods, Works and Non-consulting Services

Method	Comments
Open Competitive Bidding for Plant, Works, and Goods	International advertisement, national advertisement
Request for Quotations for Works and Goods	
Community participation in procurement	Contracts below $100,000. First contract for prior ADB review for each implementing agency

Table 16. Consulting Services

Method	Comments
Open competitive bidding with international advertising, using quality- and cost-based selection for consulting services	For consulting firms - US$300,000 and above
Open competitive bidding with national advertising, using consultant-qualification-based selection for consulting services	For consulting firms – less than US$300,000
Fixed Budget Selection for Consulting Firm	
Single Source Selection or Direct Contracting for Consulting Firm	
Individual consultant selection	For individual consultant assignments

1. List of Active Procurement Packages (Contracts)

82. The following table lists goods, works, non-consulting, and consulting services contracts for which the procurement activity is either ongoing or expected to commence within the procurement plan's duration.

Table 17. Goods, Works, and Non-consulting Services

Goods, Works, and Non-consulting Services							
Package Number[1]	**General Description**	**Estimated Value ($)**	**Procurement Method**	**Review[2]**	**Bidding Procedure[3]**	**Advertisement Date[4]**	**Comments[5]**
MEW-CW-01	Lot 1: Raising of Main Dam – Section 1 (includes intake tower, tunnel lining and trach-rack)	91,260,000 *(Value to be split between Lots based on decision on the sections/ slices)*	OCB	Prior	1S2E	Q1 2021	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Works
	Lot 2: Raising of Main Dam – Section 2						
MEW-CW-02	Lot 1: Raise of saddle dams 1 to 3 & Extension of saddle dam 1	14,472,000	OCB	Prior	1S2E	Q3 2020	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Works
	Lot 2: Raising of saddle dams 4 & 5	12,204,000					
	Lot 3: Raising of saddle dam 6	17,280,000					
MEW-CW-03	Lot 1: Spillway 1 construction	32,400,000	OCB	Prior	1S2E	Q3 2023	Advertising: International Prequalification of Bidders: No
	Lot 2: Spillway 2 construction	21,060,000					

Goods, Works, and Non-consulting Services							
Package Number[1]	**General Description**	**Estimated Value ($)**	**Procurement Method**	**Review[2]**	**Bidding Procedure[3]**	**Advertisement Date[4]**	**Comments[5]**
							Domestic Preference Applicable: No Bidding Document: Works
MEW-CW-04	Lot 1: Site security fence	1,296,000	OCB	Prior	1S1E	Q1 2020	Advertising: National Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Works
	Lot 2: Staff colony & security camp	3,888,000					
	Lot 3: Park construction	2,160,000					
MEW-CW-05	Electrification along dam	1,296,000	OCB	Prior	1S1E	Q3 2020	Advertising: National Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Works
MEW-CW-06	AIS Irrigation infrastructure improvement works (including Gate repairs, construction & installation of water level gauges)	14,622,000	OCB	Prior	1S1E	Q1 2020	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Works
MRRD-CW-01	Road realignment	19,332,000	OCB	Prior	1S2E	Q2 2020	Advertising: International Prequalification of Bidders: No

Goods, Works, and Non-consulting Services							
Package Number[1]	**General Description**	**Estimated Value ($)**	**Procurement Method**	**Review[2]**	**Bidding Procedure[3]**	**Advertisement Date[4]**	**Comments[5]**
							Domestic Preference Applicable: No Bidding Document: Works
MRRD-CW-02	Office improvements	300,000	OCB	Prior	1S1E	Q3 2020	Advertising: National Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Works
MEW-GE-01	Canal modernization Instrumentation and controls	2,300,000	OCB	Prior	1S1E	Q3 2020	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Request for Quotations - Goods
MEW-GE-02	Lot 1 - Heavy Earthmoving machinery (ASBA)	1,200,000	OCB	Prior	1S1E	Q1 2020	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Request for Quotations - Goods
	Lot 2 - Construction equipment – welding m/cs, vibrator, concrete mixer, water pumps	750,000	OCB	Post	1S1E	Q1 2020	
MEW-GE-03	Vehicles (ASBA) – 3 pickups & 1 water	200,000 *(Value to be split between Lots*	RFQ	Prior	1S1E	Q3 2020	Advertising: National

Goods, Works, and Non-consulting Services							
Package Number[1]	**General Description**	**Estimated Value ($)**	**Procurement Method**	**Review[2]**	**Bidding Procedure[3]**	**Advertisement Date[4]**	**Comments[5]**
	tanker truck	*based on the kind of vehicle)*					Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Goods
MEW-GE-04	Office equipment (computers, printers, networking equipment)	55,000	RFQ	Post	1S1E	Q4 2019	
MAIL-GE-01	Agriculture demonstration implementation (goods and equipment, services) IFAD financing	4,500,000	RFQ	Post	1S1E	Q4 2019	Small demonstration of new agricultural technologies and good practices (multiple packages) (IFAD funded).
MAIL-GE-02	Office equipment (computers, printers, networking equipment)	55,000	RFQ	Post	1S1E	Q4 2019	MAIL-GE-02
MRRD-CC-01	Community Irrigation infrastructure rehabilitation IFAD financing	24,000,000	RFQ/CPP	Post	1S1E	Q1 2020	Community Contracts/ Community labor working (multiple packages – each less than $100,000) Described in RRP & PAM
MRRD-CC-02	Canal and bridges works in Kandahar	6,115,686	RFQ/CPP	Post	1S1E	Q1 2020 to Q4 2023	Small works implemented through community participation procurement
MAIL-CC-01	On-farm irrigated agriculture investments (matching grants for small works and equipment; key activity 3a; ADF/DRR funded)	32,000,000	RFQ/CPP	Post	1S1E	Q1 2020	Community Contracts/ (multiple packages – each less than $100,000) Described in RRP & PAM

Goods, Works, and Non-consulting Services							
Package Number[1]	**General Description**	**Estimated Value ($)**	**Procurement Method**	**Review[2]**	**Bidding Procedure[3]**	**Advertisement Date[4]**	**Comments[5]**
MAIL-CC-02	On-farm irrigated agriculture investments (matching grants for small works and equipment; key activity 3a) IFAD financing	3,000,000	RFQ/CPP	Post	1S1E	Q1 2020	Community Contracts/ (multiple packages – each less than $100,000) Described in RRP & PAM
MEW-TW-01	Training MEW	300,000	RFQ	Prior	Internatio-nal Firm / Institution	Q4 2020	Training, workshops, and study tours
MRRD-GE-01	Office and field equipment (computers, printers, networking equipment, generator, survey equipment)	266,000	RFQ	Post		Q3 2019	
MRRD-TW-01	Training MRRD, NEPA, and Local Government	250,000	RFQ	Prior	Internatio-nal Firm / Institution	Q4 2020	Training, workshops, and study tours
MAIL-TW-01	Training MAIL	250,000	RFQ	Prior	Internatio-nal Firm / Institution	Q4 2020	Training, workshops, and study tours

(Domestic preference – not applicable)

Table 18. Consulting Services

Consulting Services							
Package Number	**General Description**	**Estimated Value ($)**	**Selection Method**	**Review[6]**	**Type of Proposal[7]**	**Advertisement Date**	**Comments[8]**
MEW-CS-01	Engineering, Procurement and Construction Supervision (EPCS) Consultant	21,500,000	QCBS	Prior	FTP	Q3 2019	QCBS 90:10, international advertising and shortlisting
MEW-CS-02	Water Policy & Regulatory Reform Consultant IFAD financing	1,600,000	QCBS	Prior	FTP	Q1 2020	International advertising and shortlisting
MEW-CS-03	Hydrological Modeling Platform Consultants	1,200,000	SSS	Prior	STP	Q3 2019	Continuation of ongoing support provided by eWater Solutions Ltd.
MEW-CS-04	EMMP: Independent Environment monitor	290,000	ICS	Prior		Q2 2020	International
MEW-CS-05	RESP: Independent Resettlement Monitor	475,000	ICS	Prior		Q2 2020	International
MEW-	POE: Panel of	500,000	SSS	Prior	Biodata	Q3 2019	Services to be

Consulting Services							
Package Number	**General Description**	**Estimated Value ($)**	**Selection Method**	**Review[6]**	**Type of Proposal[7]**	**Advertisement Date**	**Comments[8]**
CS-06	Experts to provide independent panel of experts to assess Dahla dam design and construction						provided by US Army of Engineers (plain clothes; to be confirmed)
MAIL-CS-01	Agriculture implementation support consultants (AISCs)	9,200,000	QCBS	Prior	FTP	Q3 2019	QCBS 90:10, international advertising and shortlisting
MEW-CS-07	Project Financial Audits (2019-2026)	240,000	CQS	Prior	STP	Q3 2019	Combined contract for all MEW, MRRD, and MAIL advance accounts.

(Domestic preference – not applicable)

2. List of Indicative Packages (Contracts) Required under the Project

83. The following table lists goods, works, nonconsulting, and consulting services contracts for which the procurement activity is expected to commence beyond the procurement plan duration and over the life of the project (i.e. those expected beyond the current procurement plan's duration).

Table 19. Goods, Works and Nonconsulting Services

Goods, Works and Nonconsulting Services						
Package Number	**General Description**	**Estimated Value ($)**	**Procurement Method**	**Review**	**Bidding Procedure**	**Comments**

Table 20. Consulting Services

Consulting Services						
Package Number	**General Description**	**Estimated Value ($)**	**Selection Method**	**Review**	**Type of Proposal**	**Comments**

3. List of Awarded and Completed Contracts

84. The following table lists the awarded contracts and completed contracts for goods, works, non-consulting, and consulting services.

Table 21. Goods, Works and Nonconsulting Services

Goods, Works and Nonconsulting Services					
Package	**General**	**Contract**	**Date of ADB Approval**	**Date of**	**Comments**

Number	Description	Value	of Contract Award	Completion	

Table 22. Consulting Services

Consulting Services					
Package Number	General Description	Contract Value	Date of ADB Approval of Contract Award	Date of Completion	Comments

4. Non-ADB Financing

85. The following table lists goods, works, non-consulting, and consulting services contracts over the life of the project, financed by non-ADB sources.

Table 23. Goods, Works and Nonconsulting Services

Goods, Works and Nonconsulting Services				
General Description	Estimated Value (cumulative, $)	Estimated Number of Contracts	Procurement Method	Comments

Table 24. Consulting Services

Consulting Services				
General Description	Estimated Value (cumulative, $)	Estimated Number of Contracts	Recruitment Method	Comments

E. Procurement Capacity

86. A procurement capacity assessment of the implementing agencies (IA), MAIL, MEW, and MRRD was conducted by the TRTA consultant. An assessment questionnaire developed by ADB was applied to carry out the assessment. The information gathered indicated that the procurement policies and procedures (Revised Procurement Law with Amendments dated August 11, 2016 and elaborated in the Procurement Rules of Procedure issued by the National Procurement Authority in 2016) adopted by the IAs are suited for the implementation of this project.

87. The procurement risks are moderate. Together with the support of the CPMOs, the IAs' procurement teams should have adequate experience in procurement of goods, works and consulting services. The IAs also engage national experts to provide technical support for procurement of development projects.

88. The specific findings of the Procurement Capacity Assessment are summarized below.

Strengths:

(i) The IAs' procurement teams will be responsible for the implementation of the procedures and processes of procurement under this project as they have experience in ADB procurement; and

(ii) Procurement systems and procedures are in place as prescribed in the Procurement Law of September 2016 and elaborated in the Rules of Procedure for Public Procurement issued by the Ministry of Finance in 2016.

Weaknesses:

(i) The procurement systems and procedures may have some minor deviations with international best practice;

(ii) The IAs' procurement department are not fully familiar with ADB procurement procedures; and

(iii) Increased workload of IAs may leave ADB-funded procurements under-resourced.

89. The weaknesses can be countered by engaging an additional Procurement Specialist for the CPMOs and an international Procurement and Contracts Management Specialist through the EPCS to assist the IAs throughout the procurement cycle.

F. Consultant Terms of Reference

90. The project will require a total of 1868 person-months (pm) of consulting services to support implementation, comprising 496 pm international and 1372 national consultants over seven years. The consulting packages are summarized in the table below. Detailed terms of reference are in the annexes.

Table 25. Indicative Consultant Requirements

No.	Handle	Consultant Package Title	Selection Method	International pm	National pm	Total
1	EPCS	Dam engineering, procurement, construction supervision (MEW-CS-01)	QCBS	368	958	1326
2	IPOE	Independent panel of experts for the Dam (MEW-CS-06)	SSS	7	3	10
3	AISC	Agriculture implementation support consultants (MAIL-CS-01)	QCBS	53	326	379
4	WREG	Water policy and regulation consultants (MEW-CS-02)	QCBS	22	49	71
5	EWTR	Hydrological modelling platform consultants (MEW-CS-03)	SSS	24	24	48
6	IENV	Independent environmental monitor (MEW-CS-04)	ICS	8	-	8
7	RESP	Resettlement monitor (MEW-CS-05)	ICS	14	-	14

No.	Handle	Consultant Package Title	Selection Method	International pm	National pm	Total
		Total		496	1360	1856

1. Engineering, Procurement and Construction Supervision Consultant

91. **Objective.** The EPCS will be selected by MEW and engaged in accordance with ADB's Procurement Regulations (2017, as amended from time to time). The MEW CPMO, as members of the project bid evaluation committee, will recruit the ISC following the QCBS procedure with a quality-to-cost ratio of 90:10. The role of EPCS consultant is to support the engineering design, procurement of contractors and construction supervision of Output 1, i.e. increasing capacity of the Dahla Dam; and Output 2a, i.e. modernizing AIS irrigation services. In addition, they will provide support to the CPMO, particularly with safeguards compliance. The EPCS consultant will setup an office in Kabul at a safe and secure place. A field office will be setup in Kandahar, and a site office at Dahla Dam.

92. **Scope of Work.** The EPCS consultant will have all-encompassing project management, detailed design, tender preparation, procurement of contractors and construction supervision responsibilities on the Output 1 works contract and Output 2a. The EPCS consultant, will in consultation with MEW/ASBA, coordinate the design and works scheduling with other project outputs such as hydropower, water supply and irrigation and appoint a Project Manager responsible for coordination with the Government, and overall project planning, management, detailed design, procurement of contractors for construction and construction supervision of the Project. The Consultant will perform all project activities in close consultation with MEW/ADB. The Consultant will also provide support to the MEW CPMO and relevant support to a Panel of Expert (POE) for the dam on an as needs basis and keep a close liaison for approval of its work from POE.

93. **Anticipated Staff Input**. The Consultant will recruit specialized experts with relevant skills and relevant international experience in handling such project. The international specialists will be supported by national staff for the successful execution of the project. The table below shows the indicative key and non-key positions pm. Inputs of each position and non-key positions are expected to be proposed by the Consultant in the technical proposal.

94. **Hybrid contract**: The EPCS consultant contract will be of a "hybrid nature": (i) the detailed engineering and design and tender preparation work will be bid as a fixed price "outputs based" contract. Firms will provide a matrix of persons, inputs and monthly charge rates for each consultant; and (ii) the contract supervision and support to the CPMO would be on an inputs basis, with details provided on the persons, number of months and cost per month.

Table 26: International Specialists for the Detailed Design and Tender Preparation Phase, and Construction Supervision Phase

SR. NO.	INTERNATIONAL	Design and Tender Preparation (minimum person-months)	Construction Supervision (minimum person months)
KEY POSITIONS			
1	Project Management Specialist/Team Leader	15	36
2	Dam and Appurtenant Structures Design Specialist	12	6
3	Hydro-Mechanical Design Specialist	6	8

SR. NO.	INTERNATIONAL	Design and Tender Preparation (minimum person-months)	Construction Supervision (minimum person months)
KEY POSITIONS			
4	Geotechnical Specialist	12	6
5	Topographic Survey Specialist	4	1
6	Hydrologist/Sedimentation Specialist	4	
7	Irrigation Design Specialist	8	
8	Cost Estimator	10	
9	Geologist/Borrow Area Management/Rock Mechanics Specialist	10	6
10	Electro-mechanical Design Specialist	4	8
11	Infrastructure Design Specialist	6	4
12	Resettlement Specialist	15	18
13	Social Safeguard Specialist	6	15
14	Gender Specialist	8	15
15	Environment Specialist	8	15
16	Irrigation Engineer (AIS)	12	12
TOTAL OF KEY INTERNATIONAL INPUTS		140	150
NON-KEY POSITIONS (INDICATIVE)		(Indicative)	(Indicative)
17	Hydraulics Specialist	6	2
18	Project Planning & Scheduling Specialist (Primavera P6)	6	1
19	Procurement/Financial Management Specialist	6	2
20	Seismology Specialist	3	
21	Architect	2	
22	GIS / Survey Specialist	2	1
23	Civil and Mechanical Drafting Engineers	6	2
24	Electrical Drafting Engineer	3	
25	Site Security Advisor	15	36
26	Fragile and Conflict Affected Situations Specialist	5	
27	Unallocated	4	
TOTAL OF NON-KEY INPUTS		58	44
	Total	**205**	**163**

Table 27: National Specialists for the Detailed Design and Construction Phases

SR. NO.	NATIONAL	Design and Tender Preparation	Construction Supervision
1	Project Management Specialist/Deputy Team Leader	15	36
2	Deputy Resident Engineer (DRE)	15	
3	Dam Design and Appurtenant Structures Specialist	12	12
4	Resettlement Specialist (3 positions)	48	72
NON-KEY POSITIONS (Indicative)			
5	Project Planning and Scheduling Specialist Primavera P6	12	
6	Hydrologist / Sedimentation Specialist	3	

SR. NO.	NATIONAL	Design and Tender Preparation	Construction Supervision
7	Seismology Specialist	3	
8	Hydraulics Engineering Specialist	12	12
9	Electro-mechanical Specialist / ARE Electro-Mech	12	12
10	Hydro-mechanical Specialist	9	12
11	Geologist /Borrow Area Management /Rock Mechanics Specialist	12	12
12	Environment Specialist	18	48
13	Procurement/Financial Management Specialist	12	6
14	Gender and Social safeguard Specialist	10	20
15	Architect	2	3
16	GIS / Survey Specialist	2	1
17	Drafting Engineers (2 positions) / (1 Civil and 1 Mechanical)	12	12
18	Drafting Engineer, Electrical	3	3
19	Site Engineer (Civil) / Project Scheduler Primavera P6		12
20	Site Engineer (Civil) / Quantity Surveyor		12
21	Site Engineer (Geotechnical / Dams/Instrumentation)		6
22	Site Engineer (Geologist / Material Engineer)		6
23	Site Engineer (Structural)		12
24	Site Engineer (Electrical)		12
25	Site Engineer (Hydraulics)		12
26	Site Engineer (Environmental)		12
27	Site Inspector (Civil)		12
28	Site Inspector (Civil) – Quantity Surveyor		12
29	Site Inspector (Instrumentation) - 2 positions		24
30	Site Inspector (Material) - 2 positions		24
31	Site Inspector (Structural) - 2 positions		24
32	Site Inspector (Electrical) - 2 positions		24
33	Site Inspector (Hydraulics) - 2 positions		24
34	Site Inspector (Geologist / Material Engineer)		24
35	Site Inspector (Environmental) - 2 positions		24
36	Irrigation Engineer (AIS)	15	30
37	Irrigation engineer / draftsman – 2 positions	30	60
38	Site Security Advisor		40
39	Fragile and Conflict Affected Situations Specialist	5	5
40	Unallocated		24
	Sub-total	**262**	**696**
	Total national	**958**	

2. Agriculture Implementation Support Consultant

95. **Objective.** International consulting services will be required to assist the MAIL implementing agency in project management and supervision. The AISC will be selected and engaged in accordance with ADB's Procurement Regulations (2017, as amended from time to time). The implementing agency's CPMO, as members of the project bid evaluation committee, will recruit the AISC following the QCBS procedure with a quality-to-cost ratio of 90:10.

96. **Scope of Work.** An international consulting firm (the consultant) will be engaged by the

CPMO. The AISC consultant will assist CPMO in overall project implementation and supervision. Key aspects of the consultant's work include two parts: (i) irrigated agriculture implementation support; and (ii) feasibility study for a pressurized drip irrigation supply service.

1. **Expertise Schedule**. The contract for consultant's service will be time-based. The AISC comprises 279 pm (including 49 pm of international specialists and 230 pm of national specialists). The AISC will be fielded shortly after project effectiveness. Additionally, the AISC will hire adequate support staff to support its consultants in undertaking their duties in an effective and efficient manner. A summary of input schedule is given in the table below, which can be adjusted during project implementation to ensure optimal utilization of resources and efficient outputs and/or deliverables.

Table 28. Summary AISC Input Schedule

	Key Positions	Person-months	Total
	INTERNATIONAL		**49**
A	**MAIL CPMO Agriculture Implementation Support Consultants**		
1	Irrigated agriculture specialist /Irrigated Engineer /Team Leader	30	
2	Impact monitoring and evaluation specialist	3	
3	Environment and safeguards specialist	4	
B	**Feasibility Study for Drip Irrigation Water Supply**		
4	Drip irrigation Engineer	6	
5	Drip irrigation institutional specialist	3	
6	Drip irrigation economist	3	
	NATIONAL		**230**
A	**MAIL CPMO Agriculture Implementation Support Consultants**		
7	Irrigated agriculture specialist /Irrigated Engineer / Deputy Team Leader	60	
8	Monitoring and evaluation specialist	60	
9	Environment and safeguards specialist	60	
10	Agricultural economist	36	
B	**Feasibility Study for Drip Irrigation Water Supply**		
11	Drip irrigation Engineer	7	
12	Drip irrigation institutional specialist	4	
13	Drip irrigation economist	3	
	TOTAL		**279**

Source: Asian Development Bank estimates.

3. Water Policy and Regulatory Reform Consultants (WREG)

97. **Objective.** Policy, strategy and capacity for managing water resources in the Arghandab river basin in economic and environmentally sustainable manner need to be strengthened. To assist in the development of policy, strategy and implementing regulations, an international consulting firm (the consultant) will be selected and engaged by the MEW CPMO in accordance with ADB's Procurement Regulations (2017, as amended from time to time). The implementing agency's CPMO, as members of the project bid evaluation committee, will recruit the consulting firm following the QCBS procedure with a quality-to-cost ratio of 90:10.

98. Regulations are required that enable the State to charge for irrigation water delivery services. The State is committed to introducing cost-recovery mechanisms in order to financially sustain the water delivery services, and to drive the transformational awareness change among water suppliers and water users.

99. Regulation and allocation of water flows must ensure ecological values in the downstream river basin aquatic habitats are sustained or improved. Maps of Arghandab River provided by the Canadian International Development Agency (CIDA) (Cartographic Atlas command area land use, 2012) show that the river itself has a natural, almost untouched morphology and numerous potential habitats for ground nesting birds, waterfowl and rheophilic fish species. These habitats need to be reactivated by the environmental flow as far as possible in close coordination with the water demand for irrigation and urban and rural water supply and the hydropower development.

100. **Scope of Work and Expertise Schedule.** MEW will supervise the consultants through the MEW CPMO, to conduct a review of the Water Law, and conduct an Arghandab River Environmental Study. Policy and regulation of water entitlements and allocation of water should be reviewed and strengthened to ensure they are robust, clear, implementable and can be monitored. Connected to this, regulations must be prepared governing the State, its authorized agents, and water delivery service entities to charge fees for water delivery services to entitled users for their water allocations. The process of reforms will be highly consultative and will be national in nature. In addition, consultants will also advise on the creation of two special purpose vehicles, under MEW, for Dahla Dam and AIS management and operations, including legal and operational structuring, financial modelling and governance arrangements, for the purpose of creating a sustainable business model for operation of a multi-purpose dam and AIS operation. The contract for consultant's service will be time-based. The contract comprises a total of 71 pm (including 22 pm of international specialists and 49 pm of national specialists). The WREG will be fielded shortly after project effectiveness. Additionally, the WREG will hire adequate support staff to support its consultants in undertaking their duties in an effective and efficient manner.

Table 29. Indicative Water Policy and Regulatory Reform Consultant Schedule

Key Positions	**Pm**	**Total**
International		
Water resources policy and regulation specialist	8	
Water pricing specialist	1	
Environment specialist	5	
Bulk water services business management specialist	8	
sub-total international		**22**
National		
Water resources policy and regulation expert	12	
Water pricing expert	3	
Environment specialist	10	
Bulk water services business management specialist	12	
Corporate lawyer	6	
Corporate accountant	6	
sub-total national		**49**
Total consultant pm		**71**

4. Hydrological Modelling Platform Consultants

101. **Objective.** The consulting services will continue the ongoing capacity development support for the MEW and MAIL staff to strengthen the institutional capacities in water resources management and hydrological monitoring. It is focused on establishing a national hydrological platform and provide training in its operation. Considering its ongoing support regarding water resources monitoring and modeling, the MEW proposes to engage the eWater[45] through SSS to provide 24 pm of international and 24 pm of national consulting services. SSS is justified as an extension of existing work currently being undertaken by eWater with MEW, MRRD, MAIL, the Afghanistan Urban Water and Supply Corporation and the National Environment Protection Agency.

102. **Scope of work.** The training program will conduct water balance estimations at a district scale and will include an introduction to the eWater Source river basin modelling platform.[46] It will also draw on earlier work that uses the eWater Source platform to model the water system of the Arghandab Basin. The capacity development program will provide a foundation for future improvements in water resource management in Afghanistan and will support these improvements by building the skills and capacity of staff in relevant areas.

[45] eWater is Australia's national platform for supporting water management in water supply systems and river basins.
[46] Source is river basin modelling program developed by eWater.

103. The indicative consultancy inputs for the capacity development program are in the table below. The outline TOR for the separate experts to be engaged for the capacity development consulting services are described below.

Table 30. Inputs for Hydrological Modeling Platform Consultants

No.	Key Positions	Pm Input	
		International	National
1	Water resources management specialist/team leader	12	
2	Water resources program coordinator		24
3	Hydrological modelling specialist	12	
	Subtotal	**24**	**24**

5. Independent Environment Monitor

104. **Environment Specialist** (international, 8 pm). Third Party Environmental Monitoring will be carried out during construction and operation phases of Output 1 (Dam Raising). This monitoring will be carried out during first two years of operation phase also. An International Environmental Specialist will be hired for this purpose. He / she shall have a Master's degree or higher in Environmental Sciences or Environmental Engineering. In addition, the Environmental Specialist shall have a minimum of 15 years of experience of working on environmental matters out of which at least 7 years associated with Dam and Reservoirs in accordance with ADBs' / World Bank's Environmental Guidelines. The Specialist tasks will include (but not limited to):

105. **Objective.** Independent Third-Party Environmental Monitoring will be carried out during construction phase of Component 1 (Dam Raising). MEW will recruit an International Environmental Specialist on ICS basis for 8 pm on intermittent basis.

(i) **Scope of work.** The specialist will assess and verify the project's environmental performance Verifying the project's environmental performance to ensure that it complies with the national environmental legislation, ADB's environmental safeguards as stipulated in Safeguard Policy Statement (2009, as amended) and EIA, site SSEMP, and other related documents.
(ii) Carry out similar monitoring during first two years of operation phase to see if any unanticipated impacts may arise during this phase and to carry out a proper due diligence to mitigate these impacts;
(iii) Preparation of quarterly environmental monitoring reports providing details related with (but not limited to) EMP compliance, monitoring of significant environmental impacts, as well as details on unanticipated impacts with mitigation measures. Details on GRM as well as any Health & Safety issues encountered at site will also be provided. Lastly, a conclusion and recommendation section will also be provided. A close out report will be provided at the end of construction phase. Moreover, a close out report will also be provided at the end of operation phase monitoring.[47]

[47] A certified lab will be hired by the third-party environmental monitoring consultant for carrying out the instrumental monitoring.

6. Independent Resettlement Monitor

106. **Objective.** Independent monitoring and evaluation of resettlement is required for the project. MEW will recruit an international resettlement specialist on the ICS basis for 14 pm intermittent input.

107. **Scope of work.** The specialist will monitor the progress, funds mobilization, and management of land acquisition, demolition, and resettlement, changes and restoration of the production and livelihoods of the affected people will be analyzed, follow-up evaluation will be provided, and M&E reports will be submitted to ADB, the CPMOs of MEW, MRRD, and MAIL, and relevant agencies. Through independent resettlement monitoring, ADB and implementing agencies including the CPMOs and PIUs will have full understanding of conditions and issues of land acquisition, demolition, and resettlement.

108. The CPMO will provide the external expert with supports such as staffing, contacting relevant officials, and provision of project documents and transfer and attendance for site visits. Tasks of the M&E group will include M&E of resettlement implementation in accordance with ADB's *Safeguard Policy Statement* (2009), planning of M&E activities, selection of monitoring spots, field investigation and analysis, and preparation of M&E reports in Afghan and English.

7. Panel of Experts Terms of Reference

109. **Objective.** MEW will select and recruit a Panel of Experts (POE) with the objective of evaluating features and actions pertaining to the safety of the Dahla Dam design and construction. It is proposed to engage the US Army of Engineers (USACE) through SSS to provide 7 pm of international and 3 pm of national consulting services. SSS of USACE is justified as an extension of historical work and knowledge of the requirements needed for the rehabilitation and heightening of the Dahla Dam.

110. **Scope of work.** The POE will review the tender documents including final detailed design and technical specifications before tendering commences and shall maintain periodic reviews for the duration of the project, until initial reservoir filling and start-up phases until all facilities are placed into final operation. The POE will provide due consideration to the administrative procedure/guidelines of the Government of Afghanistan and the World Bank safeguard policy OP4.37 under the guidance of the MEW, and provide recommendations to the MEW of actions that may be needed to upgrade the dam and appurtenances to acceptable safety standards. The POE shall be guided by the Dam Safety Assurance objectives and the related legislative regulations, standards and guidelines.

111. MEW will nominate appropriate national experts to support the POE. The national experts will support the POE during its performance of the POE function during tender/detailed design, construction and post construction stages and provide the relevant project information to the Team Leader POE for compilation of the final fact-finding reports.

Table 31. Panel of Expert Input Missions Summary

Sr. No.	International Expert	Input (months)
1	Designs and Construction Expert (International)	3
2	Hydrology /Sediment Expert (International)	3
3	Seismologist (International)	1

Sr. No.	International Expert	Input (months)
4	Dam Operation & Maintenance Engineer (National)	1.5
5	Geologist (National)	1.5

Source: TRTA Consultants, 2019

Table 32. Criteria for Selection of Panel of Expert

Expert	Required major
Dam Designs and Construction Expert (international)	• Having worked as an expert in designing and construction of large dams. Intensive knowledge and experience in rockfill dam design and construction arrangement, procedure and quality control. • Intensive experience in preparing construction plan and schedule for large-scale or complex works including rockfill dam. • Expertise in assessing foundation conditions and recommending practical solutions for treatment works including curtain and consolidation grouting. • Expertise in assessing geological conditions of abutment and reservoir rim and required safety measures • Knowledge of seismic design and design of structures in high seismic zones • Knowledge of analyzing monitoring data collected during the construction and operation phases.
Hydrology /Sediment Expert (international)	• Expertise in hydrological assessment of large dams • Experience of using latest software and programs in hydrology, flood routing and dam operation. • Expertise and experience in sediment assessment and management including sediment flushing/sluicing, dredging, excavation, etc. and use of modern computer simulation models • Knowledge in reviewing design of major hydraulic structures, such as spillway, intakes, bottom outlets, etc.
Seismologist (international)	• Expertise in seismic hazard assessment including deterministic and probabilistic approaches, the assessment of active faults/lineament, reservoir triggered earthquake assessment, etc. • Experience in the formulation / examination of required seismic motion inputs for dynamic stability / stress-strain analyses of dams in coordination with dam design experts Experience in seismic hazard assessment in high seismic zones similar to the project area
Dam Operation & Maintenance Engineer (National)	• Having worked as dam operation and maintenance engineer in home country and outside. • Expertise in maintenance of hydro-mechanical & electric equipment's • Familiarity of general O&M issues of large dams in the national and international environment
Geologist (National)	• Expertise in large dams' geotechnical investigation and foundation treatment work design of large dams and other major hydraulic infrastructure projects • Experience in similar projects in other countries • Familiarity with the national geological conditions and issues

Table 33. POE Tentative Work Schedule

No	Content	Anticipated Implementation period	person-week

No	Content	Anticipated Implementation period	person-week
1	**Tender Preparation Phase**	Q2 2020 to Q4 2021	
	Dam Designs and Construction (International)		4 weeks
	Seismologist (International)		4 weeks
	Hydrologist/Sediment Specialist (International)		4 weeks
2	**Construction stage:**	Q3 2021 to Q2 2024	
	Dam Designs and Construction (international)		4 weeks
	Hydrologist/Sediment Specialist (international)		4 weeks
	Geologist (National)		4 weeks
3	**Reservoir filling / operation phase**	Q3 to Q4 2026 (Year 1)	
1st year	Dam /Design and Construction Expert (international)		2 weeks
	Hydrologist/Sediment Specialist (International)		
	O&M expert (national)		2 weeks
	Geologist (national)		2 weeks
			2 weeks
2nd year	Dam / Design and Construction Expert (international)	Q3 2027 (Year 2)	
	Hydrologist/Sediment Specialist (International)		2 weeks
	O&M Expert (national)		2 weeks
	Geologist (national)		2 weeks
			2 weeks

VII. SAFEGUARDS

112. **Environment.** The overall project is categorized as 'A' for environment. The project output 1 is classified as category A for environment due to anticipated irreversible, diverse, or unprecedented impacts from raising the existing dam's height by 13.6 m and related infrastructure. Impacts from the route bearer highway are also covered in the EIA study prepared for output 1. Buildings in several villages will be affected, as well as several ha of irrigable land surrounding the reservoir. A draft EIA was prepared and disclosed on ADB website on 1 April 2019. The EIA presents a preliminary review of baseline environmental conditions, impacts, and risks. It is generally found that the raising of Dahla Dam will not have any long-term impacts upon the biological environment, and in most cases, pre-conditions can be improved. There are no protected areas in the vicinity of the dam. Protected species have been recorded during the environmental surveys in November 2018. While some species will be affected in the short-term during construction of the dam raise and saddle dams, mitigation measures are in place to minimize the impact of these. Introduction of water protection zones including protective measures around the reservoir are suggested for maintaining water quality in the reservoir over the long run. Moreover, the recommended Arghandab River Environmental Study to be implemented during the detailed design phase is essential to reinforce the assessment findings and recommended environmental management actions.

113. The project outputs 2–4 are classified as category B for environment. The environmental impacts have been assessed and described in the IEE study prepared for the above-mentioned outputs. Potential site-specific impacts (like, generation of dust from soil excavation and refilling; and from the disturbance to residents and traffic by the construction work, water availability, occupational and community health and safety hazards etc.) will arise during the construction phase. Some impacts would also arise during the operation phase (like dumping of waste in canals, resulting in clogging, water availability for downstream farmers etc.) as well. Appropriate avoidances/mitigation/enhancement measures have been suggested to minimize adversity of

the impacts. Moreover, implementation of Environmental Management Plan (EMP) will also help in reducing the impact significance.

114. A program of monitoring will be required to ensure that all concerned agencies take the specified action to provide the required mitigation and assess whether the action has adequately protected the environment, and to determine whether additional measures may be necessary. Regular monitoring of mitigation measures by contractors will be conducted and overseen on behalf of MEW. Monitoring during the operation stage will be conducted by the contractor in line with ADB requirements.

115. Environmental monitoring involves: (i) sampling program for systematic collection of data/information relevant to environmental assessment and project environmental management; (ii) analysis of samples and data/information collected, and interpretation of data and information. Environmental monitoring will be carried out before, during, and after the construction phase. Monitoring of key parameters will also be required during the operation phase. (Detailed monitoring program is provided in the EMP section of EIA and IEE studies). The monitoring reports will also be submitted to NEPA in addition to ADB Environmental monitoring will be implemented to detect changes in the key quality parameters. The results of the monitoring program are used to evaluate the following: (i) magnitude and significance of the environmental impacts; (ii) efficiency of the environmental protection measures.

116. The EIA and IEE prepared describe screening, categorization, assessment, public consultation, anticipated environmental adverse impacts, required mitigation and monitoring measures, and roles and responsibilities of implementing agency staff, consultants, and contractors. EMPs were prepared and consist of plans for mitigation, monitoring, reporting, and stakeholder communication during pre-construction, construction, and operation phases.

117. Responsibility for supervision of the EIA and of the IEE rests with MEW/MRRD and MRRD/MAIL respectively. Environmental Specialists will be hired on a full-time basis in each of the MEW/MRRD and MRRD/MAIL CPMO's. Moreover, International and National Environmental Specialist will also be hired in EPCS and AISC to assist the implementing agencies in carrying out environmental management monitoring activities. The MEW/MRRD and MRRD/MAIL will ensure that:

(i) Findings are locally disclosed; clearance certificate applications are submitted to NEPA;
(ii) EMP measures are incorporated into civil works designs and contracts, and that the PIU and/or PIU undertake the required environmental monitoring and reporting and perform their assigned roles in the grievance redress mechanism;
(iii) Generic EMPs provided in the IEEs are to be made part of the bidding documents for the construction contracts;
(iv) SSEMPs are prepared by the contractor's environment specialist and endorsed by the respective environment specialist present in each CPMO prior to implementation of civil works;
(v) Each CPMO has enough resources to implement and record the implementation of the SSEMPs prepared for the project;
(vi) Starting from project commencement, CPMOs will submit semi-annual environmental reports prepared by the environment to ADB, within 1 month of the close of each half of the calendar year during implementation of the project. The monitoring reports will also be submitted to NEPA. The reports will include, among other things, a review of progress made on environmental measures

detailed in the EIA and IEE and SSEMPs and monitoring thereof; and problems encountered, and remedial measures taken.

(vii) Civil works contracts are supervised to ensure compliance with the requirements of the EIA, IEE and EMPs;

(viii) Review the environmental management capability of NEPA and recommend institutional strengthening measures;

(ix) Effective implementation of GRM.

118. Each CPMO will report to ADB “any change” in project components that occurs after the EIA and IEE have been approved. ADB’s prior approval will be required before putting into effect any such changes. Where in the opinion of ADB, additional environmental assessment is needed, each CPMO will arrange the same. Each CPMO will prepare semi-annual reports on implementation of the EMP as part of the progress reports on implementation. Each CPMO will provide the construction contractors with the EIA/IEE study report including the EMP and ensure that the contractors implement the mitigation measures and EMP as described in these reports. An independent third-party environmental monitoring will also be carried out for output 1 during the construction phase. An Independent Environmental Consultant will be hired by MEW for this purpose. The main purpose of this monitoring will be to verify the project's environmental performance to ensure that it complies with the national environmental legislation, ADB's environmental safeguards as stipulated in Safeguard Policy Statement (SPS), 2009 and EIA, SSEMP, and other related documents. Environmental monitoring will also be carried out for this purpose. The monitoring outcomes will be provided in a report format which will be submitted to ADB or the executing agency on a quarterly basis.

Social Safeguards

119. **Indigenous People Safeguards.** The project is classified as Category C for indigenous peoples. There are no indigenous people, as defined by ADB SPS (2009) for operational purposes in the Project area; therefore, no indigenous peoples plan was necessary.

120. **Involuntary Resettlement Safeguards.** The project is classified as category A for involuntary resettlement impacts.

121. A draft LARF has been prepared for Output 1: Dahla Dam capacity increased. The draft LARF follows relevant Afghan laws, and ADB’s Safeguards Policy Statement (2009). The reservoir expansion caused by the dam raising will inundate at least 22 villages, fully or partially, requiring by far the most significant and extensive resettlement under the project. The draft LARF indicates first estimates of LAR impacts for the reservoir expansion, saddle dams and road realignment, and specifies an entitlement matrix for compensation, including options for livelihood rehabilitation. Access restriction due to security concerns has precluded the conduct of a socio-economic survey of the villages to be resettled, as well as limiting meaningful consultations that would normally be part of LARF preparation. The LARF instead outlines processes and methodologies to be followed during project implementation in conducting surveys, public consultations, and information disclosure for multiple LARP preparation, implementation and monitoring. MEW shall ensure that the expanded reservoir impoundment does not commence until relocation, compensation and livelihood restoration measures are implemented in accordance with the LARPs and verified by external monitoring reports, accepted by ADB and disclosed.

122. A draft LARF has been prepared for Output 2: Reliability of irrigation water supply increased. The draft LARF follows relevant Afghan laws, and ADB’s Safeguards Policy

Statement (2009). Its preparation involved: (i) measurement surveys, (ii) asset valuation/documentary research on affected plots, (iii) consultation with the AH; (iv) an AH census; and (v) a socio-economic survey of the AH. MEW will prepare LARP and due diligence report during the implementation stage, disclose it upon ADB no objection prior to civil works contract award. LARPs will be implemented and compliance reports submitted to ADB for no objection prior to civil works commencement.

123. Each draft LARF contains details on the next steps to establish project organizational structure and next steps to establish the cut-off-date (at the conclusion of the detailed measurement survey), to guide the MEW CPMO in moving forward.

124. Payments made to affected persons will follow the procedures and details outlined in the approved LARPs.

125. Table 34 outlines the process steps for land acquisition and resettlement planning and implementation for Output 1. Critical is milestone # 7, linked to a Grant Agreement covenant.

Table 34: Output 1: Resettlement planning and implementation

Process steps	Comments
1. Update of LARF following census and meaningful consultations and any changes to dam design and road realignment parameters.	Expected completion: 31 August 2020
2. Census and interviews of APs conducted	This will determine the numbers of APs to be included in the LARPs
3. Detailed Measurement Survey (DMS) completed and cut-off date reached	Cut-off date should coincide with completion of DMS
4. Relocation options identified	
5. Relocation options consulted and agreed	The first draft LARP should be completed at this point and submitted to ADB for review. It is expected that this will not be less than 2 years after project commencement.
6. Livelihood restoration measures agreed	Final of the first LARP expected at this point.
7. Compensation and allowances paid	In accordance with procedures.
8. Relocation of all persons affected by reservoir impoundment	Award of contract/s for raising of the spillway must not occur until all affected persons have been relocated.
9. Livelihood restoration measures under implementation	

126. Early next steps in the establishment of cut-off-date and conduct of DMS are as follows:

123. Early next steps in the establishment of cut-off-date and conduct of DMS are outlined in Table 35.

Table 35: Output 1: Detailed Steps to Complete the DMS and Establish the cut-off date

	Active Stakeholders	Tasks involved
Preliminaries	MEW, Govt. all project communities and APs.	1. Letter or Decree as per the Government procedure; 2. Dissemination of Information about the cut-off-date and eligibility for compensation;
Consultations	Government Departments related to the Project; Villages Elders; People directly affected by the Project. PMC	1. Meetings; 2. Workshops where applicable; 3. Meetings with the heads of AHs in Kandahar or Kabul (individually or smaller groups);
Conduct DMS	MEW PMO LFT APs PMC	Physical surveys (if possible) Analysis of imagery Analysis of interview/meeting/survey results Synthesis of data to determine final DMS

127. Project implementation will follow the safeguard procedures laid out in LARFs and LARPs A CPMO in MEW will be established to implement resettlement activities. For the task of resettlement implementation, MEW will have a Due Diligence Team. MEW CPMOs will ensure that LARF and LARP contents are locally disclosed; LARPs are submitted to ADB for review and acceptance and further disclosure prior to civil works contract award; ADB acceptance of compliance reports verified by external monitor prior to civil works commencement; and that mitigation measures are incorporated into civil works designs and contracts. A Grievance Redress Mechanism will be put in place. Meaningful consultations will continue to be conducted with affected persons throughout the project implementation phase. In addition, MEW with the concurrence of ADB, will engage an Implementing Consultant to be involved in the implementation of the LARP, and an independent External Monitoring and Evaluation Agency to provide external monitoring services, including six-monthly reports on LARP implementation, grievance redress and livelihood restoration.

128. **Prohibited investment activities.** Pursuant to ADB's Safeguard Policy Statement (2009), ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the Safeguard Policy Statement (2009). All financial institutions will ensure that their investments are in compliance with applicable national laws and regulations and will apply the prohibited investment activities list (Appendix 5) to subprojects financed by ADB.

VII. GENDER, SOCIAL AND FRAGILE AND CONFLICT AFFECT STATE DIMENSIONS

129. **Gender**. The project will address women farmers' lack of meaningful participation in water resource management. Categorized as effective gender mainstreaming (EGM), key actions of the gender action plan include: consultation workshops with men and women on project scope and benefits while encouraging women to have equal access to development opportunities of the project; developing recreational areas for families with gender design features such as separate toilets for women and men, women-friendly eateries and seating arrangements at Dahla Dam; training women paraprofessional farmers as local resource persons for capacity building of women farmers; improving skills of women farmers on adopted climate smart technologies in irrigated agricultural production; providing women staff with access to scholarships to complete Master of Science in Integrated Water Resources and Management; and hiring social and gender specialist at CPMO to support in monitoring and implementation of the gender action plan as per Table 36.

Table 36. Gender Action Plan

Activities	Performance Targets/ Indicators	Responsibility	Timeframe
Output 1: Dahla Dam capacity increased			
1.1 Mobilize women to participate meaningfully in community consultations and other activities	1.1a At least four socially inclusive information dissemination and consultation workshops (three with men and one with women) on project scope and benefits conducted, while encouraging women to have equal access to development opportunities (baseline 2019: 0). 1.1b At least 20% women's participation in community-based forums, such as village committees, grievance committees and other community-based organizations established under the project (baseline 2019:0). 1.1c Women's inputs in community forums recorded, and sex-disaggregated information on grievances and compensation received, recorded.	CPMO, MEW, MRRD, Resettlement Officer (ASBA, DAIL, DRRD), Social and Gender Specialist	1.1 a–d Starting from Q2 of Year 1
1.2 Install safe, gender-inclusive recreational facilities at the dam site	1.2a At least one recreational area developed for families with seating and picnic facilities, and eateries at Dahla Dam and Tarnak Main Canal in Kandahar City with separate restrooms for women and men with clean running water and provides safety and security for women and children[48] (baseline 2019: 0).	CPMO, MEW, EPCS, ASBA, and Social and Gender Specialist	Starting from Q1 of Year 1 at design stage and construction phase
Output 2: Reliability of Irrigation Water Supply Increased			
2.1 Improve women's safe access to community irrigation services	2.1a Rehabilitation of community irrigation systems include provision of water access points, washing pads, foot bridges and other facilities to ease women's access to water for their home gardens and cleaning needs. 2.1b At least two awareness sessions in each	CPMO, MAIL, EPCS, and Social and Gender Specialist	Starting from Q3 of Year 1 at the design and construction phase Starting from

[48] Even without safe recreational areas with essential facilities, families tend to go to Dahla Dam and Tarnak Main Canal over the weekends to enjoy themselves and go bathing and playing in the Tarnak Main Canal when it carries water. Setting up safe recreational facilities will regulate this practice.

Activities	Performance Targets/ Indicators	Responsibility	Timeframe
	village for women on issues related to water conservation, safe drinking water practices, water pollution and water borne diseases.		Q2 of Year 1
Output 3: Agriculture Water Productivity Improved			
3.1 Train female paraprofessional farmers as local resource persons for capacity-building of women farmer groups in production of high value crops, extension services, and agriculture and horticulture value chain development and marketing	3.1a Extension Services conducted for farmers on high value agriculture and horticulture, with beneficiaries consisting of at least 30% women. 3.1b Organize at least four cross-farm and knowledge sharing events to enhance mutual learning among farmers, of which 25% are women farmers. 3.1c At least 21 women farmers trained as paraprofessionals (three from each district on a pilot basis) in extension services of high value crop production, their value chain and marketing. 3.1d Paraprofessionals trained 350 women (50 from each district) in vegetable growing by providing assistance in establishing kitchen gardens, demonstration plots and greenhouses for household use and processing, packaging and marketing in villages, urban and regional markets.	CPMO, MAIL, DAIL PIUs, MRRD, and Social Gender Specialist	3.1a–c Starting from Q3 of Year 1 3.1d By the end of the project
3.2 Women and men benefit equitably from training and technology transfer	3.2a 300 farmers (30% women), have improved skills and adopted climate smart technologies in irrigated agricultural production by 2025 (baseline 2019: 0).	CPMO, MAIL, DAIL PIUs, MRRD, and Social Gender Specialist	By the end of the project
Output 4: Capacity in water resource management and use strengthened			
4.1 Provide women staff opportunities for training and participation in water resource management and use	4.1a At least 20% representation of women in consultation and decision-making forums related to training and capacity building programs. 4.1b 100 government staff with 30% women[49] complete M.Sc. in integrated water resources management by 2025 (baseline 2019: 0). 4.1c Document pre- and post-assessments of training and capacity building programs focusing on gender impacts.	MEW, MAIL, MRRD, NEPA, AUWSSC	Starting from Q3 of Year 1–Q4 2025
Institutional Strengthening, Project Management, and Monitoring and Evaluation			
5.1 Enhance capacity of executing agency, project management unit and implementing agencies in gender-inclusive design and implementation	5.1a Evidence that equal employment opportunity policy and practices are implemented for project related jobs with at least 15% female project staff (baseline 2019: less than 1% female staff in implementing agencies). 5.1b Social and Gender Specialist recruited at CPMO to support the implementation, reporting and documentation of gender	CPMO MEW, MAIL, DAIL, DRRD, MRRD, Social Safeguard Specialist	5.1a–b Starting from Q2 of Year 1

[49] If a ministry is unable to fill its quota, the scholarships will be offered to other ministries. If there are remaining scholarships available, persons from non-government organizations who meet eligibility requirements will be accepted to make up cohort quota.

Activities	Performance Targets/ Indicators	Responsibility	Timeframe
of projects and programs	results. 5.1c Gender results analyzed with case studies on the impacts of the project, prepared on the last year of project implementation 5.1d GAP progress is part of the Quarterly Progress Report prepared and submitted by executing agency and implementing agencies. 5.1e One training and two refresher courses for implementing agencies on gender-inclusive project design and implementation conducted.		5.1c Q3 of Year 6 5.1 d–e Starting Q2 of Year 1 and every year thereafter

ASBA = Arghandab Sub-Basin Agency; AUWSSC = Afghanistan Urban Water Supply & Sanitation Corporation; CPMO = central program management office; DAIL = Department of Agriculture Irrigation and Livestock; DRRD = Department of Rural Rehabilitation and Development; EPCS = Engineering, procurement, construction supervision support consultant; GAP = Gender Action Plan; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; M.Sc. = Master of Science; NEPA = National Environmental Protection Agency; PIU = project implementation unit; Q = quarter.

130. A fragile and conflict-affected state (FCAS) assessment was undertaken during project preparation using the new fragile and conflict affected state Risk Management Toolkit developed by the Afghanistan Resident Mission. An FCAS action plan has been prepared (Table 37) to be actioned during project implementation.

Table 37. FCAS Action Plan

Activities	Performance Targets/ Indicators	Responsibility	Timeframe
Output 1: Dahla Dam capacity increased			
1.1 Ensure local government awareness and coordination of conflict management	1.1 At least two workshops per year with local government departments to establish effective coordination mechanisms for direct and indirect engagement in the project, and for conflict management.	CPMO, MEW, MRRD, MAIL (ASBA, DAIL, DRRD)	Q2 of Year 1 to Q4 of Year 4
1.2 Effective LARP implementation	1.2 LARP implemented and monitored in full accordance with the plan. Grievances and mitigation responses recorded in LARP reports	MEW, CPMO Resettlement Officer	Starting from Q1 of Year 1
1.3 Ensure consultation with local communities on recreation areas	1.3 Ensure public safety risks are addressed in viewing points and swimming and recreational areas developed for families at Dahla Dam and Tarnak Main Canal in Kandahar City.	CPMO, MEW, MRRD, EPCS, ASBA, and FCAS Specialist	Starting from Q1 of Year 1 at design stage and construction phase
1.4 Prioritize opportunities for local contractors and workers	1.4 Conduct an awareness campaign amongst local contractors and communities providing information on potential opportunities and general requirements prior to issue of tenders. At least 50% of contractors' workforce are residents of the surrounding districts.	CPMO, MEW, ASBA, FCAS Specialist	Starting from Q1 of Year 1 at design stage and construction phase
Output 2: Reliability of Irrigation Water Supply Increased			
2.1 Improved community irrigation services	2.1a Design of rehabilitation of community irrigation systems uses CDD approach and may include non-irrigation water access points, foot bridges and other facilities that may be requested by local communities. 2.1b At least 2 awareness sessions in each village issues related to water conservation, safe water practices, water pollution and water borne diseases.	CPMO, MRRD, EPCS, CDC, *Mirabs*, and FCAS Specialist, Gender Specialist, Environment Specialist	2.1a Starting from Q3 of Year 1 at the design and construction phase 2.1b Starting from Q2 of Year 1
Output 3: Agriculture Water Productivity Improved			
3.1 Use local participation to select local farmers and train young men (who may otherwise take up arms) as resource persons for capacity-building of farmer groups in production of high value crops and extension services.	3.1a Extension Services Action Plan developed for high value agriculture and horticulture, including at least 30% activities aiming to give youth worthwhile employment and livelihood options. 3.1b Organize cross farm and knowledge sharing events to enhance mutual learning among farmers, of which 25% are young men. 3.1c At least 20 men farmers trained as paraprofessionals (three from each district) in extension services of high value crop production.	CPMO, MAIL, DAIL PIUs, MRRD, and FCAS Specialist	3.1a–c Starting from Q3 of Year 1
3.2 Increase young men farmers' access to agriculture and horticulture inputs and services.	3.2a At least 40% of farmer group membership is under 30 years of age. 3.2b At least 75% of matching grant recipients are under 30 years of age or employ 3 or more men under 25 years of age.	CPMO, MAIL, DAIL PIUs, MRRD, and FCAS Specialist	By the end of the project
Output 4: Capacity in water resource management and use strengthened			
4.1 Ensure increased young men's	4.1a Minimum 30% representation of young men in consultation and decision-	MEW, MAIL,	Starting from Q3 of

Activities	Performance Targets/ Indicators	Responsibility	Timeframe
participation in capacity building programs in water resource management and use	making forums related to training and capacity building programs. 4.1b Men under 30 years comprise at least 30% of sponsored M.Sc. in integrated water resources management by 2025 (baseline 2019: 0).	MRRD, NEPA,	Year 1–Q4 2025
Institutional Strengthening, Project Management, and Monitoring and Evaluation			
5.1 Enhance capacity of executing agency, project management unit and implementing agencies in FCAS risks and mitigation approaches and implementation of projects and programs	5.1 One training and two refresher courses for implementing agencies on FCAS project design and implementation conducted.	CPMO MEW, MAIL, DAIL, DRRD, MRRD, Social Safeguard Specialist	5.1 Starting from Q2 of Year 1

ASBA = Arghandab Sub-Basin Agency; CDC = Community Development Council; CDD = community driven development; CPMO = central program management office; DAIL = Department of Agriculture Irrigation and Livestock; DRRD = Department of Rural Rehabilitation and Development; EPCS = Engineering, procurement, construction supervision support consultant; FCAS = Fragile and Conflict-Affected States; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; M.Sc. = Master of Science; NEPA = National Environmental Protection Agency; PIU = project implementation unit; Q = quarter.

VIII. PERFORMANCE MONITORING, EVALUATION, REPORTING, AND COMMUNICATION

A. Project Design and Monitoring Framework

Impact the project is aligned with:
Increased jobs and gross domestic product growth (Afghanistan National Peace and Development Framework, 2017–2021).[a]

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Improved management and use of water resources in the Arghandab River basin	By 2028: a. Overall irrigation delivery efficiency increased to 36% (baseline 2019: 25%)[b] b. Irrigated grape yield increased to 4 tons/ha (baseline 2019: 2 tons/ha)	a. Monitoring reports of DAIL of Kandahar Province b. Monitoring reports of DAIL of Kandahar Province	Security conditions affect project implementation or subsequent operations
Outputs 1. Dahla Dam capacity increased	By 2026: 1a. Dahla Dam spillway crest raised to 1,149.0 masl to increase the full reservoir level by 13.6 m (baseline 2019: 1135.4 masl) 1b. 9.6 km of Kandahar-Bamian route bearer highway realigned to be above 1,154 masl (baseline 2019: n/a) 1c. ASBA operating Dahla Dam in accordance with agreed rule curves and operating guidelines 100% of the time (baseline 2019: standard release schedules without rule curves)	1a. Independent panel of experts' reviews, completion certificate and completion report 1b. MRRD PMO quarterly reports 1c. ASBA monthly dam operation reports, ASBA annual planning reports on water storage and release	Security conditions affect project implementation or subsequent operations
2. Reliability of irrigation water supply increased	By 2025: 2a. 120 community irrigation systems modernized (baseline 2019: 0) 2b. 115,000 hectares of farmland under water-related infrastructure constructed/rehabilitated (baseline 2019: 0), RFI[c] 2c. Water delivered in a timely	2a. Completion certificates and MAIL CPMO quarterly reports 2b. MAIL CPMO quarterly reports 2c. O&M	Security conditions affect project implementation or subsequent operations Climate change, severe

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	manner to 95% of farmers 90% of the time (baseline 2019: 95% of farmers 25% of the time)	agreements signed by community councils, surveys and feedback from farmers	droughts and/or increased sediment inflows reduces the live storage of the reservoir
3. Agricultural water productivity improved	3a. Number of farmers with improved knowledge and practices using climate smart technologies increased to 300 farmers, at least 30% of whom are women, by 2025 (baseline 2019: 0) RFI[d] 3b. 20 extension staff from MAIL trained to be able to conduct farmer workshops on climate-smart irrigation. (baseline 2019: 0) 3c. Percentage (70%) of persons/households reporting an increase in production (baseline 2019: TBD)	3a and 3b. MAIL CPMO quarterly reports 3c. Annual monitoring survey	
4. Capacity in water resource management and use strengthened	4a. Law on water sector regulations proposed to policy makers for amendment by 2025 (baseline 2019: not amended) 4b. 100 government staff with 30% women complete M.Sc. in integrated water resources management by 2026 (baseline 2019: 0) 4c. National hydrological monitoring and management platform established and used by ASBA to guide reservoir operations by 2021 (baseline 2019: not amended)	4a. Gazette of new regulations 4b. List of graduates from Kabul Polytechnic University 4c. MEW quarterly progress reports, training reports, ASBA annual planning reports on water storage and release	Political resistance Transfer of trained staff, inadequate and/or inefficient organizational structure, lack of staff incentives

Key Activities with Milestones

1. Dahla dam capacity increased

1.1 Undertake and complete resettlement (MEW) (Q4 2019–Q3 2024)
1.2 Detailed design of recreation area, dam and dam safety training (MEW) (Q1 2020–Q4 2021)
1.3 Bidding, bid evaluation (MRRD and MEW) (Q2 2020–Q1 2024)
1.4 Award of contracts (MRRD and MEW) (Q1 2021–Q3 2024)
1.5 Construct road realignment (MRRD) (Q1 2022–Q1 2023)

1.6 Construct recreation area (MEW) (Q2 2020–Q2 2021) 1.7 Raise main dam, intake tower, tunnel lining, trash rack (MEW) (Q1 2022–Q1 2025) 1.8 Raise and extend saddle dams (MEW) (Q4 2021–Q3 2024) 1.9 Raise spillways (MEW) (Q1 2025–Q3 2026) 1.10 Install electrification along dam (MEW) (Q1 2022–Q3 2024) 1.11 Install instrumentation (MEW) (Q1 2022–Q3 2024) **2. Reliability of irrigation water supply increased** 2.1 Undertake and complete resettlement on AIS main canal (MEW) (Q2 2020-Q2 2021) 2.2 Design and approve community irrigation sub-projects (MRRD) (Q4 2019–Q3 2021) 2.3 Sign contracts with CDCs (MRRD) (Q1 2020–Q2 2022) 2.4 CDCs construct irrigation works (MRRD) (Q1 2020-Q2 2024) 2.5 Design and undertake AIS rehabilitation and modernization works (MEW) (Q3 2020–Q2 2024) 2.6 Establish and equip AIS works center (MEW) (Q3 2020–Q1 2021) **3. Agricultural water productivity improved** 3.1 Design and implement agricultural extension and demonstrations (MAIL) (Q1 2020–Q3 2025) 3.2 Extension staff trained in climate smart agriculture (MAIL) (Q1 2020-Q3 2025) 3.3 Establish matching grant scheme administration (MAIL) (Q1–Q3 2020) 3.4 Approve and implement matching grant sub-projects (MAIL) (Q4 2020–Q2 2026) 3.5 Undertake feasibility study for pressurized drip irrigation supply (MAIL) (Q4 2020–Q1 2022) **4. Capacity in water resource management and use strengthened** 4.1 Prepare and submit water regulation reform (MEW) (Q1 2020–Q2 2025) 4.2 Conduct strategic water resources management training (MEW) (Q1 2020–Q2 2027) 4.3 Establish National Hydrological Management Platform (MEW) (Q1 2020–Q3 2022)
Project Management Activities Recruit PMO & PMU staff (Q3 2019–Q4 2021) Recruit international consultants (Q3 2019–Q1 2020) Recruit national supervision consultants (Q3 2019–Q1 2020) Establish PPMS (Q4 2019–Q1 2020) Recruit auditors (Q2–Q4 2020) Train village construction supervisors (Q1–Q3 2020) Monitor project activities (Q3 2020–Q3 2026) Prepare and execute a communication, consultation and participation plan (Q1 2020–Q3 2026) Submit PPMS monitoring reports regularly (Q2 2020–Q3 2026) Undertake project completion survey (Q4 2026–Q1 2027) Prepare project completion report (Q2 2027)
Inputs
Asian Development Bank: $348.78 million (ADF Grant) International Fund for Agricultural Development: $40.00 million Government of Afghanistan: $4.26 million Beneficiaries contributions $6.25 million

ADF = Asian Development Fund, AIS = Arghandab Irrigation System; ASBA = Arghandab Sub-Basin Agency; CDC = community development council; CPMO = central project management office; DAIL = Department of Agriculture, Irrigation and Livestock; ha = hectare; km = kilometer; m = meter; masl = meter above sea level; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; M.Sc. = Master of Science; n/a = not applicable; O&M = operations and maintenance; PMO = project management office; PMU = project management unit; PPMS = project monitoring and management system; Q = quarter.

[a] Islamic Republic of Afghanistan. 2016. *Afghanistan National Peace and Development Framework (2017–2021)*. Kabul.

[b] Calculated as follows: 100% from Dam; after river transport and diversion 65% x canal conveyance 55% x distribution 70% = efficiency to farm gate (25% in 2019)

[c] Contribution to ADB Results Framework: Land improved through irrigation, drainage, and/or flood management (target 115,000 hectares).

[d] Contribution to ADB Results Framework: Operations supporting climate change mitigation and/or adaptation.

Source: Asian Development Bank.

B. Monitoring

131. **Project performance monitoring.** Each implementing agency, being MEW, MAIL and MRRD, will be required to develop a PPMS and update it and report to ADB every 6 months. The PPMS should include all aspects and information related to the project scope as stated in the DMF. These reports will be ADB's basis for monitoring and updating project performance and measuring the development impact of the project.

132. **Compliance monitoring.** Compliance of grant and project agreement covenants will be monitored through periodic ADB review missions, annual progress reports by each IA, random checks of documents, and review of the project annual audited financial statements.

133. **Environment Safeguard Monitoring**. Each CPMO will submit to ADB semi-annual environmental monitoring reports during the construction phase and annual safeguards monitoring reports during the operation phase and disclose relevant information from such reports to affected persons promptly upon submission. If any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the project or any subproject that were not considered in the EIA/IEE, EMP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan. Each CPMO will report any actual or potential breach of compliance with the measures and requirements set forth in the EMP's promptly after becoming aware of the breach. Moreover, the supervision consultant will submit monthly environmental monitoring reports to respective CPMO's during the construction phase of the project.

134. Some of the monitoring during both the construction phase and operating periods will require sample collection as well as field measurements. An independent laboratory accredited by NEPA will be hired for carrying out such type of monitoring. Moreover, the monitoring results will also be provided in the respective semi-annual environmental monitoring reports.

135. An independent third-party environmental monitoring will also be carried out for output 1 during the construction phase as described in para. 103. An Individual Environmental Consultant will be hired by MEW for this purpose. The main purpose of this monitoring will be to verify the project's environmental performance to ensure that it complies with the national environmental legislation, ADB's environmental safeguards as stipulated in Safeguard Policy Statement (SPS), 2009 and EIA, Site Specific Environmental Management Plan (SSEMP), and other related documents. Environmental monitoring will also be carried out for this purpose. The monitoring outcomes will be provided in a report format which will be submitted to ADB / EA on quarterly basis.

136. **Resettlement**. MEW will undertake monitoring and reporting of the implementation of safeguards requirements specified in the resettlement plans. MEW will submit semi-annual safeguards monitoring report to ADB by end of January and end of July of each successive calendar year.

137. **Gender and social dimensions monitoring.** Each IA will be required to report the gender action plan achievements in its quarterly and annual progress reports.[1]

[1] ADB's Handbook on Social Analysis: A Working Document, is available at: http://www.adb.org/Documents/Handbooks/social-analysis/default.asp, *Staff Guide to Consultation and Participation*: http://www.adb.org/participation/toolkit-staff-guide.asp, and, *CSO Sourcebook: A Staff Guide to Cooperation with Civil Society Organizations*: http://www.adb.org/Documents/Books/CSO-Staff-Guide/default.asp

C. Evaluation

138. ADB will conduct semiannual and midterm review missions to assess the progress of the project and review compliance with the grant agreement and project agreement covenants. The midterm review mission will undertake a comprehensive review of the project design and the performance of the project. It may require a change in the design and implementation arrangements. Within 6 months of physical completion of the project (by Q2 2025), MAIL will submit a project completion report to ADB in a form acceptable to ADB.[2]

139. In addition, given the innovative nature of the irrigation and agriculture project design, annual monitoring and evaluation (M and E) of the activities and outputs is valuable for the government. The international M and E specialist will design the annual M&E program, with annual implementation to be supervised each year by the national M and E specialist. A team of national surveyors will collect the data. The national M and E specialist will be responsible for data analysis and comprehensive annual reporting. In addition to the DMF indicators, the M and E program will also monitor the following: (i) Outreach indicators of (a) persons receiving services promoted or supported by the project (Baseline 2019: 0, End Target: 36,000/Mid-term Target: 20,000 -30% women); (b) corresponding number of households reached (Baseline 2019:0, End Target 36,000/Mid-term 20,000); and (c) estimated corresponding total number of households members (Baseline 2019: 0, End Target: 331,200/Mid-term Target: 180,000), and (ii) Percentage (60%) of women reporting improved quality of their diets (baseline 2019: TBD).

D. Reporting

140. The MOF will provide ADB with (i) quarterly progress reports in a format consistent with ADB's PPMS; (ii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for the next 12 months; and (iii) a project completion report within 6 months of physical completion of the project. To ensure that projects will continue to be both viable and sustainable, project accounts and the executing agency audited financial statement together with the associated auditor's report, should be adequately reviewed.

E. Access to Information and Stakeholder Communication Strategy

141. Relevant project documents will be disclosed in accordance with ADB's Access to Information Policy 2018. Specifically, the LARF for raising Dahla Dam, the LARP for the irrigation and agriculture outputs, the environmental impact assessment for raising Dahla Dam, IEEs, and social safeguard due diligence reports which contain public consultations and/or information disclosure plans and grievance reporting mechanism. The documents will be disclosed on ADB's website as per Table 34 and communicated with the project-affected people.

[2] Project completion report format is available at: http://www.adb.org/Consulting/consultants-toolkits/PCR-Public-Sector-Landscape.rar.

Table 34: ADB Access to Information Plan

No.	Project Documents	Means of Communication	Responsible Party	Frequency	Audience(s)
1.	Environmental Impact Assessment for Raising Dahla Dam and Route Bearer Highway realignment	ADB's website	ADB	Disclosed on 1 April 2019	General Public
2.	IEE Irrigation and agriculture component	ADB's website	ADB	Post fact-finding mission	General Public
3.	Land Acquisition and Resettlement Framework for Raising Dahla Dam	ADB's website	ADB	Post fact-finding mission	General Public
4.	Land Acquisition and Resettlement Plan for Irrigation and Agriculture component	ADB's website	ADB	Post fact-finding mission	General Public
5.	Social Safeguard Due Diligence Reports for representative subprojects	ADB's website	ADB	Post fact-finding mission	General Public

Source: Asian Development Bank.

142. Within 6 months of grant effectiveness, the project management office of each implementing agency, in conjunction with the PIU at the field level, will develop a stakeholder communication, consultation and participation plan, approved by ADB, that succinctly outlines the stakeholder outreach and engagement approach for implementation by the outreach officers located in each PIU.

IX. ANTICORRUPTION POLICY

143. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[3] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all project contractors, suppliers, consultants, and other service providers. Individuals and/or entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the project.[4] To support these efforts, relevant provisions are included in the grant agreement and the bidding documents for the project.

X. ACCOUNTABILITY MECHANISM

144. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's

[3] Anticorruption Policy: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf
[4] ADB's Integrity Office website

operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[5]

XI. RECORD OF CHANGES TO THE PROJECT ADMINISTRATION MANUAL

145. All revisions and/or updates during the course of implementation will be retained in this section to provide a chronological history of changes to implemented arrangements recorded in the PAM, including revision to contract awards and disbursement s-curves.

[5] Accountability Mechanism

Annex 1: Matching Grant programs: draft Subproject Selection, Appraisal, and Approval Process

1. Matching grant subprojects for farmers or farmer groups with their primary activity comprising agricultural production, will be financed under the project.

2. Eligible items for on-farm include the establishment or rehabilitation of:

(i) Local short term, above ground, water storage methods, appropriate to the volumes required to be gravity fed through drip or spray micro-pipe systems will increase water use efficiency (tanks, ponds or reservoirs for gravity-fed irrigation systems);
(ii) Irrigation pumps including powered by solar, fuel, or hydraulic ram with gravel/sediment filters to lift water from streams/canals onto local adjacent fields, or into temporary storage, to short circuit longer gravity flow canals/tributaries which leak water into ground reserves, rather than transferring the majority to crops immediately to reduce evaporative and seepage transfer loss;
(iii) Sprinkler and drip irrigation systems, appropriate to crop needs either pumped or gravity fed from local storage to reduce water loss and increase efficiency and ability to be more accurate in water use;
(iv) Small-scale programmable irrigation scheduling units linked to pump operation and solenoid valve control for timed water delivery to crops, allowing overnight irrigation to avoid evaporative losses in the heat of the day;
(v) Grants to agricultural contractors for climate-smart agricultural equipment such as laser levelling implements, raised bed forming cultivators, subsoilers and rotary cultivators;
(vi) Payment to service providers for laser levelling of farmers' irrigation fields and other field based long term productivity improvements investments;
(vii) Water efficient production technologies and practices for aquaculture;
(viii) Other proposals by farmers or farmer groups that demonstrate improved water productivity.

3. In view of tight security restrictions imposed during preparation, it was not possible to canvas the full extent of interest from farming communities. Information on the potential demand for eligible agricultural productivity subprojects was derived from a Farmer Survey and discussions with relevant stakeholders as well as experiences with other projects being implemented in Afghanistan. Subproject investments may comprise roughly two separate types—those with significant requirement for material purchases (equipment, materials, irrigation distribution systems) and those requiring largely labor (kishmish khanas, underground- or above-ground storage, and water storage ponds), with limited local materials. Both will undergo the same preparation procedures until the commencement of procurement, as different implementation and procurement arrangements may need to be considered.

a. Identification of Farmer Subprojects

4. The PIU in Kandahar will canvass potential investments amongst the farmers based on the list of eligible items established by the project. In consultation with the concerned farmer or farmer groups, they will identify the precise nature of investments the project can support. Given the expected relatively small size of these investments, there are likely to be a large number of individual investments identified.

5. The identification process will include public awareness campaigns, community

meetings, and other mechanisms that are appropriate for rural Afghanistan. The PIU will need to have a strong presence at this grass-roots level on a regular basis and be able to communicate in local languages with the farmers. A facilitation partner (FP) will aggregate farmers investment demands according to the type of intervention i.e. they will group farmers requiring irrigation facilities into one group of up to approximately 20 farmers in one geographical area, then assist in preparing subproject investment proposals (SIPs) in a format required by the project.[1]

6. The PIU staff will use the SIPs, together with field investigations as the basis for confirming eligibility prior to submission to the CPMO. The SIPs will be submitted to the PIU and/or CPMO where they will be registered as potential subprojects. The process for preparing and implementing subprojects will follow steps (in Table 1 below).

Table 1. Process for preparing and implementing farmer subprojects.

Steps	Responsibility
(i) Preparation of a SIP	Farmers, facilitation partner, and PIU
(ii) Screening SIPs for eligibility against agreed criteria	CPMO and/or PIU
(iii) Preparation of feasibility study called subproject investment report (SIR)— with screening of social and environmental safeguards and financial assessments	CPMO and/or PIU
(iv) Detailed design for works including technical surveys where required	Not required
(v) Implementation schedule (including procurement) for contractors to undertake construction and suppliers to deliver and install equipment	CPMO, PIU, under the framework contract signed between CPMO and contractors and/or suppliers
(vi) Implementation of works contracts	CPMO, PIU, Contractors and/or Suppliers, and farmers

b. Screening of Subproject Investment Proposals

7. Based on the submitted SIPs, the CPMO and or PIU will review proposals against agreed criteria for eligibility to ensure proposed subprojects are consistent with project objectives and ADB and Afghan social and environmental safeguards. The following eligibility criteria have been agreed between the government and ADB to guide screening:

(i) Investment to be used for any legal agriculture assuming suitable agro-climatic conditions exist in that location;
(ii) Located in the Arghandab sub-basin and within reasonable access to the subproject investor's proposed or existing premises;
(iii) Access or potential access to water for irrigation, to be verified and confirmed by the project;
(iv) No significant resettlement impact (i.e. only ADB safeguard category C for resettlement);
(v) No significant environmental impact (i.e. only ADB safeguard category C for the environment);
(vi) Farmers must be willing to contribute 20% of the eligible investment cost for water efficient agricultural productivity improvements subject of the grant. These can be in

[1] SIPs prepared in collaboration with the Afghanistan Value Chains – High Value Crops project (USAID funded) will receive priority consideration.

the form of contribution in kind (other than land) such as their labor for installing equipment and facilities.

8. This screening is a critical part of the process as non-conforming subprojects should be rejected before further investment is made in their preparation. The CPMO staff will prepare a subproject investment report (SIR) in accordance with an established format that will form the basis of the consideration by the project evaluation committee. The SIR must confirm the eligibility of each subproject based on the original eligibility criteria. Unquantified benefits may be documented and can be used as an argument to justify the eligibility of subprojects for project financing. In particular, the review will ensure that the subprojects meet the following criteria:

(i) Subproject is shown to be technically feasible and financially sound;
(ii) Cost estimates have been clearly identified and confirmed as realistic and all sources of funding have been identified and agreed/confirmed;
(iii) The relevant SIR contains a detailed financing plan for operation and maintenance, including: the operations of the proposed investment to be sustained by the affiliated farmer, and both a sufficient budget amount and corresponding source of funding are specified and agreed upon by same;
(iv) A subproject is shown to have no major negative environmental or social impacts, and mitigation measures have been defined for minor impacts; and
(v) A subproject is shown to have no significant resettlement impact, in accordance with the government laws and regulations and ADB's Safeguard Policy Statement (2009).

9. There are standard designs available from MAIL and other development projects currently being implemented in Afghanistan, the CPMO will make available relevant plans to facilitation partner field operators to modify according to the farmers' requirements (mostly concerning scale). As investments are expected to cover simple structures only, no detailed design drawings are necessary, and installation can proceed without seeking ratification of engineers from the CPMO.

10. An SIR (which forms the basis of subproject approval) will include a social safeguard due diligence report which will be prepared by PIU. The SIR will be reviewed by the regional project evaluation committee and, if all the conditions outlined above are met, it will be referred to the CPMO for ratification as a qualifying subproject. If not, the SIR will be rejected and returned to the facilitation partner for clarification of the areas of concern. Once approved as a qualifying subproject, MAIL will sign a subproject agreement with the farmers or farmer groups proposing the subproject investment. This agreement will confirm the subproject as a qualifying subproject in which the applicable obligations of the project in respect of eligible expenditure, financing share, procurement arrangements, and payment arrangements confirming documentation and approval arrangements required for the release of funds.

11. **Procurement**. In parallel, the CPMO will enable procurement of the supply of the required items through a framework contract between the CPMO and possibly two suppliers for each subproject. The subproject agreement between the CPMO and the farmer will enable delivery orders with the supplier in which the farmer's requirements and location will be specified. The PIU will monitor delivery and/or establishment of the on-farm investment and certify the equipment or goods have been delivered. Individual farmers will also have to sign a goods receipt confirmation that will trigger release of project funds from the project advance account direct to the supplier under the framework contract.

12. In view of farmers' possibly limited knowledge of potential suppliers and sources of modern construction materials, the PIU will be the focal point to coordinate suppliers and delivery to farmers for which the farmer will confirm receipt. The farmer is required to assist in its installation as an in-kind contribution to the cost of the investment. Construction supervision is not necessary as structures will be of simple design and simple materials. The diagrammatic representation of implementation arrangements for purchased material subprojects is in Chart 1.

13. As many of these investments could involve significant requirements for local materials and labor for construction, there may be no need for an external supply arrangement of materials as the farmer will be able to obtain the same. The PIU will still go through the process of aggregating investments, preparing subproject SIPs based upon which the PIU and/or CPMO will (with the support of the ISCs) prepare SIRs that will form the basis for consideration by MAIL's evaluation committee. In the case of a positive outcome, a Subproject Agreement will be executed detailing the obligations of both the project and farmers. For such subprojects the project will process direct payments to the individual farmer's bank accounts after confirmation of completion of construction and commissioning of the investment.

Chart 1: Procedures for Appraisal and Approval of Farmer Subprojects Using Purchased Materials

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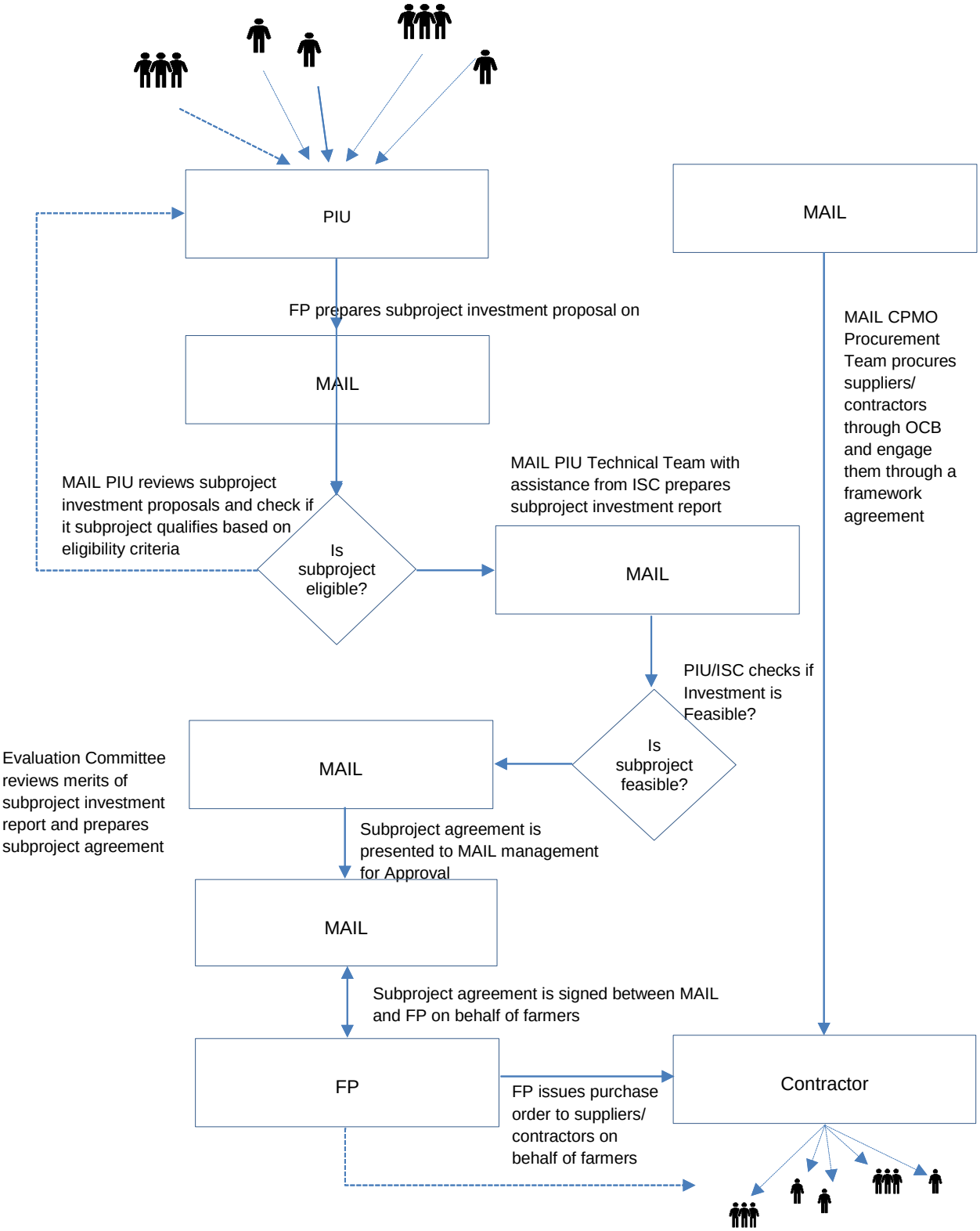

CPMO = Central Program Management Office; DAIL = Department of Agriculture Irrigation and Livestock (Kandahar); FP = facilitation partner; MAIL = Ministry of Agriculture, Irrigation and Livestock; N = No; OCB = open competitive bidding; PIU = project implementation unit; Y = Yes.

Annex 2: Consultant Outline Terms of Reference

Engineering, Procurement and Construction Supervision (EPCS) Consultant (MEW-CS-01)

A. BACKGROUND

1. Water availability in the Islamic Republic of Afghanistan is highly seasonal and erratic with frequent and worsening droughts affecting agriculture, living standards, and the local economy. The project will improve the availability and management of water resources in the Arghandab sub-basin and the Kandahar region by (i) increasing the storage capacity of the existing Dahla Dam (by raising the spillway height from 1135.4 meters above sea level (masl) to 1,149.0 masl) and enlarging the effective dam storage capacity by approximately 500 million cubic meters (MCM) to 782 MCM or 165% of the 1952 capacity or 272% of the current effective storage capacity; (ii) increasing reliability of irrigation water supplies downstream of the dam; (iii) improving agriculture water productivity by providing on-farm support to farmers to improve crop production; and (iv) strengthening institutions in water resource management. Additional benefits associated with the dam raising include hydropower generation and urban and industrial water supply to Kandahar city and its surroundings, to be undertaken by the private sector and World Bank respectively.

A. Rationale

2. Afghanistan is a conflict affected state and one of the least-developed countries in the world. In 2016, its poverty rate was 55%, while 44.6% of its inhabitants were considered food insecure.[1] With the country's average annual per capita gross domestic product (GDP) of $610 between 2011 and 2017, Afghanistan ranked 167th out of 183 countries in terms of GDP according to the World Bank (2017).[2] Agriculture is Afghanistan's major source of livelihood, employing 62.2% of the national workforce of 10.9 million people in 2017 and contributing 21.1% of the national GDP, with sector value addition of $4.1 billion in 2016.[3]

3. **Water Availability.** Afghanistan is a dry country with low precipitation. The average rainfall in Kandahar is 176 millimeters/year. Snow falls in winter, while crops require water in the summer. Limited access to reliable irrigation water is a key constraint to agricultural productivity, besides low-quality inputs and traditional agricultural practices. Crop yields are below the world average. For example, the average wheat yield in 2017 was 2.0 tons/hectare (ha), compared with a world average of 3.5 tons/ha.[4] Within the agriculture sector, horticulture accounts for 34% of sector GDP. The diverse geographical and climatic conditions of Kandahar province enable a wide range of crops to be produced at different times of the year. These include apricots, pomegranates, grapes and cereal crops, like wheat. Whilst horticulture provides a comparative advantage in terms of revenue for farmers, it requires sufficient availability and reliability of irrigation water supplies.

4. High summer temperatures, low humidity and lack of rainfall between April and

[1] Government of Afghanistan, Central Statistics Organization. 2017. *Afghanistan Living Conditions Survey (2016–2017*). Kabul.
[2] World Bank. *World Development Indicators* (accessed 2 April 2019).
[3] The Global Economy.com. *Afghanistan: GDP share of agriculture* (accessed 2 April 2019).
[4] FAO. Food and Agriculture Data (accessed on 5 June 2019).

November mean that without irrigation, few crops can produce profitable yields. The Dahla Dam, constructed in 1952, is the second largest dam in Afghanistan with a height of 55 meters (m) and a crest length of 535 m.[5] It is located in the Shah Wali Kot District of Kandahar Province in Afghanistan, approximately 40 kilometers north east of the provincial capital Kandahar. Its design capacity of 478 MCM of water provides irrigation supplies to the downstream Arghandab Irrigation System (AIS), which delivers water to 56 community schemes, and a further 64 riparian community irrigation schemes, covering almost 5 districts of Kandahar province including Kandahar city. It is a significant infrastructure for water resource storage, control and distribution. Presently, Dahla Dam provides no water supply to downstream urban communities, and the hydropower potential has not been developed.

5. Inflows to the Dahla reservoir rely on snowmelt from the Hindu Khush mountains and are typically large in volume and short in duration. The dam has lost 40% of its storage capacity due to siltation of the reservoir, and with a lack of ability to store and regulate flow, much of the inflow is discharged without regulation over the spillway into the Arghandab river. This results in (i) a reduction in cropped area, with only 47% of the command area being regularly irrigated; (ii) increased reliance on groundwater for more reliable irrigation water supplies□—this has impacted on the groundwater table and cost of pumping which is borne by farmers; and (iii) cropping patterns which are biased to winter and forage crops of lower value cereal to reduce risk from water shortage.

6. The AIS has also suffered deterioration, reducing the ability to control and distribute water effectively. Whilst there is potential to expand high value cropping, this is also limited by limited storage and reliability of irrigation water supplies from the Dahla Dam. Farmers demonstrate inefficient on-farm land and water management practices. There is limited awareness and low adoption of water-efficient on-farm technologies such as laser levelling of fields and drip irrigation, contributing to low yields and unproductive use of limited water resources. Current yields of irrigated crops average 30% of good agricultural practice.

7. **Climate change impacts.** Current models indicate significant warming across all regions of Afghanistan, and a decrease in precipitation, particularly spring rainfall.[6] Their increasing frequency, extreme weather events and a raising of the ambient Afghanistan climatic temperature by 4°C to 6°C are predicted over the next 50 years. This further highlights the relevance of improved water resources management, including improving storage capacities.[7] Afghanistan has identified among its key climate change adaptation priorities (i) rehabilitation of small- to large-scale water resources infrastructure, (ii) increasing irrigated agricultural land area, (iii) strengthening hydrological meteorological monitoring networks, and (iv) improved watershed management.[8]

8. The Arghandab Sub-basin Agency (ASBA), under the Ministry of Energy and Water (MEW), is responsible for the management of river flows and operation of Dahla Dam, and management of the AIS main canal system. Community irrigation schemes are managed by community-assigned water bailiffs (mirabs) for the various subdivisions and individual farms within the community irrigation schemes. The government recognizes the need for effective

[5] In the periphery of the dam six saddle dams have been built which together measure 2,040 m.
[6] Stockholm Environment Institute. 2008. *Socio-Economic Impacts of Climate Change in Afghanistan*. Oxford.
[7] Transaction technical assistance for the Preparation of the Arghandab Integrated Water Resource Development Project. 2018. *Arghandab Sub-Basin Hydrology Study.*
[8] Islamic Republic of Afghanistan. 2015. *Intended Nationally Determined Contribution. Submission to the United Nations Framework Convention on Climate Change.* Kabul.

operating capacity for the Dahla dam and the AIS. To improve AIS management it intends to transfer the AIS infrastructure and its operation and maintenance (O&M) to the Ministry of Agriculture, Irrigation and Livestock (MAIL). This requires restructuring support and capacity building of MAIL including provision of suitable equipment for infrastructure maintenance. It also has limited capacity to forecast water availability and coordinate delivery to meet irrigation demand. Strengthening capacity and regulatory development will enable improved management of AIS and increased reliability of irrigation water supplies to farmers' fields.

9. By increasing the storage capacity of Dahla Dam and its operations, modernizing and optimizing management of the AIS and strengthening farmers' capacity and skills for more productive agriculture, it is expected that the current area under irrigation will expand from an average of 54,000 ha to between 65,000 ha and 81,300 ha (depending on the dam storage and associated flow releases).[9] The increase in storage capacity will also provide water for municipal supply to Kandahar City, hydropower and environmental flows for the Arghandab river.

10. About two-thirds of employed women in Afghanistan are engaged in agriculture. This is mainly in horticulture, livestock raising and agro-processing activities. Cultural restrictions limit women's mobility and gender segregation curbs access to inputs and agriculture extension services. Very few women own land or have water rights which further impedes their ability to contribute to improved land and water management. The project will provide capacity building of women agriculture extension workers to access women farmers, provide scholarships to women government officers to complete a Master of Science degree in integrated water resource management, and provide women farmers with grants for improvements in agricultural productivity and economic opportunities.

11. **Enabling policy environment.** The Supreme Council for Land and Water is responsible for coordinating water-related tasks of national institutions, recommending development plans and strategies for cabinet approval, recommending drafted legislation and regulations for approval, monitoring the implementation of plans by line ministries, resolution of water-related disputes between ministries, and ensuring compliance of the Water Law[10] by relevant ministries and agencies. The water law states that 'water is free', which has constrained progression to implement water delivery service charges and, therefore, sustainable budget for O&M. Not contradicting this principle, amendments to the Water Law explicitly allowing for the charging of water delivery services has been agreed by the Office of the President, and legislative changes are in motion.

12. **Government strategies.** Government policy for productive water resources is outlined in the Strategic Framework for the Water Sector, which provides directions for the water sector in Afghanistan.[11] The Afghanistan National Peace and Development Framework, 2017–2021 supports increased jobs and GDP growth through improved management and use of water resources. Other key policies are the National Comprehensive Agricultural Sector Development and Reform Strategic Framework,[12] and the draft National Irrigation Policy.[13] This highlights

[9] The agricultural (and urban) demand is highest in the summer months, and irrigation flow varies according to availability and crop water demands.
[10] Water Law. Official Gazette. Ministry of Justice. Islamic Republic of Afghanistan. Issue # 980. 26 April 2009 currently being revised.
[11] Government of Afghanistan. 2006. *Strategic Framework for the Water Sector*. Kabul.
[12] Government of Afghanistan, Ministry of Agriculture, Irrigation and Livestock. 2009. *National Agriculture Development Framework*. Kabul.
[13] Government of Afghanistan, Ministry of Agriculture, Irrigation and Livestock. 2018. *National Irrigation Policy*. Kabul.

critical issues for the sector including: (a) land and water productivity in irrigated agriculture not reaching its potential; (b) irrigation management institutions (governmental and community-based), are weak; (c) capacity constraints across public and private stakeholders; and (d) legal framework governing the irrigation sub-sector requires updating to further clarify mandates, functions and responsibilities.

13. The National Water and Natural Resources Development Program (2010–2013, but continuing), with a budget of $1.1 billion, targets improved access to irrigation, and establishing and strengthening water basin agencies. The National Irrigation Program (2016–2025), with an investment requirement estimated at $1.5 billion, aims to improve and rehabilitate irrigation services, enhance agricultural extension services; and improve on-farm water management, operation, and maintenance.

14. **Development partners** have contributed to agriculture sector development, with horticulture and irrigation subsectors being the main beneficiaries.[14] The Arghandab Irrigation Rehabilitation Project (2008–2012) resulted in improved irrigation to about 30,000 ha, as well as clearing mines around the Dahla Dam.[15] Ongoing relevant projects include the National Horticulture and Livestock Project financed by the World Bank,[16] and the Support to National Priority Programme 2,[17] and Community Livestock and Agriculture Project,[18] both financed by the International Fund for Agricultural Development (IFAD).

15. Since 1966, the Asian Development Bank (ADB) has invested about $545 million into water resources, mainly for irrigation. ADB operations have resulted in 140,000 ha of irrigated land improved, with more than 225,000 ha under development. Key areas of assistance in ADB's country operations business plan for Afghanistan, 2019–2021[19] are: irrigation and water resources; agriculture market infrastructure; value chain development; management of integrated water resources; institutional strengthening and reforms; and increased participation of women in agriculture.

16. ADB has financed the Agriculture Market Infrastructure Project,[20] the Horticulture Value Chain Development Sector Project,[21] the Panj-Amu River Basin Sector Project,[22] and the regional technical assistance for Strengthening Integrated Water Resources Management in Mountainous River Basins.[23] Lessons learned from these interventions highlight the need for an integrated approach water resources allocation between competing users, increasing water productivity, adapting to climate change and disaster risk impacts, and strengthening and developing agricultural value chains for inclusive and equitable development impact.

[14] Development Coordination (accessible from the list of linked documents in Appendix 2).
[15] Canadian International Development Agency. 2014. *The Arghandab Irrigation Rehabilitation Project - Evaluation Report (Draft)*. Ottawa.
[16] World Bank. 2016. *Project Information Document for National Horticulture and Livestock Project*. Washington, DC.
[17] IFAD. 2015. *President's Report: Proposed grant to the Islamic Republic of Afghanistan for the Support to National Priority Programme 2*. Rome.
[18] IFAD. 2012. *President's Report: Proposed grant to the Islamic Republic of Afghanistan for the Community Livestock and Agriculture Project 2*. Rome.
[19] ADB. 2018. *Country Operations Business Plan: Afghanistan, 2019–2021*. Manila.
[20] ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Agriculture Market Infrastructure Project*. Manila.
[21] ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Horticulture Value Chain Development Sector Project*. Manila
[22] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Islamic Republic of Afghanistan for the Panj-Amu River Basin Sector Project.* Manila.
[23] ADB 2016. *Technical Assistance for Strengthening Integrated Water Resources Management in Mountainous River Basins.* Manila.

B. The Project

17. The project is aligned with the following impact: increased jobs and GDP growth. The project will have the following outcome: improved management and use of water resources in the Arghandab River basin.

18. The project has four outputs:

19. **Output 1: Dahla Dam capacity increased.** This will be delivered through three key activities: (a) civil works to raise the main dam and six saddle dams, intake tower, trash rack and spillways, plus tunnel lining, geotechnical instrumentation and other works, which will increase the full reservoir level by 13.6 m and storage capacity from 288 MCM to 782 MCM; (b) road realignment of 9.6 kilometers; and (c) capacity in dam operation and management improved. The need to minimize disruption to irrigation has been carefully considered. During dam construction, works are planned to have limited or no effect on irrigation water supplies. The construction of the intake tower, trash rack and tunnel lining structures will be coordinated with ASBA for the August to February period when there is minimum irrigation water demand. A recreational facility for families will be developed to provide an area for community participation and women's inclusion.

20. **Output 2: Reliability of irrigation water supply increased** through irrigation infrastructure modernization including canal and structures upgrading, introducing monitoring and control systems on the AIS and community-managed systems. Improved water ordering will allow water on demand to be introduced on AIS systems. There are two key activities: (a) support to the AIS operating entity for improvement of its irrigation and drainage services to community systems; and (b) support to village communities, including women, for improvement of community irrigation services.

21. **Output 3: Agricultural water productivity improved.** Capacity of farmers will be strengthened to improve farm management, adopt climate-smart irrigation and agricultural technologies and practices to improve production and sustainability. This will be delivered through demonstration of innovative agricultural practices and investment options, including support for agricultural extension services, conducting on-farm demonstrations, providing training and advisory services to farmers, and a matching grant scheme to facilitate investment in technologies to improve water productivity. Women farmers will have equitable access to agricultural extension services, training opportunities, technology transfer and advisory services. Women will be trained as local resource persons and separate training courses for women farmers will be arranged.

22. **Output 4: Capacity in water resource management and use strengthened.** The project will: (a) support development of policy, legislation and regulatory options for a system of water entitlements and allocation to allow improved management of water resources and multi-purpose dams, as well development of regulations and business structure to charge fees for water delivery services—this will strengthen financial sustainability and drive transformation to more reliable irrigation services; (b) provide water resources management training for government staff including women; and (c) establishment of a National Hydrological Modelling Platform for integrated water resources policy, planning, operations and management to strengthen water resources management.

II. CONSULTING SERVICES (FIRM)

A. Objectives of the Assignment

23. This Terms of Reference (TOR) is for the role of the engineering, procurement, construction supervision (EPCS) consultant (Consultant) for the engineering design, procurement of contractors and construction supervision of output 1 i.e: increasing capacity of the Dahla Dam; (ii) output 2a, i.e. modernizing AIS irrigation services, and (iii) provision of support role functions to the MEW Central Project Management Office (CPMO). The EPCS consultant will setup a design office in Kabul at a safe and secure place. A construction site office will be setup in Kandahar.

24. To develop and implement the project, services of a reputable and EPCS firm/joint venture (JV) are required as per the International Federation of Consulting Engineers (FIDIC) Red Book Contract.

25. The EPCS consultant will have all-encompassing project management, detailed design, tender preparation, procurement of contractors and construction supervision responsibilities on the output 1 works contract and output 2a. The EPCS consultant, will in consultation with MEW/ASBA, coordinate the design and works scheduling with other project outputs such as hydropower, water supply and irrigation and appoint a Project Manager responsible for coordination with the Government, and overall project planning, management, detailed design, procurement of contractors for construction and construction supervision of the project. The Consultant will perform all project activities in close consultation with MEW/ADB. The Consultant will also provide relevant full support to a Panel of Expert (POE) for the project on as need basis and keep a close liaison for approval of its work from POE.

26. **Hybrid contract**: The EPCS consultant contract will be of a "hybrid nature": (i) the detailed engineering and design and tender preparation work will be bid on a fixed price "outputs based" basis. Firms will provide a matrix of persons, inputs and monthly charge rates for each consultant; and (ii) the contract supervision and support to the CPMO will be on an inputs basis, with details provided on the positions, person months and cost per month provided in the proposal to complete the scope of work.

B. Broad Scope of Services

27. The scope of services shall include but not limited to:

(i) Planning and Detailed design of component No.1 (Raising Dahla dam and Six Saddle Dams) of the project and component No.2a (modernization of the Arghandab Irrigation System): 18 months
(ii) Construction supervision phase: 48 months.
(iii) Support to the MEW Central Project Management Office (CPMO): 66 months

Note: The detailed design and construction supervision phases may overlap.

28. The dam components will include (but not limited to) the following main components:

(i) Main Dam raising (including construction sequence)
(ii) Grouting Plan
(iii) Abutment treatment (if required)
(iv) Spillway, gates, stop logs and trash racks
(v) Stilling basin, energy dissipater and downstream erosion protection
(vi) Gates (spillway diversion tunnel and outlet) and valves

(vii) Diversion during construction and its related appurtenant (pipes, trash rack and other structures and system)
(viii) Site dewatering plan
(ix) Dam safety instrumentation plan
(x) Six Saddle dams raising.
(xi) Power-house penstock including intake and gates, anchor blocking, and saddle support
(xii) Realignment of route bear highway.
(xiii) Dam operation and management plan.

29. The +upgrade of the AIS components will rehabilitate, replace and modernize the following (but not limited to) prioritized infrastructure:

(i) Flow control and flow monitoring equipment
(ii) Gates
(iii) Canal restoration
(iv) Bridges
(v) Drainage works
(vi) De-siltation
(vii) Extension of Babawali wasteway
(viii) Canal safety measures

30. Support to the CPMO will take the form of support for environment and resettlement related support, due diligence and compliance, financial management systems and training and dam operations related support.

31. The TOR of the above stages are briefly described below.

A. <u>Detailed Design and tender preparation stage: 18 months</u>

32. The scope of the services of output 1a shall include but will not be limited to the following:

(i) Review previous project reports and drawings including concept design and optimization, feasibility, hydrology, hydraulics, bathymetric, topographic, geological & geotechnical and other related studies / surveys on Dahla dam raise prepared under the ADB transaction technical assistance (TRTA) and the United States Army Corps of Engineers (USACE), and identify areas of further investigations if necessary;
(ii) A comprehensive site visit of the relevant technical staff that must be conducted after the desk study of the existing feasibility study reports;
(iii) A comprehensive report to be prepared and submitted to MEW on the shortcomings (if any) of the existing feasibility study reports along with the proposed recommendations;
(iv) An inception report shall be prepared and submitted to MEW for review within 1 month of the site visit;
(v) Prepare a detailed project resource loaded schedule in Primavera P6 in consultation with MEW/ADB and other stakeholders. The EPCS schedule will highlight key deliverables such as the inception report, Interim report No.1, Interim report No.2, Draft final report and final report for approval by MEW. EPCS may propose a cost-effective schedule with less duration of the activities based on their experience. This schedule, once approved, will form the basis of payments to the EPCS. All deliverables will need to be approved by MEW before the payment will be released. The approved schedule may

only be changed in case of Force Majeure i.e. unforeseeable circumstances that prevent EPCS from fulfilling the contract. The schedule will include project deliverables as detailed from item (A) to item (E) in the Design Phase Deliverables and Payments Schedule below, covering inception report, options assessment report for the intake tower, trash rack and intake tunnel, additional investigations (if required), detailed design report, POE meetings, prequalification of contractors, procurement, construction schedule for civil works, procurement support of long lead items, critical activities and deliverable, identify and estimate resources and agree with MEW for staff deployment on as need basis, and update that in close consultation with MEW/ASBA/ADB and contractors when required. The Consultant will highlight all bottlenecks to MEW/ADB in timely manner to ensure the project resources are used in a timely and effective manner. The Consultant will ensure availability of a planning and scheduling Specialist with over 10 years in Primavera P6 in design office and report the project progress weekly, fortnightly and monthly to MEW/ADB;

(vi) Review and update overall project schedule in consultation with MEW/ADB and other activities such as irrigation works, hydropower and urban water supply. The Consultant will highlight and advise on any possible delays in all critical activities to MEW well in advance to ensure smooth operation of the project;

(vii) Review of and familiarize with Afghanistan Dam Safety Guidelines (2018) prepared by MEW for dam design compliance. The detailed design and activities should be consistent with these and International Commission on Large Dams (ICOLD), Australian National Committee on Large Dams (ANCOLD), United States Bureau of Reclamation (USBR), and USACE, American Concrete Institute (ACI) and ASTM International (formerly known as American Society for Testing and Materials), whichever is applicable and on the safer side;

(viii) Obtain existing design drawings from MEW/ASBA office. Plan and perform a detailed dam safety inspection with relevant seasoned Specialists and assess and report dam safety concern on proposed raise options, use of facility for hydropower and concerns for intake tower, trash rack and intake tunnel. The Specialist panel should include but not limited to geotechnical, geology, hydraulics, structure, mechanical, hydro-mechanical and electro-mechanical. The inspection will include close coordination with MEW/ASBA for temporary closure of intake tunnel for detailed inspection and review future options for tunnel use for hydropower production. The Consultant will make a detailed assessment report on intake tower, trash rack and intake tunnel and highlight potential raise safety concerns, if any, and present possible design options for these structures in a proposed Options Assessment Report for a 13.6 m raise for review by the MEW and POE. The Consultant will also explore options for a new low-level outlet tunnel for de-siltation/sediment flushing from the reservoir considering hydropower use of the dam. Possible locations may include Main dam left or right abutment, area between Saddle dam 6 and Main dam or as considered appropriate by the Consultant. The design options presented shall be reviewed and approved by MEW and the POE. The likely options for intake tower, trash rack include raise of these structure or construction of new structures. The likely options for intake tunnel may include no lining need, or lining requirement. The possible lining may include precast lining or shotcreting of the tunnel. However, the Consultant may propose other alternatives such as cast-in place concrete lining and others. This option assessment report shall be submitted to POE, MEW and ADB for review and approval. The Consultant will present its findings to POE/MEW/ADB in a meeting in Kabul and subsequently facilitate a visit of the POE for the project site with support from MEW. POE/MEW will review presented design options and may approve or propose alternative options for further investigation in the concluding meeting. Once approved, the Consultant will prepare the detailed design and prepare

cost estimate of these structures for approval of MEW and ADB. This is a critical dam safety activity and the Consultant will plan and coordinate this activity as soon as possible;

(ix) Perform and report detailed safety inspection of the main and saddle dams, spillways, reservoir area and other appurtenant structures and review the feasibility design and propose design changes if required in the feasibility design;

(x) Review the adequacy of the proposed spillway designs, obtain additional historical flood data on recent floods from ASBA, prepare gated option for the spillway 2 and plan and perform hydraulic model studies. Prepare a detailed report on hydraulic model study outcome and advise if a fuse plug embankment like Saddle dam extension 1 or others will be required. The gated spillway should be able to drawdown the reservoir water level as per ICOLD's requirement. The prepared report shall be submitted for MEW and POE for review and approval. Once approved, update the design to reflect necessary changes and prepare detailed cost estimate for the proposed options;

(xi) Review previous geological and geotechnical investigations performed by USACE and TRTA Consultants and if necessary, plan, procure a competent geotechnical firm which meets with MEW approval, conduct and report additional geological, geotechnical, geophysical, seismic investigations along the dams, spillways, ancillary structures and borrow areas. Potential investigation areas along main dam may include shear zone along left abutment of the main dam, extensions of various saddle dams, intake tower, trash rack area, intake tunnel, potential low-level outlet location, saddle dam 1 extension and borrow areas, proposed spillways locations, etc.;

(xii) Review and validate previous topographic survey of the project formed as part of feasibility studies, and highlight if additional surveys/revalidation will be required, prepare detailed tender for the works, procure a competent survey firm which meets with MEW approval, supervise survey and integrate results to existing survey of the project;

(xiii) Perform detailed geological mapping of abutment rock outcrops, and existing and raised reservoir area and dam site based on air photo analysis, existing information, and field inspection supported by necessary subsurface explorations. Review and evaluation of seismicity level and faulting activity if any. Review and update operating basis earthquake (OBE), maximum credible earthquake (MCE) and maximum design earthquake (MDE) for the dam and other structures design and perform relevant due diligence for validations. Prepare detailed mapping report and submit to MEW/POE for review and approval;

(xiv) Investigate and validate the availability of various construction materials required for the civil works. Prepare a borrow area management plan and Material Flow Diagram for smooth operation of all contracts for civil works in consultation with relevant project contractors during construction. The construction packages are likely to include several civil contractors working at the site at same time during low reservoir time. The Consultant will ensure close liaison between contractors to avoid any mismanagement like use of borrow areas or others;

(xv) Review and validate previous geotechnical investigations, select appropriate strength parameters for borrow areas and existing embankments. Perform detailed slope stability, seepage, settlement and dynamic assessment along all critical embankment sections in all dams as presented in the feasibility design or as amended with approval from MEW and ADB. The Consultant will use GeoStudio/FLAC 2D or 3D, PLAXIS or equivalent software suite for the existing and raised embankments as per ICOLD's and Afghan Dam Safety Guidelines under various recommended and updated seismic design conditions like OBE, MCE and MDE. The Consultant will prepare a detailed report with all the sections considered and present its finding to MEW/POE for approval. Based on the findings, the Consultant will update the design if necessary and present updated cost

to MEW and the POE for approval;

(xvi) Review and validate previous feasibility study and draft drawings on the realignment of the Route Bear Highway, and highlight if additional surveys will be required;

(xvii) Prepare draft detailed design drawings, calculations, specifications, reports, update cost estimates and tender packages for approval of all major civil works including dams, spillways, ancillary structures such as the intake tower, trash rack, tunnel lining, and the road realignment as per project procurement plan in consultation with MEW and ADB. And after receiving comments from MEW and ADB update the design and submit the final documents for tender procurements;

(xviii) Support MEW in prequalification process of the Contractors if required by MEW, Provide necessary review and approval of alternatives etc., during the tender period;

(xix) Plan, prepare design drawings, design calculation, reports, quantities estimate, cost estimate and tender package including specifications for staff colony and site security fencing;

(xx) Plan, prepare design drawings, reports, cost estimate and tender package including specifications for electrification along main dam;

(xxi) Plan, prepare design drawings, reports, cost estimate and tender package including specifications for a recreational park at the downstream side of the main dam;

(xxii) Plan, prepare design drawings, reports, cost estimate and tender package including specifications for the instrumentation for main dam, saddle dams and critical appurtenant structures. The instrumentation should include settlement markers, piezometers, inclinometers, seismographs and others;

(xxiii) Plan, prepare design drawings, reports, cost estimate and tender package including specifications for the road realignment;

(xxiv) Perform Dam Break Study as per ICOLD's and Afghan Dam Safety guidelines in close coordination with MEW/ASBA/ADB and other stakeholders;

(xxv) Prepare a reservoir management and operation plan with ASBA during construction; and

(xxvi) Prepare and manage reservoir filling operations for the raised dam with consideration of necessity of installation of a gate for filling test at spillway 2.

33. The Consultant shall keep in mind that the services and tasks described herein should not be considered as the complete and comprehensive description of the Consultant's services and duties. It is rather the Consultant's responsibility to critically verify the scope of the services indicated herein, and to propose modifications in their proposal wherever they deems it necessary according to their own professional judgment and the knowledge that they will acquire during the preparation of their proposal. It is understood that the Consultant shall perform all the services/work as necessary to fulfill the objectives of the Consultancy Contract.

34. Below is the list of the applicable standards to the detailed design of the project:

(i) USACE, USBR, ANCOLD and ICOLD (if applicable) whichever is the most safe and conservative:

ASCE7-10
ACI 318-14, ACI 350 and other applicable parts of the ACI
ASTM (for testing Material)
AASHTO (for roads and culverts)
AISC
IBC
IPC
AWS

AWWA
EM 1110-2-2100
EM 1110-2-3001
EM 1110-2-2104
ETL 1110-2-584
ASME

35. List of the standards but not limited to for design construction, erection, installation, testing, and commissioning electrical and electromechanical components of the hydro power plant.

(ii)	IEC	International Electrotechnical Commission
(iii)	ISO	International Organization for Standardization
(iv)	VDE	Verein Deutscher Elekroingenieure
(v)	BS	British Standards
(vi)	DIN	Deutsches Institut für Normung
(vii)	IEEE	Institute of Electrical and Electronic Engineers (for grounding)
(viii)	NFPA	National Fire Protection Association (for fire protection)
(ix)	NEMA	National Electrical Manufacturers Association (for fire protection)

36. Tender will include reference relevant guidelines for all works contracts.

37. These Guideline Source Books include:

01 - Observations, Explanatory & Philosophy Paper;
02 - Environmental Impact Assessment for Dams;
03 - Integrating Assessment, Management and Monitoring of Social Issues into Dam Safety Guidelines;
04 - Emergency Preparedness Plans for Dams;
05 - Hydrology for Dams;
06 - Dam Design;
07 - Dam Site Security;
08 - Operation & Maintenance Programs, Asset Registers for Dams;
09 - Dam Construction & Safety;
10 - Geological Investigations & Reporting for Dams;
11 - Operations & Maintenance; and
12 - Geotechnical Investigation & Design for Dams.

38. The scope of the services of output 2a shall include but will not be limited to:

(i) Review previous project reports and drawings including concept design and other related studies on modernization of Arghandab Irrigation System (AIS);
(ii) A comprehensive site visit of the relevant technical staff must be conducted after the desk study of the existing feasibility study reports.
(iii) A comprehensive report shall be prepared and submitted to MEW on the shortcomings (if any) of the existing feasibility study reports along with the proposed recommendations.
(iv) An inception report shall be prepared and submitted to MEW for review within one month of the site visit.
(v) Prepare draft detailed design drawings, calculations, specifications, reports, update cost estimates and tender packages for approval of all major works including flow control and

monitoring equipment, gates, canal restoration, bridges, drainage works, de-siltation, extension of Babawali wasteway, and canal safety measures.

(vi) Support MEW in prequalification process of the Contractors if required by MEW, provide necessary review and approval of alternatives etc., during the tender period.

Design Phase Deliverables (Reports) and Payment Schedule

39. The deliverables (reports) and payments will be under the major pay item headings below:

	Deliverables	Submission Schedule	Payments
A	Inception Report	end of month (3) after notice to proceed (NTP)	5% of the Total contract price of design phase will be paid on acceptance of this report
B	Interim Report No. 1	end of month (8) after NTP	25% of the Total contract price of design phase will be paid on acceptance of this report
C	Interim Report No. 2	end of month (12) after NTP	25% of the Total contract price of design phase will be paid on acceptance of this report
D	Draft Final Report	end of month (14) after NTP	15% of the Total contract price of design phase will be paid on acceptance of this report
E	Final Report	end of month (16) after NTP	30% of the Total contract price of design phase will be paid on acceptance of this report

40. The requirements and components for each of these major pay items are described in the following sections.

Design Phase Inception Report

41. The inception report shall include the following (but shall not be limited to):

(i) A summary of the outcomes of the Feasibility study review and site visit;
(ii) Dam type and location investigation, recommendation and study report;
(iii) The consultant's quality control procedures to be followed throughout the assignment, including value engineering, constructability, and risk analysis;
(iv) The consultant's capacity development plan to be followed throughout the project including involvement of government personnel seconded to the project;
(v) The consultant's comprehensive project time schedule based on earned value of design drawing and document preparation deliverables;
(vi) Analysis and recommendation of the form of construction contract to be used;
(vii) A schedule of site visits and field activities including topographical, geological and geotechnical fieldwork for surveys to be carried out and a reporting schedule for deliverables;
(viii) A report on the consultant's mobilization effort and a detailed description of problems encountered and anticipated and recommended solutions;
(ix) Powerhouse location configuration, recommendation and study report;
(x) Irrigation system configuration, recommendation and study report;

(xi) A vicinity map showing all the project components; and
(xii) Other additional requirements of MEW during the inception report stage.

42. A design review meeting will be held in Kabul 1 month following the consultant's submission of the draft inception report. The inception report will be approved by MEW following the revision of the draft inception report to include the comments of MEW following the design review meeting. Thirty (30) days should be allowed for MEW to prepare their comments following the design review meeting.

43. The Draft Inception Report will be submitted at the end of month 3 following the. notice to proceed (NTP).

Design Phase Interim Report No.1

44. The draft Interim Report No.1 should be submitted at the end of month 8 following the NTP. A design review meeting will be held in Kabul one month following the consultant's submission of a draft interim report. The interim report will be approved by MEW following the revision of the draft interim report no 1 to include the comments of MEW from the design review. Thirty (30) days should be allowed for MEW to prepare their comments following the design review meeting.

45. Interim Report No. 1 will include presentation of the following reports (but shall not be limited to):

(i) Complete hydrology report;
(ii) Complete survey and topographic report. The consultant shall carry out a survey and mapping fieldwork program to obtain the necessary topographic information (in addition to that contained in the feasibility report) for detailed design, drawings and bidding documents including specifications for the dam and appurtenances, powerhouse, irrigation pipe lines networks and related structure including survey in sufficient detail to perform detailed design of the irrigation system and command area, tunnels. The survey will be done in accordance with the 'Topographic Surveys' section of this TOR;
(iii) Complete geotechnical investigation and borrow area reports. The consultant shall carry out the necessary fieldwork program (in addition to that contained in the feasibility report) to obtain sufficient geotechnical and geological information for detailed design, drawings and specifications for the entire project. The survey and investigation will be done in accordance with the 'Geotechnical Survey and Investigation' section of this TOR;
(iv) Complete geology and geophysical results interpretation report;
(v) Complete seismology report (OBE, MDE and MCE earthquakes);
(vi) Complete meteorology reports;
(vii) A sediment management plan; and
(viii) A complete package of technical documents ready for bidding including survey, geotechnical investigations, design calculations, drawings, specifications, Bill of Quantities (BoQ) for site infrastructures including campsite, permanent and temporary buildings, water supply system, wastewater and storm water drain system, access roads, bridges, culverts, tunnels (if required) and others. The drawings will be in ready for construction condition. Sufficient information will be collated, and investigation performed to assess the access into the project work site area (including the main dam site and its appurtenances, pipeline network, irrigation area and water supply network). Water and power supply available as well as transportation facilities will be assessed.

The consultant will investigate the existing transportation infrastructure and shall design the required infrastructure improvement sufficient to support the project. Future utilization of the infrastructure will be considered in the design. The consultant shall also specifically identify, upgrade and expand the requirements of existing infrastructure. The design will be sufficient to minimize operation and maintenance costs in the future for the transportation system. The bidding document and drawing preparation will include design calculation, specifications and drawings for the following main components which will include (but not limited to) the following main components:

- Complete Geometric design of access roads including drawings of plans, profiles and sufficient cross sections at interval of 25 meters in ready for construction form per American Association of State Highway and Transportation Officials (AASHTO) policy on Geometric design of highways and streets.
- Compete pavement design report Per AASHTO Guide for design of pavement structure (1993) including a report of the Soil California Bearing Ratio values along proposed route, traffic count survey reports, pavement design calculation and drawing showing the thickness of the sub-base, base course, Prime coat and asphalt concrete binder and wearing course.
- Longitudinal road drainage channels and cross drainage structures including transition to existing natural drainage.
- Complete design of Culverts and bridges per AASHTO Standard.
- Water supply details including pipelines and pumping arrangement.
- Sewage treatment and solid waste disposal arrangements.
- Complete design of tunnel (if required) as per TOR specified standards.
- Complete Civil, Architectural, structural, electrical and plumbing design of Temporary and Permanent housing accommodation and office arrangements including those for construction site inspection staff per IBC, IPC and other related standards mention in the TOR.
- A cost estimate as described under the heading “Consultant’s Project Cost Estimate” will be prepared for this component to become part of the overall project cost estimate.
- Preparation of complete construction specification for all the above infrastructures according to the specified standards.

Design Phase Interim Report No.2

46. Interim Report No 2 will be submitted at the end of month 12 following the NTP. A design review meeting will be held in Kabul one month following the consultant’s submission of the draft final report. The final report will be approved by MEW following the revision of the draft final report to include the comments of MEW following the design review meeting. Thirty (30) days should be allowed for MEW to prepare their comments following the design review meeting.

47. Interim Report No. 2 will include presentation of the following reports (but shall not be limited to):

(i) A complete design of the raised portion of the main dam, overall stability analysis of the main dam, complete design and analysis of the six raised saddle dams and its appurtenant structures including coffer dam and its related structures and system as per contract specified standards. The design will include detailed assessment of slope stability, seepage, settlement and dynamic assessment along all critical embankment

sections in all dams and compare it with the feasibility design, clarify the differences if any and submit it to MEW, POE and ADB for review. The Consultant will use GeoStudio software suite for the existing and raised embankments as per ICOLD's and Afghan Dam Safety Guidelines under various recommended and updated seismic design conditions like OBE, MCE and MDE;

(ii) A complete design of tailrace system including feeder pipe and related structures;
(iii) A complete design of mechanical and electrical equipment and instrumentation for operation of the spillways and facilities of the main dam and six saddle dams;
(iv) A complete design of the irrigation water distribution system, canal networks and its related structures and system including delivery chambers, field channels, gates, monitoring and control system;
(v) Borrow area investigation and location configuration;
(vi) A review of the adequacy of the proposed spillway designs, obtain additional historical flood data on recent floods from ASBA, prepare gated option for the spillway 2 and plan and perform hydraulic model studies. Prepare a detailed report on hydraulic model study outcome and advise if a fuse plug embankment like Saddle dam extension 1 or others will be required. The gated spillway should be able to drawdown the reservoir water level as per ICOLD's requirement. The prepared report shall be submitted for MEW and POE for review and approval. Once approved, update the design to reflect necessary changes and prepare detailed cost estimate for the proposed options;
(vii) Detailed design drawings, calculations, technical specifications, reports, update cost estimates and tender packages for approval of all major civil works including dams, spillways, ancillary structures such as the intake tower, trash rack, tunnel lining and the road realignment as per project procurement plan in consultation with MEW and ADB. And after receiving comments from MEW and ADB update the design and submit the final documents for tender procurements; and
(viii) Cost estimate and BoQ for all the above systems.

Design Phase Draft Final Report

48. The Draft Final Report will be submitted to MEW, POE and ADB for review at the end of month 14. The Draft Final Report is the compilation of the approved interim report No.1 and approved interim report No.2, includes (but shall not be limited to) submission of technical documents ready for bidding including complete design, specifications, BOQs, schedules, drawings (drawings will be in ready for construction form). The following are required:

(i) Design criteria report (Design Basis Memorandum)
(ii) Engineering geological report
(iii) Geotechnical Report
(iv) Topographic Survey Report
(v) Hydrology report
(vi) Seismic hazard report
(vii) Comprehensive concrete report
(viii) Hydraulic steel structures design report
(ix) Report for tunnel (if required) access roads, culverts and bridges and site installations
(x) Design report of diversion system during construction
(xi) Report on Site Dewatering Plan
(xii) Design report on dam and appurtenant structures
(xiii) Design report on electromechanical equipment
(xiv) Design report on hydro mechanical equipment
(xv) Design report on the road realignment

(xvi) Design report on irrigation network and system including command area
(xvii) Design report on pipelines network for irrigation including its related structures (delivery chambers, field channels, and others...)
(xviii) Borrow areas and construction materials report
(xix) Operation manual for civil structures
(xx) Report on Quality Assurance Activities
(xxi) Report on Value Engineering
(xxii) Report on Constructability Analysis
(xxiii) Report on Risk Analysis
(xxiv) Environmental Report
(xxv) Social Safeguards Report
(xxvi) Riparian flow analysis report
(xxvii) Dam safety instrumentation plan and specifications
(xxviii) Operation and maintenance plan
(xxix) Dam safety program and instructions manual
(xxx) Emergency preparedness plan
(xxxi) Civil, Mechanical and Electrical Specifications for construction phase
(xxxii) Cost loaded schedule for construction phase
(xxxiii) Quality assurance/quality control checklists for construction phase
(xxxiv) Consultant's cost estimate (engineers check estimate) for the overall project
(xxxv) Overall project economic and financial viability assessment report
(xxxvi) Summary technical, environmental and social reports
(xxxvii) Other Reports as requested by MEW

Design Phase Final Report

49. The Final Report will be a compilation of all previous reporting as required in the draft final report and will be finalized after MEW comments have been included and MEW has approved the final report.

50. Final report will be submitted to the client at the end of month 16 after NTP.

51. MEW will review the Final report within 15 days and the design Consultant will incorporate the MEW Comments if any within 15 days and resubmit it to Client for final review and MEW will review it within 15 days and the Consultant will submit the final version of the report within 7 days and MEW will conduct the final check within 8 days and the project phase will be closed at the end of month 18.

B. <u>Construction Supervision Phase: 48 months</u>

52. The scope of the services will include but not limited to the following service:

(i) Establish a site office in Kandahar in a suitable safe place for construction support. The site office will have a full time Chief Resident Engineer and team of relevant Specialists for quality assurance, and will ensure close coordination with relevant stakeholders like ASBA, the Ministry of Rural Rehabilitation and Development (MRRD), the National Environmental Protection Agency (NEPA), Afghanistan Land Authority ([ARAZI] under the Ministry of Urban Development and Land) and local contractors);
(ii) Prepare and submit to MEW for approval a detailed Quality Assurance/Quality Control Manual for the consultant’s staff and provide relevant training to technical staff for effective construction quality control. The manual must be approved before construction

start at site and required training should be provided to staff to ensure quality control at site;

(iii) Review and approve quality control manual in consultation with MEW for each sub-contract for construction;
(iv) Ensure a detailed joint topographic survey is performed at each sub project site;
(v) Supervision, inspection and monitoring of the civil, hydraulics, mechanical and electrical works of the project to ensure that the works are carried out in accordance with the agreed schedules, design and specifications, and that the quality meets the required technical standards, systems and procedures;
(vi) Regularly review, monitor and report the progress of the contractors to MEW and report any bottle necks;
(vii) Ensure timely installation, safety of installed geotechnical instruments, regular monitoring and reporting and highlight any dam safety concerns in advance with proposed remedial measures;
(viii) Prepare and report daily, weekly, monthly and quarterly reports for the project stakeholders;
(ix) Assist implementing agencies in implementation of the environmental management plan (EMP);
(x) Perform environmental monitoring;
(xi) Assist implementing agencies in updating the IEE and EMP;
(xii) Certify volume of works completed and/or as installed based on actual;
(xiii) Certify the payments to the contractors, after checking and verifying the contractor's measurement;
(xiv) Report regularly financial status of the project to implementing agencies by:
    a. Reporting the disbursement results and financial positions with actual cash flow positions;
    b. Performing detail variation analysis between estimated/budgeted position compared with the actual position;
    c. Assessing future requirements and payments schedule; and
    d. Recommending possible measures for reducing expenditures, if any.
(xv) Monitor compliance with environmental mitigation and management plans, and the contractor's health and safety plans;
(xvi) Preparation of work-related certificates as appropriate;
(xvii) Review of supplies equipment design and perform shop and/or witness tests/pre-delivery and on-site inspections and acceptance of the equipment as appropriate;
(xviii) Review and approve erection and construction drawings to ensure technical compliance and compatibility with specifications and other requirements;
(xix) Review and approve factory testing procedures and factory test results submitted by the contractors;
(xx) Witness and report Quality Control testing of materials, plants etc., and issue corresponding certificates ensuring the testing is consistent with project requirements. Should a quality concern is raised, in consultation with MEW procure additional services and validate through third party testing;
(xxi) Review and approve commissioning test procedures submitted by the contractor;
(xxii) When works are ready for inspection and test for substantial completion:
    a. Prepare a program for inspection and test in consultation with MEW;
    b. Assess the works and assure that they are appropriately completed;
    c. Issues taking over certificate for contractors, if the works are satisfactory for operation or instruct the contractor remedial work and/or further test if failed the verification test; and
    d. Undertake the review, monitoring supervision of the contractor's work-related

occupational health and safety program activities. Recommend appropriate revision if deemed necessary.

(xxiii) Provide regular project reporting to the implementing agencies and other project stakeholders;

(xxiv) Assist the management of the reservoir operation and maintenance during construction;

(xxv) Monitor the reservoir filling operations with detailed onsite monitoring and geotechnical instrumentation surveillance after civil works completion. Highlight any dam safety concerns if any, investigate and identify the cause and propose the implementing agency the necessary remedial actions;

(xxvi) After completion of construction, preparation of as-built drawings and a construction completion report; and

(xxvii) Any other works not sufficiently described in the scope of services but can be reasonably inferred as required and necessary to be undertaken to complete the project are presumed included in the scope of works of the consultant.

53. The Consultant shall keep in mind that the services and tasks described herein cannot be considered as the complete and comprehensive description of the Consultant's services and duties. It is rather the Consultant's responsibility to critically verify the scope of the services indicated herein, and to propose modifications in his proposal wherever he deems it necessary according to his own professional judgment and the knowledge that he will acquire during the preparation of his proposal. It is understood that the Consultant shall perform all the services/work as necessary to fulfill the objectives of the Consultancy Contract.

Construction Supervision Phase Report Deliverables

54. The deliverable schedule is outlined in the table below:

	Deliverables	**Schedule**
A	Mobilization of key international experts for the construction phase and agreement with MEW on the selection of a Site Office in Kandahar	by month 18
B	Approval by MEW by month 20 of a detailed Quality Assurance Manual for the consultant's staff and plan for training to technical staff for effective construction quality control	
C	Construction Progress 6 month Reports (month 24, 30, 36, 42,48), including financial status, QA certification of works, compliance with environment, social and gender plans,	end of month 24 after NTP
D	Program for Completion Inspection and Test	submitted to MEW by month 33, to be completed by month 34
E	Contract completion Report, including results of reservoir filling monitoring, as-built drawings, and	

	Deliverables	Schedule
	summary of Inspection and Test.	

C. Support to the Central Project Management Office and Project Implementation Unit (PIU) office: 66 months

55. The EPCS consultants will provide the following support to the CPMO:

(i) Prepare draft tender documents for procurement of all relevant contract packages for approval of MEW/ADB and then prepare approved tenders for procurement;
(ii) Provide support to the financial management operation of the CPMO and PIU office, including introducing appropriate software and training;
(iii) Update environmental impact assessment (EIA), IEE and EMP accordingly;
(iv) Support to MEW for implementation of the Land acquisition and Resettlement Framework:
   a. Update Land Acquisition and Resettlement Framework (LARF) and prepare Land Acquisition and Resettlement plan (LARP) in close consultation with MEW/ASBA and relevant stakeholders;
   b. Provide necessary support for MEW in relocation / resettlement works. This may include concept, detailed design and construction of colonies for the affected people. Tender for construction such works will be prepared separately if required by MEW;
   c. Support the implementation of different LARPS.

56. **Other activities**

(i) Study and design a seasonal forecasting tool for Kandahar basin in consultation with MEW and other stakeholders;
(ii) Develop a reservoir operation management plan;
(iii) Prepare O&M manuals specific for Dahla dam safety including spillways, etc. All dam safety manuals will be prepared in line with the Dam Safety Guidelines for Afghanistan and must be consistent with ICOLD/ANCOLD and international guidelines;
(iv) Prepare Emergency Preparedness Plan (EPP) for Dahla dam. EPP will cover all dams and will be prepared in line with the Dam Safety Guidelines for Afghanistan and must be consistent with ICOLD / ANCOLD and international guidelines;
(v) Prepare Asset Management Register Plan for Dahla dam and support and train MEW in Asset Management Principles and practice;
(vi) Capacity development of reservoir operation staff for dam operation safety and emergency response;
(vii) Provide training of the dam safety to the relevant dam operation staff; and
(viii) Review and update a plan for procurement of emergency response equipment and vehicles for dam safety.

D. Implementation Arrangements

57. The overall EPCS consultancy implementation period will be 1 January 2020 to 31 July 2025. MEW will be the lead counterpart agency. The consultants will report to MEW and will be responsible for their own security. Procurement of any equipment, goods, and services will be undertaken under the consultant contract will be done in line with ADB procurement guidelines and principles.

58. The consultants would mainly work in Kabul, but members of the team are also expected to spend substantial amount of time at the project areas both near Kandahar city and at Dahla Dam.

59. The implementation schedule is in Table 1.

Table 1: Implementation Schedule

	Milestone	Expected Completion Date
1	**Dahla dam capacity increased**	
1.1	Undertake and complete resettlement	Q4 2019–Q3 2024
1.2	Detailed design of recreation area, dam and dam safety training	Q1 2020–Q4 2021
1.3	Bidding, bid evaluation and award of contracts	Q2 2020–Q3 2024
1.4	Recreation area construction	Q2 2020–Q2 2021
1.5	Raise main dam, intake tower, tunnel lining, trash rack	Q1 2022–Q1 2025
1.6	Raise and extend saddle dams	Q4 2021–Q3 2024
1.7	Spillway construction	Q4 2024–Q2 2025
1.8	Install electrification along dam	Q1 2022–Q3 2024
1.9	Install instrumentation	Q1 2022–Q3 2024
2	**Reliability of irrigation water supply increased**	
2.1	Undertake and complete resettlement on AIS main canal	Q2 2020-Q2 2021
2.2	Design and undertake AIS rehabilitation and modernization works	Q3 2020–Q2 2024
2.3	Establish and equip AIS works center	Q3 2020–Q1 2021

AIS = Arghandab Irrigation Scheme
Source: Asian Development Bank.

60. **Anticipated Staff Input**. The Consultant will recruit specialized experts with relevant skills and relevant international experience in handling such project. The international specialists will be supported by national staff for the successful execution of the project. The table below details the likely specialists and estimated pm required for the project. However, the Consultant may adjust individual input and change or add other specialists as deemed necessary and get approval from MEW if required.

61. Proposing entities will finalize the number and the nature of experts they will require to achieve the objectives and detailed activities and outputs defined in this Terms of Reference, in accordance with their proposed approach and methodology. The proposing entity should nominate one international as the team leader with demonstrated competency in managing a multidisciplinary team of consultants, liaising with the clients and funding agencies.

62. The consultants nominated as Team Leader and deputy Team Leader will be required to (i) manage the team and generation of team outputs; (ii) establish working, monitoring, and reporting procedures; (iii) review all activities and modify as required to ensure optimal outcomes; (iv) ensure delivery of inception, monthly, completion and all other reports and deliverables; (iv) ensure the project officer is well informed of any issues that arise; (vi) allocate tasks to team members depending on their individual skills and time availability.

63. The key positions under the consulting contract are outlined in Tables 2-4. Note that key positions only are scored. Non-key positions are indicative only and resumes as evaluated as pass / fail only, with the opportunity to replace any consultants who are deemed unsatisfactory.

Table 2: International Specialists for the Detailed Design and Tender Preparation Phase, and Construction Supervision Phase

SR. NO.	INTERNATIONAL	Design and Tender Preparation (minimum person-months)	Construction Supervision (minimum person months)
KEY POSITIONS			
1	Project Management Specialist/Team Leader	15	36
2	Dam and Appurtenant Structures Design Specialist	12	6
3	Hydro-Mechanical Design Specialist	6	8
4	Geotechnical Specialist	12	6
5	Topographic Survey Specialist	4	1
6	Hydrologist/Sedimentation Specialist	4	
7	Irrigation Design Specialist	8	
8	Cost Estimator	10	
9	Geologist/Borrow Area Management/Rock Mechanics Specialist	10	6
10	Electro-mechanical Design Specialist	4	8
11	Infrastructure Design Specialist	6	4
12	Resettlement Specialist	15	18
13	Social Safeguard Specialist	6	15
14	Gender Specialist	8	15
15	Environment Specialist	8	15
16	Irrigation Engineer (AIS)	12	12
TOTAL OF KEY INTERNATIONAL INPUTS		140	150
NON-KEY POSITIONS (INDICATIVE)		(Indicative)	(Indicative)
17	Hydraulics Specialist	6	2
18	Project Planning & Scheduling Specialist (Primavera P6)	6	1
19	Procurement/Financial Management Specialist	6	2
20	Seismology Specialist	3	
21	Architect	2	
22	GIS / Survey Specialist	2	1
23	Civil and Mechanical Drafting Engineers	6	2
24	Electrical Drafting Engineer	3	
25	Site Security Advisor	15	36
26	Fragile and Conflict Affected Situations Specialist	5	
27	Unallocated	4	
TOTAL OF NON-KEY INPUTS		58	44
	Total	**205**	**163**

Table 3: National Specialists for the Detailed Design and Construction Phases

SR. NO.	NATIONAL	Design and Tender Preparation	Construction Supervision
1	Project Management Specialist/Deputy Team Leader	15	36
2	Deputy Resident Engineer (DRE)	15	
3	Dam Design and Appurtenant Structures Specialist	12	12
4	Resettlement Specialist (3 positions)	48	72
NON-KEY POSITIONS (Indicative)			
5	Project Planning and Scheduling Specialist Primavera P6	12	
6	Hydrologist / Sedimentation Specialist	3	
7	Seismology Specialist	3	
8	Hydraulics Engineering Specialist	12	12
9	Electro-mechanical Specialist / ARE Electro-Mech	12	12
10	Hydro-mechanical Specialist	9	12
11	Geologist /Borrow Area Management /Rock Mechanics Specialist	12	12
12	Environment Specialist	18	48
13	Procurement/Financial Management Specialist	12	6
14	Gender and Social safeguard Specialist	10	20
15	Architect	2	3
16	GIS / Survey Specialist	2	1
17	Drafting Engineers (2 positions) / (1 Civil and 1 Mechanical)	12	12
18	Drafting Engineer, Electrical	3	3
19	Site Engineer (Civil) / Project Scheduler Primavera P6		12
20	Site Engineer (Civil) / Quantity Surveyor		12
21	Site Engineer (Geotechnical / Dams/Instrumentation)		6
22	Site Engineer (Geologist / Material Engineer)		6
23	Site Engineer (Structural)		12
24	Site Engineer (Electrical)		12
25	Site Engineer (Hydraulics)		12
26	Site Engineer (Environmental)		12
27	Site Inspector (Civil)		12
28	Site Inspector (Civil) – Quantity Surveyor		12
29	Site Inspector (Instrumentation) - 2 positions		24
30	Site Inspector (Material) - 2 positions		24
31	Site Inspector (Structural) - 2 positions		24
32	Site Inspector (Electrical) - 2 positions		24
33	Site Inspector (Hydraulics) - 2 positions		24
34	Site Inspector (Geologist / Material Engineer)		24
35	Site Inspector (Environmental) - 2 positions		24
36	Irrigation Engineer (AIS)	15	30
37	Irrigation engineer / draftsman – 2 positions	30	60
38	Site Security Advisor		40
39	Fragile and Conflict Affected Situations Specialist	5	5
40	Unallocated		24
	Sub-total	**262**	**696**
	Total national	**958**	

64. Each specialist's TOR will include, but not necessarily be limited to, the following tasks.

Each specialist will perform their tasks in collaboration with their team members. The specialists should meet the minimum requirements as below.

(i) Each international Specialist must have a master of science degree in relevant area, should be fluent in English and have a minimum of 15 years of work experience in respective professional areas except serial number 1 and 2. Team Leader and Chief Resident Engineer must have over 20 years' experience in design and managing dams, irrigation or other hydraulic structure projects;
(ii) Each national Specialist from serial number 1 to 20 should preferably have a masters' degree in required majors and should be fluent in English and have a minimum of 10 years of work experience in respective professional areas;
(iii) Each national Specialist from serial number 21 to 28 should preferably have a masters' degree in required majors and should be fluent in English and have a minimum two years of work experience in respective professional areas; and
(iv) Each national Specialist from serial number 29 to 39 should have vocational qualification or tertiary degree, should be fluent in English and have a minimum two years of work experience in respective professional areas.

65. The outline TORs for the international consultants are:

Key Positions

66. **Project Management Specialist/Team Leader** (international, 51 pm)**, Project Management Specialist/Deputy Team Leader** (national, 51 pm). The specialist will lead the consultant team and assist MEW CPMO to conduct overall project management as well. The specialist will represent the consultant team and be a focal person in communication and coordination with MEW CPMO and ADB. The specialist will control day-to-day operation of the project and report to MEW CPMO, present to MEW CPMO the technical and financial progress and issues, and will be overall responsible to provide leadership to project on overall EPCS team activities as described in TOR. More specifically, the specialist will:

(i) Be responsible of the overall dam safety of the project;
(ii) Review previous project reports and drawings including concept design and optimization, feasibility, hydrology, hydraulics, bathymetric, topographic, geological & geotechnical and other related studies/surveys on Dahla dam raise prepared under ADB TRTA and USACE, and identify areas of further investigations if necessary;
(iii) Review and update project design, procurement and construction schedule in consultation with MEW/ADB. EPCS will highlight and advise on any possible delays in all critical activities to MEW well in advance to ensure smooth operation of the project;
(iv) Review and get familiar with Afghanistan Dam Safety Guidelines (2018) prepared by MEW for dam design compliance. The detailed design and activities should be consistent with these and International ICOLD, ANCOLD and/or other guidelines;
(v) Review and approve detailed design, tender and construction drawings to ensure technical compliance and compatibility with specifications and other requirements;
(vi) Prepare the final plans and specifications for design adequacy, construction, scheduling as well as the construction supervision plan;
(vii) Supervision, inspection and monitoring of the civil, mechanical and electrical works of the project to ensure that the works are carried out in accordance with the agreed schedules, design and specifications, and that the quality is consistent with the required technical standards, systems and procedures;
(viii) Regularly review and monitor the progress by the contractor;

(ix) Review and approve factory testing procedures and factory test results submitted by the contractors;
(x) Witness factory testing of major equipment and issue corresponding certificates;
(xi) Review and approve commissioning test procedures submitted by the contractor;
(xii) When works are ready for inspection and test for substantial completion;
(xiii) Prepare a program for inspection and test;
(xiv) Examine the works and assure that they are appropriately completed;
(xv) Issues taking over certificate for contractors, if the works are satisfactory for operation or instruct the contractor remedial work and/or further test if failed the verification test;
(xvi) Provide detailed financial, physical progress reports and highlight in a timely manner any likely delays due to any particular reason. Issue regular weekly, fortnightly, monthly and quarterly project reporting to the implementing agencies and other project stakeholders; and
(xvii) Assess the result of instrumentation installation (including measurement datum marks) basing on early data collected during the construction on that basis recommendations to MEW regarding data collection, revision (supplementation) of instrumentation in line with the construction progress are made.

67. During construction phase, the international team leader/specialist will be responsible for, but not limited to, the following:

(i) Review of supplies equipment design and perform shop and/or witness tests/pre-delivery and on-site inspections and acceptance of the equipment as appropriate;
(ii) Review and approve erection and construction drawings to ensure technical compliance and compatibility with specifications and other requirements;
(iii) Review and approve factory testing procedures and factory test results submitted by the contractors;
(iv) Witness and report Quality Control testing of materials, plants etc., and issue corresponding certificates ensuring the testing is consistent with project requirements. Should a quality concern is raised, in consultation with MEW procure additional services and validate through third party testing;
(v) Certify volume of works completed and/or as installed based on actual;
(vi) Certify the payments to the contractors, after checking and verifying the contractor's measurement; and
(vii) Assist implementing agencies in implementation of the EMP.

68. **Deputy Resident Engineer (DRE),** (national, 15 pm) The specialist will be responsible for all construction activities related to dam and all structural construction. DRE must have an understanding of the construction standards and quality control. The specialist will support the Team Leader in successful delivery of the project. The specialist will:

(i) Be responsible for overall project management, reporting to the MEW and ADB, coordinating with local communities and other stakeholders in the project area and international and Contractor security forces on security issues;
(ii) Act as the Engineer in administering the civil works Contracts. Advise MEW, on all matters concerning implementation of the Contracts including, but not limited to, the progress of the civil works (the Works) and issues arising, certification of the Works, variations to the Works and the Contractor's Contracts, the settlement of disputes and, arbitration or litigation if required;
(iii) Be responsible for overall construction scheduling and supervision responsibility of project under FIDIC (Fédération Internationale des Ingénieurs-Conseils) Red book and

responsible for the Contract Management and Site Supervision of the Civil aspect of the project;

(iv) Monitor, inspect and certify the temporary and permanent Works ensuring they are constructed in accordance with the provisions of the Contracts, including the Contractor's approved Quality Assurance Plan, Health and Safety Plans, EMP and Method Statements;
(v) Coordinate the development of the final Security Plans (the Security Plan) for the Contracts and supervise their implementation;
(vi) Design and implement a project performance management system (PPMS);
(vii) Ensure health and safety of all the staff working at site; and
(viii) Responsible of the over embankment design review and dam safety of project dams and ensure safe design as per ICOLD's guidelines,

69. **Chief Dam and Appurtenant Structures Design Specialist** (international, 18 pm; national, 24 pm). The specialist will be responsible for all related cost related to dam design, dam safety and O&M of the dam. The specialist will support the TL in successful design and delivery of the project. The specialist will:

(i) Be responsible of the overall embankment design and dam safety of project dams and ensure safe design as per ICOLD's guidelines;
(ii) Review and get familiar with Afghanistan Dam Safety Guidelines (2018) prepared by MEW for dam design compliance. The detailed design and activities should be consistent with these and International ICOLD, ANCOLD and/or other guidelines;
(iii) Review previous project reports and drawings including concept design and optimization, feasibility, hydrology, hydraulics, bathymetric, topographic, geological & geotechnical and other related studies/surveys on Dahla dam raise prepared under ADB TRTA and USACE, and identify areas of further investigations if necessary;
(iv) Review and update project design, procurement and construction schedule in consultation with MEW/ADB. The Consultant will highlight and advise on any possible delays in all critical activities to MEW well in advance to ensure smooth operation of the project;
(v) Plan and coordinate visit to dam site with relevant panel and perform detailed dam safety inspection and reporting of overall dam site and in particular Intake, trash rack and tunnel lining;
(vi) Investigate and validate the availability of various construction materials required for the civil works. Prepare a borrow area management plan and Material Flow Diagram for smooth operation of all contracts for civil works in consultation with relevant project contractors during construction. The construction packages are likely to include several civil contractors working at the site at same time during low reservoir time. The Consultant will ensure close liaison between contractors to avoid any mismanagement like use of borrow areas or others;
(vii) Conduct detailed inspection of the existing structures including intake tower, trash rack and intake tunnel;
(viii) Prepare detailed design of various structural elements including parapet wall of the dam, and update cost estimate for major civil works;
(ix) Prepare a detailed construction schedule for civil works;
(x) Conduct structural and seismic analysis and detail design of intake towers, trash rack, spillways, main dam crest and other retaining walls, dam abutments structures and tunnel lining;
(xi) Review the selected aggregate source, cement type, and material characteristic for concrete structures including results of durability, gradation and reactivity tests, trial mix

designs, strength design parameters, and construction requirements;

(xii) Conduct stability analysis and resulting factors of safety for normal, unusual and extreme loading conditions for the main dam and associated structures, spillways /energy dissipating structures and outlet works;

(xiii) Review the reservoir related factors, such as reservoir rim slope stability, resulting wave action, their effect on dam stability, potential seepage, handling of debris, etc. as well as countermeasures if needed;

(xiv) Design the diversion works, schedule, hydrology and risk factors associated with diversion during construction and with the closure of diversion works at initial reservoir filling; and

(xv) Prepare Asset Register Plan for Dahla dam;

(xvi) Prepare Emergency Preparedness Plan for dams;

(xvii) Capacity development of reservoir operation staff for dam operation safety and emergency response;

(xviii) Prepare relevant material and provide training of the dam safety to the relevant dam operation staff;

(xix) Review and update a plan for procurement of emergency response equipment and vehicles for dam safety;

(xx) Prepare a reservoir management and operation plan during construction;

(xxi) Prepare a reservoir filling plan with consideration of necessity of installation of a gate for filling test at spillway 2;

(xxii) Assist the management of the reservoir operation and maintenance during construction;

(xxiii) Monitor the reservoir filling test after civil works completion. When any defects observed, identify the cause of defect and propose the implementing agency the necessary remedial actions;

(xxiv) Review and update a plan for procurement of emergency response equipment and vehicles for dam safety;

(xxv) Prepare the operation & maintenance plan, dam safety staff training, dam break studies, emergency preparedness plan for initial reservoir filling, covering including the time of closure, maximum allowable filling rate, measurements, emergency release plan, and designation of responsible operating personnel;

70. **Chief Geotechnical Specialist/Borrow Area Management/Rock Mechanics Specialist** (international, 16 pm; national, 24 pm). The specialist will be responsible for all related geotechnical assessments for the dam. The specialist will:

(i) Ensure material availability for dam construction from borrow areas and if required identify and explore additional borrow areas;

(ii) Review site exploration data for the foundation and for material sources including results of drilling or boring, laboratory testing, in-situ tests and regional and local geological characteristics and plan and conduct geotechnical surveys if required;

(iii) Prepare a borrow area management plan during construction and prepare Material Flow Diagrams;

(iv) Conduct the design of ground / foundation treatment like cutoffs or grouting, slope stability, seepage and settlement analysis;

(v) Prepare borrow area material selection, design and construction quality control manuals

(vi) Design treatment works of the foundation of the dam and associated structures, main dam left abutment shear zone treatment, slope stabilization of the abutments of main and saddle dams and reservoir areas if needed;

(vii) Review and validate previous geotechnical investigations, select appropriate strength parameters for borrow areas and existing embankments. Perform slope stability,

seepage, settlement and Dynamic assessment using GeoStudio or equivalent software suite for the existing and raised embankments as per ICOLD's Guidelines under various seismic design conditions such as OBE, MCE and MDE;

(viii) Review upstream conditions in regard to formation of reservoir landslide or ice dams (glacier) if any and handling of floods caused by the collapse of such natural dams;

(ix) Review the risk and hazard evaluations including need for dam breach analysis and inundation study as part of the Emergency Preparedness Plan;

(x) Preparation of O&M manuals for dam safety including spillways, geotechnical instrumentation, etc.; and

(xi) Plan and design the geotechnical instrumentation which include settlement markers, piezometers, and seismographs.

71. **Topographic Survey Specialist** (international, 5 pm).

72. **Hydrologist/Sedimentation Specialist** (international, 4 pm; national, 3 pm). The specialist will cover the tasks related to hydrological analysis and sediment issues at the dam reservoir. The specialist will:

(i) Conduct sedimentation assessment based on previous bathymetric surveys;

(ii) Prepare the hydrology/hydraulics design assumptions for the spillways and flood control structures. The specialist will prepare the hydrological assessment /safety, and sediment assessment/management plan and conduct appropriate design improvements;

(iii) Study and design a seasonal forecasting tool for Kandahar basin;

(iv) Study and design the flood hydrology methodology and computations for determining the project design flood hydrographs, reservoir routing and spillway sizing as well as safe yield and reservoir simulation; and

(v) Prepare sediment assessment and management plan including effective operation of bottom outlets for sediment flushing / sluicing if possible as well as other mitigation measures.

73. **Irrigation Design Specialist** (international, 8 pm).

74. **Cost Estimator** (international, 10 pm).

75. **Electro-mechanical Design Specialist** (international, 12 pm; national, 24 pm). The specialist will cover the planning and design of electro-mechanical structures. The specialist will:

(i) Perform a detailed inspection of various hydraulics structures like intake tower, trash rack and intake tunnel, irrigation outlets and advise any design change requirement;

(ii) Review and advise adequacy of these and all outlet structures design against dam raise;

(iii) If required, update design and estimate cost;

(iv) Review existing documentation on relevant structures;

(v) Review and identify design options for raised structures like Intake tower, trash rack, etc.;

(vi) Plan and design electrification along main dam;

(vii) Plan and design electrification along staff colony; and

(viii) Plan and design Electro-mechanical infrastructure at dam body, water intake tower, trash rack, gate, etc.

76. **Hydro-mechanical Specialist** (international, 14 pm; national, 21 pm). The specialist will cover the planning and design of hydro-mechanical structures. The specialist will:

(i) Review and advise adequacy of these and all outlet structures design against dam raise;
(ii) If required, update design and estimate cost;
(iii) Perform a detailed inspection of various hydraulics structures like intake tower, trash rack and intake tunnel, irrigation outlets and advise any design change requirement;
(iv) Review existing documentation on relevant structures;
(v) Review and identify design options for raised structures like Intake tower, trash rack, etc.; and
(vi) Plan and design Hydro-mechanical infrastructure at dam body, water intake tower, trash rack, spillway gate, etc.

77. **Infrastructure Design Specialist** (international, 10 pm).

78. **Resettlement Specialists** (international, 33 pm; national, 3 positions each 120 pm). The resettlement specialist shall have a minimum of 8 years of experience in ADB projects and at least one project involving reservoir resettlement. The resettlement specialist will be responsible for providing support in developing and implementing the resettlement plans in compliance to ADB's safeguard policies and procedures, and responsible for coordinating the internal and external monitoring and other safeguard related tasks. The specialist must have a good English proficiency to communicate with ADB and to fulfill all English reporting requirements. The specific tasks may include but not be limited to:

(i) Assist the CPMO, the implementing agencies, and design institutes in drafting the resettlement plans for approval of ADB, based on the detailed designs, to follow ADB's format, disclosing the plan to the affected persons prior to ADB's approval, and obtaining ADB's approval of the updated resettlement plan;
(ii) Assist the CPMO and the implementing agencies in implementing the activities on land acquisition and resettlement and livelihood restoration, in accordance with the resettlement plan;
(iii) Assist the CPMO and the implementing agencies in supervising construction contractors to ensure compliance with the resettlement plan, applicable Afghan laws and regulations, and ADB's Safeguard Policy Statement (2009);
(iv) Assist the CPMO and the implementing agencies in monitoring the implementation of the resettlement plan by collecting and updating data, and closely coordinating with the CPMO, the implementing agencies, and external resettlement monitoring agencies;
(v) Review external monitoring and evaluation reports prepared by the external resettlement monitoring agencies, respond to ADB's comments on the external monitoring reports, monitor the compliance to the resettlement plan, and evaluate the degree of impact. Also report to the CPMO and the implementing agencies on key implementation issues, and provide assistance in follow-up stages of implementation activities;
(vi) Assist the CPMO and the implementing agencies in designing and implementing the consultation and participation plan prepared during project preparation; and
(vii) Undertake site visits and other work activities as needed.

79. **Social Safeguard Specialist** (international, 21 pm). The specialist will have tertiary qualifications in social sciences or environmental studies and preferably have 5 years of experience in implementing and monitoring safeguards. The specialist will help MEW CPMO prepare and implement the safeguards plan in accordance with the ADB's Safeguard Policy

Statement (2009). The specialist will:

(i) Help implement and monitor a social action plan;
(ii) Improve awareness of a social action plan requirements (including understanding of the development shocks) to the local communities and any external stakeholders; and
(iii) Set up compliance monitoring reporting formats and support the implementing agency staff make periodic reports in an appropriate manner.

80. **Gender Specialist** (international, 23 pm). The specialist will have tertiary qualifications in social sciences or gender studies and preferably have 5 years of experience in implementing and monitoring gender action plans (GAP). The specialist will help MEW CPMO prepare and implement the GAP (Linked Document No. 9). The specialist will:

(i) Guide the CPMO in implementation and monitoring the GAP;
(ii) Improve awareness of the CPMO, EPCS consultants, and contractors of the GAP requirements (including understanding of the development shocks to women, participation requirements and mitigation actions); and
(iii) Set up compliance monitoring reporting formats and support the implementing agency staff make periodic reports in an appropriate manner.

81. **Gender and Social Safeguards Specialist** (national 30 pm). The specialist will have tertiary qualifications in social sciences, gender studies or environmental studies and preferably have 5 years of experience in implementing and monitoring safeguards and gender action plans (GAP). The specialist will:

(i) Help MEW CPMO prepare and implement the safeguards plan in accordance with the ADB's Safeguard Policy Statement (2009);
(ii) Guide the CPMO in implementation and monitoring the GAP;
(iii) Improve awareness of a social action plan requirements (including understanding of the development shocks) to the local communities and any external stakeholders; and
(iv) Set up compliance monitoring reporting formats and support the implementing agency staff make periodic reports in an appropriate manner.

82. **Environment Specialist** (international, 23 pm; national, 66 pm). The International Environmental Specialist shall have a master's degree or higher in Environmental Sciences or Environmental Engineering. In addition, the Environmental Specialist shall have a minimum of 15 years of experience of working on environmental matters out of which at least 7 years associated with dams and reservoirs as well as roadways in accordance with Environmental Guidelines from ADB/World Bank. The Environmental Specialist will help MEW/MRRD CPMO implement the environmental safeguard plans (the EIA and EMP) in accordance with national environmental legislation as well as with ADB's Safeguard Policy Statement (2009). The Specialist will:

(i) Review all relevant environmental documents, particularly EIA study for output 1;
(ii) Prepare Arghandab River Environmental Study;[24]

[24] Preparation of this study has been recommended in the EIA study for output 1 in order to analyze the impacts arising as a result of this construction activity (Dam raising) in more detail.

(iii) Update the existing EIA study due to any changes in project's scope of work during the detailed design/construction stage in accordance with ADB Safeguard Policy Statement (2009, as amended);
(iv) Review the tasks to be carried out for updating the EIA study of output 1. This would also include review of summer terrestrial and aquatic surveys, environmental flows calculation, etc.;
(v) Help develop and finalize the biodiversity plan, watershed and catchment management plan, and other relevant EMPs, and make these functional;
(vi) Prepare a detailed environmental monitoring and sampling plan to be implemented during construction and operation phase;
(vii) Implement an environmental study of downstream biodiversity (using bird life as the indicator group) and determine environmental flow requirements to be managed by ASBA from Dahla Dam;
(viii) Assist the implementing agency in preparation of Semi-Annual Environmental Monitoring Reports (SAEMRs) for submission to ADB and NEPA. Also assist the implementing agency in finalization of quarterly progress reports, annual progress reports and any specific report requested by the implementing agency;
(ix) Coordinate with NEPA Officials in conducting site visits to verify the findings of the SAEMRs;
(x) Coordinate with other consultants (e.g. Third-Party Environmental Monitoring Consultant) in implementing and in monitoring the safeguard requirements including the wildlife, aquatic, and forestry conservation programs and dam safety programs, and provide support to MEW CPMO;
(xi) Ensure that the EMP is made part of the bidding documents for construction works. Moreover he / she shall also ensure that the environmental management costs are reflected in the BoQs;
(xii) Review the Site-Specific Environmental Management Plans (SSEMPs) prepared by the construction contractor and ensure their effective implementation;
(xiii) Ensure that the environmental management and monitoring plans reflecting full details regarding the estimated mitigation costs are in place through the SSEMP;
(xiv) Review the environmental management capability of MEW as well as NEPA and recommend institutional strengthening measures;
(xv) Determine the training needs of construction contractor staff as well as develop training materials for effective implementation of the SSEMP during the construction stage;
(xvi) Review, monitor and evaluate the effectiveness with which the SSEMP is implemented, and recommend necessary corrective actions to be taken. Advise on corrective measures where necessary to the implementing agency; and
(xvii) Design a downstream ecological flow analysis along with actual monitoring.

83. **Irrigation Engineer (AIS)** (international, 24 pm; national, 45 pm over 4 years). The positions require a degree in civil engineering with a preferred 10 years of experience in irrigation infrastructure, design, operation, and institutional management. They will be based within the CPMO Kabul but will be required to travel frequently to Kandahar, sometimes for extended periods subject to security considerations. The specialists will be fluent in the English language and have good written skills in English and the national language Pashtu and Dari (national specialist only). Both will have good interpersonal and communication skills and will be familiar working in large multinational teams. Duties of the specialists will include the following:

(i) Lead the detailed irrigation infrastructure design work in collaboration with AIS engineers;
(ii) Design solar pumped lift systems linked to farmer-owned small reservoirs that can

provide gravity irrigation;
(iii) Assist the CPMO with contract tendering; and
(iv) Manage the construction supervision.

Non-Key Positions

84. **Hydraulics Specialist** (international, 8 pm; national, 24 pm). The specialist will cover the hydraulic analysis of dam and other structures as per EPCS TOR. The responsibilities will include but not limited to:

(i) Perform a detailed inspection of various hydraulics structures like intake tower, trash rack and intake tunnel and advise any design change requirement;
(ii) Review and advise adequacy of these and all outlet structures design against dam raise;
(iii) If required, update design and estimate cost;
(iv) Conduct a detailed model study of the spillways to calibrate the design;
(v) Conduct hydraulic modelling and design of gated and/or ungated spillways and energy dissipater, low level outlet, water intakes /outlets, irrigation supply valves, diversion tunnel, fuse plugs, etc.;
(vi) Review the inlet and outlet works, including its hydraulic designs, capacity for emergency reservoir drawdown, sediment handling capability, selective thermal releases, regulation range and other factors;
(vii) Prepare the detailed design of spillways in consultation with other Specialists like geotechnical, hydrology, electro-mechanical and structures, etc.; and
(viii) Provide support during construction.

85. **Project Planning and Scheduling Specialist (Primavera P6)** (international, 7 pm; national, 12 pm). The specialist will cover the project planning as per the Consultant TOR. The specialist will:

(i) Assess the project design, procurement and construction schedule as per project requirement;
(ii) Study the previous proposed schedule and update it if necessary;
(iii) Prepare a detailed project resource loaded schedule in Primavera P6 in consultation with MEW/ADB;
(iv) The schedule will highlight project key deliverables for detailed design, POE meetings, prequalification of contractors, procurement, construction schedule for civil works, procurement of long lead items, critical activities and deliverable, identify and estimate resources and agree with MEW for staff deployment on as need basis, and update that in close consultation with MEW/ASBA/ADB and contractors when required;
(v) The Consultant will highlight all bottlenecks to MEW/ADB in timely manner to ensure the project resources are used in a timely and effective manner; and
(vi) The Consultant will ensure availability of a planning and scheduling Specialist with over 10 years in Primavera P6 in design office and report the project progress weekly, fortnightly and monthly to MEW/ADB.

86. **Procurement/Financial Management Specialist** (international, 8 pm; national, 18 pm). The specialist will provide support to MEW CPMO. The specialist will report to the MEW CPMO Project Manager. The specialist will:

(i) Ensure that ADB procurement policy, described in the Grant Agreement, are followed in all stages of the procurement of goods, works and services for the project;

(ii) Assist the CPMOs in preparing bidding documents for the procurement of goods, works and services in accordance with ADB guidelines taking into account the Afghanistan Procurement Law. Coordinating and supervising all project procurement activities, in close coordination with corresponding relevant procurement department (MEW) and ADB;
(iii) Review tender documents with particular reference to the commercial aspects to ensure ADB comments are incorporated in the final version;
(iv) Assist in evaluation of bids and proposals if requested, and in the preparation of any relevant evaluation reports;
(v) Assist the project director in regular update of the procurement plan in coordination with the work plan and time schedule of the Project and the financing plan;
(vi) Support MEW CPMO during contract negotiations and ensure meetings are properly recorded and ADB procedures and applicable national regulations are followed and that these are attached as annexes to the contract form;
(vii) Develop systems to train and transfer finance and procurement skills on various aspects of ADB's procedures for CPMO and the Ministries' procurement department and finance department;
(viii) Verify that correct documentation for each disbursement related to the execution of the contracts is maintained and that the corresponding contractual obligations have been fulfilled;
(ix) Help MEW CPMO establish and maintain a financial management system, including books and accounts for the projects, adequate to reflect the operations, resources and expenditures related to the projects in a detailed manner to facilitate accurate, detailed and timely project reporting. Ensure proper asset management, compliance of expenditures with ADB fiduciary requirements, and that the accounting meets the applicable government and donor standards);
(x) Assist in the planning and budgeting for the project program, taking the lead role in the financial plan and budgets and ensuring that the assumptions, parameters, guidelines and policies in planning are complied with; and
(xi) Ensure timely preparation and submission of financial reports, including provision of supporting documentation necessary to facilitate internal and external audits (the reporting framework should enable maintenance of accurate and updated accounting records and documents, including vouchers, bank statements, agreements, receipts, etc.).

87. **Seismology Specialist** (international, 3 pm; national, 3 pm). The specialist will cover the seismic analysis around the dam body and reservoir. The specialist will:

(i) Assess the dam site geology, seismology, potential fault zones in dam reservoir, likelihood of dam break due to a seismic event, previous seismic hazard assessment works by the United States Geological Survey;
(ii) Support in preparation of geological mapping of the project area including reservoir;
(iii) Study the previous proposed seismic design criteria and update it if necessary.
(iv) Prepare the seismic hazard assessment and the seismic safety design criteria and analyses and assess any additional needs for seismic hazard assessment; and
(v) Assessment of any potential faults crossing the dam site and reservoir area as well as mitigation measures if required.

88. **Architect** (international, 2 pm; national, 5 pm). The specialist will have a degree in architecture, and 5 years of experience in architectural design and construction projects for towns, parks and amenities. They will be responsible for:

(i) Identify sites for staff colony and public recreation park in association with MEW CPMO and the Lead Engineer;
(ii) Prepare concept designs and discuss and adapt these with stakeholder inputs;
(iii) Based on agreed concept design, prepare architectural and landscape design drawings;
(iv) Ensure all designs meet local and national planning and environmental regulations; and
(v) Prepare works packages, cost estimates, and tender package including specifications.

89. **GIS/Survey Specialist** (international, 3 pm; national, 3 pm). The specialist will have a tertiary qualification in surveying and preferably 5 years of experience in surveying for civil works projects. S/he will be responsible for:

(i) Validate the accuracy of the topographic survey and update the references if required;
(ii) Support the design engineers and other team members by using computer-based methods for collecting, managing, analyzing, modeling, and presenting geographic or spatial data;
(iii) Provide survey information to support Dam Break Studies of the project and other areas where overlay maps and datasets will be required including re-settlements; and
(iv) Verify and locate their spatial relationships to each other.

90. **Civil and Mechanical Drafting Engineers** (civil and mechanical combined international, 8 pm; civil national 12 pm, mechanical national 12 pm). The drafting engineers must have a qualification in drafting or engineering, and be experienced in using industry software, for example AutoCAD/Civil 3D/ MicroStation. The engineers will be responsible for:

(i) Support the design engineers and other team members in designing and drafting works pertaining to project;
(ii) Produce tender, detail design and 'As Built' drawings of all components;
(iii) Drawings for dam design, topo survey and GIS works; and
(iv) Produce a 3D model of the project and estimate detailed quantities for the project.

91. **Electrical Drafting Engineer** (international, 3 pm; national, 6 pm). The drafting engineers must have a qualification in drafting or engineering, and be experienced in using industry software, for example AutoCAD/Civil 3D/ MicroStation. The engineers will be responsible for:

(i) Support the electrical and other team members in drafting and designing electrical system along the dam, structures and staff colony and others as required; and
(ii) Produce tender, detail design and 'As Built' drawings of all components related to electrical system.

92. **Site Engineers** (national, various person months). The Site Engineers shall be responsible to coordinate with the Team Leader, international and national specialists including contractor to relevant activities in their respective construction areas. Site engineers shall be bachelors/graduate engineers with at least 5 years' design/construction supervision experience or three years' associate diploma holders with minimum 10 years' experience preferably on a large-scale dams/hydropower/civil infrastructure projects. They must have good knowledge in reading and interpretation of drawings and sound to high computer literacy in Microsoft office suite packages and their relevant areas of expertise. Like project scheduler must have expertise in Primavera P6 and MS Project. Quantity Surveyor must have good understanding of Microsoft Excel and AutoCAD/Civil 3D, etc. Geotechnical engineers must understand relevant software

like GeoStudio, PLAXIS, etc. All site engineers must have demonstrated ability to work in a closed knit team and highly-developed and effective interpersonal and communication skills.

93. The engineers will be responsible to perform project assigned duties as per project requirements.

94. **Site Inspectors** (national, various person months). The Site Inspectors shall be responsible to coordinate with the Team Leader, international and national specialists including contractor to relevant construction activities in their respective areas under the supervision of site engineers. Site inspectors should be at least graduate engineer or three years' associate diploma holders with at least 5 years' construction supervision experience, preferably on a large-scale dams/hydropower/civil infrastructure projects. They must have good knowledge in reading and interpretation of drawings, and high computer literacy in Microsoft office suite packages and their relevant areas of expertise. All site inspectors must have demonstrated ability to work in a closed knit team and highly-developed and effective interpersonal and communication skills. The inspectors will be responsible to perform project assigned duties as per project requirements.

95. **Irrigation Engineer / Draftsman –** (two persons, national, 90 pm).

96. **Site Security Advisor** (international, 51 pm; national, 40 pm). The specialist will plan, advise and ensure the safety of the project offices and staff working on the project. The specialist will coordinate with relevant govt departments and accordingly plan project activities in a safe and sustainable manner.

97. **Fragile and Conflict-Affected Situations Specialist** (international, 5pm; national 10pm). The specialists will be responsible for:

(i) Implementing the Fragile and Conflict-Affected States (FCAS) implementation plan;
(ii) Help the CPMO and consultant team to identify and develop potential positive impacts of the project during implementation, while identifying and mitigating potential negative impacts; and
(iii) Particular focus should be given to land acquisition and resettlement, employment opportunities in construction and services required by the project, disruption caused by project construction, and ensuring equitable participation in capacity building and empowerment through stakeholder representation.

Annex 3

Agriculture Implementation Support Consultant (MAIL-CS-01)

1. **Objective**. International consulting services will be required to assist the Ministry of Agriculture, Irrigation, and Livestock (MAIL), implementing agency in project management and supervision. The AISC will be selected and engaged in accordance with ADB's Procurement Regulations (2017, as amended from time to time). The implementing agency's Central Program Management Office (CPMO), as members of the project bid evaluation committee, will recruit the AISC following the QCBS procedure with a quality-to-cost ratio of 90:10.

2. **Scope of Work**. An international consulting firm (the consultant) will be engaged by the CPMO. The AISC consultant will assist CPMO in overall project implementation and supervision. Key aspects of the consultant's work include two parts: (i) irrigated agriculture implementation support; and (ii) feasibility study for a pressurized drip irrigation supply service.

3. **Consultant General Qualifications**. The preferred requirements for the consultants are (i) an international consulting firm with extensive and proven experience in design and supervision of irrigation systems modernization, climate-smart irrigated agricultural technologies and practices, agricultural value chain development, business management, project management, and supervising investments co-financed by the private sector; (ii) familiarity with requirements of agricultural development projects in the Islamic Republic of Afghanistan; and (iii) implementation and supervision experience with similar projects financed by ADB and/or the World Bank. The international consulting firm may associate with other international and national consulting firms as appropriate. The consulting firm must have recent relevant experience and/or engagement in the country and have the necessary support structures to deal with security and other logistics required for operating in this environment.

4. **Expertise Schedule**. The contract for consultant's service will be time-based. The AISC comprises 279 pm (including 49 pm of international specialists and 230 pm of national specialists). The AISC will be fielded shortly after project effectiveness. Additionally, the AISC will hire adequate support staff to support its consultants in undertaking their duties in an effective and efficient manner. A summary of input schedule is given in the table below, which can be adjusted during project implementation to ensure optimal utilization of resources and efficient outputs and/or deliverables.

Table 1. Summary AISC Input Schedule

	Key Positions	Person-months	Total
	INTERNATIONAL		**49**
A	**MAIL CPMO Agriculture Implementation Support Consultants**		
1	Irrigated agriculture specialist /Irrigated Engineer /Team Leader	30	
2	Impact monitoring and evaluation specialist	3	
3	Environment and safeguards specialist	4	
B	**Feasibility Study for Drip Irrigation Water Supply**		
4	Drip irrigation Engineer	6	
5	Drip irrigation institutional specialist	3	
6	Drip irrigation economist	3	

	Key Positions	Person-months	Total
	NATIONAL		**230**
A	**MAIL CPMO Agriculture Implementation Support Consultants**		
7	Irrigated agriculture specialist /Irrigated Engineer / Deputy Team Leader	60	
8	Monitoring and evaluation specialist	60	
9	Environment and safeguards specialist	60	
10	Agricultural economist	36	
B	**Feasibility Study for Drip Irrigation Water Supply**		
11	Drip irrigation Engineer	7	
12	Drip irrigation institutional specialist	4	
13	Drip irrigation economist	3	
	TOTAL		**279**

Source: Asian Development Bank estimates.

5. The outline TORs for the consultants are:

A. MAIL CPMO Support Consultants

6. **Agriculture Implementation Support**

(i) Assist the CPMO in managing and implementing the project and ensuring compliance with the project implementation plan, the grant agreement, and the project agreement(s);
(ii) Prepare bid documents for goods, works, and services in accordance with the procurement plan for the project, and assist the CPMO in bid evaluation and contract award;
(iii) Prepare requests for proposal for capacity development and other consulting services, and assist CPMO in proposal evaluation;
(iv) Supervise the implementation of, and monitor the compliances with social and environmental safeguards, and social and/or gender development aspects;
(v) Help set up systems and procedures including relevant management and monitoring templates for the CPMO to follow; and
(vi) Build capacity of staff in the CPMO to undertake their tasks.
(vii) Lead in the design and implementation planning for agricultural extension and on-farm demonstrations, including procurement of equipment, on-farm demonstration works, and selection and supervision of local support services;
(viii) Lead in the mapping, analysis, preparation of prioritized value chain development plans in collaboration with stakeholders;
(ix) Provide technical oversight and guidance on technical aspects related to the post-farm enterprises and on-farm subprojects, and capacity development;
(x) Design and supervise implementation of a comprehensive Impact Monitoring and Evaluation study.

7. **Irrigated agriculture specialist /Irrigated Engineer /Team Leader** (international, 30 pm over 5 years), Deputy Team Leader, (national, 60 pm over 5 years). The specialists will have a post-graduate degree in agriculture, horticulture or other relevant subject. They will preferably have 15 years of experience in irrigated agriculture, preferably within a south-central

Asian context, and with transition from traditional flood irrigation to micro-irrigation, laser levelling and bed forming technologies, agricultural extension, and farm business management. Based in Kandahar, the specialists will be responsible for:

a. Team Leadership

(i) Support the CPMO in the preparation of monthly, quarterly, and annual reporting obligations under the grant;
(ii) Provide a point of contact between the AISC team, government CPMO and Kandahar PIU project management structures to coordinate activities of individual specialists;
(iii) Assist in the preparation of annual work plans and associated budgets for consideration by the government and ADB;
(iv) Assist the CPMO and PIU in the identification, design, preparation, and implementation of project activities;
(v) Manage the inputs of specialist consultants engaged through the AISC contract and guide their activities to ensure inputs are timely and achieve their intended purpose; and
(vi) Other tasks agreed with the project management.

b. Irrigated Agriculture

(i) Review and strengthen agricultural extension and programming capacity of DAIL;
(ii) Assess the on-farm agricultural technologies and practices, and identify improved technology and practices to be introduced;
(iii) Lead the CPMO and Department of Agriculture, Irrigation and Livestock (DAIL) PIU in the selection of demonstration sites and partner farmers based on the prioritized crops, and the site visibility and access by other farmers;
(iv) Assist the CPMO to prepare Agreements governing the purpose, roles and responsibilities of the CPMO/PIU and the demonstration partner farmers, and partner agricultural mechanization contractors;
(v) Lead the CPMO and DAIL PIU in the design of demonstrations in participation with the partner farmers, including technologies for land preparation (e.g. laser levelling, bed forming), high-efficiency irrigation application, soil moisture monitoring and irrigation scheduling systems, seed and variety selections, nurseries, integrated pest management and integrated crop nutrition, good agricultural practices, protected cropping, trellising;
(vi) Prepare a schedule of development for each demonstration, and supervise its implementation;
(vii) Prepare and supervise the implementation of an extension program to promote climate-smart and water efficient agricultural technologies and practices using the demonstration farms;
(viii) Lead in the selection of a small number of established agricultural contractors (i.e. who hire out services to farmers using their own tractors), and organize their training and equipping with laser levelling, bed forming implements and other climate-smart improved agricultural mechanization technologies;
(ix) Prepare and supervise the implementation of a program to demonstrate the improved land preparation and levelling technologies using the partner agricultural contractors;
(x) Prepare demonstration design plans and procurement lists, and assist the CPMO in procurement of materials, works and equipment for demonstrations;
(xi) Advise the CPMO and PIU in the selection of on-farm technologies, practices

and systems eligible for investment support under the sub-project matching grant scheme;
(xii) Foster the development of agro-input suppliers and linkages of farm advisory services to farmers;
(xiii) Develop opportunities for farmers to access internet-based advisory services;
(xiv) Assist the CPMO and the Agricultural Value Chain Development specialist in identifying aspects of on-farm issues and opportunities impacting on post-farm value chains, such as on-farm quality and safety systems, seed and varieties for specific markets, and integrate measures to address these issues in demonstrations and extension activities;
(xv) Guide MAIL in the preparation of training materials and extension media; and
(xvi) Submit work plans, periodic progress reports, training reports and impact reports to the Team Leader and CPMO as directed.

41. **Impact Monitoring and Evaluation Specialist** (international, 3 pm over 5 years). The specialist will have tertiary qualifications in agriculture, economics, natural resources, evaluation or other relevant subject, and have 10 years of experience in comprehensive project impact evaluation following international guidelines and also academic analytical studies of agricultural and livelihoods. S/he will:

(i) Review project aims, interventions and background documents;
(ii) Identify key impact evaluation indicators for relevance, effectiveness, efficiency and sustainability;
(iii) Ensure the data collected will include, but not be limited to the DMF performance indicators: (i) timeliness of irrigation water delivery to farmers; (ii) improved skills and adoption of climate-smart technologies in irrigated production by farmers;[1]
(iv) improved farm business management records, analysis and practices;
(v) increased on-farm water productivity ("more crop per drop"); (v) gender-disaggregated participation in value chain development forums, and in the subsequent development plans developed and implemented; (vi) increase in farmers and farmer groups with on-farm storage or value adding facilities; (vii) increase in farmers' incomes; and (viii) improvement in farmers' risk assessment (climate, business, marketing and financial risk);
(vi) Prepare a plan for baseline and 5 annual survey of control and beneficiary groups;
(vii) Ensure the annual survey is of the same respondents at the same time of year, suggested at 2 months after harvest;
(viii) Prepare survey questionnaires, reporting formats and data analysis procedures;
(ix) Guide the national consultant Monitoring and Evaluation specialist in the selection and training of local enumerators to survey farmers and enter the data in spreadsheet format;
(x) Supervise the national consultant Monitoring and Evaluation specialist to establish an impact evaluation database and data analysis;
(xi) Supervise the national consultant Monitoring and Evaluation specialist to prepare baseline, annual and final evaluation reports.

42. **Monitoring and Evaluation Specialist** (national, 60 pm over 5 years). The specialist

[1] Independent Evaluation Department, 2016. *Guidelines for the Evaluation of Public Sector Operations*. ADB Manila; and OECD. 2008. *DAC Criteria for Evaluating Development Assistance.* OECD, Paris.

will have tertiary qualifications in a relevant field together with 5 years of experience in monitoring and evaluation, management information systems, and preparation of project management reports. S/he will be responsible for:

(i) Preparation of PPMS for the project components implemented by MAIL, by adapting PPMS established under previous ADB projects in the MAIL CPMO;
(ii) Prepare reporting formats and procedures for project activities;
(iii) Maintain a PPMS database;
(iv) Prepare monthly, quarterly, six-monthly and annual reports for the CPMO Director on project progress towards the performance indicators in the project DMF;
(v) Under supervision of the international Impact Monitoring and Evaluation Specialist, finalize survey questionnaires, reporting formats and data analysis procedures;
(xii) Recruit and train enumerators to survey farmers and enter the data in spreadsheet format;
(vi) Maintain the impact evaluation database;
(vii) Carry out data analysis;
(viii) Under supervision of the international Impact Monitoring and Evaluation Specialist, prepare baseline, annual and final evaluation reports.

43. **Environment and Safeguards Specialist** (international, 4 pm over 5 years). The International Environmental Specialist shall have a Master's degree or higher in Environmental Sciences or Environmental Engineering. In addition, the Environmental Specialist shall have a minimum of 10 years of experience of working on environmental matters out of which at least 7 years associated with Irrigation and Agriculture in accordance with the Environmental Guideline of ADB/World Bank's. The Environmental Specialist will help MAIL/MRRD CPMO implement the environmental safeguard plans (IEE and EMP) in accordance with the ADB's Safeguard Policy Statement (2009). The Specialist will:

(i) Review all relevant environmental documents for outputs 2 and 3;
(ii) Update the existing IEE study due to any changes in project's scope of work during implementation in accordance with ADB Safeguard Policy Statement (SPS) 2009;
(iii) Prepare a detailed environmental monitoring and sampling plan to be implemented during establishment of demonstrations and on-farm irrigated agriculture sub-project (matching grant) investments;
(iv) Assist the implementing agency in preparation of Semi-annual environmental monitoring reports (SAEMRs) for submission to ADB. Also assist the implementing agency in finalization of quarterly progress reports, annual progress reports and any specific report asked by the implementing agency;
(v) Ensure that the EMP is made part of the bidding documents for any construction works. Moreover he/she should also ensure that the environmental management costs are reflected in the bill of quantities (BOQs);
(vi) Prepare Site-specific environmental management plans (SSEMPs);[2]
(vii) Ensure that the environmental management and monitoring plans reflecting full details regarding the estimated mitigation costs are in place through the SSEMP;

[2] Preparation of SSEMP's has been given to Environmental Consultant as the Community Development Contractors will not have the capacity to prepare these documents.

(viii) Review the environmental management capability of the Implementation agencies and recommend institutional strengthening measures;
(ix) Determine the training needs of construction contractor staff as well as develop training materials for effective implementation of the SSEMP during the construction stage; and
(x) Review, monitor and evaluate the effectiveness with which the SSEMP is implemented, and recommend necessary corrective actions to be taken. Advise on corrective measures where necessary to the implementing agency.

44. **Environment and Safeguards Specialist** (national, 60 pm). The National Environmental Specialist shall have a Bachelor's degree or higher in Environmental Sciences or Environmental Engineering. In addition, the Environmental Specialist shall have a minimum of 10 years of experience of working on environmental matters out of which at least 5 years associated with Irrigation and Agriculture in accordance with ADBs' / World Bank's Environmental Guidelines. The Environmental Specialist will:

(i) Assist the International Environmental Specialist in the accomplishment of various environmental tasks (as stipulated above);
(ii) Review all relevant environmental documents;
(iii) Assist in updating the IEE study due to any design changes;
(iv) Ensure that EMP's are made part of construction bidding documents. Moreover he/she shall also ensure that the environmental management costs are reflected in the BOQs;
(v) Preparation of SSEMPs;[3]
(vi) Determine the training needs of construction contractor staff as well as develop training materials for effective implementation of the SSEMP during the construction stage;
(vii) Ensure effective implementation of SSEMP through regular construction site visits, recording environmental non-compliances and recommending corrective action plans;
(viii) Assist the International Environment Specialist in preparation of SAEMRs for submission to ADB and National Environmental Protection Agency (NEPA). Also assist the implementing agency in finalization of quarterly progress reports, annual progress reports and any specific report requested by the implementing agency;
(ix) Ensure that the environmental management and monitoring plans reflecting full details regarding the estimated mitigation costs are in place through the SSEMP.

45. **Agricultural Economist** (national, 36 pm). This expertise is needed to support the CPMO and/or PIU to prepare subproject investment reports (SIRs) for each subproject investment proposal (SIP). Analytical capacities need to be developed amongst project implementation staff to ensure that financially and economically viable subproject investments are financed. As an integral part of the SIR, the financial and economic analysis is required to confirm eligibility of proposed subprojects and quantify the benefit in financial terms to the subproject owner as well as to the economy as a whole. As each subproject is potentially very different in nature, interpretive economic skills are needed to capture the benefits from these investments and relate them to the costs over time. The subproject economist is required to provide such technical support to the project and train implementation staff in procedures

[3] Ibid.

required in the preparation of these analyses for incorporation in the SIRs. The subproject economist will have at least a bachelor's level qualification in agricultural economics although higher level qualifications are desirable. S/he should have at least 5 years of experience in the financial and economic evaluation of agricultural investments. Preference will be accorded to those candidates who are familiar with the horticulture industry who can substantiate experience in assessing investments in production of horticultural crops (both annual and perennial) as well as in the associated grading, packing, and processing of horticultural products. S/he will be responsible for the following duties:

(i) Review available value chain studies undertaken in Afghanistan, prepare commodity market investigations and analyses for potential horticultural value chains to assist in identifying the most promising areas for investment;

(ii) Review unit financial and economic models developed under similar investment projects within the horticulture sector in Afghanistan such as the Horticulture Value Chain Development Sector Project, and the National Horticulture and Livestock Project;

(iii) Review the list of eligible on-farm investments and based on the review of available information sources prepare typical data collection requirements to be used in the financial and economic analyses for each type of subproject;

(iv) Undertake a technical review of all subproject feasibility studies (SIRs) prepared by the CPMO and/or PIUs. This review shall;

- Include field inspections of the proposed sites;
- Pay special attention to minimizing any disturbance to the natural environment and mitigating and corrective measures as appropriate;
- Review the practicality of storage implications for the investment to confirm that capacity of the storage area is consistent with planned sales patterns/product movement;
- Ensure that financial assessments of investment are completed in both financial and economic terms and that (through cash flow analysis), the subproject investor has access to adequate resources to finance the purchase of incremental raw material through the facility;
- Ensure that designs take account of security arrangements and access to external public infrastructure and services; and
- Provide written comments and recommendations to the CPMO on each subproject reviewed detailing any changes or modifications to the technical design.

(v) Assist the monitoring and evaluation specialist in designing a baseline survey to capture the base case scenarios of agribusiness enterprise (ABE) subprojects (including the affiliated farmers) and identify verifiable indicators that can be used to measure the success of the investment;

(vi) Train PMU and PIU regional staff in the methods used for data collection and in interviewing subproject proponents to collect the necessary information;

(vii) Train the PMU and PIU staff in the procedures needed to carry out an economic and financial analysis in accordance with ADB requirements detailed above;

(viii) Support the evaluation committee in their review of SIRs for eligible subproject from the economic and financial aspects of the report;

(ix) Provide support to PMU staff as they prepare the respective SIPs that are presented for consideration as outlined herein;

(x) Assist in the preparation and review of prepared SIPs for consideration by MAIL Subproject Evaluation Committee; and

(xi) Other duties reasonable assigned by the Consultant team leader.

B. Feasibility Study for Drip Irrigation Water Supply

45. **Drip Irrigation Engineer** (international, 6 pm; national, 7 pm over 5 years). These specialists are responsible for leading in the conduct of a feasibility study for a pressurized drip irrigation supply system to peri-urban high value horticulture farmers. The concept is for the untreated water from Dahla Dam delivered via gravity through a low-pressure pipeline that can be laid alongside the planned urban water supply line. This would provide a secure and highly efficient irrigation supply that will reduce disaster risk exposure and improve food security. The delivery network would reach land areas with suitable agricultural soils and conditions for high value intensive horticulture production, and the institutional arrangements will include supply charges applied to recipients to ensure sustainable revenue for operation and maintenance, and equitable valuation of water amongst competing users. The specialists will preferably have 10 years of experience in the design, construction and operation of pressurized irrigation for drip irrigation. They will be based within the CPMO but will be required to travel to the project area, security arrangements permitting. The specialists will have tertiary qualifications in engineering and will be fluent in English and demonstrate good written skills in English. The specialists will undertake the following:

(i) Review the project administration manual and feasibility studies on (i) irrigated agriculture, and (ii) water supply, that were developed during the grant project preparation, and prepare an Inception Report Concept Note outlining the proposed approach, methodology and work plan to assess the feasibility of the drip irrigation supply system;
(ii) Discuss the concept note with MAIL and other government agencies involved in water resources, and prepare an Inception Report comprising the finalized concept, approach, work plan, and outline of the Feasibility Study Report;
(iii) Supervise the Feasibility Study consultants and the quality of their outputs;
(iv) In collaboration with DAIL PIU, conduct field work to determine the engineering designs and prepare preliminary engineering drawings;
(v) Design the intake, filtration plant, main pipeline, controls, gauges, distribution and network connections to prioritized agricultural areas for drip irrigation use;
(vi) Prepare a Draft Final Report of the Feasibility Study, and in collaboration with the CPMO, present the findings and recommendations to MAIL and other relevant stakeholders in a workshop;
(vii) Review and incorporate comments from stakeholders and submit a Feasibility Study Final Report to the MAIL CPMO.

46. **Drip Irrigation Institutional specialists** (international, 3 pm; national, 4 pm). The specialists must have degree in engineering, business administration, or other relevant qualification, preferably with 5 years of experience in the institutional arrangements and management systems for piped pressurized irrigation supply service. Experience in Central Asia context is preferable. They will:

(i) With guidance and coordination by the MAIL CPMO, review existing irrigation and water supply institutional arrangements and capacity in Afghanistan and specifically in the Arghandab sub-basin;
(ii) In collaboration with DAIL PIU and the drip irrigation engineer specialists, assess the situation in the field, in terms of the proposed network localities, interest of farmers, capacity of entities that could potentially take on the management of the supply system and its services, and capacity requirements of both farmers and

the potential managing entity;

(iii) Prepare an Institutional Arrangements Report containing a capacity assessment of potential managing entities, capacity requirements to manage the system, and propose a management structure, operational procedures, eligibility criteria for farmer users of the water supply, connection and delivery conditions and responsibilities, monitoring systems, operational costs, and financing arrangements including charges for water delivery;

(iv) Present a summary of the draft Institutional Arrangements Report to MAIL and stakeholders at the workshop;

(v) Revise the report incorporating responses to comments by stakeholders;

(vi) Assist the Economists to prepare cost estimates for the institutional capacity requirements, the institutional operational costs, revenues, and financial analysis;

(vii) Contribute relevant sections of the Draft and Final Reports under instruction of the team leader.

47. **Drip Irrigation Economist** (international, 3 pm; national, 3 pm). The economists will have a tertiary qualification in economics although higher-level qualifications will be an advantage. They should preferably have 10 years of experience in the financial and economic evaluation of investment projects and be familiar with the analytical requirements outlined in ADB's Procedures for Conducting Economic Analyses of Projects.[4] Preference will be accorded to those candidates who are familiar with irrigation and water supply feasibility investments. They will be responsible for the following duties:

(i) Review the proposed drip irrigation system design and institutional requirements, and finalize cost estimates in collaboration with the engineers, institutional specialists and safeguard specialists;

(ii) Prepare cost and financing tables for the proposed investment;

(iii) Conduct an economic and financial analysis of the proposed drip irrigation system, including sensitivity analysis, using revenue estimations based on water delivery charges;

(iv) Prepare an Economic and Financial Analysis Report, also tables and text presenting cost and financing tables, economic and financial analysis for the Draft and Final Feasibility Study Report;

(v) Present a summary of the draft Economic and Financial Analysis Report to MAIL and stakeholders at the workshop;

(vi) Revise the report incorporating responses to comments by stakeholders.

Reporting Requirements:

48. The Firm will submit to the AIWRDP Project Director and Program Director MAIL CPMO for ADB Projects the following reports in English and local languages if required:

(a) An inception report with a first-year work plan (5 copies) should be submitted to the Client within two (2) months after the commencement of services

(b) Monthly progress reports briefly detailing staff inputs, expenditure, physical and non-physical progress and payments for civil works.

[4] ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila.

(**c) Quarterly progress reports** (5 copies) detailing cumulative staff inputs, expenditure, physical progress and non-physical progress and payments for civil works within 15 days after the end of each quarter from the date of commencement of services.

(d) Annual progress reports (5 copies) detailing staff inputs, expenditure, physical progress and non-physical progress and payments for civil works with an annual work plan and budget within the one month after the end of work plan year.

(e) A final project Completion report (Feasibility Study Report for drip irrigation systems). The Firm prepare a Final Report and submit within one month of completion of the assignment.

Client's Inputs and Counterpart Personnel:

49. All the information, facilities, services, property will be made available to the consultant, and the professional and support counterpart personnel.

Client's Inputs for Proposal Preparation:

50. Client will provide the following inputs: Project data and reports

Annex 4

Water Resource Management Policy and Regulatory Reform (WREG), and the Arghandab River Environment Study (ARES) Consultants, (MEW-CS-02)

1. **Objective.** Policy, strategy and capacity for managing water resources in the Arghandab river basin in economic and environmentally sustainable manner need to be strengthened. To assist in the development of policy, strategy and implementing regulations, an international consulting firm (the consultant) will be selected and engaged by the MEW CPMO in accordance with ADB's Procurement Regulations (2017, as amended from time to time). The implementing agency's CPMO, as members of the project bid evaluation committee, will recruit the consulting firm following the QCBS procedure with a quality-to-cost ratio of 90:10.

2. The State is committed to introducing cost-recovery mechanisms in order to financially sustain the water delivery services, and to drive the transformational awareness change among water suppliers and water users. Amendments to regulations are under advanced consideration that will enable the State, or bulk water supply entities, to charge for irrigation water delivery services. Further policy development is required to consider water entitlements, licensing, allocations and other water management tools for improved water resource management.

3. Regulation and allocation of water flows must ensure ecological values in the downstream river basin aquatic habitats are sustained or improved. Maps of Arghandab River provided by the Canadian International Development Agency (CIDA) (Cartographic Atlas command area land use, 2012) show that the river itself has a natural, almost untouched morphology and numerous potential habitats for ground nesting birds, waterfowl and rheophilic fish species. These habitats need to be reactivated by the environmental flow as far as possible in close coordination with the water demand for irrigation and urban and rural water supply and the hydropower development.

4. **Scope of Work and Expertise Schedule.** MEW will supervise the consultants through the MEW CPMO, to consider water resource management policy development, bulk water delivery business structuring options for sustainable operations of Dahla Dam and the Arghandab Irrigation System and conduct the Arghandab River Environmental Study. The contract for consultant's service will be time-based. The contract comprises a total of 71 pm (including 22 pm of international specialists and 49 pm of national specialists). The WREG will be fielded shortly after project effectiveness. Additionally, the WREG will hire adequate support staff to support its consultants in undertaking their duties in an effective and efficient manner.

Table 1: Water Policy and Regulatory Reform Consultant Schedule

Key Positions	Person-months	Total
International		
Water resources policy and regulation specialist	8	
Water pricing specialist	1	
Environment specialist	5	
Bulk water services business specialist	8	
sub-total international		**22**
National		
Water resources policy and regulation specialist	12	
Water pricing expert specialist	3	
Environment specialist	10	

Key Positions	Person-months	Total
Bulk water services business specialist	12	
Corporate lawyer	6	
Corporate accountant	6	
sub-total national		**49**
Total consultant pm		**71**

5. The outline TORs for the international consultants are below.

6. **Consultant General Qualifications**. The preferred requirements for the consultant firm are: (i) experience in water resources policy and regulation; (ii) experience in the Central Asian region; and (iii) experience with similar assignments financed by ADB and/or the World Bank. The international consulting firm may associate with other international and national consulting firms as appropriate. The consulting firm must have recent relevant experience and/or engagement in the country and have the necessary support structures to deal with security and other logistics required for operating in this environment.

Water Resource Management Policy and Regulatory Reform

7. **Water resources policy and regulation specialists** (international, 8 pm; national 12 pm). The specialist shall have tertiary qualifications in a field related to water resources and /or law, a preferably have 10 years of experience in water policy and regulation. Specific work tasks include:

(i) Review the Water Law and its conditions that relate to water allocation and water rights focusing on water for irrigation;
(ii) Review the Water Law and its conditions that relate to financing the operation and maintenance of irrigation water delivery systems and identify legal basis for regulating charges for water delivery services by State agencies;
(iii) In consultation with government agencies including MAIL, MRRD, and MEW, propose mechanisms, responsibilities and regulations governing the State and its authorized agencies to charge fees for cost recovery of water delivery expenses;
(iv) Facilitate stakeholder workshops on water rights, water allocation and regulation of water supply service charges;
(v) Draft the regulations according to government format and support the process of official adoption and promulgation of the regulations.
(vi) Complete an analysis and study on water conservancy policies and management.

8. **Irrigation water market and price specialists** (international; 1 pm; national, 3 pm). The water pricing specialist shall preferably have 10 years of experience in water policy, natural resources management, irrigation, economics, or public administration. The specialist must have a tertiary degree in a relevant field. Specific work tasks include:

(i) Review the Water Law and its provisions for valuation of water, water allocation rights, and transfer of water rights;
(ii) Assess water delivery services costs (including cost of capital, operation and maintenance, and service administration costs), of irrigation service providers, urban water supply services, and borehole pumping costs;
(iii) Prepare a model of irrigation water delivery services costs, and break-even prices;

(iv) Prepare economic gross margin analyses for major irrigated crops to show the impact of water charges on farm revenues
(v) Model a range of pricing strategies for irrigation water supply, including various levels of price subsidy by the State;
(vi) Prepare suggestions on water right trading and market structures and regulatory mechanisms;
(vii) Facilitate stakeholder workshops on water prices, service charges, economic impacts on farm revenues, water allocation and water markets;
(viii) Prepare a report on Irrigation Water Markets and Pricing Strategy in Afghanistan.

9. **Bulk Water Services Business Management specialist** (international, 8 pm, intermittent; national, 12 pm). The Bulk Water Services Business Management Specialists will have tertiary qualifications in irrigation engineering, business administration or other relevant field, with preferably 10 years of experience in managing bulk water supply service for a public-owned or private-owned utilities business entity. The specialists will:

(i) Advise the MEW on the creation and business structuring of two special purpose vehicle (SPV) business structures for (a) Dahla Dam operations as a regulated bulk water service provider; and (b) AIS operations for provision of irrigation water supplies by the AIS;
(ii) Review and assess the governing regulations and charter of the proposed SPVs;
(iii) Identify and define the responsibilities and functions of the proposed entities;
(iv) Assess the institutional structure and capacity for the entity to carry out its responsibilities and functions;
(v) Prepare an inventory of assets;
(vi) Consult with stakeholders including ASBA, community irrigation groups, and government agencies on proposed entity structures and service requirements;
(vii) Design a new entity structure and human resources organizational chart based on findings, and provide recommendations for capacity building;
(viii) Prepare a business plan for each entity including costs, financing, operations, asset management plan and job descriptions;
(ix) Revise business plan after review by MEW.

10. **Corporate Lawyer** (national 6 pm, intermittent). The lawyer will have tertiary qualifications in law, and preferably 10 years of experience in corporate law legal advisory services. S/he will be responsible to:

(i) Review legal options for the creation of an SPV for the purposes intended and make recommendations on appropriate options;
(ii) Draft the required founding SPV legal documents, with a strong emphasis on governance structures and arrangements;
(iii) Support the Bulk Water Services Business Management specialists in the preparation of business plans as requested.

11. **Corporate Accountant** (national 6 pm, intermittent). The accountant will have tertiary qualifications in business, accounting or related field and preferably have 10 years of experience in business accounting. S/he will be responsible to:

(i) Review the existing Dahla Dam and AIS entity financial structure, accounts and financial monitoring and reporting systems;

(ii) Prepare a package of financial statements reflecting the current financial status;
(iii) Identify any current debts or financing gaps;
(iv) For each proposed SPV, recommend an accounting, recording and reporting system, ensuring compliance with best governance practices and government reporting requirements;
(v) Support the Bulk Water Services Business Management specialists in the preparation of business plans as requested.

Arghandab River Environment Study

12. **Environment Specialists** (international, 5 pm; national, 10 pm). S/he shall have a Master's degree or higher in Environmental Sciences or related field, preferably with 15 years of experience working on environmental issues of which at least 7 years associated with water ecology. Under supervision of MEW and coordination with NEPA, the Specialists tasks will include surveying the river downstream of Dahla Dam to at least Qala-I-Bust, with specific responsibility for:

(i) A baseline assessment of riparian vegetation;
(ii) A community vegetation management survey, identifying local plant material for catchment stabilization, and considering community uses for fodder, fuel, medicinal and other uses;
(iii) Preparation a vegetation management plan in consultation with riparian communities and MEW;
(iv) An ornithological survey identifying biological hot spots, listing species and abundance, species conservation status, threat assessment of each hot spot;
(v) Preparation of recommendations of ways to develop new habitat or protect and enhance existing habitat;
(vi) A fish survey identifying biological hot spots listing species and abundance, species conservation status, threat assessment of each hot spot;
(vii) Preparation of recommendations of ways to develop new habitat or protect and enhance existing habitat;
(viii) Using available topographical date and ASBA planned flows, calculate hydraulic flow models to determine whether the planned environmental flow will be sufficient to maintain aquatic habitats;
(ix) Investigate quality of ground and surface water at spillways, causeways on the realigned road, villages on the water transmission line, Arghandab river below the dam and at the last diversion weir, and existing groundwater wells;
(x) Prepare reports with recommendations on: required environmental flows calibrated against seasonal conditions; system for ongoing monitoring of groundwater; system for regular monitoring of environmental conditions in the reservoir and downstream; and a plan for improved conservation management.

Annex 5

Hydrological Modelling Platform Consultants (MEW-CS-03)

1. The objective of the consulting services package is to continue the ongoing capacity development support for the MEW and MAIL staff to strengthen the institutional capacities in water resources management and hydrological monitoring. It is focused on establishing a national hydrological platform and provide training in its operation. Considering its ongoing support regarding water resources monitoring and modeling, the MEW proposes to engage the eWater[1] through SSS to provide 24 pm of international and 24 pm of national consulting services. SSS is justified as an extension of existing work currently being undertaken by eWater with MEW, MRRD, MAIL and the National Environment Protection Agency.

2. The training program will conduct water balance estimations at a district scale and will include an introduction to the eWater Source river basin modelling platform.[2] It will also draw on earlier work that uses the eWater Source platform to model the water system of the Arghandab Basin. The capacity development program will provide a foundation for future improvements in water resource management in Afghanistan and will support these improvements by building the skills and capacity of staff in relevant areas. The training course programs will cover:

(i) Program initiation and discussions about training course with senior water managers
(ii) Level 1 courses will develop staff skills in data collection and water balance estimation of irrigated land and irrigation systems and will introduce concepts of water system modelling.
(iii) Level 2 courses will be for a smaller group of staff with appropriate technical skills or experience in hydrological modelling, we will introduce the Source river basin modelling platform developed in Australia to support water management under conditions of water scarcity. The courses will focus on the building and calibrating of baseline Source models for Afghanistan Rivers, and include treatment and management of multisector water allocation within Source and the development and incorporation of dam operation rule curves within the model.
(iv) Level 3 courses are advanced Courses in River Basin Modelling - groups of 20 or less. These courses will equip modelers with the skills to develop water management scenarios for option assessments to support policy development in Afghanistan.
(v) Study tours of Australian Water Management Agencies both at the State and Commonwealth Levels.
(vi) In-house periods of training at eWater's office in Canberra for advanced modelers.

3. The required consultancy inputs for the capacity development program are in the table below. The outline TOR for the separate experts to be engaged for the capacity development consulting services are described below.

[1] eWater is Australia's national platform for supporting water management in water supply systems and river basins.
[2] Source is river basin modelling program developed by eWater.

Table 1: Inputs for Hydrological Modeling Platform Consultants

No.	Specialist Position	Pm Input	
		International	National
1	Water resources management specialist/team leader	12	
2	Water resources program coordinator		24
3	Hydrological modelling specialist	12	
	Subtotal	**24**	**24**

4. The outline TORs for the international consultants are below.

5. **Water resources management specialist/team leader** (international, 12 pm). The team leader will be responsible for the overall coordination and technical outputs of the assignment. The specialist shall have a university degree or above in water resources management and have over 15 years of experience in water resources management with focus on water resources monitoring and modeling. Specific tasks include at least:

(i) Carry out overall management and quality assurance for the implementation of the assignment;
(ii) Ensure an optimum communication with all experts, key stakeholders at the national and provincial levels;
(iii) Conduct the program initiation and discussions about training course with senior water managers;
(iv) Design and prepare the detailed implementation plan for the training program, with the support of the hydrological modeling specialist;
(v) Participate and present in the training events
(vi) Ensure an optimum communication with all experts, key stakeholders at the national and provincial levels;
(vii) Lead the Afghan groups during the study visit to Australia;
(viii) Facilitate the in-house periods of training at eWater's office in Canberra for advanced modelers;
(ix) Ensure the timely completion of high-quality outputs on different activities of the program; and
(x) Organize, review, and complete all reports (in English).

6. **Hydrological modeling specialist** (international, 12 pm). The hydrological modeling specialist shall have a minimum of 10 years of experience in working with hydrological information system. The specialist must have a university degree in water resources management, modeling, information engineering or in a similar major. The specific training tasks include at least to support the Water resources management specialist/team leader to:

(i) Design and prepare the detailed implementation plan for the training program;
(ii) Provide support for the preparation of the inception report and detailed workplan;
(iii) Lead the drafting of specifications for the national hydrological modeling and monitoring platform;
(iv) Prepare the technical training manuals and materials;
(v) Train the national water resources program coordinator and other modelers in installing and operating the modeling platform;

(vi) Closely work together with the Afghan groups during the study visit to Australia;
(vii) Work closely with the Afghan advanced modelers during the in-house periods of training at eWater's office in Canberra;
(viii) Prepare training evaluation reports; and
(ix) Support to preparation of all reports (in English).

7. **Water resources program coordinator** (national 24 pm). The water resources program coordinator shall have a minimum of 10 years of experience in working with hydrological modeling systems. The specialist must have a university degree in water resources management, water engineering, or in a similar related field. Specific tasks include at least:

(i) Act as liaison between the international consultant team and MEW and MAIL counterparts;
(ii) Provide support for the preparation of the inception report and detailed workplan;
(iii) Support drafting of the specifications for the national hydrological modeling and monitoring platform;
(iv) Conduct research and collect necessary hydrological data for the hydrological modeling platform;
(v) Support the Government agencies with the selection of training participants;
(vi) Support arranging the logistics for the training events and study tours;
(vii) Support and participate all training events; and
(viii) Conduct limited translation, as reasonably requested by the team leader.

8. The consultants will prepare at minimum the following reports:

(i) Inception report and detailed workplan;
(ii) summary report on the international study tour;
(iii) report describing the hydrological modeling platform, including a detailed user manual in English and Afghan language.

Annex 6

Independent Environment Monitor (MEW-CS-04)

1. **Environment Specialist** (international, 8 pm). Third Party Environmental Monitoring will be carried out during construction phase of output 1 (Dam Raising). An International Environmental Specialist will be hired for this purpose. He / she shall have a Master's degree or higher in Environmental Sciences or Environmental Engineering. In addition, the Environmental Specialist shall have a minimum of 15 years of experience of working on environmental matters out of which at least 7 years associated with Dam and Reservoirs in accordance with ADBs' / World Bank's Environmental Guidelines. The Specialist tasks will include (but not limited to):

(i) Verifying the project's environmental performance to ensure that it complies with the national environmental legislation, ADB's environmental safeguards as stipulated in Safeguard Policy Statement (2009, as amended) and EIA, site SSEMP, and other related documents;
(ii) Select the most critical areas of the EMP implementation such as "having significant impacts including cumulative ones", "located near sensitive receptors/areas", "having potential for residual impacts", etc. based on the EIA/EMP;
(iii) Conducting environmental monitoring of those critical areas. Monitoring can include instrumental[1] and / or non-instrumental techniques (visual monitoring). The monitoring can also be used to validate the results of environmental monitoring conducted as part of Semi-annual Environmental Monitoring Report (SAEMR);
(iv) Coordinate with IA/ADB the working schedule and inputs to be on-site when construction activities with potentially significant impacts are going on;
(v) Monitor both critical environmental as well as health and safety areas;
(vi) Monitor GRM database and resolution of environmental related complaints;
(vii) Document the results of the monitoring activities;
(viii) Report to IA/ADB quarterly, and immediately inform them in case of unpredicted potentially significant impacts;
(ix) In the case of unpredicted environmental impacts, providing guidance on the preparation of a corrective action plan, and monitor its implementation in coordination with Supervision Consultant's Environment Specialist;
(x) Preparation of quarterly environmental monitoring reports providing details related with (but not limited to) EMP compliance, monitoring of significant environmental impacts, as well as details on unanticipated impacts with mitigation measures. Details on GRM as well as any Health & Safety issues encountered at site will also be provided. Lastly, a conclusion and recommendation section will also be provided. A close out report will be provided at the end of construction phase.

[1] A certified lab will be hired by the third-party environmental monitoring consultant for carrying out the instrumental monitoring.

Annex 7

Independent Resettlement Monitor (MEW-CS-05)

1. **Independent Resettlement Monitor** (international, 14 pm). The Independent Resettlement Monitor will conduct the external resettlement monitoring and evaluation (M&E) for the project. Through monitoring the progress, funds mobilization, and management of land acquisition, demolition, and resettlement, changes and restoration of the production and livelihoods of the affected people will be analyzed, follow-up evaluation will be provided, and M&E reports will be submitted to ADB, the CPMOs of MEW, MRRD, and MAIL, and relevant agencies. Through external resettlement M&E, ADB and implementing agencies including the CPMOs and PIUs will have full understanding of conditions and issues of land acquisition, demolition, and resettlement.

2. The external resettlement M&E for the project will be undertaken by an independent expert entrusted by the MEW and acceptable to ADB. The CPMO will provide the external expert with supports such as staffing, contacting relevant officials, and provision of project documents and transfer and attendance for site visits. Tasks of the M&E group will include M&E of resettlement implementation in accordance with ADB's *Safeguard Policy Statement* (2009), planning of M&E activities, selection of monitoring spots, field investigation and analysis, and preparation of M&E reports in Afghan and English. The principal task for the RESP will comprise the review of the resettlement reports that are prepared by the Government with regards to:

(i) Baseline survey including (a) family information, (b) household annual income and expenditure, (c) affected land production and income loss, and (d) affected informal land production and income loss.
(ii) M&E of land acquisition including (a) progress of land acquisition, (b) progress of temporary land occupation, and (c) progress of house demolition and reconstruction.
(iii) M&E of implementation of agreed rehabilitation measures, training programs, and post-reservoir development investment.
(iv) M&E of living standards of relocated people including (a) production and living conditions before displacement, (b) production and living conditions after displacement, and (c) comparative analysis and evaluation of employment and living conditions before and after displacement.
(v) Evaluation of the capacity of resettlement institutions and the situation of public participation and complaints handling.

3. In accordance with ADB's requirements and the project schedule, external monitoring agency will submit the M&E Report to ADB, the CPMOs, and relevant agencies semiannually during resettlement implementation and annually in 2 years after the completion of resettlement. The last report will be prepared as a resettlement completion report summarizing the entire process and results.

Annex 8

Panel of Experts (POE) (MEW-CS-06)

1. **General Scope**. A POE shall be established for the review of the Dahla Dam Raise Project by MEW of the Government of the Islamic Republic of Afghanistan, to undertake periodic, comprehensive and independent reviews with the objective of evaluating features and actions pertaining to the EPCS safety and providing recommendations to the MEW of actions that may be needed to upgrade the dam and appurtenances to acceptable safety standards. The POE shall be guided by the Dam Safety Assurance objectives and the related legislative regulations, standards and guidelines.

2. The POE shall be established for reviewing the tender documents including final detailed design and technical specifications before tendering commences and shall be maintained for the duration of the project, until initial reservoir filling and start-up phases until all facilities are placed into final operation. The POE will provide due consideration to the administrative procedure/guidelines of the Government of Afghanistan and the World Bank safeguard policy OP4.37 under the guidance of the MEW.

3. MEW will nominate appropriate national experts to support the POE. The national experts will support the POE during its performance of the POE function during tender/detailed design, construction and post construction stages and provide the relevant project information to the Team Leader POE for compilation of the final fact-finding reports.

4. **Organization and Membership.** The POE shall contain core members with expertise in the disciplines required for the project.

5. A dam designs and construction expert with significant experience in the design and construction supervision of zoned earth-rockfill dams including ones in high seismic zones. In particular, the review will include borrow area material selection, design and construction quality control manuals, ground/foundation treatment like cutoffs or grouting, slope stability, seepage and settlement analysis, geotechnical and seismic instrumentation and dam break studies. In coordination with a seismologist, the seismic hazard assessment study will be updated if necessary and dynamic stability/stress-strain analyses of the dam under seismic loads will be reviewed. The review will also include geotechnical investigation and treatment works of the foundation of the dam and associated structures, main dam left abutment shear zone treatment, intake tunnel lining, raise for trash rack and intake tower, slope stabilization of the abutments of main and saddle dams and reservoir areas if needed. Upon discretion of the dam designs and construction expert, it could request a dedicated geologist with material characterization experience from borrow areas, slope stability, seepage analysis, geotechnical instrumentation, rock mechanics expertise if it encounters any particular issues that would warrant such an expert’s inputs and advise appropriate design improvements.

6. A seismologist with ample experience of seismic hazard analyses and assessment, design criteria for design and construction for large zoned earth-rockfill dams including ones in high seismic zones. The expert will review and assess the dam site geology, seismology, potential fault zones in dam reservoir, likelihood of dam break due to a seismic event, previous seismic hazard assessment works, adequacy of seismic hazard assessment in both deterministic and probabilistic approaches and potential liquefaction and rupture of the foundation by fault movements. The expert will guide on any additional survey, investigation, and analyses if needed. The expert will review the previous proposed seismic design criteria

and update it if necessary. Based on his/her recommendations, the dam and structural design of structures should be updated if required.

7. A hydrologist/sediment specialist with ample experience in hydrologic and sediment assessment for large dams and seasonal flow forecasting system design and review is needed for hydrology and sediment assessment/management study review. The hydrology review includes the hydro-meteorological assessment and flood routing of the inflow design flood and sizing of spillway facilities as well as water supply reliability/security against hydrological variability. The expert will review and advise on models prepared by eWater Australia and findings of Multi-Sector Water Allocation (MSWA) studies. The sedimentation assessment, bathymetric surveys, dam break studies and management plan will be reviewed, and appropriate due diligence will be provided to update any design or design assumptions. The expert will review the hydrology/hydraulics design assumptions for the spillways and flood control structures.

8. A Chairman shall be appointed amongst the members by MEW to coordinate the communications of the POE, to call and chair its meetings, to ensure the memberships objectivity and to provide balance to its reviews and recommendations. The person responsible for the official correspondence with the POE Chairman shall be the MEW Deputy Minister. The latter will appoint a liaison official for regular interaction with the POE.

9. The POE and the MEW shall establish a list of experts and specialists in subcategories of the disciplines mentioned above such as dam engineering, geotechnical, seismology, grouting, concreting, sedimentation, materials testing, rock mechanics, electrical, mechanical, hydropower, hydraulics, or construction supervision. The POE may then choose at their discretion qualified experts from such list to perform special assignments or evaluations on short notice and to report results directly to the POE. Note environment and resettlement safeguards issues are not part of the POE terms of reference.

10. The POE will meet as frequently as necessary depending on the status of the dam involved but no less than two times a year during the preparation and initial construction phases and once a year throughout construction and start-up. For review of design stage, meetings shall be held at such intervals to assure the POE of the adequacy of design data collection, foundation exploration, design parameters, foundation analysis, dam raised section design and determination and routing of the design floods and dam break studies. During the construction phase, at least one meeting will be scheduled just as the foundation treatment of dams in raised sections is opened to where critical conditions relating to foundation treatment or need for additional excavations, grouting can be observed. One key issue will be investigations and construction work along main dam left abutment shear zones. Meetings may also be convened at the request of MEW.

11. The POE meetings will normally be at the project site and shall be attended by all members. Inspection of the site, design of the dam under construction individually should occur only under special circumstances and in such cases the member will send his report of findings to other panel members for issuance jointly after concurrence by all panel members.

12. An advance schedule of meetings will be drawn up by the POE and MEW and sent to ADB to allow them to send an observer to POE meetings if they so desire. The ADB will not participate in any manner in the proceedings or discussions.

13. **Specific Tasks.** While the POE will review and evaluate mainly technical elements of

the dam designs, they shall not be concerned with the project scope, general features or economic characteristics. The specific elements to be reviewed and evaluated by the POE shall include but not be limited to the following:

Tender Preparation Phase

(i) To review site exploration data for the foundation and for material sources including results of drilling or boring, laboratory testing, in-situ tests and regional and local geological characteristics;

(ii) To review the designs of the foundation treatment, proposed excavation, selected foundation strength parameters and seepage control measures;

(iii) To review the strength parameters and characteristics of the selected construction materials for the rockfill dam including zoned materials, such as core, filters, riprap, etc. as well as their laboratory test results and placement /compaction requirements;

(iv) To review the selected aggregate source, cement type, and material characteristic for concrete structures including results of durability, gradation and reactivity tests, trial mix designs, strength design parameters, and construction requirements;

(v) To review the result of the seismic hazard assessment and appropriateness of the seismic safety design criteria and analyses and assess any additional needs for seismic hazard assessment and guide on any additional survey, investigation, and analyses. In particular, the review will include the assessment of any potential faults crossing the dam site and reservoir area as well as mitigation measures if required;

(vi) To review stability analysis and resulting factors of safety for normal, unusual and extreme loading conditions for the main dam and associated structures, spillways/energy dissipating structures and outlet works;

(vii) To review upstream conditions in regard to formation of reservoir landslide or ice dams (glacier) if any and handling of floods caused by the collapse of such natural dams;

(viii) To review the reservoir related factors, such as reservoir rim slope stability, resulting wave action, their effect on dam stability, potential seepage, handling of debris, etc. as well as countermeasures if needed;

(ix) To review the flood hydrology methodology and computations for determining the project design flood hydrographs, reservoir routing and spillway sizing as well as safe yield and reservoir simulation;

(x) To review sediment assessment and management plan including effective operation of bottom outlets for sediment flushing / sluicing if possible as well as other mitigation measures;

(xi) To review the modelling studies and design of spillway facilities including flow conditions, energy dissipation or need for modeling;

(xii) To review the inlet and outlet works, including its hydraulic designs, capacity for emergency reservoir drawdown, sediment handling capability, selective thermal releases, regulation range and other factors;

(xiii) To review the designs of diversion works, schedule, hydrology and risk factors associated with diversion during construction and with the closure of diversion works at initial reservoir filling;

(xiv) To review the risk and hazard evaluations including need for dam breach analysis and inundation study as part of the Emergency Preparedness Plan (framework plan);

(xv) To review the design for dam instrumentation and the program for collecting, evaluation and maintaining data to be obtained as well as preliminary operation and maintenance plan; and

(xvi) To review the final plans and specifications for design adequacy, construction, scheduling as well as the owner's quality control procedures and construction supervision plan.

Construction Phase

(i) To make at least one field inspection of the nearly completed foundation excavations prior to placement of either embankment or concrete. This is mandatory for POE members covering geology, dam engineering and foundation engineering;

(ii) To make at least one field inspection during the early phases of placement of the rockfill dam section, to evaluate quality control manuals, procedures being used during construction and to evaluate if materials being utilized and construction methods being employed are meeting design parameters and contract specifications;

(iii) Assess the result of instrumentation installation (including measurement datum marks) basing on early data collected during the construction on that basis recommendations to MEW regarding data collection, revision (supplementation) of instrumentation in line with the construction progress are made;

(iv) To review the operation & maintenance plan, dam safety staff training, dam break studies, emergency preparedness plan for initial reservoir filling, covering including the time of closure, maximum allowable filling rate, measurements, emergency release plan, and designation of responsible operating personnel; and

(v) Review the progress and monitoring reports prepared by the Supervision Consultants.

Reservoir Filling / Operation Phase

(i) To review and evaluate the organization, procedures and program to carry out independent monitoring of the dam safety status including the inspection frequencies, instrumentation records system, project data files, evaluation criteria and means to provide remedial actions;

(ii) To review and assess the adequacy of operation and maintenance plan/manuals, and establishments of project operations procedures;

(iii) To review and evaluate emergency plans including downstream flooding effects, emergency reservoir drawdown, notification of anticipated risks to the authorities in the downstream areas, system of early flood warning, major flood early warning systems, major flood spilling operations plans, and site access during emergencies;

(iv) To review the procedures for handling project records, including as built drawings, operation records, inspection records, instrumentation data and other information associated with the safety of the dam.

14. **Duration and Contract.** The following project implementation schedule is currently foreseen:

Tender preparation and contracting phase: From Q2 2020 to Q4 2021

Construction phase:	From Q3 2021 to Q4 2023
Operation phase:	From Q1 2024 to Q4 2025

15. Proceeds from output 1 of the project shall be used for this purpose.

16. **Support Services.** MEW designers and engineering consultants shall be present during selected POE meetings at the request of the POE. The POE will be provided the necessary background information, any relevant data, notes or explanations regarding the designs, computations or methods used. The MEW Chief Engineer for Dahla Dam Project will coordinate the assembling of such information. The POE may ask the designers to conduct additional studies to assist in evaluation of the matters relating to the dam safety status.

17. MEW will assist to allow prompt travel clearance(s) of POE members or specialists requested by the POE and in providing full physical access to the project sites.

18. **Meetings of the Panel of Experts.** The POE shall meet and undertake field inspections as frequently as necessary, during all phases. The panel will propose its periodic working missions depending on requirements in each phase of project implementation subject to be agreed by MEW, but not less than twice a year in each phase. The dam raise works are planned in small tenders to be prepared, bid out and contracts signed between July 2020–December 2021 i.e.1.5 years. For the initial year of the construction phase, the POE is recommended to organize its meetings quarterly in July, October and January. Then additional meetings may be organized during July and October 2021 i.e. a minimum of 5 POE meetings per annum. Additional meetings to other technical subjects can be held at request by MEW or the panel members.

19. The working missions of the POE will be at MEW head office in Kabul and/or at the dam/ construction site with participation of all permanent members. The POE meetings shall be record in minutes, signed by all members and submitted to MEW. Minutes of the meetings shall briefly outline areas of concern, request for additional more profound analysis, present recommendation for action, if any. A copy of each minutes of meeting and supplementary reports will be transmitted by MEW to the ADB (Country Director, Afghanistan Resident Mission) and the World Bank (Country Manager, Afghanistan Resident Mission).

20. **POE Reporting.** The reports of the POE shall be prepared, signed by all members and presented to MEW, prior to the departure of the members. Any item urgent to the safety of the dam should be brought immediately to the attention of MEW in writing in a special brief communication, prior to the submission of mission reports.

21. The POE may be required to work with other relevant agencies and entities in the project, design and supervision consultant and contractors to clarify relevant issues. The POE may also prepare other reports if required.

22. The POE shall not perform any remedial designs but should give general recommendations for potential solutions and approaches for corrective or rehabilitative measures.

23. MEW will provide copies of each mission report and minutes to the ADB. MEW may append a statement of actions taken on recommendations of the previous panel meeting.

24. **POE Required Expertise and Inputs.** The tables below present the required expertise,

inputs and proposed number of missions for the international and national POE.

Table 1. Panel of Expert Input Missions Summary

Sr. No.	International Expert	Input (months)	Missions (number)
1	Designs and Construction Expert (International)	3.0	6
2	Hydrology /Sediment Expert (International)	3.0	6
3	Seismologist (International)	1.0	2
4	Dam Operation & Maintenance Engineer (National)	1.5	-
5	Geologist (National)	1.5	-

Source: TRTA Consultants, 2019

25. **Criteria for Selection of Consultants.** It is proposed to engage USACE through SSS to provide 7 pm of international and 3 pm of national consulting services. SSS of USACE is justified as an extension of historical work and knowledge of the requirements needed for the heightening and rehabilitation of the Dahla dam.

26. The POE expert should meet the minimum requirements as below:

(i) Each international expert should hold a Master's degree in relevant fields and be fluent in English. They should have a minimum of 20 years of work experience in respective professional areas;
(ii) Each national expert should hold a Master's degree in relevant fields and be fluent in English. They should have a minimum of 10 years of work experience in respective professional areas;

Table 2. Criteria for Selection of Panel of Expert

Expert	Required major
Dam Designs and Construction Expert (international)	• Having worked as an expert in designing and construction of large dams. Intensive knowledge and experience in rockfill dam design and construction arrangement, procedure and quality control. • Intensive experience in preparing construction plan and schedule for large-scale or complex works including rockfill dam. • Expertise in assessing foundation conditions and recommending practical solutions for treatment works including curtain and consolidation grouting. • Expertise in assessing geological conditions of abutment and reservoir rim and required safety measures • Knowledge of seismic design and design of structures in high seismic zones • Knowledge of analyzing monitoring data collected during the construction and operation phases.
Hydrology /Sediment Expert (international)	• Expertise in hydrological assessment of large dams • Experience of using latest software and programs in hydrology, flood routing and dam operation. • Expertise and experience in sediment assessment and management including sediment flushing/sluicing, dredging, excavation, etc. and use of modern computer simulation models • Knowledge in reviewing design of major hydraulic structures, such as spillway, intakes, bottom outlets, etc.

Expert	Required major
Seismologist (international)	• Expertise in seismic hazard assessment including deterministic and probabilistic approaches, the assessment of active faults/lineament, reservoir triggered earthquake assessment, etc. • Experience in the formulation / examination of required seismic motion inputs for dynamic stability / stress-strain analyses of dams in coordination with dam design experts Experience in seismic hazard assessment in high seismic zones similar to the project area
Dam Operation & Maintenance Engineer (National)	• Having worked as dam operation and maintenance engineer in home country and outside. • Expertise in maintenance of hydro-mechanical & electric equipment's • Familiarity of general O&M issues of large dams in the national and international environment
Geologist (National)	• Expertise in large dams' geotechnical investigation and foundation treatment work design of large dams and other major hydraulic infrastructure projects • Experience in similar projects in other countries • Familiarity with the national geological conditions and issues

Table 3. POE Tentative Work Schedule

No	Content	Anticipated Implementation period	person-week
1	**Tender Preparation Phase**	Q2 2020 to Q4 2021	
	Dam Designs and Construction (International)		4 weeks
	Seismologist (International)		4 weeks
	Hydrologist/Sediment Specialist (International)		4 weeks
2	**Construction stage:**	Q3 2021 to Q2 2024	
	Dam Designs and Construction (international)		4 weeks
	Hydrologist/Sediment Specialist (international)		4 weeks
	Geologist (National)		4 weeks
3	**Reservoir filling / operation phase**	Q3 to Q4 2026 (Year 1)	
1st year	Dam /Design and Construction Expert (international)		2 weeks
	Hydrologist/Sediment Specialist (International)		
	O&M expert (national)		2 weeks
	Geologist (national)		2 weeks
			2 weeks
2nd year	Dam / Design and Construction Expert (international)	Q3 2027 (Year 2)	
	Hydrologist/Sediment Specialist (International)		2 weeks
	O&M Expert (national)		2 weeks
	Geologist (national)		2 weeks
			2 weeks

IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Climate Change Assessment

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

CLIMATE CHANGE ASSESSMENT

I. BASIC PROJECT INFORMATION

Project Title:	Arghandab Integrated Water Resources Development Project
Project Cost ($ million)**:**	$399.29 million
Location:	Afghanistan
Sector:	Agriculture, Natural Resources and Rural Development
Theme:	Water resources, irrigated agriculture, hydropower, rural roads
Brief Description:	Afghanistan is highly vulnerable to the adverse effects of climate change. Current models indicate significant expected warming across all regions of Afghanistan, and a decrease in precipitation, particularly spring rainfall. This includes increasing drought frequency, extreme weather events and a raising of the ambient Afghanistan climatic temperature by up to 6 °C over the next 50 years. Afghanistan has identified key adaptation needs to address future risks, including (i) rehabilitation of small- to large-scale water resources infrastructure, (ii) increasing irrigated agricultural land area, (iii) strengthening hydrological meteorological monitoring networks, and (iv) improved watershed management.[1] In line with these priorities, the proposed project will improve the availability and use of water resources for irrigated agriculture in the Arghandab River Basin and the Kandahar region. The water supply for this area is dependent on Dahla Dam, built in 1952, which stores irregular runoffs from snowmelt in high mountains. The Dam's reservoir, however, has lost around 40% of its storage capacity due to sedimentation from 66 years of operation, and its ability to provide regulated flows during increasingly frequent droughts is seriously constrained. The availability of water in the sub-basin of the Helmand river basin, along with the rest of Afghanistan, is highly seasonal and erratic, with frequent droughts affecting agriculture, living standards, and the local economy. The project will (i) raise the Dahla Dam, (ii) increase reliability of irrigation water supply, (iii) improve agricultural water productivity, (iv) and strengthen capacity in management of water resources.

Source: Asian Development Bank.

II. SUMMARY OF CLIMATE CHANGE FINANCE

Project Financing		**Climate Finance**	
Source	**Amount** ($ million)	**Adaptation** ($ million)	**Mitigation** ($ million)
Asian Development Bank			
Special Funds resources (ADF grant)	336.78	105.83	
Cofinancing			
International Fund for Agricultural Development (Grant)	40.00	14.39	
International Fund for Agricultural Development (Loan)	10.00	3.43	
Beneficiaries	6.25		
Government	4.26		

ADF = Asian Development Fund, IFAD = International Fund for Agricultural Development.
Source: Asian Development Bank.

[1] Islamic Republic of Afghanistan. 2015. *Intended Nationally Determined Contribution. Submission to the United Nations Framework Convention on Climate Change.* Kabul.

III. SUMMARY OF CLIMATE RISK SCREENING AND ASSESSMENT

A. Sensitivity of Project Components to Climate or Weather Conditions and the Sea Level

1. Dam water inflows into the reservoir are uncertain because of the large spread in precipitation projections, which indicate a risk for declining rainfall.
2. Construction of planned infrastructures (e.g., dam, electrification works, spillways, roads, community irrigation system) may be affected by increased heat, extreme rainfall/flows, and dust storms.
3. Crop productivity from introduction of climate resilient and productive irrigation technologies and practices at risk to increased temperatures causing higher evapotranspiration demand of crops as well extreme events (e.g., droughts, storms, floods).

B. Climate Risk Screening

1. Since the 1960s, Afghanistan has seen an increase in average annual temperatures by 0.6°C, most rapidly in September–November. The period 1998–2006 marked the longest and most severe drought in Afghanistan's known climatic history.[2]
2. Future climate projections suggest increased average annual temperatures, warming that is more rapid in spring/summer and occurs uniformly across the country, an increase in the number of hot days and nights. Changes in rainfall prior to 2100 are uncertain, but projections suggest generally drier conditions by the 2090s. Winters are expected to be significantly drier in the south, there is an increased risk of flash flooding from earlier and more rapid spring snowmelt, and drought conditions may become the norm by 2030 (footnote 2). Flood events have been reported in the vicinity of Kandahar in recent years.[3]

Climate Risk Classification: High

C. Climate Risk and Adaptation Assessment

The future changes in climate in the Arghandab watershed have been assessed using CMIP5 General Circulation Models (GCMs) at their native resolutions, spatially downscaled CMIP5 GCMs in the NASA-NEX-GDDP dataset and using regional climate models. The latter were also used to force a SWAT hydrological model to make projections of future inflows into the Dahla dam reservoir and an assessment of sedimentation rates; water changes in water demands were also analysed. Projections of this section are based on two Representative Concentration Pathways (RCPs): the moderately optimistic emissions scenario, RCP4.5, which assumes that emissions will peak around 2040 and then decrease; and the most pessimistic emissions scenario, RCP8.5, which assumes that emissions will continue to rise throughout the 21st century.

Key climate change results are as follows:

1. Future projections of total annual precipitation are uncertain and no clear trend up or down across the model ensemble can be identified over the project lifetime. The interannual variation is slightly increasing, as is the number of very wet days. The number of wet days shows a slightly decreasing trend. This indicates that precipitation may be falling more erratically. In the consecutive dry days index, no clear trend can be identified, showing no robust evidence for increase in the length of dry periods.
2. Air temperature shows strong increasing trends in all models accompanied by a clear increase in summer days and tropical nights and decrease in frost nights. Most models show an increasing diurnal temperature range. The warm spell duration index in increasing in most projections.
3. The trends of the hydrological projection show slightly decreasing average and minimum inflows into the reservoir, and an increase in extreme events.
4. An increasing trend in reservoir sedimentation is predicted, which is mainly due to the increase in maximum discharge events.
5. Extreme climate events projected are droughts, extreme rainfalls/flows, flash floods, heat waves, dust storms.

The main identified climate risks by project component are listed below:

[2] United States Agency for International Development. 2016. *Climate Change Risk in Afghanistan: Country Fact Sheet*.
[3] UN Assistance Mission in Afghanistan. 2010. *Afghanistan: Floods affect thousands in Helmand and Uruzgan.*

1. **Increase in reservoir storage.** The increase in reservoir storage capacity is necessary to overcome the combined effect of future increase in drought and future increase in domestic and agricultural water demand. The storage capacity should be increased such that these requirements can be met. The dam construction needs to be constructed in such a way that it is able to cope with future extreme events, which are likely to be more severe than in present times. Furthermore, increased sedimentation rates need to be taken into account to determine the lifetime of the increased storage. Most important risks for this part of the project design are therefore a decrease in total future inflows, and an increase in future extreme flows.
2. **Rehabilitation and modernization of water management structures in the irrigation systems.** In the absence of modernization, current irrigation practices combined with future increases in temperature-driven crop evapotranspiration demands will likely lead to water stress and shortages. As such, a key important risk for this part of the project design is an insufficient increase in water use efficiency by the rehabilitation of existing structures, and water productivity from the on-farm interventions.
3. **Water pipeline to Kandahar city.** Since water consumption per capita increases strongly with temperature, the supply needs sufficient water transport capacity to fulfil future peak demands in the city. Besides, future water quality is adversely affected by higher temperatures, which may require improvement or expansion of water treatment facilities. The most important risks for this part of the Project design are inadequate water transport capacity and lack of water quality insurance.

D. Climate Risk Screening Tool and/or Procedure Used

Desk-based analysis and the PREVIEW Data Platform by the United Nations Environment Programme.

IV. CLIMATE ADAPTATION PLANS WITHIN THE PROJECT

Adaptation Activity	Target Climate Risk	Estimated Adaptation Costs ($ million)	Adaptation Finance Justification
Output 1: Increasing storage capacity via raising dam height of the Dahla Dam by 13.6 meters, road realignment, and improving capacity in dam operation and flow operation.	Floods, future increase in inter-annual variability in flows due intense and variable precipitations	78.24	The investment will address issues on future increase in drought and domestic and agricultural water demand. Current reservoir cannot handle strongly the fluctuating water availability as a result of wet and dry years. Increased intensity of precipitation events can also lead to upstream soil erosion and greater siltation of reservoirs. Ahead of project formulation, ADB undertook a climate change assessment for the agriculture and water resources sectors and consultation with key government stakeholders including MEW and MAIL on adaptation investment needs. It particularly identified multi-purpose dams with climate-resilient irrigation, hydropower, and water resources management as priority project investments.[4] Therefore, this component is

[4] ADB. 2016. *Economics of Climate Change in Central and West Asia – Adaptation Component: Final Report*. TA Consultant's Report. Manila (TA 8119-REG).

Adaptation Activity	Target Climate Risk	Estimated Adaptation Costs ($ million)	Adaptation Finance Justification
			deemed predicated in part on climate change adaptation objectives (Type II adaptation).[5] Recognizing the multiple objectives and rationale for the project, only 30% of the component cost is categorized as adaptation finance.
Output 2: Improvement of irrigation and drainage services by operating entity, and support improvement of community irrigation services.	Floods, heatwaves, droughts, increase in daily maximum temperatures and heat wave frequency	16.86	Will address issues on irrigation inefficiencies alongside with prospective higher evapotranspiration demands of the crops due to the increasing temperatures. Hydrological study showed that future inflows into the Arghandab reservoir are insufficient to fulfill all irrigation demands during dry years, even if all water can be retained by the reservoir with increased storage capacity. In line with output 1, the component is deemed Type II adaptation, and 30% of the component cost (excluding grant fees) is categorized as adaptation finance.
Output 3: Capacity building, demonstration activities, and small grants for farmers on climate-smart on-farm irrigation and agriculture technologies.	Extreme events including droughts, storms, floods.	23.85	Will address poor climate-adaptive capacity of farmers in agricultural management versus droughts, increasing temperatures and floods. In line with output 1, this component is deemed Type II adaptation, and 100% of component cost (excluding grant fees) is categorized as adaptation finance.
Output 4: Increased capacity in water resources management and use including water regulation reform, staff training to master's level, establishment of national hydrological modelling platform, and strategic water resources	Future increase in inter-annual variability in flows due intense and variable precipitations.	4.70	In line with output 1, this component is deemed Type II adaptation, and 100% of the component cost is categorized as adaptation finance.

[5] ADB. 2016. *Guidance Note on Counting Climate Finance in Urban and Water.* Manila.

Adaptation Activity	Target Climate Risk	Estimated Adaptation Costs ($ million)	Adaptation Finance Justification
management.			

Source: Asian Development Bank.

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Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Economic And Financial Analysis

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Asia and the Pacific Division
Programme Management Department

ECONOMIC AND FINANCIAL ANALYSIS

A. Introduction

1. The economic and financial analysis is based on the Asian Development Bank (ADB) Guidelines for the Economic Analysis of Projects (2017), Financial Due Diligence Note (2009) and Preparing and Presenting Cost Estimates for Projects and Programs Financed by the ADB (2014). Under the project, ADB resources or ADB-administered resources will finance the following outputs: (i) Dahla Dam capacity increased, (ii) reliability of irrigation water supply increased, (iii) agricultural water productivity improved, and (iv) capacity in water resource management and use strengthened, referred to in this document as component 1 for output 1, and component 2 for outputs 2–4. Other investments not financed by this project but prepared by ADB and being implemented in parallel, will provide Kandahar with an urban and industrial water supply, and bring additional power generation capacity for Kandahar City and its surroundings, referred to in this document as components 3 and 4 respectively.

2. The cost and benefit will be completed in the facilities from upstream to downstream investments as a package. Hence direct investment components as well as parallel financing components are included in the economic analysis. While the hydropower and urban water supply economic costs and benefits were included in the economic analysis, they have not been included in the financial analysis as the project is non-revenue generating. The financial analysis, however, examined the financial sustainability of the implementing agencies. The approach was to identify projected incremental recurrent costs and to assess the capacity of the implementing agencies to absorb these.

B. Country and Sector Context

3. The 2016 Human Development Report ranked Afghanistan 169th out of 188 countries and the lowest performer in Asia.[1] In the Subnational Human Development Index of Afghanistan, the South regional group which includes Kandahar is the bottom ranked region.[2] While annual economic growth between 2003 and 2012 averaged 9.3%, growth has slowed considerably averaging 2.5% between 2013 and 2017. With population growth of nearly 3%, the weak growth, attributed to political instability and deteriorating security conditions, is insufficient to create jobs for people entering the labor force and to reduce poverty. A severe infrastructure deficit limits private sector activity, reducing job creation and economic growth.[3] With low domestic revenue at less than 12% of gross domestic product (GDP), operating and development budgets are financed mainly by donor assistance, accounting for 56% of budget revenue.

4. The availability of water in the Arghandab sub-basin, along with the rest of Afghanistan, is highly seasonal and erratic, with frequent droughts affecting agriculture, living standards, and the local economy. Irrigated agriculture in Kandahar vicinity is solely dependent on Dahla Dam, which stores seasonal runoffs from snowmelt in high mountains. The dam's reservoir is believed to have lost around one third of its storage capacity due to sedimentation over 64 years of operations, hence its ability to provide regulated flows during frequent droughts and floods is seriously constrained. Promoting stability and growth in Kandahar province is a priority for the government, but the potential for socio-economic development in the province is severely

[1] UNDP. 2017. *Human Development Report 2016: Human Development for Everyone.*
[2] Global Data Lab. 2018. *Subnational Human Development Index version 1.0, Institute for Management Research*. Radbound University.
[3] ADB. 2017. *Country Partnership Strategy: Afghanistan, 2017–2021.* Manila.

impeded by the lack of access to sustained and reliable water and by chronic power shortage. In particular, only 47% of land with water rights is irrigated with 20% reduced yield due to water stress and only 110% cropping intensity is achieved, less than 10% of Kandahar household population served by water system and load shedding of 582,266 megawatt-hours (MWh) per year.

C. Demand Analysis

5. **Irrigation.** Afghanistan has adequate irrigation water supplies but poor institutions and infrastructure hamper efficient distribution and management of water.[4] Only 10% of irrigated land has formal irrigation systems with other areas depending on inefficient informal systems (footnote 3). There are 120 community-managed irrigation systems utilizing water from Arghandab River, downstream of Dahla Dam, with a command area of estimated 54,088 hectares (ha), out of total land area with water rights of 115,000 ha. The current core constraint is inefficient management of water, which in turn results in lack of available water and low productivity from water. The current service level is a substantially reduced period of water release, totaling 4-5 months per year during spring, summer and autumn periods. There are significant losses in water transmission from the diversion structures to farm fields, as most structures that are not part of the Arghandab Irrigation System are earthen open intakes that are, along with canals, severely eroded from high-flow events (increasing with climate change). Irrigation water losses are estimated to be about 66% of the water leaving the dam actually reaching farm fields, while traditional methods of on-farm flood irrigation results in low water use efficiency.

6. From current irrigated area among six crop types of 54,088 ha,[5] the changes in cropped land areas over 20-year period were based upon likely farmer responses to increased irrigation water reliability and uptake of new irrigation and crop agronomic technologies, combined with a response to price incentives for quality farm produce (

7. Table 1) are: (i) efficient usage of water results in extra 4,350 ha of cultivated land; (ii) area with a second crop increases from 5,408 ha to 16,258 ha; (iii) cropping intensity rises from 110% to 128%; (iv) proportion of land adopting Climate Smart Irrigation Technology (CSIT) CSIT and CSIT combined with Integrated Pest and Disease Management (IPDM) and Agronomic Technology starts at 4.5% at year 5 and reaches 77% by year 20, based on Rogers adoption curve.[6] The expected rate of uptake of these Afghan-proven technologies results from active farmer demonstrations, and farmer field schools with core of early adopter farmers within first five years. Adoption will increase at a rising rate as late adopters take up the new practices followed by the wider majority. A minority of farmers is expected to adopt CSIT only due to affordability of additional investment in IPDM and agronomic technologies.[7]

Table 1. Crop areas (ha)

	Baseline	Y5	Y10	Y15	Y20
Total Land Area Cultivated	54,088	54,909	56,533	57,569	58,438
Incremental Land Area Cultivated	0	821	2,445	3,481	4,350
Total Land Area 2nd Cropping	5,408	6,229	8,735	12,817	16,258
Cropping Intensity	110%	111%	115%	122%	128%
Total Land Area CSIT and CSIT/IPDM/AT	0	2,474	11,167	23,722	45,254

[4] Civil-Military Fusion Centre. 2012. Irrigation, Profits & Alternatives Crops.
[5] Based from farm survey data (transaction technical assistance (TRTA) Farmer Survey, May 2018).
[6] Reference: Innovation Adoption Curve
[7] Examples include wire trellising grapes, retraining and replanting orchards or laser levelling of land and setting up vegetable bed systems as well as trickle irrigation of existing land.

	Baseline	Y5	Y10	Y15	Y20
CSIT and CSIT/IPDM/AT Share of Total Land Area	0%	5%	20%	41%	77%

AT = Agronomic Technology; CSIT = Climate Smart Irrigation Technology; ha = hectare, IPDM = Integrated Pest and Disease Management
Source: TRTA Consultants. 2019.

8. **Urban water supply**. Nationally, only 36% of the population use safely-managed drinking water. In the Afghanistan Living Conditions Survey 2016-17 (ALCS), access to sufficient supply of drinking water is the top concern of communities.[8] Kandahar water service can only supply less than 10% of the household population. Component 3 will supply 100 liters per capita per day (lpcd) for the projected 2033 Kandahar City population of 1.29 million, estimated at 47,200 megaliters (ML) per year,[9] and 50 lpcd for the projected 2035 million population of 0.20 million for the village area.

9. **Power supply**. Only about 30% of the population has access to grid-connected electricity. Afghanistan ranks among the lowest 5% of nations in per capita energy consumption globally and is a net energy importer (footnote 3). The country is in the bottom 15% in access to electricity in the World Bank Doing Business 2018.[10] In a subnational index, Kandahar ranked fourth of five provinces in access to electricity.[11] 447,029 customers in Afghanistan's South East Power System (SEPS) and the North East Power System (NEPS), excluding areas north of Kabul, has peak demand of 462 megawatts (MW) and currently suffers from load shedding of about 582,266 MWh per year. Component 4 will supply an average of 143,038 MWh per year to SEPS and NEPS with transmission and distribution (T&D) losses estimated at 8.26%.[12]

D. Cost-benefit Analysis

1. Approach and Methodology

10. The economic internal rate of return (EIRR) is based on streams of costs and benefits resulting from (i) raising Dahla Dam to improve water availability, (ii) enhancing efficiency of existing irrigation networks and agriculture value chains, (iii) significantly improving water supply for Kandahar City and Arghandab Valley village populations and iv) generating and transmitting hydroelectric power supply to SEPS, as well as NEPS. The EIRR was calculated in 2018 constant prices in dollar terms, using border price as numeraire. The standard conversion factor (SCF) of 0.9481 was calculated from trade data for Afghanistan for the period 2012-2016.

11. The exchange rate used was AF80.72 per USD. Capital and Operation and Maintenance (O&M) costs include materials, equipment, labor (foreign skilled labor, local skilled labor, and local unskilled labor), physical contingency, land, resettlement, environmental costs and security. Costs were categorized either as tradable or non-tradable and the latter adjusted by the SCF.

12. Appropriate shadow wage rate factors (SWRF) were determined for skilled and unskilled local labor. Skilled local labor that is in scarce supply has SWRF of 1.0, comprising actual wage rate and benefits. The SWRF for unskilled labor is 0.41 based on the daily wage for rural unskilled casual labor adjusted for seasonal employment in the course of a year.[13]

[8] Central Statistics Organization. 2018. Afghanistan Living Conditions Survey 2016–17 Highlights Report.
[9] Based on increasing population coverage from 80% in 2024 to 100% in 2031 and annual population growth.
[10] World Bank. 2018. *Doing Business 2018: Reforming to Create Jobs.*
[11] World Bank. 2017. *Doing Business in Afghanistan 2017.*
[12] Nangialai Miakhail DCEO/DABS meeting 25 July 2018.
[13] While casual rural wage is 86% of unskilled construction worker, seasonal employment of only 150 days per year

13. The economic net present value (ENPV) was discounted at the minimum required EIRR of 9% for the project over a 20-year period up to year 2043. The 20-year horizon is based on component 3 (urban water system) having the shortest economic life among the four project components. Residual value was estimated for all other assets with remaining economic life.

2. Economic Benefits

14. The component 1 'without project' scenario is Dahla Dam storage volume of 288 million cubic meter (m^3), a 40% reduction from the original 1952 storage capacity of 478 million m^3. Irrigation volume required cannot be supplied throughout the season, even in wet years, due to the limited water storage. The component 1 'with project' scenario is improved dam storage volume by 500 million m^3 to 788 million m^3 or 165% of the 1952 capacity. The benefits of component 1 are reflected in all other components.

15. Component 2 benefit is improved irrigation reliability and efficiency, resulting in expansion of irrigated area. Furthermore, there will be improved on-farm irrigation water efficiency, increased cropping intensity and yields, and a shift to higher value crops arising from agriculture value chain investments.

16. Farms adopting CSIT and CSIT + IPDM AgronTech experience improved gross margin (GM) over baseline flood irrigation technology water stressed model.[14,15] The drivers of GM gain over baseline are crop yield increase, crop price increase and cost savings. The ranges for each driver are: (i) yield increase from removing water stress,[16] efficient application of water, and better pest and disease, plant and harvest management: 25% to 125%; (ii) price increase[17] from better quality crop harvest and more effective marketing: nil to 10%; (iii) variable cost increase[18] (cost of additional labor offset by savings from avoiding water pumping cost): -60% to 207%.

17. Total gross margin was derived from land area distribution among six crop types and GM by crop type by technology for 'without project' (baseline) and years 5, 10, 15 and 20 'with project'. The 'without project' GM was adjusted for annual 3.88 MCM reduction in water due to sedimentation resulting in shrinking cultivated area and depletion of groundwater by year 15. The difference between total 'with project' and 'without project' GM is the incremental GM, ranging from $57 million in year 5 to $193 million in year 20.

18. The incremental GM from crop types cereals, cereals with vegetables, forage and two crop vegetable/fruit are non-incremental economic benefits, as outputs will displace imports. The incremental GM from crop types orchards and vineyards are incremental economic benefits as outputs will be new exports. All economic benefits are adjusted by the SCF.

19. Due to significantly improved service level, component 3 economic benefit[19] is

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lowers the SWRF.

[14] Crop prices were sourced from G.A. Kuhn. 2010. Roots of Peace Crop Income.

[15] Baseline water stressed model is 20% less yield to the baseline model of Roots of Peace Crop Income.

[16] An improvement of 20% is applied over baseline for all crops as a response in yields from CSIT. When IPDM with improved agronomic practices are included, this is increased further.

[17] Increased quality and prices for produce is assumed arising from future farmer produce marketing output revision for the project.

[18] Cost savings principally relate to the avoidance of ground water use. This has been costed in the baseline model using data collected from the TRTA Farmer Survey, May 2018. Casual labor is required for harvesting, planting, weeding and crop spraying for treatment of pests and diseases. This is usually over and above the normal basic family labor input. Casual labor has been apportioned to crops on the basis of person days/ha of crop.

[19] More details of economic benefit estimation are in the Economic and Financial Analysis Supplementary Document.

incremental modelled by a consumers' surplus in the primary market as it accounts[20] for all welfare changes in the primary and secondary markets. Consumer surplus is the quantity of project incremental output times the parameter -1/τ.[21] τ can be derived from the price elasticity of the demand for water which depends linearly on its price.[22,23] For the household consumer surplus, the price elasticity of demand ranges from -0.3 to -0.6 for developing countries, while the mean price elasticity of demand in a meta-analysis was -0.365, which is within the range for developing countries.[24] -0.44 was used as price elasticity for non-household consumer surplus as higher than households at -0.365 and the Kandahar non-household sector has less ability to substitute water demand than in industrialized countries.[25]

20. Component 4 output will result in incremental economic benefit from increased consumption for existing SEPS and NEPS customers[26] valued using the consumer surplus method.[27] The average price (tariff) was obtained from Da Afghanistan Breshna Shekat (DABS) for 2019 at AF7.49/kWh. Price elasticity of demand is inelastic at -0.2 and consumption level for 'without project scenario' is 578,472 MWh.[28,29] Willingness to pay for existing SEPS and NEPS customers is estimated at AF11.74/kWh. Annual incremental economic benefit, net of T&D losses, amounts to $18.1 million.

3. Economic Costs

21. The total economic cost is $772.2 million with investments for components 1 to 4 at $234.5, $215.2, $263.5, and $59.0 million, respectively. Component 1 investment comprises of raising the dam wall by 12 meters to 1,154 meters above sea level and the spillway by 13.6 meters to 1,149 meters above sea level, geotechnical instrumentation, dam site security fence, electrification along the dam, raised route bearer highway, recreational park, international panel of dam experts and dam safety staff training. Component 1 capital costs were estimated at $234.5 million in economic prices, excluding taxes and duties, price contingency and financing charges during construction. O&M economic cost based on 0.5% of capital cost is estimated at $0.99 million. Land cost of resettlement for inundated areas[30] was estimated at agricultural

[20] P. Choynowski. 2018. *Measuring Welfare Gains from Infrastructure Projects: Power, Road Transport and Water and Sanitation*.
[21] $CS = -(1/\tau)(q^w_1 - q^w_0)$.
[22] Price elasticity of demand is $\eta_p = \tau p^w$
[23] Household tariff is AF35/m^3 while non-household tariff is AF45/m^3; AUWSSC technical deputy Mr. Latif Mozafarkhil telephone interview 19 June 2019.
[24] M. Sebri. 2017. *A meta-analysis of residential water demand studies*. Environ. Dev. Sustain. 2014, 16, 499–520 in A. Reynaud; G. Romano. 2018. *Advances in the Economic Analysis of Residential Water Use: An Introduction*. Water 2018, 10, 1162.
[25] Based on a meta-analysis of 120 municipalities in the United States having a range of -0.44 to -0.97 while that of 51 French industrial facilities had a range of -0.10 to -0.79.
[26] Due to peak demand behaviour, SEPS alone could not fully absorb the power output of Dahla. NEPS consumption is made possible by PTEC grid interconnection completion in 2020.
[27] Consumer surplus $CS = 0.5[P_E (\Delta Q)^2 / (e_d Q_1)]$ where P_E is tariff rate, ΔQ is incremental power production at 13.6m raise, e_d is price elasticity of demand and Q_1 is existing consumption level.
[28] SEPS is 113,621 MWh from C-4 Feasibility Study. NEPS is 464,851 MWh based on 983,340 x 260 MW/550 MW = 464,851 MWh; The consumers in Kabul comprise by far the majority of customers of NEPS. Per line 27 of the draft report on Component 4, an estimated 3.23 million people have access to electricity. This is equal to 3,230,000/8.92 (reference line 27) = 362,108 customers. If they did not suffer from load shedding, their estimated average consumption would equal 362,108 x (310 watts (reference line 28)/1,000,000) x 24 x 365 = 983,340 MWh in a year.
[29] ADB. 2013. Power Sector Master Plan, Consultant's report. Manila (TA 7637-AFG).
[30] Based on preliminary estimates for size of land and land-use opportunity loss between inundated and relocation areas since land acquisition and resettlement process is at preliminary stage due to no physical access to the upstream affected villages and a long process of rectification of topographical survey in collaboration with affected persons.

production opportunity loss of $0.05 million annually. With a 100-year life, the residual value of the dam in 2043 was estimated at $141.1 million in economic price.

22. Component 2 investment comprises irrigation modernization and climate smart productive use of water in farming, supported by building capacity of support services. Component 2 capital costs were estimated at $215.2 million in economic prices, excluding taxes and duties, price contingency and financing charges during construction. With a 30-year life, the residual value of the irrigation system upgrade in 2043 was estimated at $14.0 million in economic price. Farms adopting CSIT and CSIT + IPDM AgronTech incur capital costs. Incremental capital expenditure for years 5, 10, 15 and 20 is offset against the investment of the project for the output 'adoption of climate resilient on-farm agricultural technologies'. Farms adopting CSIT and CSIT + IPDM AgronTech also incur annual O&M costs. These are estimated at 15% of capital costs, reaching $16.2 million by year 20. The annual O&M costs for the irrigation systems comprising of the Arghandab Irrigation System and 120 community systems are estimated at $0.54 million.

23. The component 3 investment of $263.5 million comprises of two systems for Kandahar City and the Arghandab Valley village area[31] along the route of the water transmission main. Component 4 investment of $59.0 million comprises: two Dahla Dam Hydroelectric Power Stations; one substation; 110 kilovolts transmission line connecting to substation at Kandahar City and 20 kilovolts connection to medium voltage distribution lines.

4. Overall Economic Assessment

24. The economic analysis of components 1 to 4 shows that, with a hurdle rate of 9%, the project is economically viable with an EIRR of 15.7% in constant 2018 prices.

25. A sensitivity analysis was carried out to examine the robustness of the overall EIRR to adverse changes in key input variables with results summarized in Table 2. The overall project will remain economically viable under the following scenarios: (i) a 10% increase in capital cost for either component 1, 2, or 3, possibly arising from higher-than-expected inflation or higher costs due to security deterioration, flood damage or change in scope; (ii) 10% lower water flow into the dam due to less-than-forecast precipitation curtailing benefits of components 2 and 4; (iii) 10% lower water demand for component 3, arising from lower population growth or delay in implementation and expansion of the network; (iv) a 10% increase in capital cost for all components 1 to 4; and (v) a delay in benefits by a year for all components 1-4. Viability is most sensitive to water flow changes which is addressed by component 2 output on capacity building in water resource management.

Table 2. Overall project sensitivity analysis ($ million)

Change in Variable	EIRR	Base Case Value	Sensitivity Indicator	Switching Value	ENPV
Base case	**15.7%**				**318**
C1 capital cost increases by 10%	15.3%	235	0.38	265%	306
C2 capital cost increases by 10%	15.5%	215	0.22	454%	311
C3 capital cost increases by 10%	15.1%	263	0.51	197%	302
Water flow is 10% lower (Mm^3)	14.0%	1168	2.96	34%	224
C3 water demand is 10% lower (lpcd)	15.3%	100	0.70	42%	296
Combination					
C1-C4 capital cost increase by 10%	14.5%		1.19	84%	280
C1-C4 one year delay	14.7%	no delay	0.11	7.2 years	282

EIRR = economic internal rate of return, ENPV = economic net present value, lpcd = liters per capita per day, Mm^3 = million cubic

[31] These are 48 Arghandab Valley rural communities along the route of the transmission main.

meters, O&M = Operation and Maintenance
Source: Asian Development Bank estimates.

26. A distribution analysis reveals beneficiaries from this project include up to 58,438 cultivated land involving 11,697 farmers for irrigation and agriculture development,[32] up to 2033 Kandahar City population of 1.29 million and 2035 population of 0.20 million for the 48 Arghandab Valley rural communities along the route of the transmission main for urban and industrial water supply, and up to 447,029 households in Afghanistan's SEPS and NEPS, excluding areas north of Kabul, for alleviating load shedding.

E. Financial Sustainability Analysis

1. Component 1: Raising Dahla Dam and Six Saddle Dams

27. The implementing agency for component 1 is Ministry of Energy and Water (MEW). As this component is non-revenue generating, the approach was to identify projected incremental recurrent costs and to assess MEW's capacity to absorb these. The annual O&M costs are 0.5% of capital costs, estimated at $1.08 million, to be incurred from 2026.[33] This will need to be funded by budgetary allocation from MEW or water service charges to be developed by the project and implemented by the Arghandab Sub-Basin Agency (ASBA). MEW is unlikely to absorb these costs unless additional budget is allocated to MEW, as ASBA has historically undertaken nil maintenance for Dahla Dam.[34]

2. Component 2: Irrigation and Agriculture Development

28. The implementing agency for component 2A is MEW and for component 2B is the Ministry of Agriculture, Irrigation and Livestock. As this component is non-revenue generating, the approach was to identify projected incremental recurrent costs and to assess the capacity of the implementing agencies to absorb these.

29. The annual incremental O&M costs for component 2A (Table 3) are comprised of the Arghandab Irrigation System (AIS) and the community irrigation systems involving 54 AIS community systems and 66 non-AIS community systems. The two 'without project' O&M cost columns show required and actual 'without project' O&M.[35] The 'with project' O&M shows savings from required 'without project' O&M, as less O&M is required due to the upgrade of the irrigation system.[36]

Table 3. Annual O&M costs

Category	Required without project	Actual without project	With project	Incremental O&M cost
AIS	$700,000 = 20k	Current ASBA	$630,000 = 10% savings from cross-section	$555,000

[32] 90% of cultivated land area with 4.5 ha farm size and 10% of cultivated land area with 600 ha farm size based from farm survey data (TRTA Farmer Survey, May 2018) and consistent with CIDA socio-economic survey of 2011.
[33] The O&M from 2023 to 2025 is covered by 3-year defect liability period included with capital costs.
[34] MEW refused to provide its financial statements for confidentiality reasons and ASBA did not respond to queries on annual funding.
[35] The cost of O&M is carried by the community paying a fee to the Mirab who takes care of the operation and the very small repairs. Larger repairs are carried out by community effort in labor or a special collection of funds for work that cannot be done by community labor (e.g. purchase of steel and cement). Actual mobilized labor and financial contributions fall in some systems short of what it should be. It was assumed that the shortfall is an average of 15% over all systems.
[36] The project's upgrading works will reduce the occurrence of side slope collapse and the need for periodical cross-section restoration. On the other hand, the lining will need annual repairs.

Category	Required without project	Actual without project	With project	Incremental O&M cost
	ha x $35	budget $75,000	restoration net of lining repairs	
54 AIS community systems	$160,000 = 20k ha x $8	$136,000 = 20k ha x $6.80	$144,000 = 10% savings from avoidance of side slope collapse net of lining repairs	$8,000
66 non-AIS community systems	$420,000 = 30k ha x $14	$357,000 = 30k ha x $11.9	$373,500 = 11% savings from durability of diversion structures, main intakes, and related riverbank protection and avoidance of side slope collapse net of lining repairs	$16,500

AIS = Arghandab Irrigation System, ASBA = Arghandab Sub-Basin Agency, ha = hectare, O&M = operation and maintenance.
Source: TRTA Consultants. 2019.

30. The AIS includes the Arghandab Weir and an irrigation 'main system' feeding the 54 AIS community systems. The 66 non-AIS community systems have main intakes on Arghandab River. The incremental O&M for AIS is $0.56 million, while that of the community systems is $0.02 million. Similar to the dam, the annual incremental O&M costs for AIS will need to be funded by budgetary allocation from MEW or water service charges to be developed by the project and implemented by ASBA. The incremental O&M costs for the community systems will be funded by farmers, similar to current arrangements.

31. The annual incremental O&M costs for component 2B is 15% of capital costs (Table 4) to cover the cost of maintaining and operating capital items such as trellis networks and on-farm irrigation systems, advisory services, local fees for regulatory management of food safety, farm inspections, transport equipment maintenance, delivery of produce, and on-farm management and marketing costs.

Table 4. Annual O&M cost by crop type and technology ($/ha)

Crop type	Orchard	Vineyards	Cereals only	Cereals with veg/fruits	Forage (Alfalfa based)	2 crop veg/fruit
CSIT	225	225	135	263	135	225
CSIT, IPDM, AT	330	555	169	401	169	330

AgronTech = Agronomy Technology, CSIT = Climate Smart Irrigation Technology, ha = hectare, IPDM = Integrated Pest and Disease Management, O&M = Operation and Maintenance, veg/fruit = vegetable/fruit
Source: TRTA Consultants. 2019.

32. Annual incremental O&M is estimated at $1 million in year 5 and reaches $16 million by year 20 (Table 5). This is likely to be funded by adopting farmers through the farmer-owned company, an output of component 2.

Table 5. Annual O&M cost by year ($ million)

		Y5	Y10	Y15	Y20
Orchards	CSIT only	0	0	0	0
	CSIT, IPDM, AT	0	0	1	2
	Total	**0**	**0**	**1**	**2**
Vineyards	CSIT only	0	0	0	1
	CSIT, IPDM, AT	0	1	2	6
	Total	**0**	**1**	**3**	**6**
Cereals only	CSIT only	0	0	0	0
	CSIT, IPDM, AT	0	0	1	1
	Total	**0**	**0**	**1**	**2**
Cereals with veg/fruits	CSIT only	0	0	0	0
	CSIT, IPDM, AT	0	1	2	3
	Total	**0**	**1**	**3**	**4**
Forage (Alfalfa based)	CSIT only	0	0	0	0
	CSIT, IPDM, AT	0	0	0	0
	Total	**0**	**0**	**0**	**0**
2 crop veg/fruit	CSIT only	0	0	0	0

CSIT, IPDM, AT	0	0	1	1
Total	**0**	**0**	**1**	**2**
Total Annual O&M, $ million	**1**	**4**	**8**	**16**

AT = Agronomy Technology, CSIT = Climate Smart Irrigation Technology, IPDM = Integrated Pest and Disease Management, O&M = Operation and Maintenance, veg/fruit = vegetable/fruit.
Source: TRTA Consultants. 2019.

Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Eirr Afg Aiwrd Project 20190716

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

EIRR for Arghandab Integrated Water Resources Development Investment Project

Currency: US dollars, in 2018 prices

Numeraire: border prices

Exchange rate (AF per $): 80.72

Year	Electricity	Urban HH Water	Urban non-HH Water	Village Water
	Sold (MWh)	Sold (ML)	Sold (ML)	Sold (ML)
2018				
2019				
2020				
2021				
2022				
2023				
2024		28 945	2 894	2 784
2025		31 676	3 168	2 859
2026	131 223	34 546	3 455	2 936
2027	131 223	35 582	3 558	3 016
2028	131 223	36 650	3 665	3 097
2029	131 223	37 749	3 775	3 181
2030	131 223	38 882	3 888	3 267
2031	131 223	44 498	4 450	3 355
2032	131 223	45 833	4 583	3 446
2033	131 223	47 208	4 721	3 539
2034	131 223	47 208	4 721	3 634
2035	131 223	47 208	4 721	3 732
2036	131 223	47 208	4 721	3 732
2037	131 223	47 208	4 721	3 732
2038	131 223	47 208	4 721	3 732
2039	131 223	47 208	4 721	3 732
2040	131 223	47 208	4 721	3 732
2041	131 223	47 208	4 721	3 732
2042	131 223	47 208	4 721	3 732
2043	131 223	47 208	4 721	3 732

Memorandum Items and Assumptions

Economic opportunity cost of capital (discount rate):

HYDROPOWER

Transmission and distribution losses

Power supply generated (MWh)

Tariff (AF/MWh)

Price elasticity of demand

Consumption SEPS and NEPS (MWh/year)
Economic benefit electricity (AF/kWh)

URBAN WATER
Unaccounted for water (UAW), 2024
Unaccounted for water (UAW), 2025
Kandahar population 2018 (million)
Kandahar annual population growth rate (%)
Water volume Kandahar (lpcd)
Coverage (\ 2024
Coverage (\ 2025
Coverage (\ 2026
Coverage (\ 2031
Non-domestic (% of residential demand)
Water tariff residential (AF/'000 liter)
Water tariff commercial/institutional (AF/'000 liter)
Price elasticity of demand for water (residential)
Price elasticity of demand for water (commercial/industrial)
Villages population 2018 (million)
Villages annual population growth rate (%)
Water volume villages (lpcd)
Unaccounted for water (UAW) for villages

IRRIGATION
Incremental (new exports orchards, vineyards, 50% 2 crop veg/fruit)
Year 5 incremental GM ($'m)
Year 10 incremental GM ($'m)
Year 15 incremental GM ($'m)
Year 20 incremental GM ($'m)
Non-Incremental (import substiution cereals, cereals with veg/fruit, 50% 2 crop veg/fruit)
Year 5 incremental GM ($'m)
Year 10 incremental GM ($'m)
Year 15 incremental GM ($'m)
Year 20 incremental GM ($'m)

Shadow Pricing of Capital, Operating and Maintenance Costs

HYDROPOV Update of Mathematical Model of Power Production at Dahla Dam rev 18.xlsx and Cost Estimate I

Capital Cost (financial, $ mill

		Non-tradable
Materials	16.75	4.19
Equipment	22.43	0.00
Skilled local labor	4.76	0.00

Unskilled local labor	3.48		3.48
Skilled imported labor	3.08		0.00
Land			0.00
Environment costs			0.00
Resettlement/safeguard costs			0.00
Security costs	5.05		5.05
Taxes and duties	3.59		0.00
Interest during construction			0.00
Physical contingency	5.98		0.00
Price contingency	7.06		0.00
Subtotal	**72.18**		
Total:	**72.18**		

Operation and Maintenance Cost (financial, $ millions)

2% of generation, lines and substation capit	1.23		0.49
Total:	**1.23**		

IRRIGATION AND AGRICULTURE DEVELOPMENT

Capital Cost (financial, $ mill

			Non-tradable
Materials	37.36	net out tax	3.55
Equipment	10.64		0.00
Skilled local labor	37.77		0.00
Unskilled local labor	8.78		8.78
Skilled imported labor	14.23		0.00
Land			0.00
Environment costs			0.00
Resettlement/safeguard costs	6.60		6.60
Security costs	0.56	ok	0.56
Taxes and duties	5.45	ok	0.00
Interest during construction	0.78	ok	0.00
Physical contingency	9.53	ok	0.00
Price contingency	4.73	ok	0.00
Subtotal	**136.43**		
		358.50	
Total:	**136.43**		
Year 5 incremental capex ($'m)	5.05		0.29
Year 10 incremental capex ($'m)	19.22	61%	1.09
Year 15 incremental capex ($'m)	27.66		1.57
Year 20 incremental capex ($'m)	56.32		3.20

Operation and Maintenance Cost (financial, $ millions)

AIS and community systems irrigated area	0.56		0.22
Year 5 farm annual O&M ($'m)	0.76		0.04

Year 10 farm annual O&M ($'m)	3.64		0.21
Year 15 farm annual O&M ($'m)	7.79		0.44
Year 20 farm annual O&M ($'m)	16.24		0.92

DAM

Capital Cost (financial, $ mill

			Non-tradable
Materials	58.59	net out tax	7.01
Equipment	75.49		0.00
Skilled local labor	23.42		0.00
Unskilled local labor	11.99		11.99
Skilled imported labor	20.54		0.00
Land			0.00
Environment costs	0.32		0.32
Resettlement/safeguard costs	20.47		20.47
Security costs	15.01	ok	15.01
Taxes and duties	10.49	ok	0.00
Interest during construction			0.00
Physical contingency	17.95	ok	0.00
Price contingency	8.58	ok	0.00
Subtotal	**262.86**	**221.32**	
Total:	**262.86**		
Annual land cost for production foregone ($	0.05		0.05

Operation and Maintenance Cost (financial, $ millions)

0.5% of capital cost	0.99	0.08
Total:	**0.99**	

URBAN WATER

Capital Cost (financial, $ mill

		Non-tradable
Materials	91.35	9.13
Equipment	55.13	0.00
Skilled local labor	13.50	0.00
Unskilled local labor	22.33	22.33
Skilled imported labor	35.73	0.00
Land		0.00
Environment costs		0.00
Resettlement/safeguard costs		0.00
Security costs	19.49	19.49
Taxes and duties	16.99	0.00
Interest during construction		0.00

Physical contingency		40.55	0.00	
Price contingency		16.80	0.00	
Subtotal		**311.86**		
	Total:	**311.86**		

Operation and Maintenance Cost (financial, $ millions)

Urban O&M @ $168 per ML of water with U			6.79	2.04	
Current urban O&M @ $70 per ML of water			-0.21	-0.06	
Village O&M @ $126 per ML of water with U			0.40	0.12	
Urban	Village	$126		50	38
		Total:	**6.99**		

Standard Conversion Factor

(US$ millions)

	2010	**2011**	**2012**	**2013**	**2014**
Imports (cif)	5 154	6 390	9 832	8 724	7 729
Exports (fob)	388	376	415	515	571
Import taxes/duties	596	651	567	510	449
Import subsidies					
Export taxes/duties	0	3	4	1	2
Export subsidies					
SCF:	0.9030	0.9126	0.9479	0.9478	0.9489

Source:
ADB Key Indicators for Asia and the Pacific 2017
International Monetary Fund, Government Finance Statistics Yearbook and data files.
Derived import/export taxes from IMF % of total taxes

					Economic Costs	
C1 Dam Capital Cost ($ millions)	**C1 Dam O&M Cost** ($ millions)	**C2 Irrigation Agri-Devt Capital Cost** ($ millions)	**C2 Irrigation Agri-Devt O&M Cost** ($ millions)	**C3 Urban/ Village Water Capital Cost** ($ millions)	**C3 Urban/ Village Water O&M Cost** ($ millions)	**C4 HPP Capital Cost** ($ millions)
11.73		5.99		29.20		
11.73		5.99		98.10		
46.90		23.95		98.10		
58.68		29.94	0.15	29.20		
46.95		23.95	0.85	0.26	6.88	4.52
35.23		17.96	1.00	0.84	7.12	54.47
23.50	0.99	11.97	1.15	0.84	7.76	
0.05	0.99		1.30	0.84	7.99	
0.05	0.99		2.42	0.84	8.24	
0.05	0.99	0.24	2.99	0.84	8.49	
0.05	0.99	3.83	3.57	0.84	8.75	
0.05	0.99	3.83	4.14	0.84	9.99	
0.05	0.99	3.83	4.72	0.84	10.29	
0.05	0.99	5.52	6.09	0.84	10.61	
0.05	0.99	5.52	6.92	0.84	10.62	
0.05	0.99	5.52	7.74	0.26	10.63	
0.05	0.99	5.52	8.57		10.63	
0.05	0.99	5.52	9.40		10.63	
0.05	0.99	11.23	11.63		10.63	
0.05	0.99	11.23	13.31		10.63	
0.05	0.99	11.23	14.99		10.63	
0.05	0.99	11.23	16.68		10.63	
0.05	0.99	11.23	18.36		10.63	
-141.12	0.99	-14.01	18.36	-138.84	10.63	-21.12

9.0%	
8.3%	DABS meeting 25/7/18
143 038	Average year production 13.6m raise
7 490	DABS average tariff
-0.20	Fichtner, 2013. Islamic Republic of Afghanistan: Power Sector Master Plan, Technical Assistance Co

578 472	983,340 x 260 MW/550 MW = 464,851 MWh; The consumers in Kabul comprise by far the majorit
11.74	consumer surplus method $CS = 0.5[P_E (\Delta Q)^2 / (e_d Q_1)]$
27%	C3 feasibility study
20%	C3 feasibility study
0.83	Based on discussions with AUWSSC, it was agreed that a population figure of 830,165 should be a
3.0%	and a growth rate of 3% (Component 3 Feasibility Study, 2019).
100	In consultation with AUWSSC, a target water consumption of 100 LPCD for purposes of determinir
80%	C3 feasibility study
85%	C3 feasibility study
90%	C3 feasibility study
100%	C3 feasibility study
10%	Commercial, industrial and institutional requirements were established at 10% of domestic consu
35.00	AUWSSC technical deputy Mr. Latif Mozafarkhil telephone interview 19 June 2019
45.00	AUWSSC technical deputy Mr. Latif Mozafarkhil telephone interview 19 June 2019
-0.37	Sebri, M. A meta-analysis of residential water demand studies. Environ. Dev. Sustain. 2014, 16, 49
-0.44	Williams, M. and B. Suh (1986), "The Demand for Urban Water by Customer Class," Applied Econo
0.13	MRRD
2.7%	MRRD most of the internally displaced people more likely move to urban centers
50	MRRD
15%	new supply system

38.54
51.57
66.71
102.60
18.20
35.41
61.70
90.00

Lines and Substations 2018 rev 1.xlsx

Capital Cost (economic, $ millions)

Materials	16.54
Equipment	22.43
Skilled local labor	4.76

Unskilled local labor		1.43
Skilled imported labor		3.08
Land		0.00
Environment costs		0.00
Resettlement/safeguard costs		0.00
Security costs		4.79
Taxes and duties		0.00
Interest during construction		0.00
Physical contingency		5.98
Price contingency		0.00
Subtotal		**59.00**
	Total:	**59.00**

Operation and Maintenance Cost (economic, $ millions)

2% of generation, lines and substation capital cost		1.20
	Total:	**1.20**

Capital Cost (economic, $ millions)

Materials		37.18
Equipment		10.64
Skilled local labor		37.77
Unskilled local labor		3.62
Skilled imported labor		14.23
Land		0.00
Environment costs		0.00
Resettlement/safeguard costs		6.26
Security costs		0.53
Taxes and duties		0.00
Interest during construction		0.00
Physical contingency		9.53
Price contingency		0.00
Subtotal		**119.75**
	Total:	**119.75**
Year 5 incremental capex ($'m)		5.03
Year 10 incremental capex ($'m)		19.16
Year 15 incremental capex ($'m)		27.58
Year 20 incremental capex ($'m)		56.15

Operation and Maintenance Cost (economic, $ millions)

AIS and community systems irrigated area	0.54
Year 5 farm annual O&M ($'m)	0.76

Year 10 farm annual O&M ($'m)	3.63
Year 15 farm annual O&M ($'m)	7.77
Year 20 farm annual O&M ($'m)	16.19

Capital Cost (economic, $ millions)

Materials	58.23
Equipment	75.49
Skilled local labor	23.42
Unskilled local labor	4.94
Skilled imported labor	20.54
Land	0.00
Environment costs	0.30
Resettlement/safeguard costs	19.41
Security costs	14.23
Taxes and duties	0.00
Interest during construction	0.00
Physical contingency	17.95
Price contingency	0.00
Subtotal	**234.51**
Total:	**234.51**
Annual land cost for production foregone ($'m)	0.05

Operation and Maintenance Cost (economic, $ millions)

0.5% of capital cost	0.99
Total:	**0.99**

Capital Cost (economic, $ millions)

Materials	90.87
Equipment	55.13
Skilled local labor	13.50
Unskilled local labor	9.20
Skilled imported labor	35.73
Land	0.00
Environment costs	0.00
Resettlement/safeguard costs	0.00
Security costs	18.48
Taxes and duties	0.00
Interest during construction	0.00

Physical contingency		40.55
Price contingency		0.00
Subtotal		**263.46**
	Total:	**263.46**

Operation and Maintenance Cost (economic, $ millions)

Urban O&M @ $168 per ML of water with UAW				6.69
Current urban O&M @ $70 per ML of water with UAW				-0.20
Village O&M @ $126 per ML of water with UAW				0.40
Urban	165	Village	124	
			Total:	**6.88**

2015	**2016**	**2017**	**Total**	
7 723	6 534		40 542	
571	596		2 668	
494	359		2 379	
			0	
2	2		11	
			0	
0.9440	0.9524		**0.9481**	(5-year average for 2012-2016)

C4 HPP O&M Cost ($ millions)	TOTAL CAPITAL	TOTAL O&M	Total ($ millions)	C2 Irrigation Crop GM Exports ($ millions)	Increm C3 Household Urban/Village Water ($ millions)
			0.00		
	47	0	47		
	116	0	116		
	169	0	169		
	118	0	118	7.31	
	76	8	83	14.61	35.74
	108	8	117	21.92	38.90
1.20	36	11	47	29.23	42.22
1.20	1	11	12	36.53	43.47
1.20	1	13	14	39.01	44.77
1.20	1	14	15	41.48	46.10
1.20	5	15	19	43.95	47.47
1.20	5	16	21	46.42	53.90
1.20	5	17	22	48.89	55.50
1.20	6	19	25	51.76	57.15
1.20	6	20	26	54.63	57.26
1.20	6	21	26	57.50	57.37
1.20	6	21	27	60.38	57.37
1.20	6	22	28	63.25	57.37
1.20	11	24	36	70.05	57.37
1.20	11	26	37	76.86	57.37
1.20	11	28	39	83.66	57.37
1.20	11	30	41	90.46	57.37
1.20	11	31	42	97.27	57.37
1.20	-315	31	-284	97.27	57.37

ɔnsultant's Report, ADB.

y of customers of NEPS. Per line 27 of the draft report on Component 4, an estimated 3.23 million peopl

dopted for 2018, which is based on the estimate by USACE of the population for 2011

ıg supply requirements was adopted (Component 3 Feasibility Study, 2019).

ımption since no information was available with respect to non-domestic water consumption (Componeı

9–520 in Reynaud, A.; Romano, G. Advances in the Economic Analysis of Residential Water Use: An Intrc
ımics 18: 1275-1289 in Olmstead, S. and Stavins R., Managing Water Demand: Price vs. Non-Price Conseı

Summary economic capital costs

C1 Dam raising
C2 Irrigation and agriculture devt
C3 Urban/Village water
C4 Hydropower

Economic Benefits					
ıental			Non Incremental		Net
C3 Non-household	C4 HPP	TOTAL	C2 Irrigation		Economic
Urban Water	Electricity	Incremental	Crop GM Imports	Total	Benefit
($ millions)	($ millions)	($ millions)	($ millions)	($ millions)	($ millions)
					0.00
					0.00
		0.000		0	-47
		0.000		0	-116
		0.000		0	-169
		7	3	11	-107
3.48		54	7	61	-23
3.81		65	10	75	-42
4.15	18.09	94	14	107	60
4.27	18.09	102	17	120	107
4.40	18.09	106	21	127	113
4.53	18.09	110	24	134	119
4.67	18.09	114	27	141	122
5.35	18.09	124	30	154	133
5.51	18.09	128	34	162	140
5.67	18.09	133	39	171	146
5.67	18.09	136	44	179	153
5.67	18.09	139	49	187	161
5.67	18.09	142	54	195	168
5.67	18.09	144	58	203	175
5.67	18.09	151	64	215	179
5.67	18.09	158	69	227	190
5.67	18.09	165	75	239	200
5.67	18.09	172	80	252	211
5.67	18.09	178	85	264	221
5.67	18.09	178	85	264	548

ENPV= 317.95

EIRR= 15.69%

le have access to electricity. This is equal to 3,230,000/8.92 (reference line 27) = 362,108 customers. If they c

nt 3 Feasibility Study, 2019).

duction. Water 2018, 10, 1162.
rvation Programs, 2006.

234.5
227.7
263.5
59.0

784.6

Sensitivity Analysis ($'million)

		Base Case	Sensitivity	Switching
Change in variable	**EIRR**	**Value**	**Indicator**	**Value**
Base case	15.69%			
C1 capital cost increases by 10%	15.31%	235	0.38	265%
C2 capital cost increases by 10%	15.48%	215	0.22	454%
C3 capital cost increases by 10%	15.14%	263	0.51	197%
~~C4 capital cost increases by 10%~~	~~15.62%~~	~~59.00~~	~~0.09~~	~~246%~~
~~C1 O&M cost increases by 10%~~	~~9.65%~~	~~0.99~~	~~0.14~~	~~800%~~
~~C2 O&M cost increases by 10%~~	~~9.60%~~	~~18.36~~	~~0.84~~	~~220%~~
~~C3 O&M cost increases by 10%~~	~~9.56%~~	~~10.63~~	~~1.49~~	~~167%~~
~~C4 O&M cost increases by 10%~~	~~9.65%~~	~~1.20~~	~~0.06~~	~~1741%~~
Water flow is 10% lower (MCM)	13.98%	1168	2.96	34%
C3 water demand is 10% lower (lpcc	15.26%	100	0.70	42%
~~C1/C2 one year delay~~	~~10.30%~~	~~no delay~~	~~0.02~~	~~4.5 years~~
~~C3 one year delay~~	~~15.09%~~	~~no delay~~	~~0.07~~	~~over 20 years~~
~~C4 one year delay~~	~~10.14%~~	~~no delay~~	~~0.13~~	~~4.35 years~~
Combination				
C1-C4 capital cost increase by 10%	14.50%		1.19	84%
~~C1-C4 O&M cost increase by 10%~~	~~10.17%~~		~~1.24~~	~~80.5%~~
C1-C4 one year delay	14.70%	no delay	0.11	7.2 years

did not suffer from load shedding, their estimated average consumption would equal 362,108 x (310 watts (re

ENPV						
317.95		318.24				
306.24	1.00	#DIV/0!				
311.23	1.00	#DIV/0!				
302.08	1.00	#DIV/0!				
~~315.48~~	~~1.00~~	~~#DIV/0!~~	Nil impact so ignore			
~~33.17~~	~~1.00~~	~~#DIV/0!~~	Nil impact so ignore			
~~30.84~~	~~1.00~~	~~#DIV/0!~~	Nil impact so ignore			
~~28.63~~	~~1.00~~	~~#DIV/0!~~	Nil impact so ignore			
~~33.44~~	~~1.00~~	~~#DIV/0!~~	Nil impact so ignore			
224.18	1.00	#DIV/0!	C4 reduce l	1.00	C2 GM reduction	1.00	1.00
295.94	1.00	#DIV/0!	nil impact on GM as per Chris unless permanent, nil mpact C4 as wate				
~~66.80~~	~~1.00~~	#DIV/0!	C2 benefits delayed by 1 year		Nil impact so ignore		
~~296.79~~	~~1.00~~	#DIV/0!	C3 benefit delayed by a year		Nil impact so ignore		
~~59.02~~	~~1.00~~	~~#DIV/0!~~	C4 benefit delayed by a year		Nil impact so ignore		
280.31	1.00	#DIV/0!					
~~59.48~~	~~1.00~~	~~#DIV/0!~~	Nil impact so ignore				
282.05	1.00	#DIV/0!					

eference line 28)/1,000,000) x 24 x 365 = 983,340 MWh in a year.However, they do suffer from severe load sheddi

kills viability

r will still pass through turbine

ng, the only estimate I could find being from the following website: http://rta.org.af/eng/2017/08/28/in

creasing-electricity-load-shedding-in-kabul-concerning/. This website suggests that “Kabul needs 550 MV

V electricity, but unfortunately the city has now 260 MW electricity which can be equally distributed by D

›ABS to Kabul people”

Shadow Wage Rate Factor

Casual Rural Worker

Month	Casual daily wage (AFN)	Person-days Working per Month	Monthly Earnings (AFN)
January	300	0	0
February	300	0	0
March	300	30	9 000
April	300	30	9 000
May	300	0	0
June	300	0	0
July	300	0	0
August	300	30	9 000
September	300	30	9 000
October	300	30	9 000
November	300	0	0
December	300	0	0
Total		150	45 000

Source: C2 national consultant

SWRF factor unskilled 0.41

Construction Worker

Month
January
February
March
April
May
June
July
August
September
October
November
December
Total

Source: C1 national co

Unskilled

Daily wage (AFN)	Person-days Working per Month	Monthly Earnings (AFN)
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
350	26	9 100
	312	109 200

nsultant

EIRR for Arghandab Integrated Water Resources Development Investment Project

Currency: US dollars, in 2018 prices

Numeraire: border prices

Exchange rate (AF per $): 80.72

Year	Urban HH Water Sold (ML)	Urban non-HH Water Sold (ML)	Village Water Sold (ML)
2018			
2019			
2020			
2021			
2022			
2023			
2024	28 945	2 894	2 784
2025	31 676	3 168	2 859
2026	34 546	3 455	2 936
2027	35 582	3 558	3 016
2028	36 650	3 665	3 097
2029	37 749	3 775	3 181
2030	38 882	3 888	3 267
2031	44 498	4 450	3 355
2032	45 833	4 583	3 446
2033	47 208	4 721	3 539
2034	47 208	4 721	3 634
2035	47 208	4 721	3 732
2036	47 208	4 721	3 732
2037	47 208	4 721	3 732
2038	47 208	4 721	3 732
2039	47 208	4 721	3 732
2040	47 208	4 721	3 732
2041	47 208	4 721	3 732
2042	47 208	4 721	3 732
2043	47 208	4 721	3 732

Memorandum Items and Assumptions

Economic opportunity cost of capital (discount rate):

URBAN WATER

Unaccounted for water (UAW), 2024

Unaccounted for water (UAW), 2025

Kandahar population 2018 (million)

Kandahar annual population growth rate (%)

Water volume Kandahar (lpcd)
Coverage (\ 2024
Coverage (\ 2025
Coverage (\ 2026
Coverage (\ 2031
Non-domestic (% of residential demand)
Water tariff residential (AF/'000 liter)
Water tariff commercial/institutional (AF/'000 liter)
Price elasticity of demand for water (residential)
Price elasticity of demand for water (commercial/industrial)
Villages population 2018 (million)
Villages annual population growth rate (%)
Water volume villages (lpcd)
Unaccounted for water (UAW) for villages

Shadow Pricing of Capital, Operating and Maintenance Costs

URBAN WATER
Capital Cost (financial, $ mill

		Non-tradable
Materials	91.35	9.13
Equipment	55.13	0.00
Skilled local labor	13.50	0.00
Unskilled local labor	22.33	22.33
Skilled imported labor	35.73	0.00
Land		0.00
Environment costs		0.00
Resettlement/safeguard costs		0.00
Security costs	19.49	19.49
Taxes and duties	16.99	0.00
Interest during construction		0.00
Physical contingency	40.55	0.00
Price contingency	16.80	0.00
Subtotal	**311.86**	
Total:	**311.86**	

Operation and Maintenance Cost (financial, $ millions)

Urban O&M @ $168 per ML of water with U			6.79	2.04	
Current urban O&M @ $70 per ML of water			-0.21	-0.06	
Village O&M @ $126 per ML of water with U			0.40	0.12	
Urban	Village	$126		50	38

Total: **6.99**

Standard Conversion Factor

(US$ millions)

	2010	**2011**	**2012**	**2013**	**2014**
Imports (cif)	5 154	6 390	9 832	8 724	7 729
Exports (fob)	388	376	415	515	571
Import taxes/duties	596	651	567	510	449
Import subsidies					
Export taxes/duties	0	3	4	1	2
Export subsidies					
SCF:	0.9030	0.9126	0.9479	0.9478	0.9489

Source:

ADB Key Indicators for Asia and the Pacific 2017

International Monetary Fund, Government Finance Statistics Yearbook and data files.

Derived import/export taxes from IMF % of total taxes

Economic Costs						
Dam Capital Cost ($ millions)	**Dam O&M Cost** ($ millions)	**Irrigation Farm capital Cost** ($ millions)	**C3 Urban/ Village Water Capital Cost** ($ millions)	**C3 Urban/ Village Water O&M Cost** ($ millions)	($ millions)	($ millions)
			29			
			98			
			98			
			29			
			0	7		
			1	7		
			1	8		
			1	8		
			1	8		
			1	8		
			1	9		
			1	10		
			1	10		
			1	11		
			1	11		
			0	11		
				11		
				11		
				11		
				11		
				11		
				11		
				11		
			-139	11		

9.0%

27%	C3 feasibility study
20%	C3 feasibility study
0.83	Based on discussions with AUWSSC, it was agreed that a population figure of 830,165 should be a
3.0%	and a growth rate of 3% (Component 3 Feasibility Study, 2019).

100	In consultation with AUWSSC, a target water consumption of 100 LPCD for purposes of determinir
80%	C3 feasibility study
85%	C3 feasibility study
90%	C3 feasibility study
100%	C3 feasibility study
10%	Commercial, industrial and institutional requirements were established at 10% of domestic consur
35.00	AUWSSC technical deputy Mr. Latif Mozafarkhil telephone interview 19 June 2019
45.00	AUWSSC technical deputy Mr. Latif Mozafarkhil telephone interview 19 June 2019
-0.37	Sebri, M. A meta-analysis of residential water demand studies. Environ. Dev. Sustain. 2014, 16, 49
-0.44	Williams, M. and B. Suh (1986), "The Demand for Urban Water by Customer Class," Applied Econo
0.13	MRRD
2.7%	MRRD most of the internally displaced people more likely move to urban centers
50	MRRD
15%	new supply system

Capital Cost (economic, $ millions)

Materials	90.87
Equipment	55.13
Skilled local labor	13.50
Unskilled local labor	9.20
Skilled imported labor	35.73
Land	0.00
Environment costs	0.00
Resettlement/safeguard costs	0.00
Security costs	18.48
Taxes and duties	0.00
Interest during construction	0.00
Physical contingency	40.55
Price contingency	0.00
Subtotal	**263.46**
Total:	**263.46**

Operation and Maintenance Cost (economic, $ millions)

Urban O&M @ $168 per ML of water with UAW	6.69
Current urban O&M @ $70 per ML of water with UAW	-0.20
Village O&M @ $126 per ML of water with UAW	0.40

Urban 165 Village 124

Total:	**6.88**	

2015	**2016**	**2017**	**Total**	
7 723	6 534		40 542	
571	596		2 668	
494	359		2 379	
			0	
2	2		11	
			0	
0.9440	0.9524		**0.9481**	(5-year average for 2012-2016)

		Economic Benefits			
		Incremental Benefits			
HPP O&M Cost ($ millions)	Total ($ millions)	Irrigation Crop gross margin ($ millions)	Alt Irrigation Water ($ millions)	C3 Household Urban/Village Water ($ millions)	C3 Non-household Urban Water ($ millions)
	0.00				
	29.20				
	98.10				
	98.10				
	29.20				
	7.14			35.7	3.5
	7.95			38.9	3.8
	8.59			42.2	4.1
	8.83			43.5	4.3
	9.07			44.8	4.4
	9.32			46.1	4.5
	9.58			47.5	4.7
	10.82			53.9	5.3
	11.13			55.5	5.5
	11.44			57.2	5.7
	11.45			57.3	5.7
	10.89			57.4	5.7
	10.63			57.4	5.7
	10.63			57.4	5.7
	10.63			57.4	5.7
	10.63			57.4	5.7
	10.63			57.4	5.7
	10.63			57.4	5.7
	10.63			57.4	5.7
	-128.21			57.4	5.7

dopted for 2018, which is based on the estimate by USACE of the population for 2011

ıg supply requirements was adopted (Component 3 Feasibility Study, 2019).

ımption since no information was available with respect to non-domestic water consumption (Component 3

9–520 in Reynaud, A.; Romano, G. Advances in the Economic Analysis of Residential Water Use: An Introdu
ımics 18: 1275-1289 in Olmstead, S. and Stavins R., Managing Water Demand: Price vs. Non-Price Conserva

Net Economic Benefit	Sensitivity Analysis		($'million) Base Case
Benefit	**Change in variable**	**EIRR**	**Value**
($ millions)	Base case	13.13%	
0	C3 capital cost increases by 10%	12.06%	263.46
0	C3 O&M cost increases by 10%	12.89%	10.63
-29	C3 water demand is 10% lower (lpcd)	12.05%	100
-98	C3 one year delay	11.87%	no delay
-98			
-29			
32.1			
34.7			
37.8			
39			
40			
41			
43			
48			
50			
51			
51			
52			
52			
52			
52			
52			
52			
52			
52			
191			
80.06			
13.13%			

3 Feasibility Study, 2019).

ıction. Water 2018, 10, 1162.
ıtion Programs, 2006.

Sensitivity	**Switching**			
Indicator	**Value**	**ENPV**		
		80.06		80.06
2.02	49.5%	63.90	1.00	#DIV/0!
0.63	159.0%	75.04	1.00	#DIV/0!
2.79	35.9%	57.76	1.00	#DIV/0!
0.27	3.75 year	58.61	1.00	#DIV/0!

EIRR for Arghandab Integrated Water Resources Development Investment Project

Currency:	US dollars, in 2018 prices
Numeraire:	border prices
Exchange rate (AF per $):	80.72

Year	Electricity
	Sold (MWh)
2018	
2019	
2020	
2021	
2022	
2023	
2024	
2025	
2026	131 223
2027	131 223
2028	131 223
2029	131 223
2030	131 223
2031	131 223
2032	131 223
2033	131 223
2034	131 223
2035	131 223
2036	131 223
2037	131 223
2038	131 223
2039	131 223
2040	131 223
2041	131 223
2042	131 223
2043	131 223

Memorandum Items and Assumptions

Economic opportunity cost of capital (discount rate):
HYDROPOWER
Transmission and distribution losses
Power supply generated (MWh)
Tariff (AF/MWh)
Price elasticity of demand

Consumption SEPS and NEPS (MWh/year)
Economic benefit electricity (AF/kWh)

Shadow Pricing of Capital, Operating and Maintenance Costs

HYDROPOWER Update of Mathematical Model of Power Production at Dahla Dam rev 18.xlsx and

Capital Cost (financial, $ millions)

			Non-tradable
Materials	16.75		4.19
Equipment	22.43		0.00
Skilled local labor	4.76		0.00
Unskilled local labor	3.48		3.48
Skilled imported labor	3.08		0.00
Land			0.00
Environment costs			0.00
Resettlement/safeguard costs			0.00
Security costs	5.05		5.05
Taxes and duties	3.59		0.00
Interest during construction			0.00
Physical contingency	5.98		0.00
Price contingency	7.06		0.00
Subtotal	**72.18**	**61.52**	
Total:	**72.18**		

Operation and Maintenance Cost (financial, $ millions)

2% of generation, lines and substation capital cost	1.23	0.49
Total:	**1.23**	

Standard Conversion Factor (SCF)

(US$ millio

	2010	**2011**	**2012**	**2013**
Imports (cif)	5 154	6 390	9 832	8 724
Exports (fob)	388	376	415	515
Import taxes/duties	596	651	567	510
Import subsidies				
Export taxes/duties	0	3	4	1
Export subsidies				
SCF:	0.9030	0.9126	0.9479	0.9478

Source:
ADB Key Indicators for Asia and the Pacific 2017
International Monetary Fund, Government Finance Statistics Yearbook and data files.
Derived import/export taxes from IMF % of total taxes

				Economic Costs	
Dam Capital	**Dam O&M**	**Irrigation Farm capital**	**Urban Water**	**Urban/Peri-Urban Water**	
Cost ($ millions)	**Cost** ($ millions)	**Cost** ($ millions)	**Capital Cost** ($ millions)	**O&M Cost** ($ millions)	($ millions)

9.0%	
8.3%	DABS meeting 25/7/18
143 038	Average year production 13.6m raise
7 490	DABS average tariff
-0.20	Fichtner, 2013. Islamic Republic of Afghanistan: Power Sector Master Plan, Techr

578 472	983,340 x 260 MW/550 MW = 464,851 MWh; The consumers in Kabul comprise l	
11.74	consumer surplus method	$CS = 0.5[P_E (\Delta Q)^2 / (e_d Q_1)]$

Cost Estimate Lines and Substations 2018 rev 1.xlsx

Capital Cost (economic, $ millions)

Materials	16.54
Equipment	22.43
Skilled local labor	4.76
Unskilled local labor	1.43
Skilled imported labor	3.08
Land	0.00
Environment costs	0.00
Resettlement/safeguard costs	0.00
Security costs	4.79
Taxes and duties	0.00
Interest during construction	0.00
Physical contingency	5.98
Price contingency	0.00
Subtotal	**59.00**
Total:	**59.00**

Operation and Maintenance Cost (economic, $ millions)

2% of generation, lines and substation capital cost	1.20
Total:	**1.20**

ɔns)

2014	**2015**	**2016**	**2017**	**Total**	
7 729	7 723	6 534		40 542	
571	571	596		2 668	
449	494	359		2 379	
				0	
2	2	2		11	
				0	
0.9489	0.9440	0.9524		**0.9481**	(5-year average for 2012-2016)

C4 HPP Capital Cost ($ millions)	C4 HPP O&M Cost ($ millions)	Total ($ millions)	Irrigation Crop gross margin ($ millions)	Alt Irrigation Water ($ millions)	Household Urban/Peri-Urban Water ($ millions)
		0.00			
		0.00			
		0.00			
		0.00			
		0.00			
5		4.52			
54		54.47			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
	1	1			
-21	1	-20			

ıical Assistance Consultant's Report, ADB.

by far the majority of customers of NEPS. Per line 27 of the draft report on Component 4, an estimated 3.

Economic Benefits						
	Incremental Benefits			Non Incremental Benefits		
Non-household Urban Water ($ millions)	C4 HPP Electricity ($ millions)			Irrigation Crop Imports ($ millions)	Alt Irrigation Non-irrigation Water Savings ($ millions)	Energy Import Savings ($ millions)

18.1
18
18
18
18
18
18
18
18
18
18
18
18
18
18
18
18
18
18

23 million people have access to electricity. This is equal to 3,230,000/8.92 (reference line 27) = 362,108 c

GHG Gain ($ millions)	Alt HPP Other Energy Savings	Total ($ millions)	Net Economic Benefit ($ millions)
			0
			0
			0
		0.00	0
		0.00	0
		0.00	0
		0.00	-5
		0.00	-54
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	17
		18.09	38
		ENPV=	46.63
		EIRR=	27.80%

Sensitivity Analysis
($'million)

Change in variable
Base case
C4 capital cost increases by 10%
C4 O&M cost increases by 10%
Water flow is 10% lower
C4 one year delay
Combination
Capital and O&M cost increase by 10% and waterflow is 10% lower

ustomers. If they did not suffer from load shedding, their estimated average consumption would equal 362,10

	Base Case	Sensitivity	Switching		
EIRR	**Value**	**Indicator**	**Value**	**ENPV**	
27.80%				46.63	
25.24%	59.00	0.59	169%	43.88	1.00
27.60%	1.20	0.11	881%	46.10	1.00
23.45%	1168	2.44	46%	35.24	1.00
22.12%	no delay	0.18	7.2 years	38.30	1.00
21.04%		3.15	33.5%	31.95	1.00

8 x (310 watts (reference line 28)/1,000,000) x 24 x 365 = 983,340 MWh in a year.However, they do suffer fro

46.63
#DIV/0!
#DIV/0!
#DIV/0! C4 reduce by 1(1.00
#DIV/0!

#DIV/0!

m severe load shedding, the only estimate I could find being from the following website: http://rta.org.af/eng/2(

)17/08/28/increasing-electricity-load-shedding-in-kabul-concerning/. This website suggests that “Kabul n

ıeeds 550 MW electricity, but unfortunately the city has now 260 MW electricity which can be equally dis

stributed by DABS to Kabul people”

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Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Gender Action Plan

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

GENDER ACTION PLAN

Activities	Performance Targets/ Indicators	Responsibility	Timeframe
Output 1: Dahla Dam capacity increased			
1.1 Mobilize women to participate meaningfully in community consultations and other activities	1.1a At least four socially inclusive information dissemination and consultation workshops (three with men and one with women) on project scope and benefits conducted, while encouraging women to have equal access to development opportunities (baseline 2019: 0). 1.1b At least 20% women's participation in community-based forums, such as village committees, grievance committees and other community-based organizations established under the project (baseline 2019:0). 1.1c Women's inputs in community forums recorded, and sex-disaggregated information on grievances and compensation received, recorded.	CPMO, MEW, MRRD, Resettlement Officer (ASBA, DAIL, DRRD), Social and Gender Specialist	1.1 a–d Starting from Q2 of Year 1
1.2 Install safe, gender-inclusive recreational facilities at the dam site	1.2a At least one recreational area developed for families with seating and picnic facilities, and eateries at Dahla Dam and Tarnak Main Canal in Kandahar City with separate restrooms for women and men with clean running water and provides safety and security for women and children[1] (baseline 2019: 0).	CPMO, MEW, EPCS, ASBA, and Social and Gender Specialist	Starting from Q1 of Year 1 at design stage and construction phase
Output 2: Reliability of Irrigation Water Supply Increased			
2.1 Improve women's safe access to community irrigation services	2.1a Rehabilitation of community irrigation systems include provision of water access points, washing pads, foot bridges and other facilities to ease women's access to water for their home gardens and cleaning needs. 2.1b At least two awareness sessions in each village for women on issues related to water conservation, safe drinking water practices, water pollution and water borne diseases.	CPMO, MAIL, EPCS, and Social and Gender Specialist	Starting from Q3 of Year 1 at the design and construction phase Starting from Q2 of Year 1
Output 3: Agriculture Water Productivity Improved			
3.1 Train female paraprofessional farmers as local resource persons for capacity-building of women farmer groups in production of high value crops, extension services, and agriculture and	3.1a Extension Services conducted for farmers on high value agriculture and horticulture, with beneficiaries consisting of at least 30% women. 3.1b Organize at least four cross-farm and knowledge sharing events to enhance mutual learning among farmers, of which 25% are women farmers. 3.1c At least 21 women farmers trained as paraprofessionals (three from each district on a pilot basis) in extension services of high	CPMO, MAIL, DAIL PIUs, MRRD, and Social Gender Specialist	3.1a–c Starting from Q3 of Year 1

[1] Even without safe recreational areas with essential facilities, families tend to go to Dahla Dam and Tarnak Main Canal over the weekends to enjoy themselves and go bathing and playing in the Tarnak Main Canal when it carries water. Setting up safe recreational facilities will regulate this practice.

Activities		Performance Targets/ Indicators		Responsibility	Timeframe
	horticulture value chain development and marketing		value crop production, their value chain and marketing.		
		3.1d	Paraprofessionals trained 350 women (50 from each district) in vegetable growing by providing assistance in establishing kitchen gardens, demonstration plots and greenhouses for household use and processing, packaging and marketing in villages, urban and regional markets.		3.1d By the end of the project
3.2	Women and men benefit equitably from training and technology transfer	3.2a	300 farmers (30% women), have improved skills and adopted climate smart technologies in irrigated agricultural production by 2025 (baseline 2019: 0).	CPMO, MAIL, DAIL PIUs, MRRD, and Social Gender Specialist	By the end of the project
Output 4: Capacity in water resource management and use strengthened					
4.1	Provide women staff opportunities for training and participation in water resource management and use	4.1a	At least 20% representation of women in consultation and decision-making forums related to training and capacity building programs.	MEW, MAIL, MRRD, NEPA, AUWSSC	Starting from Q3 of Year 1–Q4 2025
		4.1b	100 government staff with 30% women[2] complete M.Sc. in integrated water resources management by 2025 (baseline 2019: 0).		
		4.1c	Document pre- and post-assessments of training and capacity building programs focusing on gender impacts.		
Institutional Strengthening, Project Management, and Monitoring and Evaluation					
5.1	Enhance capacity of executing agency, project management unit and implementing agencies in gender-inclusive design and implementation of projects and programs	5.1a	Evidence that equal employment opportunity policy and practices are implemented for project related jobs with at least 15% female project staff (baseline 2019: less than 1% female staff in implementing agencies).	CPMO MEW, MAIL, DAIL, DRRD, MRRD, Social Safeguard Specialist	5.1a–b Starting from Q2 of Year 1
		5.1b	Social and Gender Specialist recruited at CPMO to support the implementation, reporting and documentation of gender results.		
		5.1c	Gender results analyzed with case studies on the impacts of the project, prepared on the last year of project implementation		5.1c Q3 of Year 6
		5.1d	GAP progress is part of the Quarterly Progress Report prepared and submitted by executing agency and implementing agencies.		5.1 d–e Starting Q2 of Year 1 and every year thereafter
		5.1e	One training and two refresher courses for implementing agencies on gender-inclusive project design and implementation conducted.		

ASBA = Arghandab Sub-Basin Agency; AUWSSC = Afghanistan Urban Water Supply & Sanitation Corporation; CPMO = central program management office; DAIL = Department of Agriculture Irrigation and Livestock; DRRD = Department of Rural Rehabilitation and Development; EPCS = Engineering, procurement, construction supervision support consultant; GAP = Gender Action Plan; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development;

[2] If a ministry is unable to fill its quota, the scholarships will be offered to other ministries. If there are remaining scholarships available, persons from non-government organizations who meet eligibility requirements will be accepted to make up cohort quota.

M.Sc. = Master of Science; NEPA = National Environmental Protection Agency; PIU = project implementation unit; Q = quarter.

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Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Summary Poverty Reduction And Social Strategy

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

Country:	Afghanistan	Project Title:	Arghandab Integrated Water Resources Development Project
Lending/Financing Modality:	Project Grant	Department/Division:	Central and West Asia Department Environment, Natural Resources and Agriculture Division

I. POVERTY AND SOCIAL ANALYSIS AND STRATEGY

Poverty targeting: SDG2, SDG6, SDG7

A. Links to the National Poverty Reduction and Inclusive Growth Strategy and Country Partnership Strategy

The Afghanistan National Peace and Development Framework (ANPDF) 2017–2021 of the Government of Afghanistan aims to achieve self-reliance and increase people's welfare through inclusive and balanced economic growth. It has been under implementation through national priority programs and sector master plans. All these efforts aim to facilitate strategic investments in infrastructure, human capital, quality service delivery, and technology. ANPDF specifies increased jobs and gross domestic product growth through improved management and use of water resources, and prioritizes development of the agricultural sector, further stressing the need for significant investments in water management and irrigation modernization. In addition, the National Infrastructure Plan, 2017–2021 covers the planning, delivery, and operation of infrastructure by highlighting sector priorities; presents an infrastructure pipeline; and addresses policies, regulations, and institutional reforms. The country partnership strategy (CPS) for Afghanistan, 2017–2021 closely aligns with the government's ANPDF, national priority programs, various sectors' master plans, and the national infrastructure plan. The CPS is built on the strong partnership, established between the Asian Development Bank (ADB) and Afghanistan to enhance the effectiveness and inclusiveness of ADB operations. The CPS integrates various approaches to fragile and conflict-affected situations. The project is designed to improve management and use of water resources in the Arghandab River basin, with positive impact on improvements of livelihoods, income and food security, and poverty alleviation.

B. Results from the Poverty and Social Analysis during Transaction Technical Assistance (TRTA) or Due Diligence

1. Key poverty and social issues. The key issues to be addressed are inefficient management of water resources, low agricultural productivity, low farm incomes, inability to generate employment in agricultural value chains, food insecurity, lack of knowledge and capacity, poverty, weak infrastructure, and a fragile and conflict-affected situation. Kandahar Province has a large number of internal migration (6%) and returnees are increasing the number of urban slums.[1] Kandahar province is home to nearly 6% (5.53% in 2017) of poor people out of the total population, and food insecurity ranges from 40%–60%.[2] Kandahar province is having 15% disabled headed households and 2% female headed households.[3] The small farm holders and local support agencies have insufficient knowledge of water-efficient irrigation technologies, irrigation scheduling, and good agricultural practices; there is limited availability of farm inputs, water, and seasonal working capital. The water supply distribution system in Kandahar City covers 10%–20% of the city;[4] only 8% of Kandahar's population rely on untreated tap water while 48 target villages use untreated water from dug wells.[5] An increase in private wells has occurred as surface water supplies became depleted during the 2017 drought event,[6] and aquifer levels severely declined. The current supply and the capacity of the system are inadequate to provide the basic level of service for the population now and in the future. The large-scale rotating load shedding is taking place in the South East Power System. Only eight villages of Arghandab district have access to electricity with extensive load shedding, while Shah Wali Kot district does not have access to electricity.

2. Beneficiaries. The project will primarily benefit the 830,165 (Y2018) population of Kandahar City and approximately 1.25 million population of seven rural districts of Kandahar Province. All categories of income groups will benefit, whether they are the citizens of Kandahar City, farmers who manage their farms, sharecroppers, or wage laborers. The project investment component 3, water supply to Kandahar City and 48 villages, will benefit a total of 830,165 urban and 235,565 rural population with safe drinking water, of which 402,250 urban women and girls and 31,211 periurban/rural women and girls will benefit.[7] The three priority areas of preference of the surveyed population are security, provision of irrigation water, and marketing of agriculture products.

3. Impact channels. Support to small farmers to access agricultural advisory, crop recommendations and market information to enhance climate-resilient agricultural production; and support for demonstrations, incorporating high-efficiency irrigation technologies participate in training activities, discount schemes including good agricultural practices. As the crop yields

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1 National Statistics and Information Authority. 2019. *Afghanistan Multidimensional Poverty Index 2016–2017: Report and Analysis*.
2 Islamic Republic of Afghanistan, Central Statistics Organization. 2018. Afghanistan Living Conditions Survey 2016-17, Analysis Report. Kabul.
3 Afghanistan Food Security Cluster. 2018. *Afghanistan Emergency Food Security Assessment August–September 2018*.
4 Haziq, Mohammad & Panezai, Sanaullah. 2017. *An Empirical Analysis of Domestic Water Sources, Consumption and Associated Factors in Kandahar City, Afghanistan.* 7. 49-61. 10.5923/j.re.20170702.03.
5 TRTA baseline socio-economic survey, October 2018
6 Pajhwij Afghan News, 2017
7 TRTA baseline socio-economic survey, October 2018

increase, the benefits of mechanization will be revealed from the "inside" giving farming families the opportunity to diversify

labor use away from manual labor, take up the "slack" within households and adopt productive and profitable use in other enterprises, such as small ruminant and poultry houses and fruit drying. A number of actions are planned in Design and Monitoring Framework (DMF) and Gender Action Plan (GAP) to benefit the poor and marginalized.

4. Design features. The project design addresses the core constraint to economic growth and security: inefficient management of water and low agriculture productivity. The region is highly vulnerable to the climate change impact of decreasing precipitation; therefore, the design incorporates measures to strengthen resilience and adaptation. Addressing this core problem through irrigation modernization and climate-smart productive use of water in farming, supported by building capacity of support services, will stimulate growth of farmers' incomes, increase value addition and marketing activity, and introduce water use management systems. The project management unit will implement a matching grant scheme using smaller-scale grants to stimulate sector transformation to higher level of climate-smart agriculture.

C. Poverty Impact Analysis for Policy-Based Lending: Not Applicable

II. PARTICIPATION AND EMPOWERING THE POOR

1. Participatory approaches and project activities. Consultations with stakeholders including target beneficiaries and affected persons were carried out throughout the TRTA. Four workshops were held in Kabul and three in Kandahar on project design options and land acquisition, resettlement and environment issues. Information about the project was broadly disseminated. A communication, consultation and participation plan will be developed by the implementing agencies for the awareness raising of the general public, beneficiary and affected population about the services and benefits to be provided under the project and project implementation mechanisms. The consultation and participation activities with stakeholders proposed in the GAP, DMF, land acquisition and resettlement frameworks, and project administration manual (PAM) to guide detailed design consultants, executing agency and implementing agencies, and civil works contractors, seek to integrate the views and redress concerns of beneficiary and affected population particularly vulnerable groups. A multi-tier decentralized grievance redress mechanism will be established with the involvement of multiple stakeholders. Citizen feedback and satisfaction surveys will be conducted on a yearly basis to systematically acquire and redress the concerns and issues of the target beneficiaries and project affected population.

2. Community organizations will support in identification of the target groups of both men and women to ensure transparency, managing consultations and participation, and information dissemination. The possibility of engaging civil society organizations in the implementation of the project will be explored during the detailed design stage.

3. Civil society organizations. The following are envisaged during project implementation, rated as high (H), medium (M), low (L), or not applicable (NA): ☒ (M) Information gathering and sharing ☒ (M) Consultation ☐ Collaboration ☐ Partnership

4. Participation plan. A project level participation plan will be prepared at the detailed design stage to strengthen participation of community-based organizations and affected persons particularly the poor and vulnerable. ☒Yes ☐ No.

III. GENDER AND DEVELOPMENT

Gender mainstreaming category: Effective gender mainstreaming

A. Key issues. Women mostly spend their time in domestic chores, care work, and small-scale farm level productive activities, largely in post harvesting and value chain activities. Gender analysis indicates that women's poverty worsens due to lack of access to safe water which necessitates taking care of family members during waterborne illnesses and performing household chores manually due to lack of access to electricity. This not only hinders female education but also impedes employment opportunities, social activities and access to basic amenities and leisure. Women face discriminatory attitudes in public life due to which their presence in public life is very limited and access to development opportunities is restricted. A small number of women are involved in providing services in the education, and health and development sector. Women's employment is less than 1% in public sector agencies, including the project's implementing agencies. Majority of women do not play a role in decision-making regarding physical assets and cash handling at the household level. They do not have access to irrigation management systems and face limited access to the skill development needed in agriculture and livestock extension services. A GAP developed for the project to streamline the participation of women and marginalized in accessing the project benefits.

B. Key actions. ☒ Gender action plan ☐ Other actions or measures ☐ No action or measure

The key actions to address the gender issues within the project scope include: consultation workshops with men and women on project scope and benefits while encouraging women to have equal access to development opportunities of the project; developing recreational areas for families with gender design features such as separate toilets for women and men, women-friendly eateries and seating arrangements at Dahla Dam; training women paraprofessional farmers as local resource persons for capacity building of women farmers; improving skills of women farmers on adopted climate smart technologies in irrigated agricultural production; providing women staff with access to scholarships to complete Master of Science in Integrated Water Resources and Management; and hiring social and gender specialist at the central project management office to support in monitoring and implementation of gender action plan.

IV. ADDRESSING SOCIAL SAFEGUARD ISSUES

A. Involuntary Resettlement **Safeguard Category:** ☒ A ☐ B ☐ C ☐ FI

1. Key impacts. Output 1 (Raising Dahla Dam and Six Saddle Dams) will have the largest land acquisition and resettlement impact. Is it anticipated that approximately in excess of 5,800 people will be directly affected by the inundation, and will lose their habitat in the public interest without themselves directly reaping any benefits from the project. In excess of 200 *jeribs* of orchards, 50,000 fruit trees, and over 14 mosques and cultural areas will be affected. Output 2 (reliability of irrigation water supply increased) will cause demolition of an estimated 167 shops, 4 houses, 2 green houses, a mosque, a small cluster of graves built on government owned land and 3,855 fruit trees and 1,832 timber trees planted by people along the canal embankments as the government reclaims the Right of Way. The water supply component will use government owned land for the main infrastructure development, but the rehabilitation and construction of a new distribution network may impact residential and commercial structures, business incomes, and cause access and other disruptions. In rural areas, the installation of transmission main may cause damages to crops and trees. The initial impact assessment of the hydroelectric power development component revealed that all infrastructure will be built on government owned lands, but installation of the transmission line may impact crops, trees and structures.

2. Strategy to address the impacts. Output specific land acquisition and resettlement frameworks prepared to provide guidelines and procedures to mitigate adverse impacts by following ADB SPS 2009 and related national Afghan laws and regulations to (i) avoid or minimize land acquisition and resettlement impacts; (ii) if unavoidable, affected persons will assist in improving their livelihoods and standards of living to a level at least equal to previous living situation; (iii) compensation at replacement cost; (iv) affected persons will receive information on their rights, their participation in planning and implementation of land acquisition and resettlement plans.

3. Plan or other Actions.

☐ Resettlement plan
☐ Combined resettlement and indigenous peoples plan
☒ Resettlement framework ☐ Environmental and social management system arrangement
☐ Combined resettlement framework and indigenous peoples planning framework ☐ Social impact matrix ☐ No action

B. Indigenous Peoples **Safeguard Category:** ☐ A ☐ B ☒ C ☐ FI

No indigenous people reside in the Project area based on ADB SPS (2009).

V. ADDRESSING OTHER SOCIAL RISKS

A. Risks in the Labor Market

1. Relevance to labor market: ☐ unemployment; ☐ underemployment; ☐ retrenchment; ☒ (H) core labor standards

2. Labor market impact. The project will have short- and long-term positive impacts on the local labor markets particularly for skilled and unskilled labor and farming households. A monitoring mechanism will be developed to comply with the core labor standards. Afghanistan is among the Tier 2 'watch list' countries, therefore, the key concerns in Afghanistan (forced labor, child labor and sex trafficking) will be monitored during the project implementation. A set of standard clauses will be integrated in the bidding documents of contractors, sub-contractors and service providers to ensure compliance with core labor standards.

B. Affordability

Under output 2, support will be provided to small farmers through discount schemes and matching grants. Under output 3, the standpipes will be installed in the areas with high concentration of poor, who cannot afford connection charges and live in informal settlements with no titled lands.

C. Communicable Diseases and Other Social Risks

1. The impact of the following risks are rated as high (H), medium (M), low (L), or not applicable (NA):
☒ (M) Communicable diseases; ☐ Human trafficking; ☐ Others (please specify) _____

2. Risks to people in project area. The environment, health and safety and occupational health and safety risks will be addressed by developing its respective plans and their effective implementation, and inclusion of terms and conditions in the employment contracts of workers to provide medical assistance and full cost coverage by the contractors. Awareness campaign on communicable diseases for all workers will be included in the bidding documents of contracts.

VI. MONITORING AND EVALUATION

1. Targets and indicators. The DMF includes pro-poor, socially and gender-inclusive targets including: (i) 300 farmers, including 30% women, have improved skills and adopted climate-smart technologies in irrigated agricultural production by 2025 (baseline 2019: 0); (ii) 300 farmers or farmer groups have implemented climate-smart and productive solutions by 2025 (2019: 0); (iii) water delivered in a timely manner to 95% farmers 90% of the time (baseline 2019: 95% of farmers 25% of the time); and (iv) 115 community irrigation systems modernized (baseline 2019: 0).

2. Required human resources. The human resource requirements are provided in the PAM. The environment and social safeguards and gender equality and social inclusion specialists will be hired to monitor the implementation of environment and social safeguard instruments and GAP, and to report on the poverty, social and gender mainstreaming against targets.

3. Information in the project administration manual. The PAM includes implementation arrangements and reporting requirements on social, environment, social inclusion, poverty and gender related impacts.

4. Monitoring tools. The monitoring tools include the project performance monitoring reports of the executing agency and implementing agencies, periodic progress reports, third party monitoring reports, review mission reports, mid-term report and

project completion reports.

IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Initial Environmental Examination

Document Date: 22/10/2019

Project No. 2000002332

Asia and the Pacific Division
Programme Management Department

Initial Environmental Examination

July 2019

AFG: Arghandab Integrated Water Resources Development Project

Output 2: Reliability of irrigation water supply increased
Output 3: Agricultural water productivity improved

Prepared by the Ministry of Finance, Islamic Republic of Afghanistan for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 9 July 2019)

Currency unit	–	afghani (AF)
AF1.00	=	$0.0124545099
$1.00	=	AF80.2922

ABBREVIATIONS

ADB	–	Asian Development Bank
AIS	–	Arghandab Irrigation System
ANSI	–	American National Standards Institute
ARAZI	–	Afghan Land Authority
ASBA	–	Arghandab Sub-basin Agency
AUWSSC	–	Afghanistan Urban Water Supply and Sewerage Corporation
CIDA	–	Canadian International Development Agency
DABS	–	Da Afghanistan Breshna Sherkat
DFID	–	Department for International Development (UK)
EHS guidelines	–	Environmental, Health, and Safety guidelines
EIA	–	Environmental impact assessment
EMP	–	Environment management plan
EWS	–	Early Warning System
GAP	–	Good Agricultural Practices
GHG	–	Greenhouse Gas
GRM	–	Grievance redress mechanism
IA	–	Implementing agency
IBAT	–	Integrated Biodiversity Assessment Tool
IEE	–	Initial environmental examination
IFC	–	International Finance Corporation
IUCN	–	International Union for Conservation of Nature
JICA	–	Japan International Cooperation Agency
LARP	–	Land Acquisition and Resettlement Plan
MAIL	–	Ministry of Agriculture, Irrigation, and Livestock
MASL	–	Meters above sea level
MEW	–	Ministry of Energy and Water
MOF	–	Ministry of Finance
NEPA	–	National Environmental Protection Agency
OCHA	–	United Nations Office for the Coordination of Humanitarian Affairs
O&M	–	Operation and maintenance
PMU	–	Project Management Unit
SPS	–	Safeguard Policy Statement
TDS	–	Total Dissolved Solid
TOR	–	Terms of Reference
TRTA	–	Transaction Technical Assistance
UAE	–	United Arab Emirates
UNESCO	–	The United Nations Educational, Scientific and Cultural Organization
UNMACA	–	United Nations Mine Action Centre for Afghanistan
USAID	–	United States Agency for International Development
USACE	–	US Army Corps of Engineers
WHO	–	World Health Organization
WUA	–	Water User Associations

WEIGHTS AND MEASURES

^{o}C	–	Degree Celsius
m^3	–	Cubic meter
ha	–	Hectare, 10,000 m^2
km	–	Kilometer
m	–	Meter

GLOSSARY

Mirab	–	Water Master or Water Bailiff
Shura	–	Community Development Council

NOTE

(i) In this report, "$" refers to US dollars.

EXECUTIVE SUMMARY

The Government of the Islamic Republic of Afghanistan (Government) requested the Asian Development Bank (ADB) for Transaction Technical Assistance (TRTA) to prepare a project to improve water resources management, irrigated agriculture, water supply for Kandahar City, and to augment electric power in Kandahar City and the surrounding area.

The contract for consulting services for TA-9273 AFG: Preparing the Arghandab Integrated Water Resources Development Investment Project was signed on 20 September 2017 between ADB and FCG ANZDEC Limited from New Zealand to design a project suitable for funding.

Under the project, ADB resources or ADB administered resources will finance the following Outputs: (i) Dahla Dam capacity increased, (ii) reliability of irrigation water supply increased, (iii) agricultural water productivity improved, and (iv) capacity in water resource management and use strengthened. Other investments not financed by this project but prepared by ADB and being implemented in parallel, will provide Kandahar with an urban and industrial water supply, and bring additional power generation capacity for Kandahar City and its surroundings. Separate Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) have been prepared for each project investment component.

Raising the dam will provide an additional 500 million m^3 water to Dahla reservoir. By increasing storage volume, the project aims at improving water management and water allocations throughout the year as compared to the existing situation. Output 1 is classified as ADB category A due to anticipated irreversible, diverse, or unprecedented impacts from raising the existing dam's height by 13.6 m and related infrastructure. Buildings in several villages will be affected, as well as several hectares of irrigable land surrounding the reservoir. A draft EIA has been prepared accordingly.

Under Output 2, for both the Arghandab Irrigation System (AIS) and the community-managed systems, the project will modernize irrigation infrastructure, monitoring and control systems, and increase climate resilience for all farmers, including planning and delivery of water in a timely manner to 90% of AIS area farmers. There are two sub-components: (i) support to the AIS operating entity for improvement of irrigation and drainage services; and (ii) support to village communities for improvement of community irrigation services.

Outputs 3 (Agricultural water productivity improved) and 4 (Capacity in water resource management and use strengthened) do not entail any infrastructure development or construction activities and thus, no environmental impacts are anticipated on Outputs 3 and 4 of the proposed project. In this regard, this IEE is mainly focused on details of Output 2, classified category B as per ADB safeguards policy.

Project Context and Impacts

Agriculture is the main source of livelihood and survival for 80% of the population that lives in rural areas of Afghanistan. It is a crucial sector for national food security and economic growth. However, agricultural production faces problems of water shortages mainly during the latter half (summer) of the planting period. The issue is the wastage of water due to aging of irrigation facilities and disorganized irrigation practices.

Inadequate structures and systems to supply correct amounts of water result in areas that are over-irrigated as well as areas that do not receive adequate water for crop production, resulting in inefficient use of agricultural inputs. Soil salinization due to poor drainage and over-irrigation,

as well as soil and land degradation due to canal bank erosion are priority issues in five provinces - Helmand, Ghazni, Faryab, Shaberghan, and Kandahar. Crop cultivation and watering technologies are outdated and inefficient. Therefore, the efficient use of limited water resources is an issue of paramount importance.

Outputs 2 and 3 of the project aims to improve the productive use of water in agriculture in the Arghandab Sub-Basin, with four sets of activities: (i) improving irrigation water supply through rehabilitation and modernization of AIS canals, gates, offtakes, related primary irrigation infrastructure, and the infrastructure of community-managed irrigation systems; (ii) increasing climate resiliency and water use efficiency through introduction of on-farm irrigation technologies; (iii) strengthening post-farm value chains through investments in storage, agro-processing and access to markets; and (iv) increasing capacity in water resource management and use.

A set of climate-smart options for investment will be conducted which potentially will have transformational impact on agriculture productivity. Sustainable, environmentally friendly farming will be implemented to maximize farming and value chain benefits from improved irrigation across the command area. Improved and sustainable tillage techniques, good agricultural practices (GAP), integrated pest management (IPM), and integrated crop nutrition (ICN) technology will be introduced. Drip and micro-irrigation will be promoted, together with precision soil moisture sensors and delivery controls to optimize water for crop needs. Laser levelling of fields will also be promoted to remove high underwatered areas and low areas where ponding and excessive evaporation occurs. The major benefits of these irrigation technologies include an increased yield, water saving, improved quality, fertilizer application efficiency, energy conservation, reduced labor costs, uniformity of water application, improved disease and pest control, feasibility of irrigating difficult terrain, and improved tolerance to salinity.

Farmer and irrigation surveys[1] have been conducted to provide adequate insight into the present condition of the irrigation and drainage infrastructure of the community irrigation schemes and to identify the scope for improvement of the irrigation infrastructure.

Output 2 Impacts

The total land acquisition required for the project is 35,940 m^2. This irrigated land owned by two sizeable farmers is required for the construction of the 600 m Babawali wasteway. The project will also affect a total of 495 entities which includes 167 businesses, 4 homes, and 2 greenhouses occupying state land; and 322 affected persons living on private land across the road on the other side of the canal embankment, who will lose trees planted on the state- owned embankment. A mosque and a small cluster of graves, both on state land, are also impacted.

IEE Methodology and Report

A field visit to Kandahar was conducted during 9-13 July 2018. The main irrigation canal, upper division weir for Output 2 and, saddle dams, spillway, main dam, proposed contractor's yard, and the reservoir for Output 1 were visited. The main stakeholders (Ministry of Energy and Water (MEW), Ministry of Agriculture, Irrigation, and Livestock (MAIL), National Environmental Protection Agency (NEPA), Arghandab Sub-Basin Agency (ASBA), Da Afghanistan Breshna Sherkat (DABS), Afghanistan Urban Water Supply and Sewerage Corporation (AUWSSC), and the Cultural Department of Kandahar City) were visited.

[1] TRTA Irrigation Survey Reports A and B, and TRTA Farmer Survey Report, 2018

Data collected from various sources have been evaluated; NEPA in Kabul and Kandahar, AUWSSC, Cultural Department Kandahar, DABS, ASBA, Helmand River Basin Authority, Archaeology Institute Kabul, and KNMI climate explorer, Helmholtz Institut Geesthacht, Germany.

This IEE report includes description of the physical and the biological environment, assessment of impacts on the environment during detailed design, construction and operation, and the Environmental Management Plan (EMP). Environmental impacts have been identified and mitigation measures have been recommended accordingly. The EMP includes monitoring activities to be conducted during construction and operation stages.

Mitigation Measures

Presentation of the impacts and recommendations for their mitigation have been categorized for detailed design, construction, and operation, using a risk-based approach that assesses impact significance and provides a rating:

(i) Mitigation of impacts identified for addressing at detailed design include: protection of historic and cultural sites, screening of agricultural technologies and training to ensure they are environmentally positive in impact;
(ii) For construction phase (rehabilitation of irrigation infrastructure, land levelling and drainage, and any agricultural buildings), the critical impact mitigation measure includes the development of a Site-Specific EMP (SSEMP) by the contractor, which will include closely following NEPA legal requirements, and addressing issues such as water quality, dust, noise and disposal of waste materials;
(iii) The operation phase foresees the need to build capacity of irrigation system operators and farmers to identify and mitigate potential environmental impacts through preventative system maintenance, water supply and drainage monitoring, and monitoring farmers' records of water use, pesticide and fertilizer use to ensure these are within GAP standards;

It is generally found that Output 2 will not have any long-term impacts upon the biological environment. No extra land will be converted for utilization of irrigation infrastructure, nor agricultural or industrial use. Improved safety and climate-resilient construction of irrigation infrastructure will aim to mitigate flood damage and erosion. Capacity building in GAP and climate-smart irrigation practices will optimize use of agricultural inputs including water, avoiding possible over-use due to lack of knowledge and lack of monitoring.

Challenges and Limitations

The realities against which this document has been produced need to be clearly stated. Afghanistan is recognized as being one of the most insecure environments in which such a study can be conducted. Major parts of the catchment to this dam area are considered to be "no-go" areas, which has highly compromised the efficacy and rigorousness of the IEE data-gathering and analysis process. Although there has been generous cooperation between the TRTA, partners and government agencies, the insecurity has been a major driver in determining the limitations of what could be done.

Opportunities are there during the detailed design and pre-construction phase to put in place appropriate planning and ensure that envisaged problems and challenges can be mitigated against. This include putting in place the a comprehensive EMP from which the contractor can develop the SSEMP, ensuring constancy of water supply during construction, and applying applicable specifications to minimize effects of potential flooding. In addition, social issues such

as resettlement, favorable treatment to local communities for employment generation and improving the ease of people and animal movement across the revitalized irrigation network can be addressed. During construction the major mitigation measures are anticipated to be managed through the SSEMP incorporating close collaboration with the beneficiary community and the MEW / Department of Agriculture, Irrigation, and Livestock (DAIL), IA's and PMU. The documentation and administrative framework is expected to positively influence the both quality and delivery of the project. Operationally the project offers far greater opportunity for management of all agricultural inputs (e.g. water, fertilizer, pesticides) as well as promoting greater levels of climate-smart farming practices.

Firmly associated with both the insecurity and the lengthy period of the civil war, is the lack of contemporary data on which analysis and conclusions can be made. While government agencies are willing partners in assisting the TRTA, both their human resource capacity and lack of physical resource add to the general state of inferior data. These issues can be overcome but they require longer time than what logical planning would determine. This IEE has been a victim of such shortfalls.

CONTENTS

APPENDIXES (separate document)

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I. INTRODUCTION

1. The proposed Arghandab Integrated Water Resources Development Investment Project (the project) will finance improvements to the availability and use of water resources for irrigated agriculture, urban water supply, and power generation for Kandahar, the country's second largest city, and its vicinity. The project—located in the Arghandab River sub-basin, within the Helmand River system—will also make the management of these water resources more efficient. The availability of water in the sub-basin, along with the rest of the Islamic Republic of Afghanistan, is highly seasonal and erratic, with frequent and worsening droughts affecting agriculture, living standards, and the local economy. The water supply for Kandahar City as well as irrigated agriculture for over 64,000 ha of farmlands in the Kandahar vicinity is solely dependent on Dahla Dam. Built in 1952, the dam stores irregular runoffs from snowmelt in high mountains, however, the reservoir has lost 40% of its storage capacity to sedimentation over 66 years of continuous operations. Subsequently its ability to provide regulated flows during frequent droughts is seriously constrained.

2. Promoting stability and growth in Kandahar Province is a high priority for the Government of the Islamic Republic of Afghanistan (Government). The potential for socio-economic development in the province is severely impeded by the lack of access to sustained and reliable water. Enough water would be available to address these issues if this resource was managed efficiently, however, the ability of the Government and provincial authorities to do this is severely constrained by the diminishing storage in Dahla Dam reservoir, lack of institutional and human capacity in water sector institutions. The proposed investment program will provide a long-term sustainable solution to these problems.

3. Given the large number of development partners and limited institutional capacity, the Government and ADB agreed that ADB's assistance would be focused on the infrastructure investments in agriculture and natural resources management, energy, and transport and communications. The Country Partnership Strategy (2017-2021) shows that the performance of ADB's Afghanistan portfolio was above the average despite vast implementation challenges, and the performance of agriculture and natural resources sector projects were generally satisfactory. The Government puts a high priority on this proposed investment program.[2]

A. Purpose of the Report

4. Project funded by ADB comprises four Outputs: (i) Output 1: Dahla dam capacity increased; (ii) Output 2: reliability of irrigation water supply increased; (iii) Output 3: agricultural water productivity improved; and (v) Output 4: capacity in water resource management and use strengthened. The overall outcome of the Project will be its contribution to improved water resource management and rural economic growth.

5. Output 1 is classified as ADB category A due to anticipated irreversible, diverse, or unprecedented impacts from raising the existing dam's height by 13.6 m and related infrastructure. Buildings in several villages will be affected, as well as several hectares of irrigable land surrounding the reservoir. A draft EIA has been prepared accordingly.

6. Under Output 2, for both the AIS and the community-managed systems, the project will modernize irrigation infrastructure, monitoring and control systems, and increase climate resilience for all farmers, including planning and delivery of water in a timely manner to 90% of

[2] ADB. 2017. "Afghanistan: Country Partnership Strategy (2017-2021)". Manila. https://www.adb.org/documents/afghanistan-country-partnership-strategy-2017-2021

AIS area farmers. There are two sub-components: (i) support to the AIS operating entity for improvement of irrigation and drainage services; and (ii) support to village communities for improvement of community irrigation services.

7. Outputs 3 (Agricultural water productivity improved) and 4 (Capacity in water resource management and use strengthened) do not entail any infrastructure development or construction activities and thus, no environmental impacts are anticipated on Outputs 3 and 4 of the proposed project. In this regard, this IEE is mainly focused on details of Output 2, classified category B as per ADB safeguards policy.

8. Under Output 2, physical works will focus on irrigation; rehabilitation of the irrigation canals, diversion weirs, gates, and associated crossings. Some environmental impacts are expected. IEE findings have been used to prepare the Environmental Management Plan (EMP) including the environmental monitoring plan.

9. This IEE was drafted for, and in coordination and consultation with the Ministry of Energy and Water (MEW), the Ministry of Agriculture, Irrigation and Livestock (MAIL), and the Ministry of Rural Rehabilitation and Development (MRRD) during May – December 2018. The international and the national environmental specialist visited the project sites. Consultations with the relevant stakeholders were carried out in order to discuss the project's goals and implementation. Scope and progress of the IEE were presented to the MEW project steering committee in Kabul on 8 July 2018.

B. Data Collection

10. Baseline data referring to the physical, biological and the socio-economic environment have been collected from previous studies and through meetings with the following authorities and agencies:

(i) MEW Kabul;
(ii) Afghanistan Urban Water Supply and Sewerage Corporation (AUWSSC);
(iii) Arghandab Sub-Basin Agency Kandahar (ASBA);
(iv) Da Afghanistan Breshna Sherkat (DABS) Kandahar;
(v) Helmand River Basin Authority;
(vi) NEPA Kabul and NEPA Kandahar;
(vii) Archaeology Institute Kabul;
(viii) Department of Culture Kandahar.

11. The primary data was collected through site visits and observations, technical and environmental surveys, and consultations with the government and community representatives.

12. A site visit of the project area was conducted on 10 July 2018. A fish biological study and ornithological study have been carried out at the dam in November 2018 by NEPA experts. Baseline air quality monitoring and water quality monitoring has been carried out in January 2019 at the dam, below the dam and in Kandahar City. Irrigation and farmer surveys were completed between April and October 2018, covering technical details and issues raised by the 120 community irrigation systems with combined water rights on 115,000 ha, comprising the three irrigated farming zones in the project area: (i) Arghandab Irrigation System; (ii) downstream of the Arghandab diversion weir; and (iii) upstream of the Arghandab diversion weir. The surveys were conducted for two purposes, namely to: identify (i) the scale of the community systems (which have been in operation for over 100 years) and the size of the cultivation area; and (ii) the priority needs for infrastructure improvement works, as expressed by the community, with as primary objective to raise the efficiency of irrigation water conveyance and distribution efficiency. The

interviewed Maliks and mirabs (community leaders and water masters) pointed to the following as being the most serious and most common problems:

(i) the general absence of division boxes and gates makes it difficult to provide time-based delivery turns and hence results in inefficient water use;
(ii) the general absence of canal lining so that at locations where a canal cuts through loose soil (sandy soil) it frequently happens that the canal's side slopes slip into the canal and block canal flow; this in turn causes upstream canal banks to overtop so that water is lost and downstream users cannot be supplied in timely manner;
(iii) siltation and gravel debris accumulation in canals, resulting in some sections prone to overflow of banks.

13. Subsequent to the site-based data-gathering work, the TRTA team consulted and collaborated with relevant government agencies including implementation agencies in Kandahar and Kabul. Additionally, a Kandahar based TRTA coordinator has been providing information as required.

14. This IEE has also been informed by both primary and secondary research, and supported by government policy. Climate change must be considered in the IEE to address key climate change adaptation needs identified in the Afghanistan National Adaptation Plan and Intended Nationally Determined Contribution submitted to the United Nations Framework Convention on Climate Change.[3] Both MAIL and NEPA are responsible for biodiversity.[4]

15. Reports of small irrigation system interventions carried out over the period 1995 to 2003 by various parties (Germany, Taliban, Food and Agriculture Organization of the United Nations (FAO), Japan International Cooperation Agency), some concerned with the large canals of the AIS, while others focused on the community systems.[5] The United States Army Corps of Engineers (USACE) surveyed in 2011.[6] In 2009 to 2012, the Canadian International Development Agency (CIDA)-funded Arghandab Irrigation Rehabilitation Project undertook a range of activities to restore the functioning of the AIS.[7] Project appraisal (2007/2008) had found that the reservoir was seriously silted up; Dahla Dam outlet works were leaking, some of the gates at the diversion dam were not working, the main canals were silted up, and many of the offtake gates needed to be replaced. It was estimated that the overall system's water delivery efficiency was only about 25% as it was observed that throughout hundreds of kilometers of canals, severe leaks and broken infrastructure was allowing the water to drain away instead of being used for irrigated agriculture.[8] The remedial work was completed in 2012 for a contract sum of about $40 million. The work consisted of de-silting and repairs to some 78 km of main canal and about 415 km of community system canals, replacement of valves, and erecting sluice gates. This work was successful and all main canal sections are still in reasonably good condition.

C. Impact Assessment and Mitigation

16. Potential consequences and project impacts on the physical and biological environment have been assessed. Analysis is based on findings during field visits and evaluation of data received from various sources. Assessment relates to environmental impacts during detailed

[3] Government of Afghanistan. 2015. Intended National Determined Contribution. Kabul.
[4] National Biodiversity Strategy and Action Plan, Islamic Republic of Afghanistan, Framework for Implementation, 2014-2017: from http://extwprlegs1.fao.org/docs/pdf/afg150087.pdf
[5] Sanyu Consultants Inc. (2004:2-14): 'The Study on Urgent Rehabilitation Support Program of Agriculture in Kandahar, Afghanistan, Final Report.
[6] USACE 2011. Detailed Technical Assessment. Washington
[7] CIDA, 2008. The Arghandab Irrigation Rehabilitation Project. Ottawa
[8] CIDA, Technical Appraisal Mission Report (final) v2008-12. Page 76.

design, construction and operation of Output 2. A Rapid Environmental Assessment (REA) has been carried out to address the likely/potential impacts (Appendix 1). No significant adverse environmental impacts have been identified and the project has been categorized as category B Project. The likely and potential impacts are summarized in the EMP and mitigation measures have been developed accordingly.

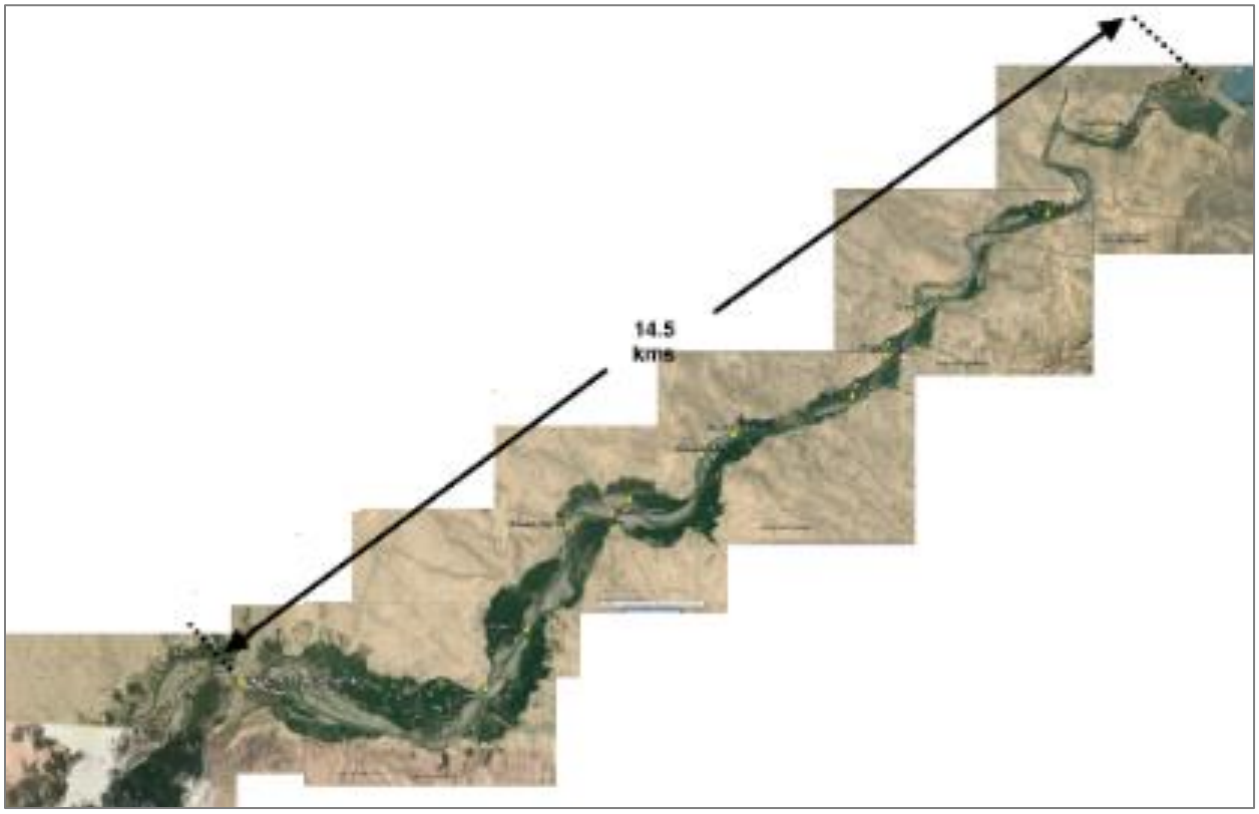
II. DESCRIPTION OF THE PROJECT

A. Existing Situation

17. The Dahla Dam, built in 1952, is the largest dam in Kandahar Province and the second largest in Afghanistan. The Dahla Dam when first constructed created a reservoir with a gross storage capacity of 491 million m^3, from which lands in the Arghandab Valley, including the Tarnak area would be irrigated.[9] The dam is located 34 km north of Kandahar City.

18. Water from the dam is conveyed to the agricultural land to be irrigated. Water from Dahla Dam flows into the Arghandab River through 13 division weirs below the dam.

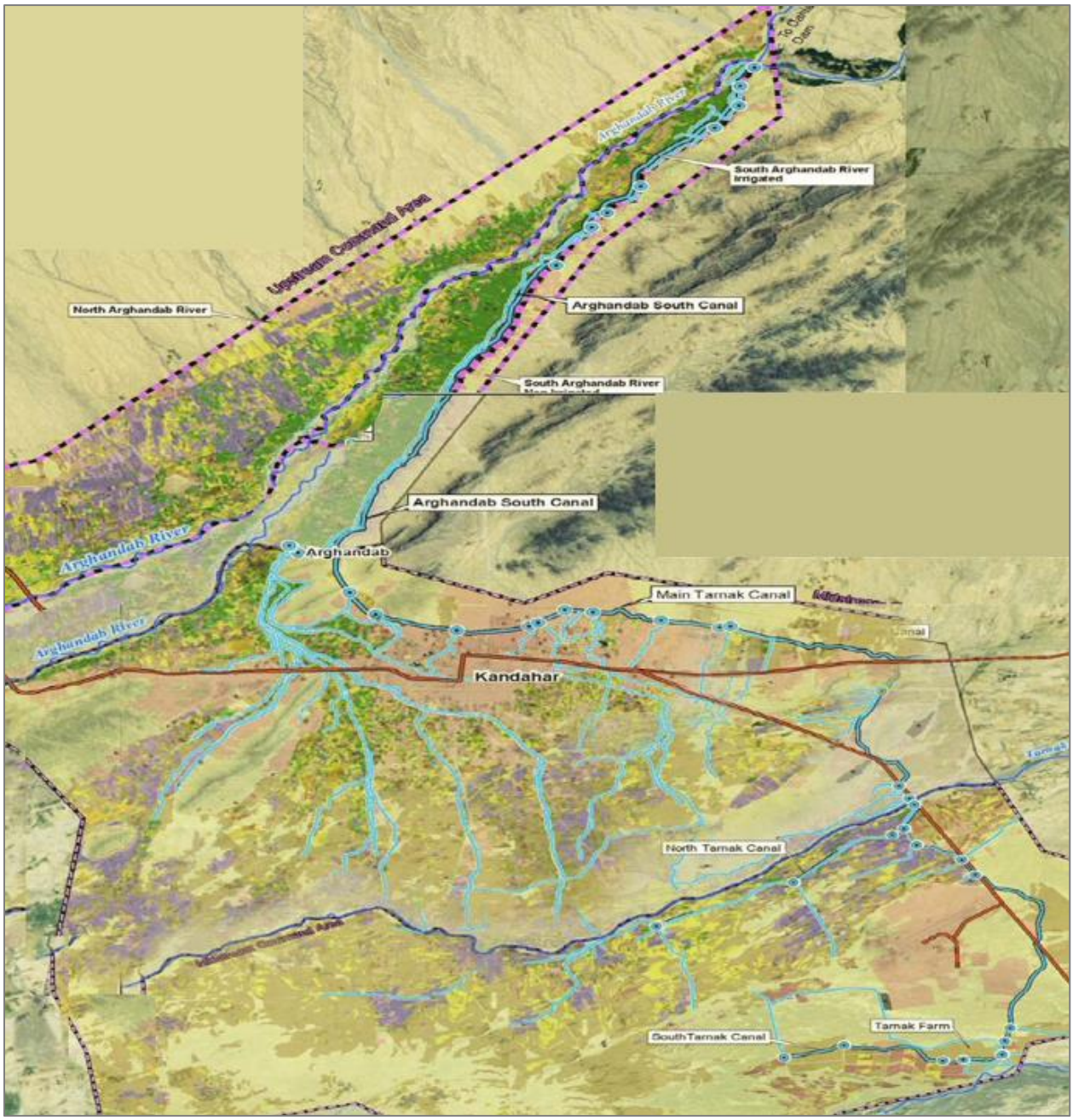
Figure 1. Division Weirs Below the Dam Used for Irrigation



Source: ASBA Kandahar and TRTA Consultants, 2018

[9] Tudor 1956:31: Capacity above the outlet valves is 388,000 acre feet (479 million m^3). Baron 1973:16: 390,000 acre feet (481 million m^3) and a stated gross irrigable area of 475,000 acres (191,058 ha).

Figure 2. Project Location – Overview of Irrigation Canals and Irrigated Area

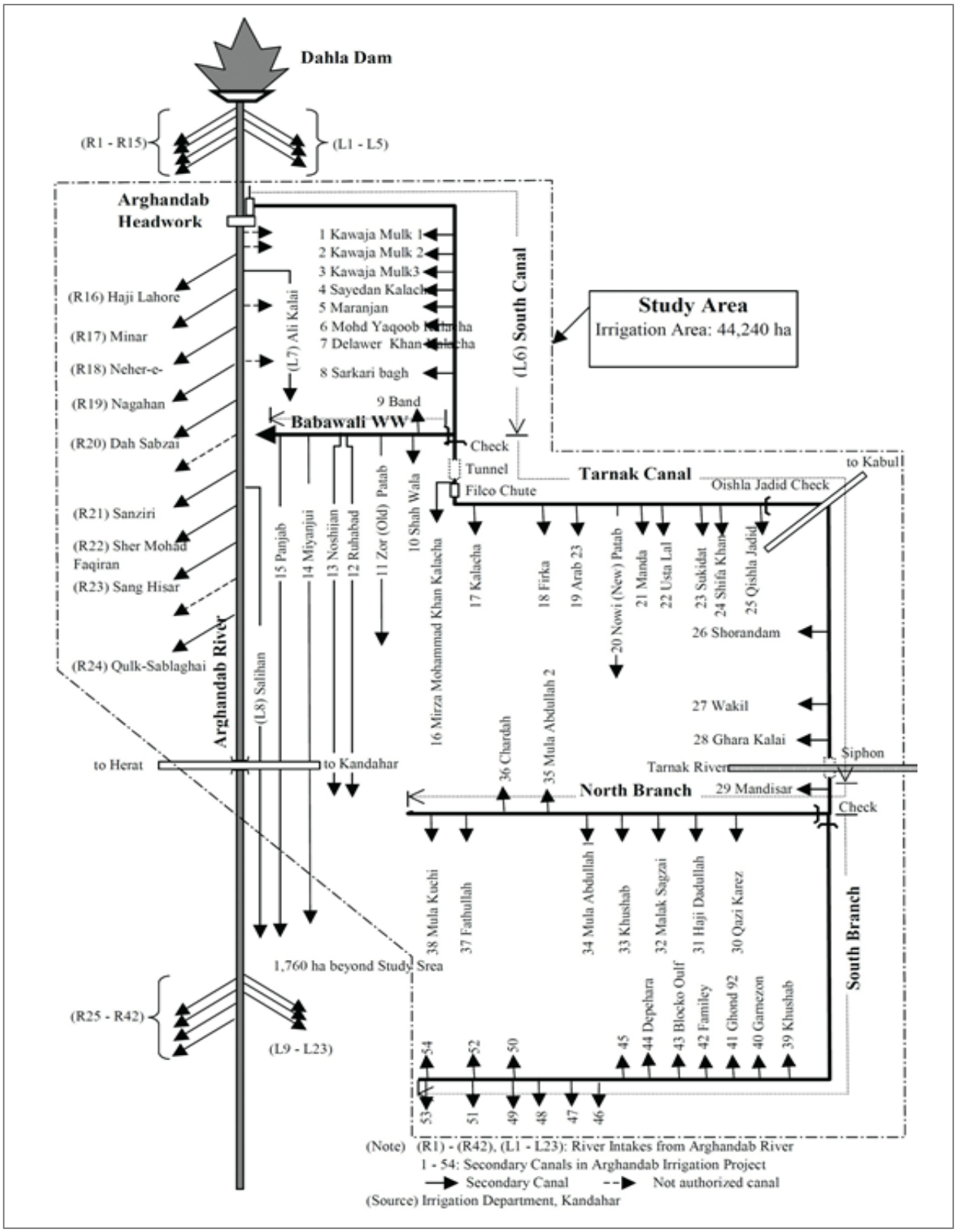


Source: CIDA / AIRP, 2012

19. The AIS spreads over 7 districts (Arghandab, Shah Wali Kot, Dand, Daman, Zheri, Mainwant, Panjwayee).

20. The following figure provides a sketch of the community canals existing in 1953 on the right and left bank of Arghandab River, the time that the design for the AIS was prepared. The attached schematic was prepared in 2003 and distinguishes 119 community schemes. Of these, 54 are served from major turnouts on the Arghandab Irrigation System (AIS), and 65 each have an own intake from the Arghandab River, outside the AIS.

Figure 3. Arghandab Irrigation System and Command Area



Source: ASBA Kandahar, 2018

21. The TRTA irrigation sub-component team's desk study and rapid appraisal from 16-19 April 2018 confirmed that all irrigation in Arghandab Valley occurs in irrigation and drainage schemes which are fully community-owned and-managed and that availability of documentation on the performance of these systems is negligible. It is said that most have a history of more than 100 years. Throughout the valley, water resources are shared, and irrigation water is distributed according to long-established agreements between villages and, within the villages, between landowners. The water distribution is conducted by irrigation and drainage system managers (mirabs), who have been appointed and are annually evaluated by the communities. The longer canals (>5 km) typically serve multiple villages. For management purposes, the communities served by such canals have agreed on a division of the canal into segments, each being managed by one mirab. The AIS system has its own permanent diversion weir and is allowed to take up to 40% of the river flow approaching the diversion dam. The balance of 60% is available for diversion by the community systems outside the AIS.

B. Rationale

22. The AIS, although at its introduction in the 1950s being referred to as a modern system, is not an example of high efficiency. Only some parts of Arghandab South Main Canal are lined, while the longer Tarnak Main Canal (TMC) with its slower flow is still fully in earth, as are its two branch canals. TMC transects Kandahar City, which occupies a relatively high position in the oasis, and seepage losses over this section are likely considerable.

23. While the canals have steel gates on all division structures and turnouts, these are still manually operated. The TRTA observed that at all structures visited, that pad locks are applied and spindles were reasonably greased, indicating that ASBA actively operates the gates. ASBA explained that it will respond when downstream farmers complain of too little water by adjusting upstream turnout gates until water reaches the concerned location.

24. Flow monitoring is inadequate. ASBA does not keep proper records of water levels and gate settings and sees no other way of determining discharge than by a time-consuming measuring of cross-section and flow velocity with a gauge. It has no calibration curves or tables. Instead, gate settings - especially at the large division structures - are discussed in the field with the related *mirabs* and adjusted until all agree.

25. There is an increasing urban impact on irrigation infrastructure. The system was built at a time that Kandahar was a small city, surrounded by agriculture-oriented villages. The city's residential area has expanded enormously, adding previously rural villages into its embrace and converting them in crowded city-oriented ones. Traffic in, out, and through those densely populated areas has increased. In cases, the roads are along the upstream sections of community system canals, many of are deep and too wide, occupying space that could be used more economically for improving roads. The canals form a danger for the road users, while traffic close to the canal will erode the canal bank.

26. More bridges over canals are needed. TMC was to the North of the City, but now transects it and traffic flows across the canal have intensified. Some new bridges have been built across the canal, but not as many as needed to support the development of a road network conducive to the economic traffic. ASBA reported that more bridges for animals, small vehicles and pedestrians are needed.

27. Recreational use is important. Furthermore, thousands of citizens tend to enjoy themselves daily, bathing and playing in the TMC when it carries water. ASBA complained about

the erosion of the canal side slopes due to this behavior of the citizens. Indeed, the TRTA observed that the canal section seems to have widened since it was constructed due to erosion of its banks. The canal is now 20 meters wide, and this has resulted in normal water depth over this section having become about 1 meter only. There was no water running in the canal, but the impression was that flow velocity is usually very low.

28. The main forces in the physical environment that negatively impacts on the stability of the community systems is the eroding power of the rivers. Arghandab River is geologically relatively young and still incising. As a consequence of this, intakes on the river need to be re-excavated, deeper and deeper, and sometimes moved to further upstream, requiring an extension in upstream direction of the main canal.

29. A second factor is the siltation in the canals, especially in the most downstream section. Where the canals have a relatively great hydraulic slope, the water running through the canal incises into the soil and carries the eroded material downstream and to deposits it where the speed of flow diminishes. Construction of a siltation pond at or near the river offtake point has been suggested and should be further considered.

30. A third factor is the stability of the soil. The upstream sections of many of the canals run in deeply excavated/incised beds with vertical side slopes. Combined with the above ongoing process of erosion of the canal bottom, collapse of the side slopes is a frequent problem, particularly where canals transect more loose, sandy soils.

31. While the community systems appear to be operational, the overall efficiency of water use in these systems is weak. The low efficiency problem concerns the following aspects: (i) Losses due to leakage and evaporation along the water supply from Dahla Dam to the intakes of the community systems; (ii) Poor efficiency in diverting water from the river into the main community intakes; (iii) Poor internal efficiency in conveying and distributing the water within the community system, and; (iv) Inefficiency of field application.

C. Proposed Project

1. Output 2: Reliability of Irrigation Water Supply Increased

32. The objective of Output 2: reliability of irrigation water supply increased, is improved irrigation and drainage services in the irrigation schemes downstream of Dahla Dam, so that water will be delivered effectively and efficiently via main, secondary, and tertiary canals to the farmers, and surplus water will be drained adequately. Improvement of the irrigation and drainage services will result from the following activities:

(i) Appropriate dam operation rules will be formulated and formalized: the enlargement of the storage capacity of the reservoir under Output 1 will make it possible to increase releases into Arghandab River and maintain them over a longer period throughout the year than is possible with the current storage capacity;
(ii) Rehabilitation and modernization of the irrigation and drainage infrastructure and;
(iii) Strengthening of the governance, management, operation and maintenance of the irrigation and drainage infrastructure.

33. The command area of the AIS is approximately 40,000 to 46,000 ha and covers vineyards (grape vines), fig, almond, pomegranate and other fruit orchards and crops. While pomegranate orchards are situated on land with the very best irrigation water supply, and vineyards on land

with second best irrigation water supply, seasonal crops are grown to an extent varying from year to year, depending on irrigation water supply.

34. Potentially, investments will concern one or more of the following: (i) improvements to the infrastructure and the management of the AIS main irrigation and drainage system; (ii) improvements to the infrastructure and management of the community systems receiving their supply from the AIS; (iii) improvements to the infrastructure and management of the community systems outside the AIS.

a. Activity 1.1. Improve AIS Irrigation and Drainage Services

35. The project will support rehabilitation of infrastructure as prioritized by ASBA: flow control and monitoring; gates; canal restoration; bridges; drainage works; de-siltation; extension of Babawali wasteway; and canal safety measures.

36. An important activity will be to collaborate with *mirabs* to explore the establishment of Water User Associations (WUA) with the purpose of improving management and sharing of water resources, particularly downstream water users. Although the efficiency of water delivery will improve across the command area, it will be important to strengthen farm-based understanding of the whole system and the WUA's can be an important player in this. It is noted that WUA's, should they be deemed to have a role to play, could be facilitated through the Community Development Councils (CDC).

37. **Install flow monitoring equipment**. The project will help ASBA to monitor and control flows. ASBA's monitoring and control of canal flow is based on historically seasonally maintained water levels. ASBA advised that it has no calibration curves for determining flow through any of the gates, even not for the flow over Arghandab Weir. It is therefore not clear how much water is being delivered to the various sub-areas and community schemes. In order to make maximal efficient water distribution possible, ASBA will intensify its flow monitoring and keep proper records. The project will install adequate flow monitoring equipment and develop calibration curves for the weir and all AIS gates. It is planned to supply the AIS canals with 10 and the rivers with 70 water level monitoring gauges. The flow monitoring equipment will be further enhanced with the added capacity to act as an early warning system (EWS), particularly where short-term flooding could be expected to see water break the banks of canals. Devices will be installed on the AIS irrigation canals, as well as at a number of points on Arghandab River, upstream and downstream of Dahla Dam, on Tarnak River, Dori River, and at Arghandab River's confluence with the Helmand River. A model of device most suitable for the environment in which it is to function, would be a sturdy large size (30x30 cm) reinforced concrete pillar with a 1.5-meter-deep foundation into the bottom, inlaid with colored ceramic or other material elements that are anchored deep into the concrete. The simplicity will make it possible for ASBA to employ people living nearby, or the nearest *mirab*, to regularly report the water level by making a dated and coordinated photograph and send it to ASBA by telecom or internet.

38. **Repair gates and upgrade operation mechanisms**. The project will repair and replace gates, particularly gate leaves. ASBA provided an initial list of repairs needed on gates; 72 gates on Khwaja Maluk Diversion Weir, Arghandab North Main Canal, TMC and Tarnak North and South Canals, and 788 gates of community system infrastructure (see Appendix 7).

39. **Canal cross-section restoration and stability improvement**. Canal side slopes are subject to erosion by water action and at particular places also by humans, animals, and vehicles entering and exiting the water carrying canal or the dry canal bed. As a consequence, at some sections side slopes tend to collapse and interrupt the irrigation process. At other sections, the

canal is substantially wider than the original width, which is particularly a problem where the canal transects residential area or where its banks accommodate intensively used roads. ASBA has provided a list of canal sections that need to be provided with vertical soil retaining walls at one or both sides of the canal, or fully concrete lined over the cross-section perimeter with inclined lining (see Appendix 7).

40. **Improve recreational value and other non-irrigation-related uses**. A special case is the section of TMC, where it transects Kandahar City. When it carries water, the section between stations 19+400 and 21+720 (length: 2,300 m), through "Aino Mina", a new part of the city It is at this section that the canal has become very wide due to erosion of its side slopes. As a consequence, normal water depth has decreased to about 1 meter only and speed of water flow is very low, together with the gravelly canal bed, this clearly offers excellent opportunities for this form of recreation. Volume-wise, this will be the most substantial work item on the AIS system. The project will restore actual canal width to what is hydraulically required, and construct concrete lining of the canal side slopes against further erosion. The works will be designed such that they convert the canal section into a more convenient mass-recreational site. Along both banks of the canal section, the reduction in-canal width will be used to construct a number of shallow, wide, and fenced bays, accessible via convenient steps. The canal bottom consists of a thick layer of porous gravelly material. To fully prevent seepage over this section, concrete lining will be constructed as the canal bottom. The canal bank will be developed to offer a park-like landscape, with places to sit.

41. **Bridge construction**. Given the size of the city nowadays and the traffic through it, TMC forms a considerable obstacle to transport of people and goods. The project will construct six new pedestrian and vehicles integrated bridges in listed locations and key dimensions linking existing thoroughfares (Appendix 7).

42. **De-siltation and siltation ponds.** ASBA reported that silt is a problem in the canal sections most downstream. ASBA has provided a list of canal sections requiring de-siltation. The list contains all sections of the circa 10 to 11 km long Tarnak North Branch Canal and no sections of any other canal. If appropriate, siltation ponds will be constructed in the upper parts of the canal system.

43. **Babawali Wasteway.** This wasteway is the AIS principal wasteway and situated at the end of Arghandab South Main Canal and the head of TMC, upstream of the TMC's tunnel section. The wasteway is to be operated in case of an emergency on TMC, such as a sudden blockage of the TMC, for example due to collapse of the tunnel or of one of the inverted siphons. Such a blockage will result in the water level in the canal increasing and overtopping the banks and this is likely to cause serious damage to the city. The wasteway channel ends abruptly where the Arghandab River flood plain starts. When it was constructed, the flood plain was likely bare terrain of which no one claimed ownership, but at present the terrain is under cultivation. Discharging the full flow of South Canal (capacity 42.5 m^3/s) via the wasteway will damage the properties on the flood plain that its path crosses. ASBA proposed the construction of a 1.2 km link channel between the end of the wasteway and the river. This channel will cross a number of minor community system canals. The project will provide machinery to enable ASBA to extend the wasteway channel in consultation with land owners.

44. **Electrical gate hoisting mechanisms**. The project will install an electrical-powered gate hoisting mechanism on the gates at Babawali Bifurcation/Wasteway structure and install a generator that can be used during periods that grid power is not available. Manual operation should remain possible and be convenient at all times. The operation panel will be installed inside the office building (see Appendix 7).

45. **Safety measures**. ASBA reported that annually 25-30 people drown in its canals. In an effort to reduce the risk of citizens and vehicles falling or slipping into the canal the municipality has in 2017 provided barriers along the section of the canal transecting the city, and planted trees on the canal bank. A dedicated survey will be undertaken to identify the sections where these accidents have happened in the past and thus risks are highest of a repeat, and investigate why these accidents tend to happen there. The project will provide: boards with warnings, construct additional barriers to keep vehicles away from the canal edge, and construct flights of steps at well-selected locations and properly designed to facilitate the access citizens are looking for.

b. Activity 1.2. Improve Community Irrigation Services

46. The project will provide a fund for community irrigation infrastructure rehabilitation according to the priorities of each community irrigation group. Funds will be allocated on the basis of $200 per hectare of each farmer's registered irrigated land, and pooled within each community irrigation group for infrastructure constructed under ADB's community contracting procedure.

47. The TRTA undertook an extensive survey, covering all 120 community systems, listing indicative works that the *mirabs* prioritized. The various types and indicative quantities of priority works proposed in the survey are in Table 1 and a breakdown for the main canals is presented in Table 2. The works will be done through CDC.

Table 1. Indicative List of Priority Works on 120 Community Systems

		Unit	Quantity
1	Lining	m	23,186
2	Retaining wall	m	14,088
3	Water divider	nos	60
4	Culverts	nos	100
5	Aqueduct	nos	9
6	Siphon	nos	3
7	Diversion structure	nos	60
8	Protection wall	m	10,854
9	Control gates/small	nos	684
10	Control gates/medium	nos	104
11	De-siltation	m	58,860

Source: TRTA Consultants, Irrigation survey, 2018

Table 2. Indicative List of Priority Works per Main Canals

No	Name of canal	Type of work/structure										
		1	2	3	4	5	6	7	8	9	10	11
		Lining	Retaining wall	Water divider	Culverts	Aqueduct	Siphon	Diversion structure	Protection wall	Control gates		De-siltation
		(m)	(m)	#	#	#	#	#	(m)	S (#)	M (#)	(m)
1	Delahor	100	-	1	-	1	-	1	70	2	1	-
2	Munar	617	975	-	1	-	1	1	590	67	8	-
3	Ali Kalai	-	-	-	3	-	-	1	383	-	1	-
4	Nahre roza	6	380	-	-	-	-	1	-	1	-	-
5	Kohak Nagahan	-	495	4	1	-	-	1	-	6	3	-
6	Salihan	717	285	-	-	-	-	1	-	8	1	2,000
7	Deh Sabzi	440	-	1	-	-	-	1	-	9	1	4,000
8	Sanzeri	470	-	-	-	-	-	-	-	8	-	-
9	Shir Ahmad wa Faqiran	-	-	-	-	-	-	1	-	-	2	-
10	Sange Hesar	215	300	-	1	-	-	1	1,210	17	6	-

No	Name of canal	Type of work/structure										
		1	2	3	4	5	6	7	8	9	10	11
		Lining	Retaining wall	Water divider	Culverts	Aqueduct	Siphon	Diversion structure	Protection wall	Control gates		De-siltation
		(m)	(m)	#	#	#	#	#	(m)	S (#)	M (#)	(m)
11	Nahre Qazi	95	-	-	-	-	-	1	-	1	1	-
12	Klak Sagwagha	50	-	2	1	1	-	1	-	10	2	-
13	Pashmol	41	900	1	4	-	-	1	300	8	4	-
14	Syah Joi	65	-	3	-	-	-	1	-	8	2	-
15	Panjwaee Markazi	75	135	4	-	-	-	1	1,000	14	2	-
16	Nahre Kariz	123	160	-	2	-	-	1	-	4	1	-
17	Sperwan	685	-	-	1	-	-	1	225	6	1	-
18	Raz Mohammad khan	50	120	-	-	-	-	1	-	5	1	-
19	Zank Abad	40	500	2	4	-	-	1	600	13	2	2,000
20	Nelgham	177	88	-	2	-	-	1	400	5	2	-
21	Gad Hul	70	-	-	3	-	-	1	400	4	1	-
22	Rajabak	110	-	-	2	-	-	1	-	3	1	-
23	Talawkan	600	300	-	1	-	-	1	250	-	-	2,000
24	Moshan	677	-	4	-	-	-	1	-	16	1	-
25	Charshakha aw Merakhur	66	450	1	1	-	-	-	451	6	1	-
26	Deh Kobat	860	30	-	1	-	-	1	180	2	2	3,000
27	Dawab	347	220	-	3	1	-	-	150	18	-	-
28	Kani Zai	812	370	-	-	-	-	-	50	6	-	3,500
29	Qalai Shamir	300	-	-	5	-	-	1	-	8	1	-
30	Jangi Abad	70	310	-	1	-	-	1	-	10	1	-
31	Shiriki Wala	290	100	-	1	-	-	1	-	8	1	-
32	Jabadar	220	130	-	-	-	-	1	-	-	-	-
33	Landai Wala	60	-	-	-	-	-	1	-	2	-	5,000
34	Mohammad Zo Wala	17	-	-	-	-	-	1	-	3	3	-
35	Mirano	120	-	-	-	1	-	1	-	7	1	-
36	Faizullah Khan	70	-	2	-	-	-	1	-	4	1	-
37	Haji Gul Mohammad	106	-	-	1	-	-	1	-	9	2	-
38	Mandozai	270	-	-	1	-	-	1	-	4	1	1,000
39	Balol Zo	300	-	-	4	-	-	1	-	10	1	-
40	Band-e-Timor	150	-	-	4	-	-	1	-	15	1	-
41	Chushma	275	-	-	-	-	-	1	-	5	1	-
42	Jamal Zoi	330	-	-	1	-	1	1	-	-	1	-
43	Jogram1	70	-	-	-	-	-	1	-	7	1	-
44	Jogram2	100	-	-	-	-	-	1	-	-	1	-
45	Kaghazi	300	-	-	5	-	1	1	-	-	1	-
46	Shalghamai	250	-	-	-	-	-	1	-	6	1	-
Total		**10,806**	**6,248**	**25**	**54**	**4**	**3**	**42**	**6,259**	**345**	**66**	**22,500**

Source: TRTA Consultants, Irrigation survey, 2018

48. The request for project assistance with de-siltation concerns special cases, where the community could not and cannot mobilize the labor needed to complete that work. When working with the *mirabs*, it will be important for the project to assess the reasons for this and conclude whether the result of the de-siltation will be sustainable in the longer-term. To be successful, the sustainability of a community system needs to be established upon the premise that outside assistance will not always be available. The need for such assistance may reflect that there are only few farmers with a sufficiently strong interest in the canal's service.

2. Output 3: Agricultural Water Productivity Improved

49. Output 3: agricultural water productivity improved, is interlinked with Output 2, in that irrigated agriculture will utilize the water made available from the infrastructure and organizational

and management elements of Output 2. With demand for staple crops fairly inelastic, aiming to increase gross production of staple crops may not give the greatest margin from investment in increased or improved water availability. Higher value crops and processing are emerging activities. Such processing is already undertaken, for example, with pomegranates and grapes.

50. The project will establish demonstrations with partner farmers to provide farmers hands-on experience of climate-smart agricultural technologies and practices that will improve productivity, product quality and value, and environmental outcomes, such as:

(i) Water-efficient irrigation technologies (drip irrigation, soil moisture monitoring, laser levelling of land, raised beds, mulching);
(ii) Integrated pest management (IPM), integrated crop nutrition (ICN);
(iii) Management of soil organic matter, e.g. through compost, green manure crops, cover crops;
(iv) Resistant varieties (to drought, heat, cold, pest, disease, etc.);
(v) Post-harvest facilities to ensure food safety;
(vi) Improved solar drying systems;
(vii) Improved cool stores (e.g. improved in-ground traditional cool stores, and heat-pump cooled stores).

51. The project will support the adoption of climate-smart agriculture, and post-harvest handling and processing technologies and practices, through matching grant investments for screened and approved business plans of farmers, farmer groups and agro-enterprises. The screening criteria and process include environmental screening, documented in the Project Administration Manual (PAM), Annex 1.

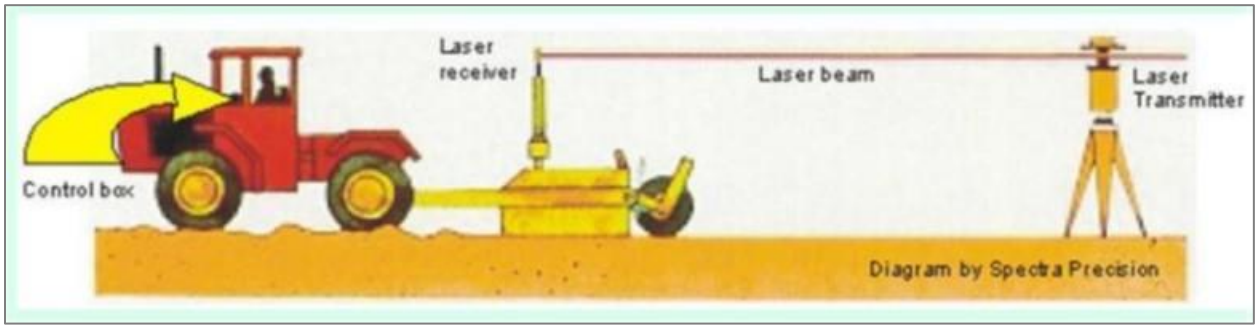
52. Alternative technologies for irrigation and agriculture will reduce water losses:

(i) Irrigation water which follows, or flows down, field contours, for example in polyethylene pipes with simple pierced holes or spray nozzles, or spray and drip feeders attached to vineyard and orchard trellises;
(ii) Mulching between rows to reduce water loss and barrels connected to micro-pipes with drip holes, to supply water direct to roots beneath the mulch;
(iii) In addition to the simple adoption of delivery technologies, improved laser guided levelling of land will improve water use efficiency and avoid puddling, and over-watering of some areas, compared to under-watering of others;
(iv) Fertigation is a combination of irrigation and fertilizer application, when the irrigation water is used to carry plant nutrients in a pre-set amount per hundred liters delivered. This is similar in principle to hydroponic methods, but in the latter plants are grown without soil, whereas fertigation methods allow plants to grow in soil and apply the water from drip or spray nozzles. Both are used for intensive greenhouses, but fertigation also can be used in outdoor nurseries, for example for vines, vegetables or tree crops to promote rapid growth. Fertilizers will be applied in adequate dose to prevent overfertilization and contamination of the ground water.

53. The proposed trellising of plants keeps them off the ground and increases usable space and yield. Plants are more exposed to sunlight, improved air circulation reduces incidence and spread of diseases and the quality of fruit and foliage improves. Trellising also prevents fruit rotting

before harvesting and reduces the use of fungicides and pesticides. In addition, the biodiversity of insects (bees) can be expected to increase with introduction of trellis.[10]

Figure 4. Integrated Laser Guided Levelling



Source: TRTA Consultants, 2018

54. Additional examples to save water for irrigation are presented in the following figures.

Figure 5. Mulching Between Rows (Left) and Feeder Pipes to allow Drip Irrigation (Right)

Source: TRTA Consultants, 2018

Figure 6. Drip Irrigation of Pomegranate Seedlings (Left) and Sprinkler Irrigation of Forage Crops (Right)

Source: TRTA Consultants, 2018

[10] Hortomallas. 2014-2017. *Trellising Plants – The Importance And Advantages*. https://www.hortomallas.com/en/trellising-plants-the-importance-and-advantages/

55. Gravity feed systems will be replaced by local solar powered pumping solutions from close-by rivers, canals or streams to fields which are at higher elevations than the water source. This reduces the need for long canals/streams as feeders to fields where gravity and elevation historically demand water take off points, often several kilometers above the field in order to maintain gravity fed flows.

56. Solar power which is now available in small-scale affordable units and linked to small-scale pumping with filters and local storage balloons, can take water from nearby sources – avoiding groundwater and using local main or secondary canals and streams/river tributaries. This cuts out water loss in transmission, which is currently upwards of 50% of dam discharge and gives local flexibility of water management. On-farm water storage is proposed. Use of heavy-duty pond liners and black plastic tanks is recommended.

57. Plant targeted irrigation will be used instead of field gravity fed flooding. Direct pumped or gravity fed drip and sprinkler irrigation technology has advanced considerably since the 1980s. Use of flexible and collapsible hoses, with drip or directed spray nozzles, above or below ground, are commonplace in developed horticulture, for orchard, vineyard and field crops.

58. Flood and sprinkler irrigation will be conducted for larger “field scale” operations which are not row crops, such as grains and forages or field herbage for human consumption e.g. winter wheat, barley, alfalfa, borage, onions in a bed system, etc. Converting farmers from flood irrigation row crops for high value vegetables, to bed systems with sprinklers e.g., onions, tomatoes, water melon, can increase yields and reduce water loss while benefitting labor requirements and enabling more effective fertilizer use, through mechanized harvesting and planting.

59. The large-scale adoption of drip irrigation will result in higher yields, and lower water, fertilizer and power use in crop production.

60. Improved water availability will increase agricultural production and will increase use of fertilizers and pesticides. Training will be provided to farmers by Department of Agriculture, Irrigation, and Livestock (DAIL) on improved agronomic practices including correct application of water, fertilizers and pesticides to mitigate any negative impact.

61. Improvement of the agricultural practice (Output 3) will not be based on additional use of fertilizers and pesticides. No impact on water quality is expected due to implementation of this Output. Saving of fertilizer is about 25% (extra effect in drip compared to flood field).[11]

D. Construction Activities

1. Output 2

62. The typical construction activities for Output 2: reliability of irrigation water supply increased, will include the following:[12]

(i) Establishment of camp for the contractors;
(ii) Development of the quarries for clay core, filters, rockfill, riprap and aggregates for the canal rehabilitation works;
(iii) Lining of canals where sections are in deep excavation and cut through sandy ridges. This is needed mainly for the upstream sections from the main intake of the

[11] Introduction of Micro Irrigation (Drip Irrigation) and associated high-tech crop production technologies for various crops at Dahla Dam Area of Afghanistan
[12] See Appendix 7 for more details.

canal down to the area where the main canal splits out into branch canals because of large discharge and high velocity. This can be implemented at one or both sides of the canal as stone masonry retaining wall or made of reinforced concrete;

(iv) Repair or replacement of existing structures (100 culverts, 6 new bridges and 60 division boxes);
(v) De-siltation of the canals (14,000 m of AIS canals, 58,860 m of community canals);
(vi) Repair or replacement of gates (at the diversion weir, offtakes gates: 72 gates on AIS canals, 60 water dividers and 788 gates on community);
(vii) Lining of canals (17,995 m of AIS canal, 23,186 m of community canals);
(viii) Construction of retaining walls along the canal to the roadsides where canal water is causing erosion of its bank and making the road narrow (14,088 m);
(ix) Water dividers and water division boxes for better control of flow (60 water dividers on community systems);
(x) Construction of new culverts on the community canals inside the villages (100 culverts);
(xi) Construction of diversion structures and main intakes for community irrigation systems which receive water from Arghandab River;
(xii) Riverbank protection from erosion by floods is particularly important where community canals run on a riverbank that is threatened by erosion.

63. The engineering options for infrastructure rehabilitation and improvement of canals will involve either rehabilitation or construction of new siphons, flow central gates, flow diversion structures/boxes, culverts and lining of canals. No new canals will be built. No widening or extension of canals is foreseen. More details are presented in Appendix 7.

64. Social access points will be built along the canal for washing, drawing water and to water animals.

2. Output 3: Agricultural Water Productivity Improved

65. Any sub-project investment proposals involving construction (e.g. of agricultural processing or storage facilities) will be assessed and screened using documented procedure in the PAM (Annex 1).

E. Construction Schedule

66. Output 1: Reliability of irrigation water supply increased, has two main activities:

(i) **Improve AIS irrigation and drainage services** (2020-2023). The work concerns priorities identified by ASBA and includes: flow control and monitoring; gates; canal restoration; bridges; drainage works; de-siltation; extension of Babawali wasteway; and canal safety measures;
(ii) **Improve community irrigation services** (2020-2023).

F. Human Resources and Equipment

67. **Activity 1.1.** Government will continue its budget allocation to ASBA for staff and operations. For the period of construction rehabilitation and modernization, the project provides budget for construction materials, upgrade of the ASBA central workshop, and budget for construction machinery.

68. For both construction phase and subsequent operations phase, community contribution will be levied. At present ASBA does not charge irrigation fees, but the Project is providing support to the government for regulatory reforms which will introduce fees for irrigation water delivery service, and thus provide sustainable revenue for operation and maintenance. In the interim, ASBA will liaise with community irrigation groups to implement a labor contribution scheme for suitable works on the sections of main canals that provide water to the groups' farmlands. The suggested labor contribution rate is five work days per hectare of registered irrigated land. Contributed labor will be provided mostly outside of the irrigation season. This contribution will provide ASBA approximately 20 laborers daily for about six months of the year, a total of about 3,000 person-days. The scheme is intended to also strengthen the prioritization of canal works based on farmers' needs and ensure community oversight of environmental mitigation.

69. The project will provide a budget to support machinery and a central workshop facility to strengthen the capacity of ASBA to carry out operation and maintenance works (including the maintenance works described herein). Based on the role of ASBA, its institutional framework and asset inventory, the project will support an inventory review of the organization's facilities (offices, heavy machinery, light equipment, vehicles, maintenance and repair work shop, heavy equipment, etc.) and assess additionally required or superfluous assets. The project will repair or provide machinery and equipment based on priority needs. ASBA have suggested a list of heavy equipment for procurement as detailed in Table 2. The project will fund the establishment of a workshop at Arghandab District Office, comprising a work shed (for steel work fabrication and machinery maintenance), a fabricator (for culverts, gates, canal lining slabs, etc.), and storage facility for materials and equipment.

Table 3. List of Heavy Machinery Requested by ASBA

Item	Quantity	Purpose
Wheel excavators / long arm	2	Cleaning canals from vegetation and silt
Wheel dozer (D4 or D6)	1	Cleaning silt from canals and for service the Dam
Wheel loader	1	Loading soil into dump trucks
Dump truck	3	Transporting excavated material
Grader	1	Levelling inspection roads
Roller	1	Compaction
Low-bed trailer	1	Transporting equipment
Tractor with trailer and grass cutter	1	Cleaning canal banks of vegetation
Flat bed truck with crane	1	Lifting and carrying various equipment and material:
Concrete mixer	2	
Vibrator	1	For concrete
Welding machine	2	Repairing flow control gates
Water tanker truck	1	
Water pumps – 4 inches	2	4 inches
Pickup for personnel transport	3	Transportation for ASBA staff

Source: ASBA, 2018

70. **Activity 1.2.** The work will be prioritized by community irrigation groups through their *mirabs* and CDC. MRRD engineers will assess sites and design the works and supervise the construction activities that will be carried out by community contracts with CDCs.

G. Identified Sites

1. Borrow Areas

71. Establishment of borrow pits will require consultation with mirabs to identify suitable sites. At the same time, the refurbishment plan for the site will need to be established to ensure the contractor leaves the site to a safe and acceptable standard.

2. Landfill

72. Where silt has been removed from existing irrigation, there will be a need to relocate this material. In many cases, farmers may benefit from using silt for top-dressing. However, there will be material suitable only for landfill and appropriate sites need to be identified and agreement established as to how such sites will be managed and left at conclusion of the contractual works.

73. it is anticipated that there could be a great deal of variation in the quality of the material which will be extracted from the channel clearing process. There will be fine silts which can be relocated as valuable topsoil additives, however, in some channels there will be lower quality material unsuitable for relocation into broad acreage or intense horticultural areas. This material, unquantifiable at this stage, will need to be relocated and used as landfill. Moreover, farmer's consent will also be obtained to check if the silt can be used as fertilizer or to dump the same into the landfill site.

74. The estimated main earth requirements are presented in the table below. More details are presented in Appendix 7.

Table 4. Earth Work

	Lining (m^3)			De-siltation (m^3)
	Excavation	**Backfilling**	**Stone and boulder**	
AIS Canals - existing	215,940	179,950	97,173	33,600
Babawali wasteway - new	25,800	10,560	15,000	-
Community systems - existing	61,466	18,440	52,053	70,793
TOTAL	**303,206**	**208,950**	**164,226**	**104,393**

Source: TRTA Consultants

3. Construction Camp

75. The establishment of contractor's work camp may cause adverse impacts on the environment if various aspects such as liquid and solid waste management, equipment maintenance, materials' storage, and provision of safe drinking water are not addressed properly. The site for the work yard will be selected by the contractor. **It is firmly recommended** to use the existing facilities below the dam which have been used by previous contractors. A large already sealed area can be used for the installation of equipment and storage sites. In addition, the existing area provides enough space to set up the necessary concrete batching plant.

76. It is anticipated that additional small camps will be established in the vicinity of the irrigation system for use by the contractor.

77. In order to ensure that potential impacts resulting from the construction works are kept at a minimum, the contractor will be obliged to prepare the SSEMP which will be a legally binding document to assist the contracting team to successfully adopt and implement the EMP. The SSEMP will include the following plans or method statements:

(i) Layout plan of the work camp including a description of all precautionary measures proposed to avoid potential adverse impacts on the environment (surface and ground water, soils, ambient air, human settlement);
(ii) Sewage management plan for the provision of sanitary latrines and proper sewage collection and disposal system to prevent pollution of soil, watercourses or groundwater;
(iii) Solid Waste management plan covering the provision of garbage bins, regular collection and disposal in a hygienic manner, as well as proposed disposal sites for various types of wastes (e.g., domestic waste, used tires, etc.) consistent with applicable national regulations;
(iv) Description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from water courses. Storage facilities for fuels and chemicals will be located at least 300 m from open watercourses. Such facilities will be bounded and provided with impermeable lining to contain spillage and prevent soil and water contamination;
(v) Methods for management of quarries and landfill sites.
(vi) These plans will be approved by the supervising engineer prior to beginning of construction activities.

78. Prior to establishment of the work camp(s) the contractor shall conduct consultations with local authorities to identify sources of potable water for the workforce that will not compete with the needs of the local population. Potable water for the workforce shall comply with WHO quality standards.

H. Project Impacted Areas

79. The project impact areas due to modernization of the irrigation system (Output 2) include:

(i) AIS including main canals, weirs, canals and feeder canals;
(ii) Access roads needed for construction;
(iii) Floodplain of the Arghandab River;
(iv) Borrow areas;
(v) Area of contractor's camps and close vicinity.

80. The project impact areas due to agricultural development (Output 3) are: Agricultural land of the floodplain of the Arghandab River divided in upstream, midstream and downstream area.

III. ANALYSIS OF ALTERNATIVES

81. The project includes rehabilitation of the existing irrigation system. Construction of new canals is not foreseen.

A. Output 2

82. The Output 2 works is focused upon remedial and improvement works to irrigation infrastructure with the aim of improving the reliability of irrigation water services to farmers, and reducing losses in transmission of water from the reservoir to farm fields. The high levels of subsistence agriculture currently practiced across the irrigated area indicates the critical importance at the household level, whereby farmers have a high dependence upon the existing and very limited livelihood alternatives.

Table 5. Output 2 Alternatives

Alternative	Comment	Environmental perspective
No project intervention	• Continued deterioration of irrigation systems; • Increased use of ground water for water security; • No improvement in livelihoods; • No wider economic growth.	• Increasing transmission losses in irrigation water delivery resulting in increased dry areas downstream and drought disaster risk; • Lowering of water tables, over-use of ground water, boreholes and wells dry up in affected areas; • Siltation and breach of canals increases risk of flooding.
Rehabilitate irrigation infrastructure to previous design and previous technology (e.g. earthen walls, earth or rock pile diversions, existing steel gates)	• Minor improvement in transmission efficiency for a short period; • Cost approaches the level for modernization, without the benefits;	• Earthen walls require large amounts of soil suitable for agriculture or native ecology habitat; • Rock pile and earthen diversions require significant borrow areas, but are prone to erosion and redeposit downstream; • Flood risk not substantially diminished.
Modernize irrigation infrastructure	• Engineering technology for canal lining is the key concern: concrete lining prone to cracking due to underflow and bed shift; recommended is concrete blocks that allow some movement for settling and easy relocation; • Canal bed stabilized with subsurface geofabric to prevent and leakage; • Modern designs and material for offtakes, diversions and weirs more resistant to damage and displacement;	• Building techniques that allow for physical environmental dynamics extend structure life, and low input maintenance, reducing environmental footprint; • Centralized construction of canal lining blocks, culverts, diversions, etc. reduces site area impacts and increases efficiency of borrowed or recycled material; • Climate resistant designs reduce environmental impact resulting from waste, debris from climate-damaged structures; • More efficient designs reduce water losses during transmission;

Alternative	Comment	Environmental perspective
Strengthen monitoring and control systems	• Install simple and durable flow measurement devices, gates and diversions that can be operated and measured by a local community-appointed farmer, using SMS to send data to AIS controllers; • Establish central monitoring and control office in AIS, with data fed in by some automatic stations as well as farmer / *mirab* gatekeepers.	• On-time monitoring and control reduces water wastage and environmental damage from periodic ponding (anaerobic conditions), nutrient leaching, and salinization.
Preferred option: Comprehensive approach: Modernize infrastructure, strengthen monitoring and control systems, build capacity for design, maintenance and monitoring	• Recommended option – includes benefits above; • Include training and awareness campaign on integrated water resource management including flows for environmental ecosystems support; • Improved farm and water productivity and livelihoods.	• Includes benefits above; • Increased awareness of natural resources conservation and environmental values.

Source: TRTA Consultants, 2019

B. Output 3

83. The aim is to foster understanding and adoption of agricultural practices that will improve efficiency of water use (reduce excessive irrigation and reduce losses due to evaporation and in delivery). No intervention and single or narrow approach alternatives will not result in large-scale transformational change by farmers to adopt climate-smart technologies for irrigation along with associated crop input management. With a comprehensive approach involving training, demonstration, and support to adopt technologies and practices, plus post-farm value chain development, farmers will adopt the “more-crop-per-drop” scenarios which needs to become a critical component of their irrigation practices, and will improve their incomes.

Table 6. Output 3 Alternatives

Alternative	Comment	Environmental perspective
No project intervention	• Crop fields have areas of both over-watering (saturation) and under-watering, which reduces yields and contributes to salinity problems; • Productivity low; • Soil water availability in conventional irrigation is cyclical, causing reduction in growth; • Conventional irrigation practice is labor-intensive, as a lot of labor is required for forming and maintaining field channels; Conventional irrigation is highly inefficient because of losses due to	• Soil structure and nutrient loss; • Plants more prone to pests and diseases, stimulating farmers to use more fertilizer and pesticides; • Low productivity of land and water resources.

Alternative	Comment	Environmental perspective
	evaporation, seepage, and deep percolation; • Water use is very high considering 60% to 70% water loss before it reaches the plants; • Due to lack of supplied irrigation, farmers and residents increasingly are drawing ground water resulting in lowering water tables; • Undulating terrains are not irrigated effectively; • Sandy soils with high infiltration rates are not irrigated effectively; Difficulties in keeping up the gradient in field channels.	
Train farmers in good practices	• Adoption and uptake limited by lack of knowledge of where to source technologies and finance to access to purchase materials and equipment required for good practices.	• Improved awareness of potential and actual environmental harm from bad agricultural practices.
Train and demonstrate climate-smart farming technologies and practices	• Farmer-managed demonstrations with participatory learning approaches provide farmers opportunities to monitor and evaluate new ideas, technologies and practices; • Farmer field schools supported and facilitated by agricultural specialists (e.g. in IPM, crop nutrition, pruning, trellising, mulching, irrigation technologies and irrigation scheduling), strengthen farmer-to-farmer knowledge systems and improve knowledge retention.	• Improved environmental outcomes from good agricultural practices.
Preferred option: Integrated approach to stimulate large-scale adoption of climate-smart technologies, good agricultural practices, and post-farm value chain development through support for farm business planning and matching grant investment for screened and approved sub-project investments	• Farmers, farmer groups and agribusiness entities use resources more efficiently and achieve productivity gains; • Comprehensive value chain development strengthens weak links and gaps therefore greater value created in the value chain; • Increased incomes to farmers and other stakeholders in value chains.	• Environmental impacts from agricultural are reduced due to efficiencies in water uses, better soil management, reduced level of agro-chemical and fertilizer use through more knowledge intensive 'smart farming' technologies and practices, and also greater monitoring and awareness of how to work with agro-ecology rather than against it.

Source: TRTA Consultants

IV. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

84. The project is classified 'Category B' under ADB's Safeguard Policy Statement (SPS). Under Afghanistan regulations, the project is classified as category 2.

A. Afghanistan

1. Constitution

85. The following laws of the Government of Islamic Republic of Afghanistan govern the way in which the environmental management of the project must be implemented, in order to proceed. Constitutional articles pertaining to environmental management include:

86. **Article 40**: Private Property

(i) Property is immune from invasion;
(ii) No person shall be forbidden from acquiring and making use of a property except within the limits of law;
(iii) Nobody's property shall be confiscated without the provisions of law and the order of an authorized court;
(iv) Acquisition of a person's property, in return for a prior and just compensation within the bounds of law, is permitted only for securing public interests in accordance with the provisions of law;
(v) Inspection and disclosure of a private property are carried out only in accordance with the provisions of law.

87. **Article 51**: Compensation

(i) Any person suffering undue harm by government action is entitled to compensation, which he can claim by appealing to the court;
(ii) With the exception of situations stated in the law, the state cannot claim its right without the order of an authorized court.

88. **Article 15: Environment**

(i) With the exception of situations stated in the law, the state cannot claim its right without the order of an authorized court;
(ii) The state is obliged to adopt necessary measures for safeguarding forests and the environment.

2. National Legislation, Policies, and Regulations

89. **Environment Act (2007).** The Government of Islamic Republic of Afghanistan adopted its first environmental framework, the Environment Act of 2005, with the goal of ensuring that environmental issues were addressed as an integral part of the development process. The Environment Act was approved by the Cabinet in December 2005 and was developed by NEPA over a period of two years with the assistance of international experts, including extensive stakeholder consultation with concerned ministries, quasi-government agencies, civil society and other interested parties.

90. The Environment Act sets forth national administrative roles and coordination with provincial authorities; establishes management frameworks for natural resource conservation,

biodiversity, drinking water, pollution control, environmental education, and defines enforcement tools.[13]

91. The Act has been promulgated to give effect to Article 15 of the Constitution of Afghanistan and provide for the management of issues relating to rehabilitation of the environment and the conservation and sustainable use of natural resources, living organisms and non-living organisms.

92. Legislators continued this new theme, leading to the drafting of an enhanced Environmental Law in 2006. Subsequently, the Environmental Law became part of the Islamic Republic of Afghanistan Official Gazette No. 912, dated 25 January 2007.

93. **Environmental Law (Official Gazette No. 912, 25 January 2007).** The Environmental Law is the fundamental law on environmental consideration in Afghanistan; it stipulates basic policies and procedures of activities for environmental consideration such as EIA, pollution control, conservation and management of water resources, protected area, biodiversity, environmental information and education. The law also defines National Environmental Protection Agency (NEPA) as the responsible agency on the activities for environment. NEPA has overall responsibility to address policy and legal issues as well as environmental management in coordination with other related departments.

94. The Environmental Law contains a specifically designed legal framework needed to sustainably manage Afghanistan's natural resources and rehabilitate its damaged environment. The law also clarifies institutional responsibilities and contains the compliance and enforcement provisions required to allow the Government to enforce the legislation. The law is a fundamental prerequisite to enable NEPA to fulfill its mandate. The primary objectives of the law are to:

(i) Improve living conditions and protect the health of humans, fauna, and flora;
(ii) Maintain ecological functions and evolutionary processes;
(iii) Secure the needs and interests of present and future generations;
(iv) Conserve natural and cultural heritages; and,
(v) Facilitate the reconstruction and sustainable development of the national economy.

95. The Environmental Law (2007), Article 19, provides a legal framework for public consultation during environmental assessment.

96. Article 19, public participation: Affected persons may express their opinion on a proposed project, plan, policy or activity, preliminary assessment, environmental impact statement, final record of opinion and comprehensive mitigation plan, before the approval of the project, plan, policy or activity, and the proponent must demonstrate to the NEPA that affected persons have had meaningful opportunities, through independent consultation and participation in public hearings, to express their opinions on these matters on a timely basis.

97. NEPA shall not reach a decision on any application for a permit until such time that the proponent has demonstrated to the satisfaction of NEPA that copies of the document has been distributed to affected persons, informed the public that the document is being made available for public review by advertising the document and displaying a copy of it for inspection, and convened and recorded the proceedings of a public hearing.

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[13] Taylor, D. A. 2006. "Policy: new environment law for Afghanistan". *Environmental Health Perspectives*, 114(3). Accessed at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1392251/

98. After NEPA has reviewed the application for a permit, they shall reach a decision, inform the public of that decision and make available any relevant documentation or information for public review.

3. Regulations and Guidelines for EIA

99. National EIA policy is an integrated approach to EIA in Afghanistan. The definition of EIA as described in the Environmental Law is: 'EIA refers to the procedures used for evaluating the likely environmental and consequent social impacts, both beneficial and adverse, of proposed projects, plans, policies or activities where there is a possibility of significant adverse effects arising as a result, in order to improve the quality and development impact of such projects by identifying ways of improving project selection, siting, planning, design and implementation'.

100. NEPA created this policy to provide guidance to project proponents while undertaking development projects that may have potential impacts on the environment. They also provide guidance on how the public should be consulted and define the roles and responsibilities of various stakeholders in that process.

101. The three documents below are the main regulations and guidelines for EIA in Afghanistan.

(i) **National Environmental Impact Assessment Policy (2007)** follows on from the Environment Law and sets forth a policy vision, principles, strategy, and process for environmental assessment in Afghanistan. The emphasis is on ensuring that projects with potentially significant impacts are identified to the national environmental regulator, NEPA, and follow adequate due diligence procedures. The document provides a range of additional useful information on NEPA and environmental assessment in the Afghanistan context.

(ii) **Environmental Impact Assessment Regulations.** Official Gazette No. 939 (March 2008). Schedule I lists project types likely to have significant impacts (Category 1) or potentially adverse impacts (Category 2); and the industries likely to give rise to pollution. Schedule II provides the clearance certificate application form.

(iii) **Administrative Guidelines for the Preparation of Environmental Impact Assessments** (June 2008). These guidelines were prepared as a companion to the 2008 Regulations, to guide proponents on interacting with NEPA, on public consultation, and roles and responsibilities of stakeholders.

102. Under Article 20 of the Environment Law, NEPA shall appoint an EIA Board of Experts to review, assess and consider applications and documents submitted by proponents for obtaining permits and make technical recommendations in regard to whether to issue permits, as well as the conditions that should be attached to any permit that is granted.

103. In more detail, the legal procedure of EIA starts with submitting application to NEPA by the project proponent. The purpose of the application is to screen the projects which require EIA. A screening report needs to be attached to the report to explain brief description of the project activities, site conditions, potential impacts and mitigations in IEE level. It is also required to describe results of public consultation with affected people. The systematic process to identify, predict and evaluate the environmental effects of proposed projects, plans or policies given in the National EIA policy is described in the figure below. The policy also describes the timeline for approval of different stages of EIA process.

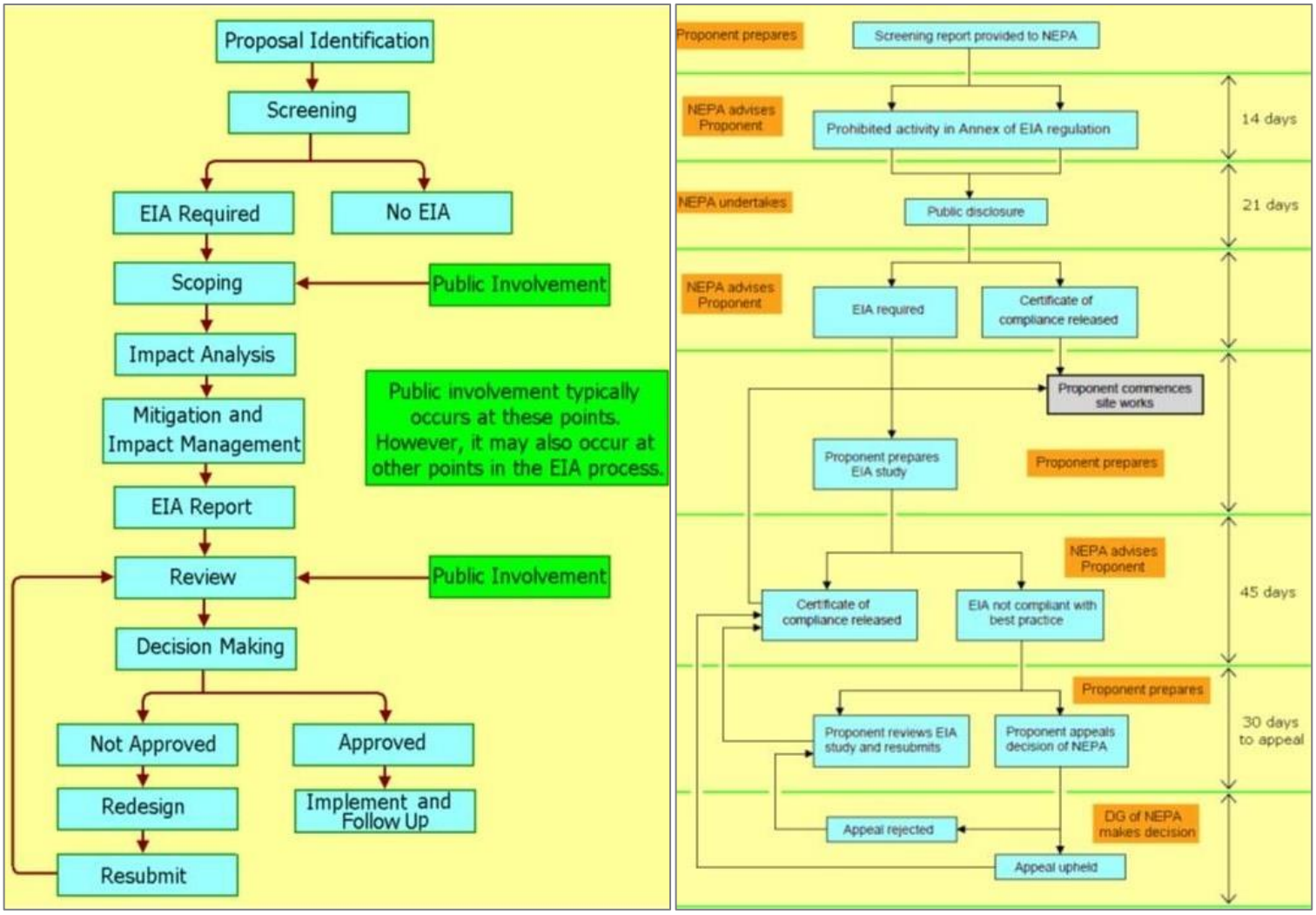
104. National EIA policy provides a project screening list which categorizes different projects. Category 1 and category 2 are defined for each type of activities based on the likelihood of the significance of the impacts stemming from particular projects. Category 1 is for activities likely to have significant adverse impacts while category 2 is for those with less adverse than category 1. According to NEPA regulations, both categories 1 and 2 require an EIA. NEPA reviews the submitted screening report and finalize the requirement of EIA considering the results of the public disclosure after submission of the screening report. Public disclosure is conducted by the proponent under the responsibility of NEPA.

105. The regulations state that a proponent intending to undertake multiple projects in a particular area should prepare a single screening report and assign the environment category appropriate to the projects' collective potential environmental impacts. Separate screenings are unacceptable.

106. In the case that NEPA decided that the activity does not require EIA, certificate for compliance is issued without EIA to approve the activity. In the case that EIA is decided to be required, the project proponent has to complete EIA and submit EIA report to NEPA. Within 45 days after the submission, NEPA reviews the report and approve the activity if it is sufficient. According to NEPA, board of experts has been established which comprises of 12 experts from Kabul University and ministries for reviewing EIA.

107. In addition, EIA Regulations Schedule 1 lists project types that are automatically assigned to these two categories. Category 1 and 2 projects must obtain a Certificate of Compliance from NEPA prior to starting construction. Certificate applications consist of a screening report and the application form in EIA Regulations Schedule 2.

Figure 7. The EIA Process in Afghanistan



Source: National Environmental Impact Assessment Policy (2007)

4. Other Relevant Laws and Regulations

108. **Water Law (2009**). The Water Law states that water is owned by the public and that the Government is responsible for water protection and management. It assigns responsibilities to government institutions for management and protection of water resources, water ownership, and regulates water ownership fees, rights, permits, and usage.[14]

109. Afghanistan's Water Law is one component of the country's strategy to integrate its water systems and institutions. The water law recognizes the key role of local WUA in the protection and management of water resources. The MEW has responsibility for setting up WUA (Article 10), and MAIL has the task of setting up irrigation associations (Article 11). Throughout years of conflict, Non-Governmental Organizations (NGOs) developed and maintained strong links with rural communities in all provinces. AUWSSC proposes broadening their role to coach Water Users Associations and members of CDC in conservation techniques and water management

[14] Ahmad, T. 2013. *Legislation on use of water in agriculture: Afghanistan*. http://www.loc.gov/law/help/water-law/afghanistan.php

systems. In particular, AUWSSC advocates end-user participation in decision making relating to water resource management, operation and maintenance of water supply systems and agreeing on water use allocations.

110. **Law on the Protection of Historical and Cultural Properties**, Issue No. 828 (2004). After defining the material falling within its scope, the law sets forth the State's interest and rights in such materials, specifies prohibited and regulated activities involving such materials, and establishes enforcement measures such as penalties and fees.

111. **The Law on Land Expropriation** sets out the provisions governing the expropriation or acquisition of land for public interest purposes, such as the establishment/construction of public infrastructure or for acquisition of land with cultural or scientific values, land of higher agricultural productivity and large gardens.

112. Accordingly, the law declares that:

(i) Acquisition of a plot or portion of a plot of land for public use is decided by the Council of Ministers and is compensated at fair value based on current market rates (Article 2);
(ii) The right of the owner or land user will be terminated three months prior to the start of civil works on the project and after the proper reimbursement to the owner or person using the land has been made. (Article 6); and
(iii) The value of land, value of houses and buildings on the land, and value of trees and other assets on the land will be considered for compensation (Article 8;) and compensation is determined by the Council of Ministers.

113. **Pesticide Regulations** (1989). Afghanistan has had pesticide regulations since 1989, but they have never been enforced due to lack of resources. A draft Pesticide Law dating from 2009 has yet to be enacted.

B. International Agreements

114. The Constitution binds the state to abide by the United Nations (UN) charter, international treaties, international conventions that Afghanistan has signed, and the Universal Declaration of Human Rights (Article 7).

115. International agreements relevant to environmental management of water resources development to which Afghanistan is a party are (listed in order by the year in which each came into force):

(i) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1975) – international cooperation to control trade in species threatened with extinction or in danger of becoming so; in species whose trade interferes with regulation of trade in extinction-threatened species; and in species identified by a party under national-level trade control to prevent/restrict exploitation, for which international cooperation is needed;
(ii) Convention on the Conservation of Migratory Species of Wild Animals (also called Convention on Migratory Species, CMS, and the Bonn Convention, 1983) – conserve terrestrial, marine and avian migratory species throughout their ranges;
(iii) UN Convention on Biological Diversity (1993) – objectives are to conserve biological diversity; promote sustainable use of biological diversity; and (iii) seek more fair and equitable sharing of the benefits of genetic resource utilization;

(iv) UN Framework Convention on Climate Change (1994) – aims to stabilize greenhouse gases in the atmosphere at levels that will not change climate systems in dangerous ways;
(v) UN Convention to Combat Desertification (1996) – aims to combat desertification and mitigate drought effects in countries experiencing serious drought or desertification;
(vi) Kyoto Protocol (2005) – extends the Convention on Climate Change;
(vii) Paris Agreement on Climate change (2015);
(viii) Afghan – Iranian Helmand River Water Treaty (1973) Afghanistan is committed to sharing the water from Helmand River with Iran and supply it with 26 m^3 of water per second or 850 million m^3 per annum.[15]

116. In addition, Afghanistan has signed but not ratified:

(i) The United Nations Educational, Scientific and Cultural Organization (UNESCO) Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (1970) – aims to protect cultural property against theft and promotes restitution of stolen items;
(ii) Ramsar Convention on Wetlands (1975) – promotes conservation and sustainable use of wetlands;
(iii) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1992*)* – aims to reduce movement of hazardous waste between nations, prevent transfer of such waste from developed to less developed countries (LDCs); minimize waste amounts and toxicity; promote environmentally sound management at or near generation sites; assist LDCs in environmentally sound management of their wastes; does not address radioactive waste;
(iv) Memorandum of Understanding Concerning Conservation Measures for the Siberian Crane (1993) – aims to protect the species (*Leucogeranus leucogeranus)* through concerted, coordinated actions to prevent disappearance of remaining populations;
(v) The United Nations International Institute for the Unification of Private Law (UNIDROIT) Convention on Stolen or Illegally Exported Cultural Objects (1995) – attempts to fill gaps in the UNESCO convention by making the final owner of a stolen cultural item who cannot show due diligence responsible for restitution;
(vi) UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2006) – safeguard, ensure respect for, and raise awareness at local, national, international levels, and provide international cooperation and assistance.

C. Asian Development Bank

1. Policies

117. **Safeguard Policy Statement (2009)** is ADB's safeguards policy document. It describes the common objectives and policy principles of ADB's safeguards and outlines the delivery process for ADB's safeguard policy. SPS 2009 promotes sustainability through protection of people and the environment from the adverse impacts of projects, and by supporting the strengthening of country safeguard systems. It presents a consistent, consolidated framework for environment, resettlement, and indigenous peoples safeguards.

[15] The 1973 Helmand River Treaty is the only agreement that Afghanistan has that specifically addresses water allocations

118. **Public Communications Policy (2018)** guides ADB's efforts to be transparent and accountable to the people it serves, which it recognizes are essential to development effectiveness. The policy recognizes the right of people to seek, access, and impart information about ADB's operations, and it aims to enhance stakeholders' trust in and ability to engage with ADB, through proactive disclosure, presumption in favor of disclosure, recognition of the right to access and impart information and ideas, country ownership, limited exceptions, and the right to appeal.

119. **Information Disclosure.** In line with ADB's Public Communications Policy, ADB is committed to working with the borrower/client to ensure that relevant information (whether positive or negative) about social and environmental safeguard issues is made available in a timely manner, in an accessible place, and in a form and language(s) understandable to meaningful inputs into project design and implementation. For environment category A projects, ADB will post draft EIAs at least 120 days before Board consideration on the ADB website. Final EIAs along with EMP will be uploaded upon receipt.

120. **Due Diligence and Review.** For projects proposed for financing, ADB will conduct safeguard reviews, including reviews of the borrower's/client's safeguard documents, as part of its overall due diligence. ADB's safeguard due diligence and review emphasizes environmental and social impact assessments and the planning process, in addition to safeguard documentation. Due diligence and review involves field visits as well as desk reviews. Through such due diligence and review, ADB will confirm:

(i) that all key potential social and environmental impacts and risks of a project are identified;
(ii) that effective measures to avoid, minimize, mitigate, or compensate for the adverse impacts are incorporated into the safeguard plans and project design;
(iii) that the borrower/client understands ADB's safeguard policy principles and requirements and has the necessary commitment and capacity to manage social and environmental impacts and/or risks adequately;
(iv) that the role of third parties is appropriately defined in the safeguard plans; and
(v) that consultations with affected people are conducted in accordance with ADB's requirements.

121. In cases where the assessment and planning process, or the safeguard documents, do not meet ADB's safeguard requirements, the borrower/client will be required to undertake additional assessment and/or improve the safeguard plans. When the borrower/client has inadequate capacity to carry out safeguard plans for a proposed project, the project will include component(s) to strengthen that capacity. For projects that are deemed by ADB to be highly complex and sensitive, ADB will require the borrower/client to engage an independent advisory panel during project preparation and implementation.

2. Guidance

122. **Environmental Assessment Guidelines (2003)**. These guidelines describe how to fulfill the requirements outlined in ADB's Environment Policy and the Operations Manual on Environmental Considerations in ADB Operations. These guidelines also guide consultants in preparation of an IEE or an EIA report for a project under consideration.

123. **Environmentally Responsible Procurement (2007)**. This document provides guidance to ADB staff, consultants, and executing agencies on environmentally responsible procurement, defined as "a systematic approach to the purchase of goods and services that are thought to be

less damaging to the environment than other goods and services that serve the same purpose," specifically, products that "reduce waste, improve energy efficiency, limit toxic by-products, contain recycled content or are reusable, and are produced with the least environmental impact, and services that help improve the environment, are rendered with minimum environmental and social impacts, and use resources and energy efficiently."

124. **Complaint Handling in Development Projects - Grievance Mechanisms: A Critical Component of Project Management (2010)**. This document presents definitions, concepts, rationale, and history relevant to the ADB project grievance redress mechanism.

125. **Complaint Handling in Development Projects - Building Capacity for Grievance Redress Mechanisms (2010)**. This document presents a framework and practical suggestions for building the capacity of an organization to manage an effective grievance redress mechanism.

126. **Selected References for Good Practice in Environmental Safeguards Implementation (2014)**. This internal Central and West Asia Department document presents internet hyperlinks to exemplary environmental safeguards documents (IEEs, EIAs, Environmental assessment and review frameworks, etc.) prepared for projects in these countries.

3. Categorization

127. ADB projects and subprojects are screened using a REA checklist filled out for the components. This checklist captures the type; location, sensitivity, scale, nature, and magnitude of potential environmental impacts, and availability of cost-effective mitigation measures. Based on the checklist findings, the project or component is assigned to one of the following ADB environmental categories.

128. **Category A** – likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An EIA, including an EMP, is required.

129. **Category B** – Potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An IEE, including an EMP, is required.

130. **Category C** – A proposed project is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.

131. The project Output 2 has been categorized as category B under ADB SPS. ADB guidelines indicate that any perceived potential adverse are reversible through application of the EMP, thus also initiating a Category B status. An IEE would be required to meet ADB SPS requirements. This IEE has been prepared, to the level of a draft EIA report.

D. Assessment Standards and Guidelines

132. Implementation of Afghanistan laws and regulations is supported by technical national and international standards and guidelines. Afghanistan has recently established national environmental standards or guidelines for air quality, noise, or water quality. Baseline measurements have been compared to Afghanistan standards and guidelines when available and to International institutions such as the International Finance Cooperation (IFC)[16], and the

[16] International Finance Cooperation. 2018. Environmental, Health, and Safety Guidelines. Approaches for Annual Crop Production. www.ifc.org/ehsguidelines

World Health Organization. The Ministry of Mining of Afghanistan, for example, uses the IFC Environmental, Health and Safety Guidelines in its environment, health, and safety regime, and WHO standards are routinely used for drinking water quality.

133. The relevant standards applicable to the project are listed below:

(i) WHO Water Quality Standards (4th edition 2017)
(ii) WHO Air Quality Standards (Global update 2005)
(iii) IFC Environmental, Health, and Safety Guidelines (2018)
(iv) Afghanistan National Air Quality Standards (Standard Organization, 2009);
(v) Regulation on Decrease and Prevention of Air Pollution (NEPA, 2010)
(vi) Afghanistan National Water Quality Standards (Standard Organization, 2011);
(vii) Regulation on Water Quality Control and Maintenance (NEPA, 2015);
(viii) Afghanistan National Noise Quality Standards (Standard Organization, 2013)
(ix) Regulation on reduction and prevention of noise pollution (NEPA, 2016).

1. Water Quality

134. Drinking water: The project will provide water from the dam reservoir to water treatment plants (water supply project investment component) for subsequent drinking water supply to Kandahar communities. Water to be supplied to residents must comply with Afghanistan Drinking Water Quality Standard.

135. Irrigation water: The project will provide water from the dam reservoir to the Arghandab canals for irrigation purposes (Output 2). Irrigation modernization is expected to increase the current river basin irrigated area from 54,088 ha to between 65,000 and 90,000 ha.

136. Biodiversity: Fishing is occurring at the dam reservoir but also upstream and downstream. Water quality and water flows must be monitored in order to preserve biodiversity.

137. **WHO Drinking Water Quality Guidelines (4th edition 2017).** The guidelines have formed an authoritative basis for the setting of national regulations and standards for water safety in support of public health.

138. **Afghanistan National Water Quality Standards** have been prepared subsequently of WHO guidelines.

Table 7. Afghanistan and WHO Drinking Water Quality Guidelines

Parameters	Afghanistan National Water Quality Standard	WHO (4th edition 2017)	Used standard
Micro-biological (e.g. E coli)	0 CFU/100 mL	<1 CFU/100 mL	0 CFU/100 mL
Turbidity	5 NTU	5 NTU	5 NTU
pH	6.5-8.5	6.5-9.5	6.5-8.5
TDS	1000 to 2000 mg/L	-	1000 to 2000 mg/L
Total Hardness	500 mg/L	-	500 mg/L
Nitrate (as NO_3^-)	50 mg/L	50 mg/L	50 mg/L
Nitrite (as NO_2^-)	3 mg/L	3 mg/L	3 mg/L
Barium	0.7 mg/L	1.3 mg/L	0.7 mg/L
Boron	2.4 mg/L	2.4 mg/L	2.4 mg/L
Arsenic	0.05 mg/L	0.01 mg/L	0.01 mg/L
Fluoride	1.5 mg/L	1.5 mg/L	1.5 mg/L

Parameters	Afghanistan National Water Quality Standard	WHO (4th edition 2017)	Used standard
Lead	0.01 mg/L	0.01 mg/L	0.01 mg/L
Cyanide	0.05 mg/L	previously 0.07 mg/L	0.05 mg/L
Nickel	0.07 mg/L	0.07 mg/L	0.07 mg/L
Nitrate as Nitrogen	11 mg/L	11 mg/L	11 mg/L
Zinc	3 mg/L	-	3 mg/L
Selenium	3 mg/L	0.04 mg/L	0.04 mg/L
Chloride	250 mg/L	-	250 mg/L
Sulphate	250 mg/L	-	250 mg/L

Source: Afghanistan National Water Quality Standards and WHO Drinking Quality Standards 2017

Table 8. FAO Irrigation Water Quality Standards

Water Quality Classification	EC at 25 °C (Micromhos/cm)	TDS (mg/L)	SAR (meq/L)	RSC (meq/L)
Excellent	<250	<160	Up to 10	<1.25
Good	250-750	160-500	10-18	1.25-2.5
Medium	750-2250	500-1500	18-26	>2.5
Bad	2250-4000	1500-2500	>26	-
Very Bad	>4000	>2500	>26	-

EC = electrical conductivity, TDS = total dissolved solid, SAR = sodium adsorption ratio, RSC = residual sodium carbonate, meq/L = milliequivalents per liter
Source: Arshad, M & A. Shakoor, Irrigation Water Quality, 2017

2. Air Quality

139. **WHO Air Quality Guidelines (Global update 2005).** The WHO guidelines offer guidance on thresholds and limits for key air pollutants that pose health risks.

140. **Afghanistan National Water Quality Standards** have been prepared subsequently of WHO guidelines.

141. Afghanistan standards should be used in this IEE and subsequent monitoring surveys.

Table 9. Afghanistan and WHO Air Quality Standards

	Averaging period	WHO Guideline value in µg/m^3	Afghanistan maximum allowable concentration value in µg/m^3
TSP	24 hours	-	300
Carbon monoxide (CO)	8 hours 1 hour 30 minutes	-	10 30 60
Lead (Pb)	1 year	-	0.5
Sulfur Dioxide (SO_2)	24 hours 10 minutes	125 (Interim target-1) 50 (Interim target-2) 20 (guideline) 5000 (guideline)	50 -
Nitrogen dioxide (NO_2)	1 year 1 hour	49 (guideline) 200 (guideline)	40 80

	Averaging period	WHO Guideline value in µg/^{m3}	Afghanistan maximum allowable concentration value in µg/^{m3}
Particulate Matter (PM_{10})	1 year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)	70
	24 hours	150 (Interim target-1) 100 (Interim target-2) 74 (Interim target-3) 50 (guideline)	150
Particulate Matter ($PM_{2,5}$)	1 year	35 (Interim target-1) 23 (Interim target-2) 15 (Interim target-3) 10 (guideline)	35
	24 hours	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)	75
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)	100

Source: Afghanistan National Air Quality Standards and WHO Air Quality Standards 2005

3. Noise Levels

141. **IFC EHS Guidelines on Environmental Noise Management** (2018). The Environmental, Health, and Safety (EHS_ guidelines are technical references and measures that are generally considered to be achievable in new facilities with reasonable costs. IFC has set limits which noise impacts shall not exceed. When national standards differ from the EHS guidelines measures, the projects are required to follow the more stringent option.

142. **Afghanistan standards** should be used in this IEE and subsequent monitoring surveys.

Table 10. Afghanistan and IFC EHS Noise Management Standards

	Afghanistan		IFC EHS	
Receptor	**Day-time 7:00 – 22:00**	**Night-time 22:00 – 7:00**	**Day-time 7:00 – 22:00**	**Night-time 22:00 – 7:00**
Residential, institutional, educational	55	45	55	45
Industrial, commercial	55	45	70	70
Roads	70	57		

Source: (i) Guidance Note for Noise Action Planning, Environmental Noise Regulations 2006, Environmental Protection Agency; (ii) IFC. 2018. Environmental, Health, and Safety Guidelines.

4. Crop Production

143. **IFC EHS Guidelines on Annual Crop Production (2018).** The EHS guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology and reasonable costs. EHS guidelines shall be used for environmental assessments.

144. Environmental issues associated with annual crop production may include the following:

(i) Stress on water resources;
(ii) Soil erosion and loss of productive capacity;
(iii) Pesticide use;
(iv) Eutrophication of aquatic environments;
(v) Loss of biodiversity;
(vi) Crop residues and other solid waste;
(vii) Atmospheric emissions.

145. Environmental impacts are addressed, and mitigation measures are proposed:

(i) Determine the quantity and quality of water needed for crop production;
(ii) Evaluate the capacity of groundwater or surface water resources;
(iii) Select crops compatible with water availability;
(iv) Maximize the use of available precipitation;
(v) Implement irrigation water conservation;
(vi) Soil loss prevention;
(vii) Alternatives to pesticide use;
(viii) Rotation of crops;
(ix) No use of restricted pesticides listed in the Stockholm Convention;
(x) Use pesticides labeled under international standards;
(xi) Application of best technologies and techniques;
(xii) Optimization of nutrient application to avoid eutrophication;
(xiii) Utilization of field borders to provide wildlife corridors around fields used for annual crop production;
(xiv) Use of biofuels instead of fossil fuels to reduce greenhouse gas (GHG) emissions;
(xv) Reduction of particulate matter emissions by avoiding burning straw;
(xvi) No burning of agricultural waste;
(xvii) Enhancement of soil aeration.

146. Environmental impacts related to improved irrigation and agricultural practice are discussed in chapter 0. Mitigation measures are proposed in this chapter accordingly using IFC EHS guidelines.

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

1. Introduction

147. The physical environment through which the proposed irrigation scheme will be conducted comprises a range of conditions. The proposed existing system upgrade will not introduce any new acreage into the command area, and so the physical environment, which is predominantly under agricultural land use, remains the same. Sustainable management of physical and biological elements in an arid-zone is a constant challenge. As shall be seen, the project does offer the opportunity to improve on biophysical health of the river, resource management and ultimately the productivity of the land use.

2. Climate

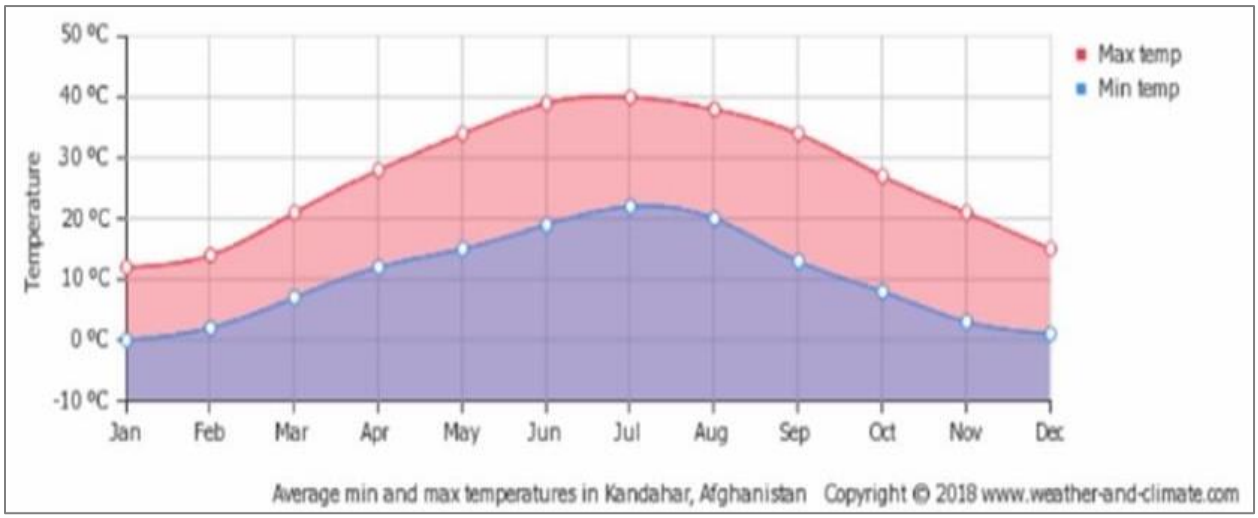
148. Afghanistan's climate is typical for an arid or semi-arid steppe, with cold winters and dry summers. The climate varies substantially between the different regions of the country. The plains in the western and southern regions are characterized by hot semi-arid (BSh) and hot desert climates (BWh). During the summer northerly, dry and hot and steady winds prevail. The central mountains are characterized by cold semi-arid and cold desert climates (BWk and BSk) with cold and dry winters. In January the temperature may drop to under -15°C at the highest altitudes, while in July the temperatures vary between 0°C and 26°C depending on the elevation. In the mountainous regions bordering Pakistan a divergent fringe effect of the monsoon brings tropical, warm and humid air masses, which sometimes advance up to the central regions between July and September. Precipitation generally fluctuates greatly during the course of the year in all parts of the country. Apart from the eastern regions, which are influenced by the monsoon, major precipitation levels occur from December to April. The annual precipitation totals vary between 50 mm in the desert and 1,100 mm on the north side of the Hindukush.

149. Kandahar is a desert climate, and precipitation is low. While annual rainfall has an average 176 mm, the evaporation figure is just over 10 times that.[17] Classification is BWh according to Köppen and Geiger. The annual average temperature in Kandahar is 18.8 °C. Annual average rainfall is 176 mm. The hottest month is July with average temperatures of 31.8 °C. January shows the lowest temperature with an average of 5.7 °C.

150. In the figure below, the mean daily maximum (solid red line) shows the maximum temperature of an average day for every month for Kandahar while the mean daily minimum (solid blue line) shows the average minimum temperature.

[17] Michel. 1957. The Kabul, Kunduz, and Helmand Valleys and the National Economy of Afghanistan: A Study of Regional Resources and the Comparative Advantages of Development. *National Academy of Sciences, USA.*

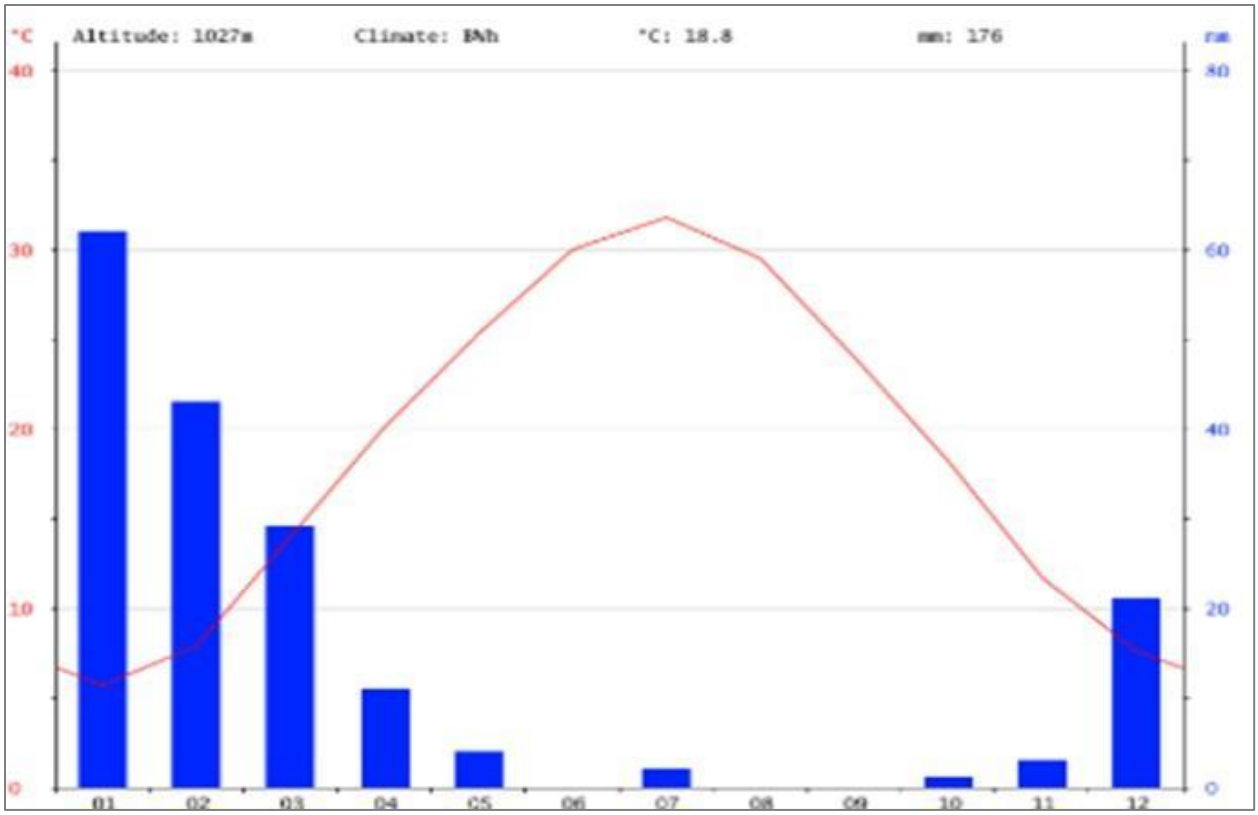
Figure 8. Average Minimum and Maximum Temperatures in Kandahar



Source: World Weather and Climate Information 2010-2019

151. All over Kandahar Province, the summer heat is intense, and the simoom (hot dust storms) and fiery winds which frequently occur throughout this part of the country during the hot season make life difficult. At the same time, the bare rocky ridges that traverse the country, absorbing heat by day and radiating it by night, render the summer nights almost as hot.

Figure 9. Average Temperature and Precipitation in Kandahar



Source: Climate-Data.org. 2018 https://de.climate-data.org/location/1255/

3. Geographical Location

152. The Kandahar Province is in the southeastern part of Afghanistan, which is bound on the northeast by the Zabul Province, on the north by the Uruzgan Province, on the west by the Helmand Province, and on the east and the south by Pakistan. The province's area is 53,500 km^2 and lies between 32°-30' N and 29°-30' N latitude and between 64°-30' E and 67°-50' E longitude.

153. The overall Helmand River system, including the Arghandab River as a major tributary, together drain 43% of Afghanistan including most of the southern part of the country. It has an average discharge of approximately 140 m^3/s but is highly variable both annually and seasonally as the waters are primarily snow melt from the ridge of mountains running through the center of the country. These include the Sia Koh Mountains and the Parwan Mountains northwest of Kabul.

4. Topography

154. Mountains, with an elevation of about 1,200 to 2,800 meters above sea level (MASL), dominate the northern and the eastern parts of the province. On the other hand, the southern and the western parts of the province are dominated by desert with an elevation of about 1,000 MASL.

155. The topography of the project site includes bare mountains without vegetation and the flood plain of Arghandab River. Elevations of the mountains are up to 1,300 MASL. Highlands below the dam have very scarce vegetation (elevation: 1,120 – 1,140 MASL). The Arghandab River valley begins at 1,200 m at Dahla Dam. The elevation below Kandahar is below 1,000 MASL.

5. Geology

156. Afghanistan has some of the most complex and varied geology in the world. The oldest rocks are Archean and they are succeeded by rocks from the Proterozoic and every Phanerozoic system up to the present day. The country also has a long and complicated tectonic history, partly related to its position at the western end of the Himalaya mountain range.

157. The Kandahar Province is characterized by numerous ranges of bedrock. This bedrock is elongated from northeast to southwest. Bedrock is eroded and modelled by weather (wind, rain, freeze). Sediment terraces exist in the valleys and along Arghandab River. The following bedrock occurs in the project area:

(i) Limestone and sandstone (Early Cretaceous; Aptian and Barremian)—Limestone, marl, sandstone more abundant than conglomerate;
(ii) Ultramafic intrusions (Early Cretaceous)—Dunite, peridotite, serpentinite;
(iii) Lava (Oligocene and Eocene)—Basaltic andesite, basalt, trachyte, dacite, rhyolite, ignimbrite, tuff; conglomerate and sandstone, siltstone, limestone.

158. Surficial deposits in the area consist of flood plain alluvial origin. These flood plain deposits are of quarterly age, forming a body of succession of alluvium that is overlain by the surficial deposits of Holocene age. Lithologically, they can be classified as flood plain deposits.

159. According to the changing locations of the Arghandab River and its tributaries, the lithological composition or variation of the alluvial fill is varying not only in vertical but also in horizontal direction. It is evident that the alluvium consists of alternating beds of gravel, sand, silt and clay (fan alluvium and colluvium, shingly and detrital sediments, determined to be from the Holocene and late Pleistocene).

160. Loess is also very common in the project area. Loess is more abundant than sand and clay. Loess is an aeolian sediment formed by the accumulation of windblown dust and silt.

6. Soil

161. Soil conditions of farm land in the upstream area are of silty sand and sandy loam, and well drained and relatively poor of organic matter, nutrients and minerals.

162. Soil of the midstream area is silty sand and sandy loam. The fertility of soil is relatively better than that of upper stream area.

163. Soil of the downstream area are silty loam alluvial soil, and relatively rich in nutrients and minerals. But drainage is one of important factors in the area, and it may cause salinity in case of over-irrigation on farmland. Therefore, it is expected to introduce water saving irrigation systems in the area in the future.[18]

7. Seismic Hazard

164. The history of destructive earthquakes in Afghanistan spans more than 4,000 years. Earthquakes have killed more than 7,000 Afghans in the last 10 years, including the Nahrin earthquake in May 1998 that killed an estimated 4,000 people. Future large earthquakes, driven by ongoing active geologic processes in the region, will occur close to population centers and lifelines, with a consequent risk for greater casualties and damage. The seismic hazard must be considered in the siting, construction, and restoration of communities and facilities in Afghanistan

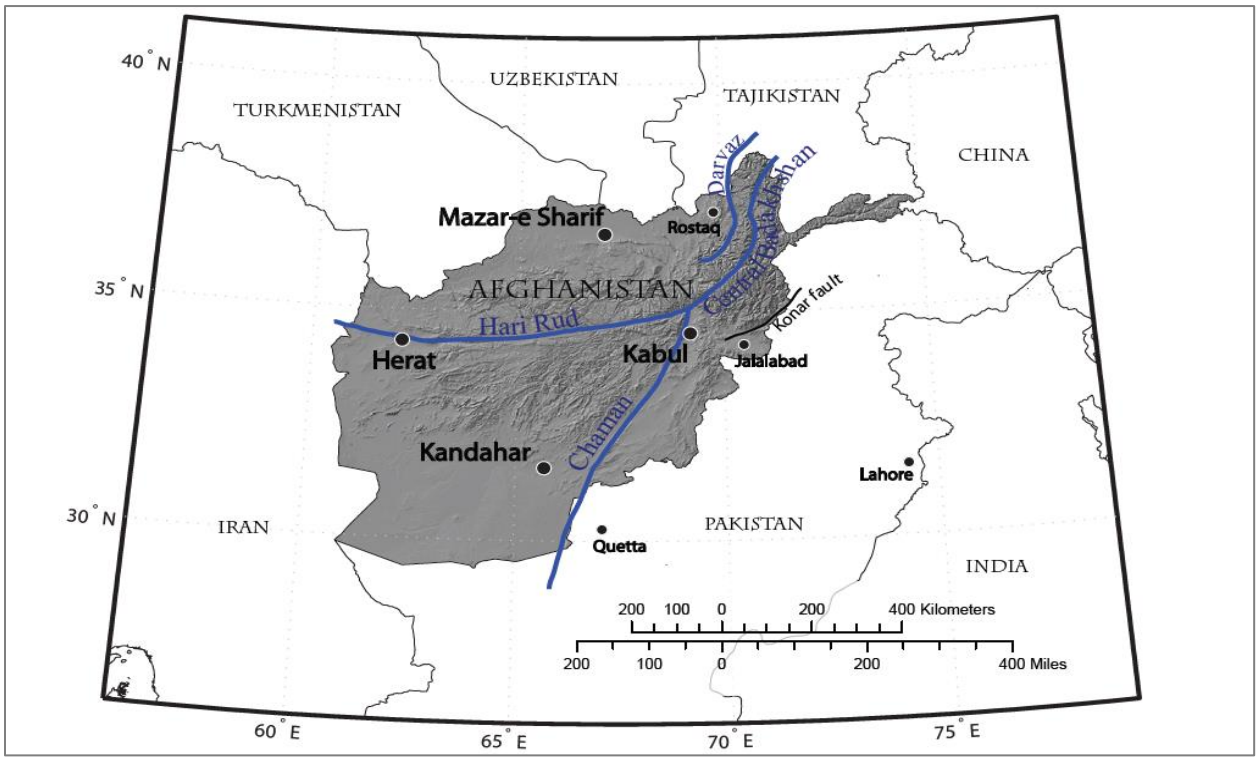
165. Several sources of seismicity are present in Afghanistan and contribute to appreciable seismic hazard for several major cities including Kabul, Mazar-e Sharif, and Herat.

166. Kabul, Mazar-e Sharif, Herat, and Kandahar have 2% chance in 50 years of exceeding a peak ground acceleration of 50, 35, 28, and 13% gravity respectively, and 10% chance in 50 years of exceeding a peak ground acceleration of 27, 17, 7, and 7% gravity, respectively. These values are similar to values found for the intermountain West of the United States. However, the hazard values for Afghanistan are relatively uncertain owing to a lack of information characterizing the sources of seismic hazard, particularly the many faults that might be active.

167. In 2007, the US Geological Survey completed the most extensive study to date of potential seismic sources in Afghanistan and developed probabilistic ground motion maps to help quantify the expected frequency and strength of ground shaking in the country.[19] The figure below presents the map of Afghanistan showing the locations of modelled fault sources (heavy blue lines).

[18] JICA. 2004. The study on urgent rehabilitation support program of agriculture in Kandahar, Afghanistan.
[19] USGS, Dahla Seismic Write-up, 2011

Figure 10. Preliminary Earthquake Hazard Map of Afghanistan



Source: USAID, by Oliver S. Boyd, Charles S. Mueller, and Kenneth S. Rukstales, US Department of the Interior, US Geological Survey, 2007

8. Hydrology

168. An aquifer, or water-bearing formation, is a term used to designate a formation that contains and can transmit a considerable amount of water. Aquifers are defined as a water-bearing bed or structure of earth, gravel or porous stone.[20]

169. The most important hydrogeological properties of an aquifer where ground water is flowing include: (i) Transmissibility = permeability x thickness of the aquifer; and (ii) Specific yield or the storage capacities of the water-bearing formation.

170. Kandahar groundwater aquifers have been assessed in previous studies through several groundwater surveys. The results are presented in the table below.

Table 11. Characteristics of Kandahar Groundwater Aquifers

Kandahar City Groundwater Model	Afghanistan Geological Survey (Abdullah and Chmyroiv, 2008)	DACAAR Nationwide Monitoring Report (Saffi, 2007)	Kandahar Groundwater Resource Assessment (CDM, 2003)	Description	Notes
Unconfined/Semi-Confined	Recent, Aeolian+, Talus, Upper and Middle Quaternary	Unconfined	Unconfined	Gravels, sands, talus, sand loam	Loess cover present in north and much of Kandahar area
Upper Confined	Neogene		Upper Confined	Sands and gravels	May not be correlative with

[20] Nespak, I. 1980. Analysis and Evaluation of Pumping Test Data Second Edition (Completely Revised), *Delft.*

					northern part of the model domain
City Aquifer	Neogene	Neogene Multi-Aquifer System	City Aquifer	Sands and gravels with scattered layers of conglomerate and caliche	Not correlative with northern part of the model domain *Hard layers at percussion drilling limit (100-120m) will give a false bedrock depth
Deep Aquifer	Paleogene-Helmand-Arghandab Uplift	Not Defined	Not Defined	Variably cemented, red to pale red fine grain sediments with sandstone and conglomerate	Not correlative with northern part of the model domain *May be source of artesian flow
Mixed Age Carbonate Bedrock Aquifer System	Cretaceous Bedrock Aquifer System *Paleozoie Aquifer System	Fracture Karst Water	Not Defined	Carbonate units known and suspected to have karst potential	Relatively High Hydraulic Conductivity, enhanced neat faults and major fracture zones
Mixed Age Coarse Clastic Bedrock Aquifer System	Not Defined	Not Defined	Not Defined	Cambrian-Cretaceous and younger sandstones and conglomerates, and some mixed carbonate units	Relatively medium hydraulic conductivity excluding fracture sets and faults
Mixed Age Low Porosity Bedrock Aquifer System	Paleogene Katawaz Artesian Basin *Mixed Age Intrusives Aquifer System *Pre-Cambrian Aquifer System	Not Defined	Bedrock	Igneous metamorphic, and fine-grained sedimentary rocks	Relatively low hydraulic conductivity excluding fracture sets and faults

171. Groundwaters have been widely used in the irrigated areas of the Arghandab basin to support surface water irrigation. While in principle, tubewells need to be approved and registered, this appears not to have happened in the Arghandab River Basin, or in fact in much of Afghanistan. This is leading to rapid decline of the water table in many areas, and if not controlled will ultimately lead to the loss of aquifers and the inability of groundwater to support irrigation. Increasing the availability and planning of surface water release under the project should have a major goal of limiting the need for groundwater usage, and thus reversing or at least stabilizing the falling water tables. This must be supported through adequate links with the community.

172. Dahla Dam, which is fed by precipitation and snow melt in its upper catchments, currently only supplies irrigation water. The Loy Walla irrigation canal which is supplied with water from the dam, is one of the few surface water sources flowing through the city. This canal water is also unofficially used for domestic water consumption by residents without piped water connections, and is often used untreated. Even though the leakage water from this canal infiltrates into the shallow unconfined aquifer, groundwater levels are still dropping.

173. The Arghandab River is about 400 km long. It rises in the Hazarajat country north-west of Ghazni, flows south-west passing near the city of Kandahar, and then falls into the Helmand 30 km below Girishk. In its lower course it is used for irrigation and the valley is cultivated and

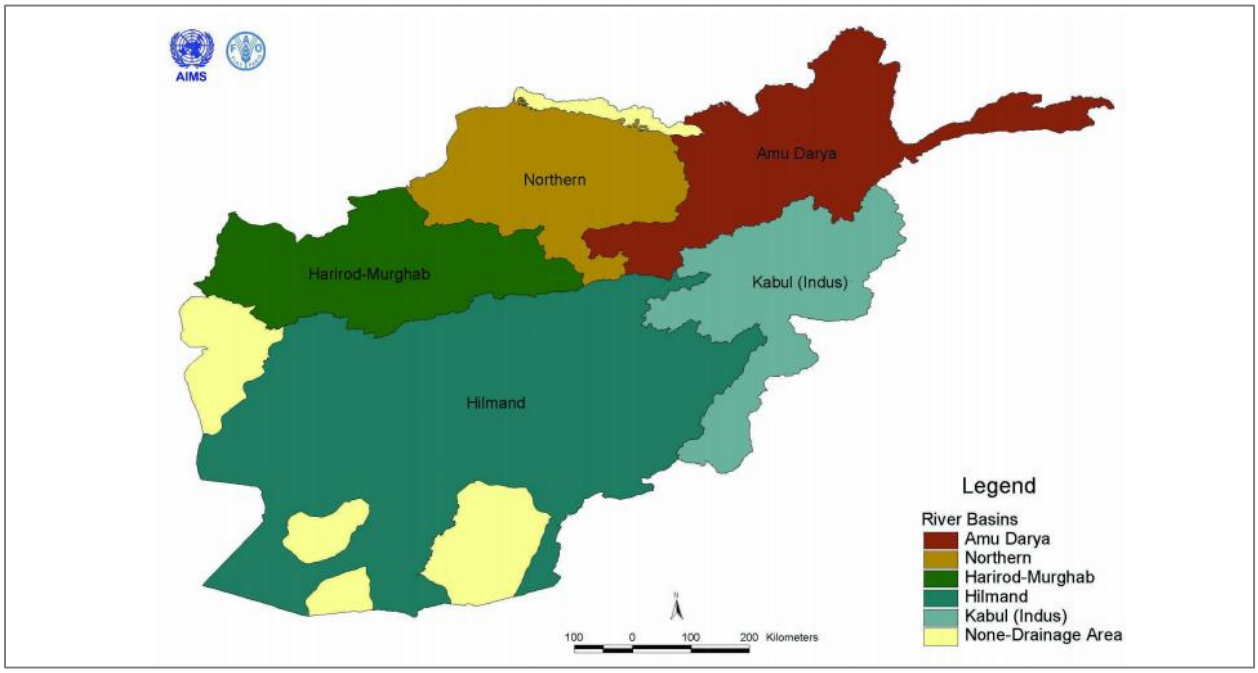
populous. The Tarnak is a chief confluent to the Arghandab joining it on the left at about 50 km southwest of Kandahar City. The Tarnak is about 320 km long.

174. For the Arghandab River Basin there are only partial records of historic precipitation data, particularly in the upper parts of the basin where much of the water resource is generated. This is largely because of the very difficult (steep) terrain. There is, however, good coverage of stream gauging stations up until 1979.

175. From a water resources planning and management perspective, the Arghandab River Basin is best treated in two distinct parts:

(i) The upper mountainous catchment areas in which much of the water resource is generated and where traditional irrigation is the main water user;
(ii) The middle and lower catchment areas where there is existing formal and traditional irrigation and resources can partly be managed through the operation of two large reservoirs (Kajaki and Dahla).

Figure 11. Afghanistan's Five Major River Basins and Sub-basin Boundaries



Source: Raphy Favre and Golam Monowar Kamal (2004) 'Watershed atlas of Afghanistan' p64 (first edition - working document for planners), available at http://aizon.org/watershed_atlas.htm, accessed on 30/09/2018

Figure 12. Helmand and Arghandab River Basin's Main Rivers and Geography

Source: Wikipedia, available at https://en.wikipedia.org/wiki/Helmand_and_Arghandab_Valley_Authority (accessed on 30/09/2018)

176. In addition to water from Arghandab River, there are water resources from *karezes*. These are more typically diversions constructed at sediment fans of mountain torrents, where they break out of the mountains. These are above the valley bottom, and basically outside the Dahla Dam command area. Kandahar Department of Agriculture, Irrigation and Livestock reported (2011-2012) that there were originally around 8,000 *karezes*, of which at the time of reporting only 300 *karezes* were still functioning. Schemes relying on *karezes* were more prone to seasonal water shortage, compared to the systems that receive Arghandab River water. The cause for the decline in *karezes*, though, is reportedly been the increase in deep tube wells and a series of relatively dry years.

9. Climate Change and Flooding

177. Typically, low reservoir volume periods in the project area are from July to November. However, the frequency of high and lows for the inflow to Dahla reservoir is likely to increase over time due to climate change. The impacts of climate change on reservoir performance are likely to result in reduced inflow and partly increased maximum flows during extreme events. This results in respective differences in downstream water availability. Especially with regards to extreme runoff events, it needs to be understood that the capacity of the reservoir and respectively the buffering capacity is limited (storage capacity is about 11% of the annual inflow under average conditions).

178. The general climate trend of reducing inflows is of less impact than the increase in extreme conditions and respective water availability fluctuations where the low inflow during dry years or

the high inflow during wet years is difficult to be buffered. These differences between wet and dry years are causing the largest challenges for the downstream irrigation schemes as with a reservoir and dam built for average conditions significant spill occurs and over-year buffering is not possible.

179. Reservoir behavior was simulated as part of the TRTA hydrology study based on predefined scenarios considering baseline (2005-2014), and future 2050 conditions under average, wet and dry conditions for a defined set of downstream current and future environmental as well as urban demands. Irrigation water demand has been iteratively tuned to understand maximum irrigation water availability while maintaining a reservoir reserve of 50 million m^3. The irrigation water demand was set considering the differing monthly demands, with the condition that demands must be met in all months during the irrigation period in order to avoid crop damage. Results show that climate change, i.e. a potential drier future, will have a significant effect on water availability that cannot be fully compensated by the reservoir buffer, even with increased reservoir capacity.

180. Overall, the project is categorized as low risk for climate change impact and in practice will reduce emissions through use of generation of electrical power using hydropower replacing diesel generation. The project will also remove the need for continual and ongoing extraction of ground water from boreholes by improved water storage of natural annual rainfall and snow melt water. Another positive impact will be the reduction of water loss from spillways with consequent ability to enable environmentally minimal flows to be maintained in the main river networks of the river delta and its linked canals. Climate risks were considered based on the sample subprojects.

10. Water Quality

181. Water at 12 wells in Kandahar City were tested in November 2017 and at 2 surface water sources: Dahla Dam and downstream of the reservoir in Arghandab River, in February 2018. Additional water quality analysis was conducted in January 2019 on 10 wells in Kandahar City and on 2 surface water sources. The locations of the sampling are presented in the figure below.

Figure 13. Locations of Water Quality Sampling, January 2019

Source: TRTA Consultants. 2019

182. Results are presented in details in Appendix 4. The main characteristics of the surface water tests performed in 2018 and 2019 exceeding either WHO, or Afghanistan standard for physical, chemical or bacteriological characteristic are summarized in the table below.

Table 12. Water Quality Survey Results (2017-2019)

Sample location	Sampling date	Physical *turbidity: 5* *EC: 1500 (WHO) - 3000 (ANSI)*	Chemical *Chloride: 250* *Sulphate: 250* *Fluoride: 1.5* *Hardness: 300* *Sodium: 200*	Bacteriological *Total coliforms: 0 col/100ml (WHO)* *Faecal coliforms: 0 col/100ml (WHO)*
SURFACE WATER				
Close to Intake Tower, Dahla Dam Reservoir, Shah Wali Kot district, Kandahar Province	26/02/2018	Turbidity: 13 NTU	-	?
	1/01/2019	Turbidity: 60 NTU	-	Total Coliform and Faecal coliform: > 250
Downstream, Dahla Dam, Shah Wali Kot district, Kandahar Province	26/02/2018	-	-	?
	1/01/2019	-	-	Total Coliform and Faecal coliform: > 250

Note: WHO and ANSI standards are indicated below the first row for the characteristics exceeded.
Source: TRTA Consultants, 2019

183. Water quality data from a water sample taken at the main canal in February 2018 shows low TDS concentrations (259 mg/l < 1,000 mg/l Afghan National Standard). Electrical conductivity was low accordingly (538 µS/cm). Turbidity was also low (1,7 NTU < 5 NTU Afghan National Standard). It appears from conversations with local AUWSSC staff that during the snow melt in the spring turbidity levels increase in the Arghandab River and Dahla Reservoir.

184. Bacteriological analysis on total coliform and faecal coliform bacteria showed negative results, however it is expected that this result may be invalid. Indeed, the water quality of the canal is highly affected by domestic sewage. There is evidence of organic pollution from the following sources:

(i) Discharge of sewage from adjacent settlements into the river;
(ii) Car washing in the river;
(iii) Detergents from laundry in the river, which includes phosphates.

185. There is no public waste collection system. Waste from markets, households, and construction sites affect the river and the canals. There is also no appropriate landfill and waste disposal mechanisms in place. Most waste generated in Kandahar City is dumped into the ditches and canals, and the city is suffering from adverse effects of unmanaged waste.

186. In January 2019, bacteriological contamination has been detected in Arghandab River. Disinfection treatment of the water is required before human consumption.

11. Noise

187. The noise level, in the absence of any construction work, is typical of a busy village area and city area dominated by a cumulative of many unidentifiable sounds, mostly related to road traffic. Noise will increase in the project area during construction caused by heavy machinery and transportation of construction material.

188. It is anticipated that settlements and shops located along the canals to be rehabilitated will be affected by noise during the construction phase. Baseline noise monitoring will be measured before commencement of construction activities. During the detailed design, documentation will detail that the contractor will be responsible for scheduling meetings with respective communities to establish agreement as to the commencement and completion of daily work times. It will also be the responsibility of the contractor to monitor noise levels of all machinery involved in the construction.

12. Air Quality

189. Existing air quality is considered not to be a critical issue and, although not measured, appeared normal during site visits. Quality can deteriorate rapidly during dust storms generated across barren land and deserts during windy seasons. Actual pollutants in Kandahar City consist of windblown and re-entrant dusts, emission from brick kilns, residential heating and cooking, portable domestic generators, as well as mechanical shop generators. Dust storms are the main source of particulate matters.

B. Biological Environment

1. Biodiversity

190. Of importance to this IEE is the status of existing biodiversity across the footprint of the Dahla Dam catchment, as well as the important riparian biomes of the Arghandab River downstream of the dam. An effective tool which provides a basic risk screening on biodiversity is the Integrated Biodiversity Assessment Tool (IBAT) developed by The International Union for Conservation of Nature (IUCN). The IBAT draws together globally recognized biodiversity information which assists in identifying biodiversity risks and opportunities within or close to a project boundary. An IBAT report was completed, for an area 50 km circumference of the Dahla Dam wall and dated 04 July 2019 (Appendix 8). The IBAT aims to overlap with relevant protected areas, key biodiversity areas and the IUCN red list.[21] In this case, the report reveals that there are no protected area and no key biodiversity areas within the zone. The report also reveals the potential for the occurrence of a number of species from the vulnerable, endangered, critically endangered lists.

Table 13. IUCN Red List of Threatened Species Potentially Found in the Project Area

Species Name	Common Name	IUCN Category	Taxonomic Class
Aquila heliaca	Eastern imperial eagle	VU	Aves
Aquila nipalensis	Steppe eagle	EN	Aves
Aythya ferina	Common pochard	VU	Aves
Capra aegagrus	Wild goat	VU	Mammalia
Chlamydotis macqueenii	Asian houbara	VU	Aves
Clanga clanga	Greater spotted eagle	VU	Aves
Falco cherrug	Saker falcon	VU	Aves
Gazella subgutturosa	Goitered gazelle	VU	Mammalia
Gyps bengalensis	White-rumped vulture	CR	Aves
Marmaronetta angustirostris	Marbled teal	VU	Aves
Neophron percnopterus	Egyptian vulture	EN	Aves
Ovis orientalis	Mouflon	VU	Mammalia
Oxyura leucocephala	White-headed duck	EN	Aves
Panthera pardus	Leopard	VU	Mammalia
Ursus thibetanus	Asiatic black bear	VU	Mammalia
Vanellus gregarius	Sociable lapwing	CR	Aves
Vormela peregusna	Marbled polecat	VU	Mammalia

CR = critically endangered; EN = endangered; VU = vulnerable.
Source: IBAT Proximity Report, 2018. Generated under licence 146-2715 from the Integrated Biodiversity Assessment Tool on 04/07/2019. http://www.ibat-alliance.org

143. At time of writing (July 2019) the second round of field work to establish biodiversity status in the Dahla Dam is being conducted by two experts from NEPA supported by the TRTA team.

[21] The IUCN Red List is a comprehensive inventory of the global conservation status of plant and animal species through the application of a set of quantitative criteria to evaluate extinction risk of thousands of species.

Findings from this survey will be incorporated into an updated version of this IEE as they become available.

2. Vegetation and Land Use

191. No national, provincial nor regional flora and fauna species of significance or their habitat were found within the area potentially affected by the project.

192. Small reed areas are found below the dam and these likewise play an important role in riparian ecology. Riparian forests along the river bank have frequently been cut with no replanting program. As a result, canopy species are now non-existent, a situation which impacts the local and micro climatic conditions as well as leaving river banks vulnerable to erosion. Long-term strategies for the improved management of these riparian plant communities will include replanting programs linked with use of bioengineering devices as required.

193. Plant communities within the catchment of both the Dahla Dam and the broader Arghandab River fall into a number of categories based upon topography, soil types and aspect. (i) Riparian / water tolerant species favoring shoreline conditions and commonly supporting habitat and nursery conditions for aquatic and bird species; (ii) Immediate land beyond high water mark broadly referred to as having a fan-shape characteristics and subject to sheet erosion and seasonal flooding; (iii) higher sloping terrain.

194. The arid climate of the region determines that indigenous plant species are at best sparse but diverse. For this reason, the ecology is highly vulnerable to the impacts of nomadic grazing. Dominant plant species include *Alhagi sp.* (Camel Thorn), *Ononis spinosa* (Spiny Restharrow), *Artemesia spp* (Sagebush).

195. It is recommended that a comprehensive plant list for these areas, along with propagation details, will be assembled as a component of the detailed Arghandab River Environmental Study (ARES).

3. Fauna and Wildlife

a. Arghandab River

196. Both upstream and downstream of Dahla Dam, the Arghandab River banks demonstrate a range of degradation. As a result of the seasonal fluctuation of water flow levels combined with the constancy of human impact (agriculture, sewage, deforestation), the environment is in part highly compromised with a low ecological importance.

197. However, at various locations river morphology shows only minor human impact and appears undisturbed.[22] The greater the distance from permanent settlement, particularly where the river meanders and islands are very common, there are areas of natural habitat which will be of ecological importance for aquatic and terrestrial species. These areas offer potential habitat for ground nesting birds (gravel bank, reed) etc. In addition, there is evidence of deep pools where trout have been recorded to exist. The recommended ARES will substantiate the status of a representative number of these non-degraded riparian areas to both identify nodal points where real-time monitoring could be established, and complete detailed fish / aquatic specie surveys to inform the environmental flow database and assist the detailed engineering design stage.

[22] Embankments consisting of natural substrate (rocks, gravel, sand), exist only in settlements and at bridges to protect against floods and erosion.

198. The ARES is not specifically being proposed for Output 2, but it is envisaged that aspects of the ARES (e.g. water quality baseline data) will be drawn upon.

199. E-flows will benefit considerably from a positive collaboration of farmers. It is recognized that as part of Output 2, there will be a need to facilitate an understanding with farmers of the concept of e-flows and the need for them to recognize the role it will play in improving the ecological viability and sustainability of the river system.

200. Due to topography the river has no major drops nor large waterfalls. Subsequently, the river flows in level reaches broken up by many rapids and riffles. Deep pools can be found close to rapid areas. Depending upon outfall source and relative temperature differentials, it is anticipated that the increased flow throughout the year combined with environmental flows (after the raising of the Dahla Dam) can improve potential habitats below the dam compared to the existing situation. As hunting of birdlife is recognized as a local activity, the success of these habitats will depend upon ongoing stewardship and protection by local community groups.

201. Extensive data on wildlife numbers and habitat is not available however the ARES will be responsible for assembling greater information on relevant species, habitat and opportunities for the project to enhance and protect wildlife. There is evidence that avian species which rely on the water are present, such as: (i) Fish eagle *(Pandion haliaetus*); and (ii) Black kite *(Milvus migrans*).

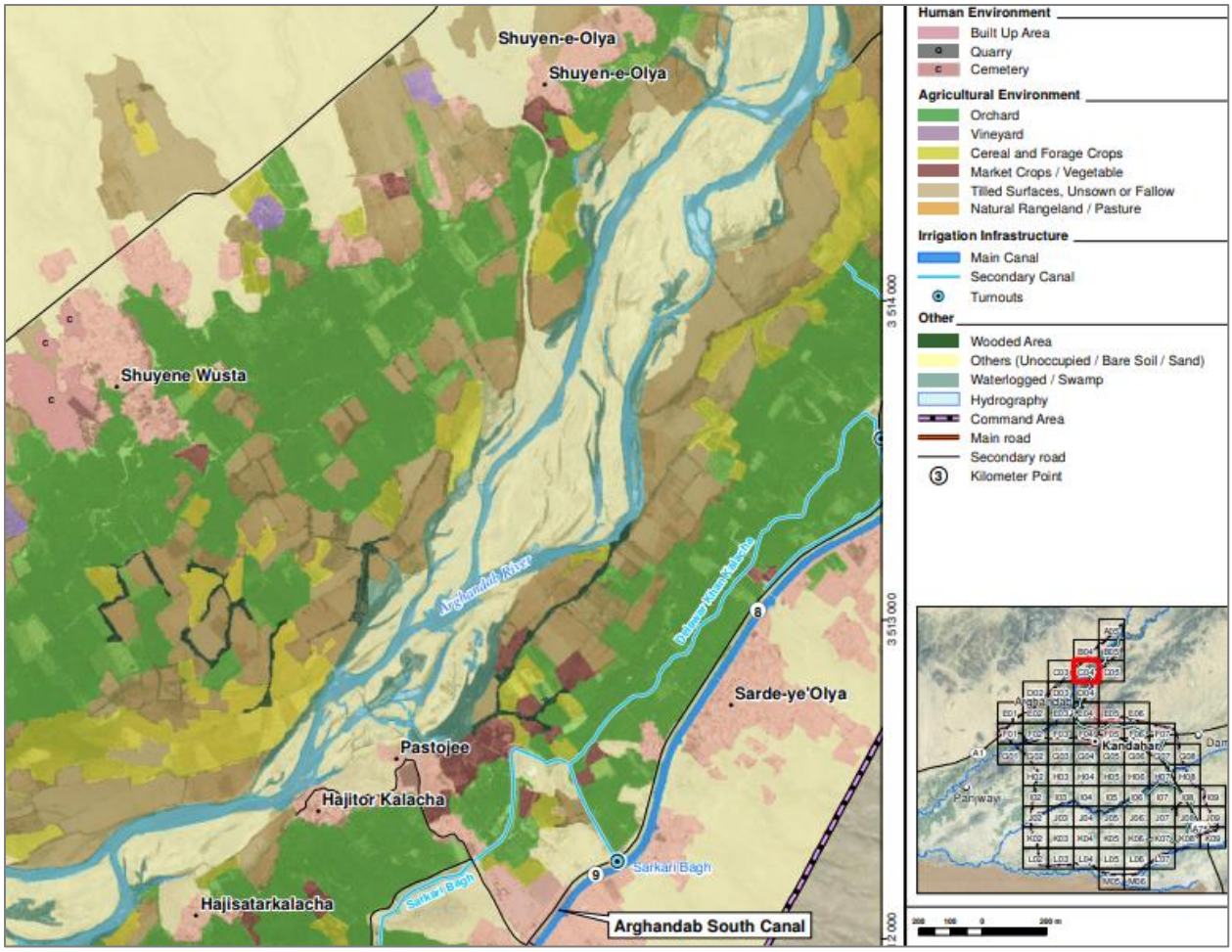
202. The November 2018 survey identified 14 waterfowl species and 17 individual birds from other species within the Dahla Dam. This is a preliminary indicator that the dam water and subsequent irrigation canals are important areas and play a significant role for waterfowl and other wildlife species in the south-west of Afghanistan. Water birds use this area as an aquatic habitat for shelter, foraging, roosting and breeding. In addition to the water birds, the survey also identified two mammals, Jungle cat (*Felis chaus*) and Golden Jackal (Canis aureus), both of which are on the Afghanistan “Red List”.[23]

203. So, while the 2018 survey found that these species use the river as their feeding habitat, the occurrence of these species is impacted by water scarcity and human impacts, such as sewage and hunting.

204. Beyond the dam, and in the surrounding catchment / desert areas, striped hyena (*Hyaena hyaena*) are very common. During the ARES, the areas along the irrigation canals and agricultural areas downstream of the dam shall also be surveyed.

[23] IUCN The IUCN Red List of Threatened Species™ is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of quantitative criteria to evaluate the extinction risk of thousands of species.

Figure 14. Arghandab River Below the Dam Showing Meanders and Islands



Source: CIDA. Cartographic Atlas command area and land use, 2012

Figure 15. Upstream of First Division Weir - Reeds and Potential Habitat for Nesting Birds

Source: TRTA Consultants, 2018

b. Dahla Dam

205. Dahla Dam is an artificial, man-made habitat and is well recognized as a recreational destination for families from Kandahar. The dual purpose of the dam area means that ongoing maintenance and management of the area is critical if standards are to be maintained. The cost to support this could be covered by admittance fees.

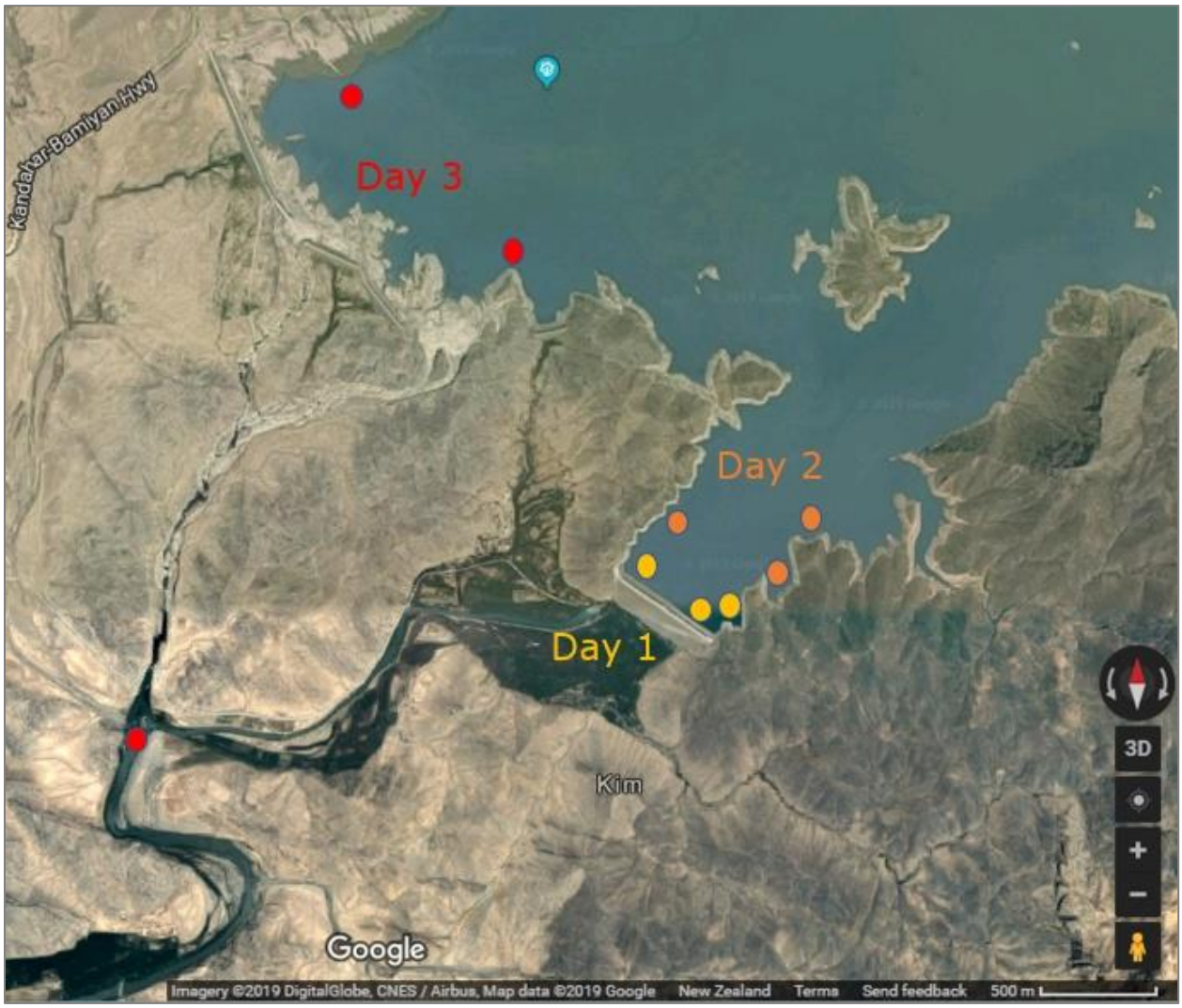
c. Aquatic Environment

206. A fish biological survey was implemented in November 2018 by the TRTA and NEPA to assess the aquatic life at the dam. The survey was conducted using three methods: (i) interviews of fisherman using a questionnaire on the fishing method used, time of the year, and main threats to fishing, (ii) meetings with aquaculture owners and related governmental organizations, and (iii) fish catches in nets at nine different sites of Dahla Dam reservoir and one site downstream of Dahla Dam. The locations are shown in the figure below. On day 1, the survey team surveyed deep water zones, on day two, deep and shallow, and on day three shallow zones including one zone downstream of the dam.

207. The river south from the dam is habitat for rheophile trout (*Salmo trutta oxenesus*), which is recognized as being endemic to the region.[24] The 1953 construction of the Dahla Dam made no provision for fish ladder technology, so for 65 years there has been no upstream fish migration above the dam. However, *Salmo trutta oxenesus* is reported to exist in the river above the dam. It is anticipated that the lack of river sediment downstream of the dam will also have compromised seasonal cycles of nutrient deposits. The ARES will specifically assess the (i) effectiveness of modified “fish-friendly” hydro turbines, (ii) identify fish endemic to this river system, and (iii) evaluate the potential for a fingerling program to be introduced into the dam to replenish fish stocks.

[24] TRTA communication ASBA Kandahar.

Figure 16. Location of the Fish Nets used during the Fish Survey



Source: TRTA Fish survey, 2018

208. The ARES will specifically survey the river and dam again to collect and document in a usable form, additional information regarding the existing aquatic species (preferred habitat conditions, breeding cycle, predators, susceptibility to overfishing along with their vulnerability to project activities). This information is an important component of understanding and improving management of aquatic species. The project has the opportunity to make very positive long-term contributions in this regard.

209. There are about 1500 fish farms (cages) raising common carp in canals and channels according to MAIL Kandahar. It is highly likely wild species exist.

210. Three existing fish species were found in the dam reservoir as part of the 2018 TRTA survey. It has been observed that these species may be vulnerable to major construction and the disturbance in the water body adjacent the new walls. The ARES will specifically investigate this issue and make appropriate recommendations to mitigate. The three species concerned are:

(i) **Sheer Mahi** *(Clupisoma Naziri)*. Sheer Mahi was caught in all the fish nets used during the three days in different parts of the dam (shallow water zones and pelagic

zones). The extent of occurrence of this species is high and exists in all parts of the dam. It mostly exists in the south-west part of the dam.

(ii) **Common Carp** *(Cyprinus carpio).* The Common Carp was caught in four out of nine fish nets that were used to catch the fish in the dam. The specie mostly exists in the southern parts of the dam. No specimen was caught in the deep water zone.

(iii) **Mola Carplet** (*Amblypharyngodon mola*). 1,092 Mola Carplet were caught in only three of the fish nets among all the nine nets (63% of the fishes caught) in the western part of the dam near the overflow and valve tower and eastern part of the dam. This species is likely to be most affected during the construction of the overflow and valve tower because the population of this species is very high in this part of the reservoir and is mostly found in this area.

211. The results of fish caught in the dam reservoir and downstream are summarized in the table below and the survey report is in Appendix 3.

Table 14. Quantities of Fish Caught during the Fish Survey

Local name	Common name	Scientific name	Quantity				
			Day 1	Day 2	Day 3	TOTAL	
Toghandy	Sheer Mahi	*Clupisoma naziri*	42	328	40	**410**	**24%**
Gulpam	Common Carp	*Cyprinus carpio*	12	4	210	**226**	**13%**
Yaqubyan	Mola Carplet	*Amblypharyngodon mola*	1068	24	0	**1092**	**63%**
		TOTAL	1122	356	250	**1728**	**100%**

Source: TRTA fish survey, 2018

212. Downstream, only Sheer Mahi was caught. One of the fishermen met during the survey mentioned that there were two species downstream: (i) Sheer Mahi and (ii) Dag fish. However, the survey team was not able to catch any specimen of Dag fish.

213. *Salmo trutta oxenesus* (common name: Khaldar Mahi) was not caught, although it is reported as existing in Dahla Dam.[25] This species is expected to occur upstream of the dam in river sections with high velocity due to its high oxygen demand. It is common in some rivers of Afghanistan.[26]

214. The catfish Sher Mahi (*Clupisoma Naziri*), an indigenous fish of Khyber Pakhtunkhwa, is facing serious threats to its survival due to climatic changes, water pollution, and overfishing. The species is found in Afghanistan and adjacent river basins.

215. Experts in the fisheries department of Pakistan's Khyber Pakhtunkhwa province, zoologists, and those in the fish business have observed a decrease in the population of Sher Mahi in its main habitat, the Kabul river. These experts believe extreme weather events – especially severe floods and erratic rainfall – combined with water contamination and overfishing are the main cause of the depletion of Sheer Mahi. The construction of the Warsak Dam in 1960 blocked the migratory route of the fish upstream. *Clupisoma Naziri* cannot be reared in water ponds, or fish farms, due to its biology. Experiments of rearing the *Sher Mahi* in hatcheries were not successful.[27]

[25] TRTA communication with ASBA

[26] Simon Funge-Smith et al. 2004. The potential for aquaculture development in Afghanistan, Asia Pacific *Fishery Commission. AD HOC Publication.*

[27] The Third Pole.net. *Understanding Asia's Water Crisis*. 2018. https://www.thethirdpole.net

216. For the same reasons, decrease in this fish species is also expected in Arghandab River. This fish species uses Dahla Dam reservoir as their habitat. The dam contributes to the survival of this species and must not be emptied completely.

217. There is no information available regarding the existing aquatic ecology of the river and of the dam. The river is expected to have a variety of substrates, mostly hard rock but also sand, silt and gravel. Habitats for different aquatic species are expected to decline due to water scarcity and the complete drying out of the ecosystem in dry years. Establishment of a sustainable, minimum environmental flow after the dam raise will boost the emergence of aquatic habitats below the dam and upstream of human settlements (benthic fauna, zooplankton, phytoplankton, fish). In times of flooding when water falls over the spillway, fish can migrate downstream of the dam. Fish species are present in the section of the Arghandab River below the dam.

218. Dahla Dam is an important habitat fish (and birds). Adequate water management will be needed to sustain and protect these species. The ARES survey will specifically survey and recommend upon ways to improve aquatic habitats in Arghandab River after the dam raise. In addition, measures to invoke water source protection will be strategically applied to the river to achieve appropriate management of human excreta and waste disposal in settlements both upstream and downstream of the dam. If not, while environmental flows may improve with increased water releases from the Dahla Dam they in turn may be compromised by wastewater discharges to Arghandab River.

219. Policy recommendations from the ADB and the World Bank support the introduction of integrated sewage systems within 5 years of water reticulation being available.

d. Ornithological Environment

220. An ornithological survey was implemented in November 2018 by the TRTA and NEPA to assess the bird life both at the Dahla Dam and downstream.[28] The survey was conducted using two methods: (i) collecting data through direct observations; (ii) interviewing local hunters (three hunters from surrounding villages) by using a specialized questionnaire on the presence of water birds, main threats, and hunting practices at Dahla Dam.

221. What is of importance to this Output 2 works is that the 2018 November survey revealed some very good, relatively undisturbed habitat downstream of the Dam. Unfortunately, the actual coordinates for the downstream sites surveyed were not conveyed. The planned ARES for 2019 is to specifically include the need to survey and document actual sites considered to be potential monitoring points from the point of view of bird habitat. These monitoring points are also expected to be key points in monitoring the impact and value of environmental flows.

222. In addition, the ARES will aim to strengthen the findings of the 2018 survey with the inclusion of any additional species cited.

4. Nature Conservation Status of the Project Impact Areas

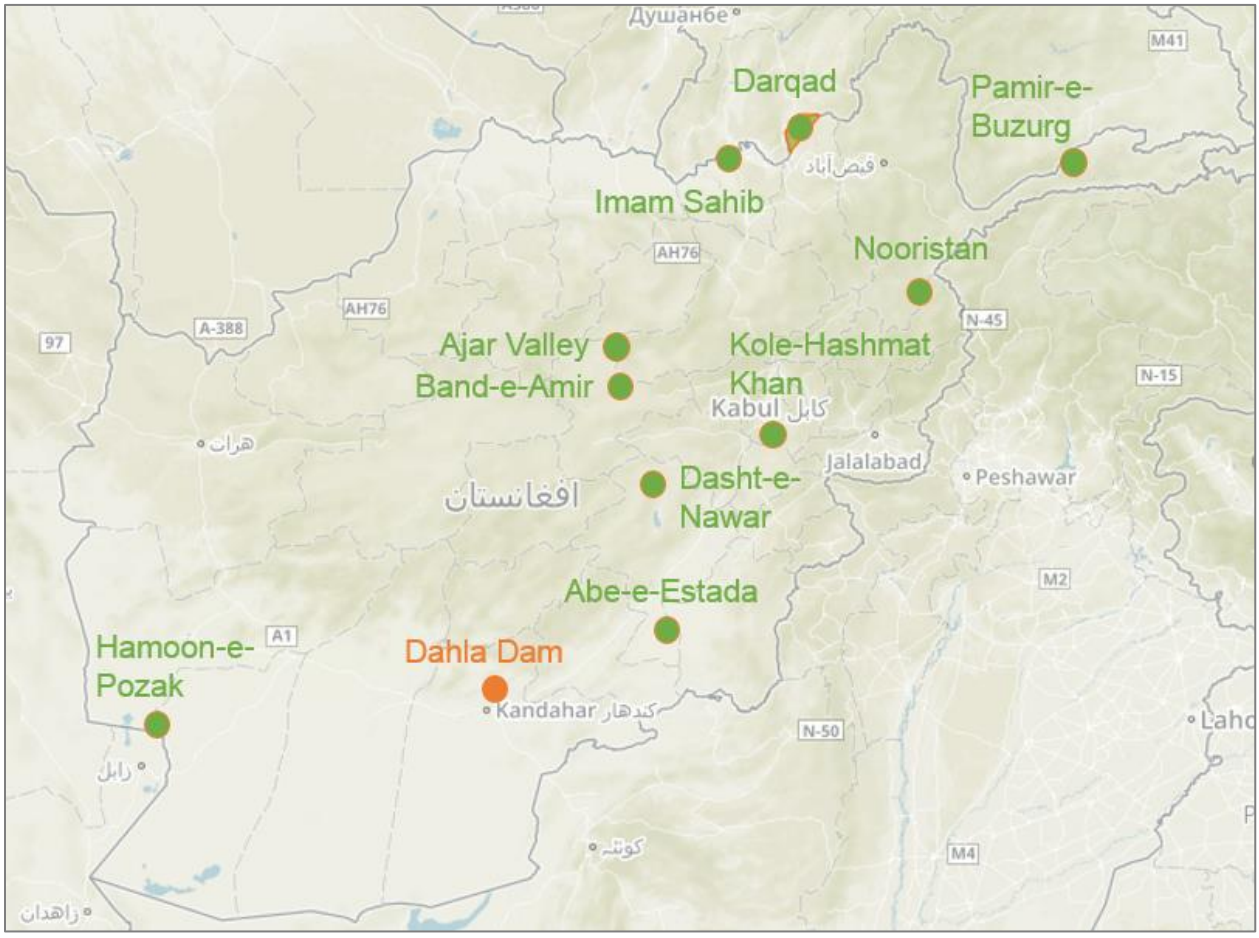
223. There are ten reported protected areas in Afghanistan. A location map is presented below:[29]

(i) Darqad: wildlife reserve;
(ii) Abe-e-Estada: flamingo and waterfowl sanctuary;

[28] See TRTA Output 1 EIA report (2019) and TRTA Ornithological Survey report (2018) for more details.
[29] United Nations Environment World Conservation Monitoring Centre, Protected-Planet, 2019

(iii) Ajar Valley: national park;
(iv) Kole Hashmat Khan: waterfowl sanctuary;
(v) Hamoon-e-Pozak: waterfowl sanctuary;
(vi) Pamir-e-Buzurg: national park;
(vii) Dasht-e-Nawar: flamingo and waterfowl sanctuary;
(viii) Imam Sahib: wildlife reserve;
(ix) Nooristan: national park;
(x) Band-e-Amir: national park.

Figure 17. Location Map of Afghanistan Protected Areas



Source: UN Environment World Conservation Monitoring Centre, Protected-Planet, 2019
No protected areas are in the vicinity of Dahla Dam. This was confirmed by NEPA to the TRTA. The closest protected area to Dahla Dam is Abe-e-Estada, located 200 km North-East of Dahla Dam. Abe-e-Estada is a 270 km^2 flamingo and waterfowl sanctuary.

5. Wetlands

224. The drainage systems in Afghanistan predominantly conclude in endorheic (closed) basins.[30] The Helmand and Arghandab rivers receive their input from rainfall, snowmelt and glaciers, and create lakes and marshes which are important wetland ecosystems. The rivers are a source of water for irrigation, while the lakes raise the humidity in the surrounding areas and reduce the need for irrigation of crops – a much needed saving in arid climatic conditions. The small number of wetlands formed by these rivers support a wide variety of wetland-dependent

[30] UNEP. 2003. *Annual Evaluation Report*. Evaluation and Oversight Unit. September 2004.

birds, particularly migratory water birds. Most of the wetlands are used by migratory birds for feeding and resting, while some are used for breeding. It is therefore important that consideration is given to environmental flows for the system.

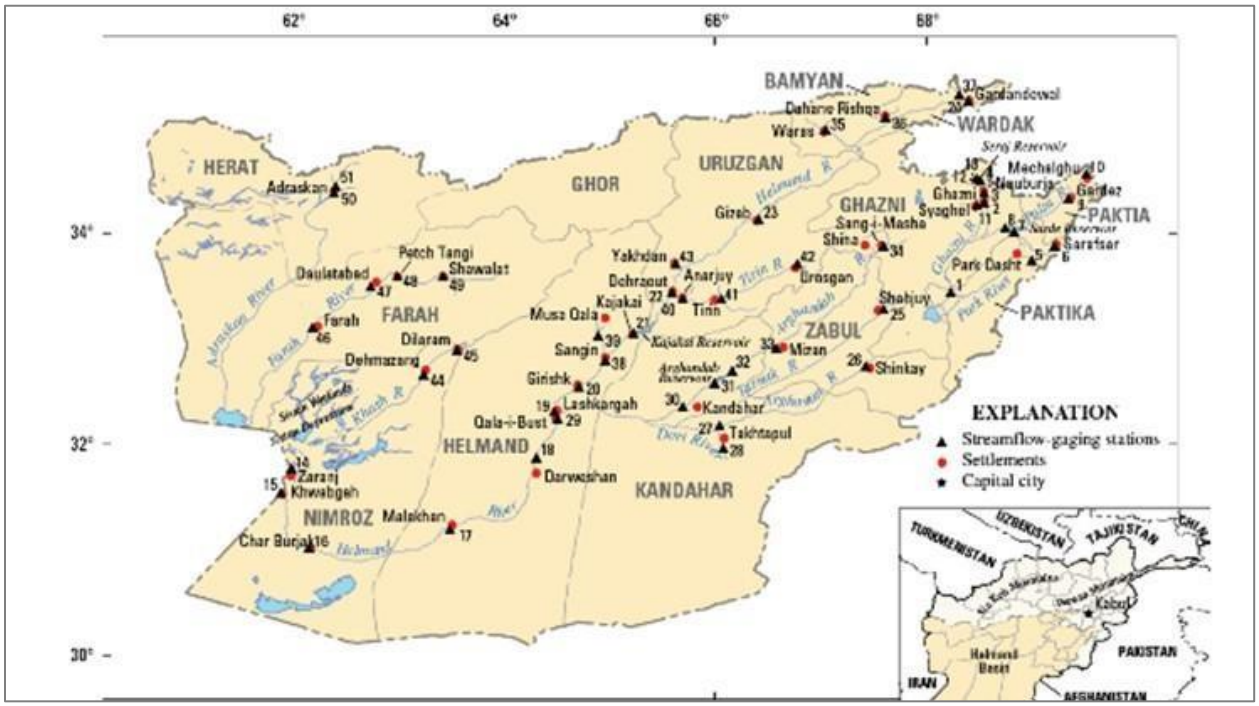
225. Arghandab River meets Helmand River at Qala-i-Bust. The Helmand River provides the hamouns (wetlands) with water in Iran after the border. These lakes are one of the main and most valuable aquatic ecosystems in Iran and are registered wetlands in the Ramsar and UNESCO Biosphere Reserve Conventions.[31]

226. The basin is a closed inland delta at the lower end of the Helmand River. It consists of a delta plain (2,500 km^2) and a wetlands system (5,000 km^2). The Helmand River can completely dry up within a series of dry years. The Helmand is the main source for water for these wetlands.

227. High floods are necessary to prevent the lakes from gradually becoming saline, by intermittent flushing the contents into the terminal saline depression of the Goud-e-Zereh. Periodical droughts are needed to 'reset' the system and maintain the dominance of early succession stages of marsh vegetation.

228. Implementation of the transboundary agreement between Afghanistan and Iran has problematic during periods of the civil war. The planned Environmental Flow for the Arghandab River aims to supply the approximate 17% of flow to the Helmand. At the same time, the Cumulative Impact Assessment for the project will raise the issue of the need to address environmental flows across the entire basin. If successful, such an initiative can make a very positive contribution to the sustainability of the highly valued and registered wetlands / hamouns in both Afghanistan and Iran.

Figure 18. Helmand River Basin: Location of Streamflow - Gauging Stations



Source: US Agency for International Development, Streamflow Characteristics of Streams in the Helmand Basin, Afghanistan, 2018

[31] Delft Hydraulics. 2006. *Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran*.

Table 15. List of Streamflow Gauging Stations in the Arghandab River Basin

Map number	Afghan ID number	USGS ID number	Station name
25	4-1.21R-7A	323200067280000	Tarnak River near Shahjuy
26	4-1.222R-6A	320000067180000	Lora River near Shinkay
27	4-1.22R-1A	312600065550000	Arghastan River near Kandahar
28	4-1.2L0-5A	311300065570000	Dori River at Takhtapul
29	4-1.L00-1A	3130000064230000	Arghandab River at Qala-i-Bust
30	4-1.L00-3A	313700065340000	Arghandab River near Kandahar
31	4-1.L00-4A	315000065520000	Arghandab River below Arghandab Reservoir
32	4-1.L00-5A	315700066020000	Arghandab River above Arghandab Reservoir
33	4-1.L00-6A	321000066270000	Arghandab River at Mizān
34	4-1.L00-9A	330800067280000	Arghandab River at Sang-i-Masha

Source: Delft Hydraulics. 2006. Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran

C. Environmental Flows

1. Definition, Models and Benefits

229. An environmental flow is defined as a system for managing the quantity, timing, and quality of water flows below a dam, with the goal of sustaining freshwater and estuarine ecosystems and the human livelihoods that depend upon them. There are numerous environmental flow models which can be applied, and they are determined by:

(i) Existing status of a river; pristine, modified, highly modified;
(ii) A holistic river system assessment including the ability to mimic flow variance related to the spectrum of characteristic ecological conditions (unique biota, aquatic habitat richness, aquatic species diversity, measures of flow regulation and catchment fragmentation, presence of protected areas);
(iii) Consideration of sediment movements and the lateral and longitudinal migration of biota, and;
(iv) Status of catchment, proximity and density of settlement, and livelihood dependence upon river flows.

230. Anticipated benefits of the environmental flow are as follows:

(i) Improve the ecological integrity of the river by replenishing endemic fish habitats below the dam and Kandahar (revitalization of ecomorphological structures of the river like sand and gravel banks);
(ii) Protection of existing river basin ecosystems from negative impacts while protecting critical natural habitats below the dam and in Kandahar according to the US Large Dam Legislation;
(iii) Mitigate the decline of ground water adjacent the river downstream of the dam (and Kandahar) including the upstream part of the irrigation area;
(iv) Supplementing numerous handpumps along the river with water.

2. Considerations

231. Establishing appropriate environmental flows depends on several factors, including hydrological and ecological data availability and the understanding and acceptance of the environmental flows system by the community of users. The civil war and associated insecurity

have created challenges for data-gathering in the project area, and a compromised plan based upon very old data is inevitable (available flow data is dated from 1950s-1978). However, maps from 2012 provided by CIDA indicate that the Arghandab River has a natural, almost untouched morphology and numerous 'potential' habitats for ground dwelling birds, waterfowl and rheophilic fish species which could be 'reactivated'. Clear understanding and acceptance of the potential of the overall system by water users requires promoting a shared understanding of ecosystem objectives, along with carefully examining pressures and constraints in reaching these objectives. Where water availability is limited with a high dependency from adjacent settlement, it can be expected that there will be social and political realities which implementing agencies will need to be responsible for. The stakeholders involved should include water users along the river, as well as relevant ministry and agency specialists.

232. In summary, the validity of any water flow predictions and development of prescriptive environmental flow approaches will rely upon engagement of all water users and effective monitoring. Assuming the positive CIDA data regarding sections of the river, there are very positive indicators that environmental flows can have considerable positive impact, supporting the viability of existing habitat and aquatic species. Improved baseline data regarding downstream status collected thru the ARES, will aim to confirm and strengthen the impact of the anticipated environmental flows.

233. Recognition that any river flow will have its limitations is fundamental. The Arghandab River rises in the high-altitude foothills of the Hindu Kush and flows through a predominant arid-zone where for some months of the year it may appear to have no flow as surface water dries up. The Arghandab is a tributary of a closed system (Helmand River) which terminates in the endorheic Sistan Basin in neighboring Iran.[32] This basin includes a series of wetlands and lakes, which equilibrate through evaporation. By effectively initiating steps to establish real-time monitoring, the project can contribute to the long-term sustainability of the river.

3. Contributors and Allocations

234. The combined contributors to environmental flows are: (i) the "spill" from the dam, i.e., water which must be released (almost always through the hydropower turbines) because it cannot be stored, (ii) deliberate releases from the dam, (iii) return flows from irrigation (iv) return flows from urban and peri-urban water supply, i.e., water which returns to the river due to tailwater runoff or soil infiltration, and (iv) seepage from the dam which infiltrates into the aquifer and the river below the dam.

235. Environmental allocations from Dahla Dam should flow down the Arghandab, and be supplemented by seasonal flows from the Arghastan, Tarnak and Dori rivers which join the Arghandab at Doad. In many irrigated areas, groundwater pumping has been increasing in volume, with the consequence that the water table has fallen, reported to be as much as 180 m in some areas. Thus, some environmental flows will in practice go towards shallow aquifer replenishment, although this is dependent upon soil profiles and percolation rates. A potentially profound anomaly to the impact and efficiency of any environmental flow is that where no overarching system of management prevails, flows classed as environmental in the Arghandab may be abstracted by farmers further downstream on the Helmand River.

[32] An endorheic basin is a closed drainage basin that retains water and allows no outflow to other external bodies of water, such as rivers or oceans, but converges instead into lakes or swamps, permanent or seasonal, that equilibrate through evaporation.

4. Management of Environmental Flows

236. A preliminary-pilot or benchmark environmental flow proposal is recommended as a starting point. This has been calculated as 254 million m^3 for an average year. This flow provides enough water for water supply, irrigation and hydropower development and will mimic the average monthly and annual discharges in the Arghandab. Additionally, these flows will also voluntarily percolate and accede to what has been identified as diminishing and falling groundwater table due to pumping for irrigation.

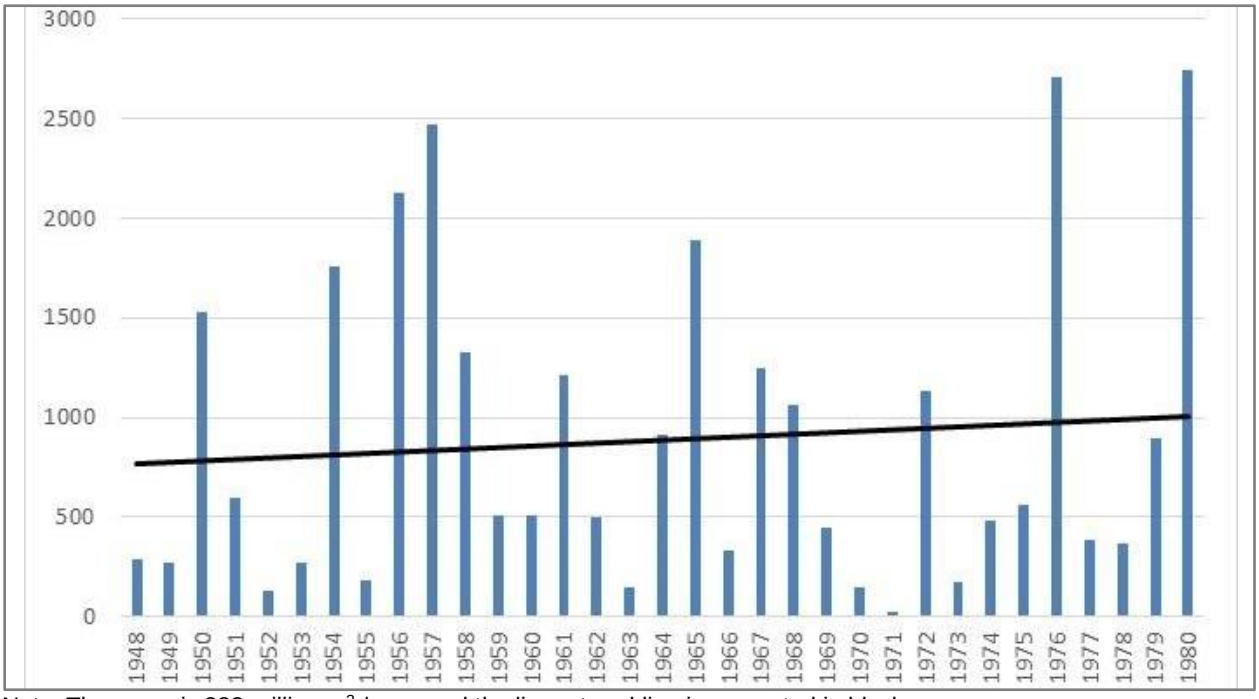
237. Environmental flows have been calculated for dry year (0%), average year (50%), and wet year (100%). Currently it is unknown whether any prescribed environmental flow will reach Qala-i-Bust where Arghandab River meets the Helmand River. The proposed environmental flow will provide the upper Arghandab River with water (area of 13 weirs below the dam and some kilometers below the last weir no 13).

238. **Dry year.** In dry years, the water in the reservoir will be used only for urban and industrial water supply. The river will fall dry completely in summer and autumn. Almost no environmental flow will be released from the dam, which is the same process that would occur naturally. The ecosystem is adapted to droughts even when the whole river falls dry. Low annual flow has been reported in 1952, 1963 and 1971. Endemic fish species *Clupisoma Naziri* (common name: Sheer mahi, catfish) and *Salmo trutta oxenesus* (common name: Khaldar Mahi, trout) will migrate upstream if the water level will drop continuously. *Schizocypris altidorsalis* is a benthopelagic fish species that has been reported from pools in dry river beds in Afghanistan and Iran, and this fish returns to more permanent rivers when water levels drop.

239. In drier years, when irrigation water is limited, it is unlikely that communities will allow the water to pass their offtakes, particularly if their crops are thirsty. Therefore, to avoid over-exploitation of this dedicated environmental surface water, it is imperative that all water users are involved and informed concerning the purpose behind the environmental flows.

240. **Average year.** Flow data shows an average annual flow of 888 million m^3 of Arghandab River at Qala-i-Bust where the Arghandab River meets the Helmand River (time series: 1948–1980). The flow shows a slight increase over the years (linear trend line in figure below), probably due to the construction of the dam in 1952.

Figure 19. Flow of Arghandab River at Qala-i-Bust 1948-1980



Note: The mean is 888 million m^3 / year and the linear trend line is presented in black.
Source: MEW 2018 and TRTA Consultants, 2018

241. Unfortunately, current flow data are not available. The proposed environmental flow will provide the river with water below the beginning of the main channel (weir no 13). The river will get additional water from irrigation and water supply via drainage canals and groundwater during the irrigation season. Drainage will increase due to increased irrigation water use. Raising of the dam will improve the existing situation for the average year. Currently, a high proportion of the spring flood runs over the spillway and is thus not available for the dry season.

242. **Wet year**. When flows are expected to exceed the capacity of the dam over the early spring period, environmental releases can commence in early to mid-winter and river flow can be expected almost throughout the year.

243. A review of the Arghandab/Helmand on Google Earth at moderately high resolution has not identified any wetlands between Kandahar and Shila-i-Chark. This situation, combined with the lack of regular summer to winter flow at Qala-i-Bust, suggests that the environmental contribution from Dahla to the Arghandab is mainly beneficial to existing habitats in the river bed (e.g. spawning and feeding habitats) and to those settlements/communities which exist along the river for water supply for people and livestock, recreation, and for groundwater re-charge.

244. Maps of Arghandab River produced by CIDA[33] indicate that in some sections, the river itself has a natural, almost untouched morphology with numerous potential habitats for ground nesting birds, water fowl and rheophile fish species. It is anticipated that these habitats in particular will benefit from environmental flows. To be successful, the proposed flows need to be activated as far as is possible in coordination with the water demand for irrigation, urban and rural water supply and the hydropower development.

[33] Cartographic Atlas command area land use, 2012

Table 16. Environmental Flow Releases in Addition to Spills

%		0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3	Mm^3
Hamal	**Apr**	16,0	20,0	27,5	35,0	42,5	50,0	52,5	55,0	57,5	60,0	66,0
Sawr	**May**	9,6	12,0	16,5	21,0	25,5	30,0	32,5	35,0	37,5	40,0	44,0
Jawzā	**Jun**	9,6	12,0	12,0	12,0	12,0	12,0	16,5	21,0	25,5	30,0	33,0
Saratān	**Jul**	0	0	0	12,0	12,0	12,0	15,0	18,0	21,0	24,0	26,4
Asad	**Aug**	0	0	0	11,0	11,5	12,0	15,0	18,0	21,0	24,0	26,4
Sonbola	**Sep**	0	0	0	10,0	11,0	12,0	15,0	18,0	21,0	24,0	26,4
Mizān	**Oct**	0	0	0	9,0	10,5	12,0	15,0	18,0	21,0	24,0	26,4
Aqrab	**Nov**	0	0	0	9,0	10,5	12,0	15,0	18,0	21,0	24,0	26,4
Qaws	**Dec**	0	0	0	9,0	10,5	12,0	15,0	18,0	21,0	24,0	26,4
Jadi	**Jan**	6,4	8,0	11,0	14,0	17,0	20,0	21,0	22,0	23,0	24,0	26,4
Dalvæ	**Feb**	9,6	12,0	16,5	21,0	25,5	30,0	32,5	35,0	37,5	40,0	44,0
Hūt	**Mar**	16,0	20,0	25,0	30,0	35,0	40,0	47,5	55,0	62,5	70,0	77,0
Year		**67,2**	**84,0**	**108,5**	**193,0**	**223,5**	**254,0**	**292,5**	**331,0**	**369,5**	**408,0**	**448,8**
% of inflow		**17%**	**18%**	**17%**	**24%**	**22%**	**22%**	**20%**	**19%**	**18%**	**18%**	**18%**

Source: ASBA and TRTA Consultants, 2018

245. While the environmental flows in spring in a moderate to extreme wet year will be substantial, there will be issues relating to such flows in dryer years. Kandahar farmers have a tradition of abstracting high to maximum volumes for their crops, almost regardless of downstream demand. Although it is expected that farmers will have sufficient water for irrigation purposes as a result of Output 2, as previously indicated, there is a need garner support and understanding from *mirabs* and farmers regarding the role and purpose of e-flows.

246. It is recommended that *mirabs* and farmers have the environmental flow needs fully explained to them, and that their actions in the first two or three years after project completion are supported with collaborative monitoring driven by *mirabs* and water users. The approach to environmental management and water releases will then be reassessed if necessary.

247. In principle it is suggested that the proposed environmental flows are added to the irrigation releases planned for a given month, and also added to the 60% of flow that passes downstream at the diversion to the Main South Canal. A proposed gauge on the Arghandab just above the Arghastan junction will be installed and will measure the flow reaching the lower Arghandab. If this is successful, environmental flow in summer can be continued. If not, it may be necessary to curtail them or revise the approach.

248. Dry to wet season environmental flows can be improved after raising of the dam due to its higher storage capacity. While significant degradation of existing critical habitats is not expected, the anticipate environmental flows will provide conditions for an increase in the viability of the riparian ecological system. However, to be successful this will require collaboration with downstream WUAs.

249. As a ballpark figure, the intention of the environmental flow must be that the Arghandab and tributaries contribute about the same proportion of Helmand flow as in the past or around 17%.[34] The raising of the dam wall will allow for a water holding capacity increase to approximately 782 million m^3. The added capacity is 500 million m^3 which is approximately equivalent to the holding when the dam was built in 1952, and a bit more. Average annual inflows are about 1,400 million m^3. Inflows of up to 2,800 million m^3 (called wet year flows) or more are typical once every 10 years. These inflows are the result of high and quick snow melt along the Hindukush and it

[34] Delft Hydraulics. 2006. *Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran*.

can be expected that there will be significant outflows from spillways during such events. The raising of the dam wall cannot capture the magnitude of all the snow melt. While greater water will be immediately available, it is recommended that the issue of appropriate environmental flows be established over time.

5. Limitations and Future Studies

250. The recommended preliminary-pilot or benchmark environmental flow of 254 million m^3 is an calculated estimation and a starting point.[35] From this estimate, flow measurements could be carried out at existing water gauging stations monthly over a period of one year to monitor the availability of water in the river and clarify how much water can reach different sections and habitats of the river (Dahla Dam to Qala-i-Bust). Assessment can subsequently be made as to the adequacy of this flow. It is important to note that the pilot flow is not anticipated to be available every year.

251. It is recommended to conduct additional studies during the detailed design stage, and that this work be supported as a capacity building initiative for NEPA. As part of the recommended detailed ARES, hydraulic calculations on Dahla Dam and the Arghandab River shall be conducted to clarify how much water will reach different sections and habitats of the river (Dahla Dam to Qala-i-Bust) and to show whether this flow is providing sufficient water to sustain riparian vegetation and aquatic life including fish and waterfowl throughout the year. The ARES Terms of Reference are in Appendix 6.

252. Assembling real-time datasets across the catchment and downstream using remote stations is considered to be an important step in refining a workable and responsive approach to environmental flows. It is recommended that the detailed design shall define the number and location of monitoring units to log with greater accuracy the needs over time during dam operation. Rehabilitation of water gauging stations will be required in advance. If rehabilitation cannot be completed, temporary measurements will be required at these locations (e.g. use of Ott SLD – side-looking doppler sensor). Procurement of mobile measuring devices would be required.

253. With the benefit of more comprehensive datasets, an Environmental Flow Management Plan will be developed during detailed design stage.

6. Environmental Flow Monitoring During Dam Operation

254. During the dam operation, long-term monitoring and recording in an ongoing manner is recommended. Appropriate environmental flow could be identified by (i) maintaining a record of what has voluntarily gone across the spillway - annual meltdown flooding (if any), added to (ii) flows from hydro and (iii) monitored along the downstream course of the river. Calculation of what is possible to make up any deficit each year given the compounding set of circumstance would follow. This model could deliver scenarios where a range of 4-8 years out of 10 years may see no environmental flows at all - assuming that dry conditions prevail in the mountains. It is this year-

[35] As outline in the introduction of this section, the variables in assessment of appropriate environmental flows in the project area present a challenge. The Arghandab River is an ephemeral system in an arid zone where increasing demands have been made on adjacent groundwater resources with the result of levels dropping dramatically in parts. The increasing demands upon the river combined with the anticipated uncharacteristic weather events and more rapid spring meltdown associated with climate change all contribute to change the potential dynamics of the river. In some areas, flows to the river can be expected to percolate to depleted groundwater levels, compromising the immediate utilization of the flows.

by-year range combined with the limitations in the dam which will ultimately determine the environmental flows that are possible.

255. Based on the collected data, the assessment shall include: (i) combining real-time spring time data from the Hindu Kush (detailing temperature, commencement and time interval of snow melt), with (ii) existing water held in the dam post-construction, along with (iii) downstream deficits at various nodal points to identify what flows have occurred and whether these will adequately support environmental flow requirements.

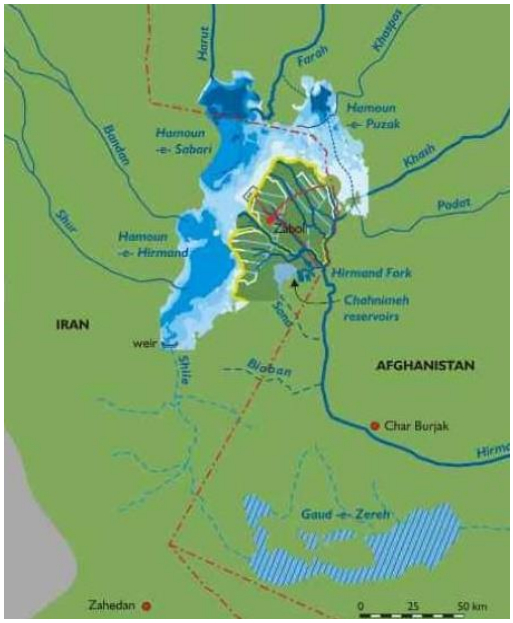
256. The results of the assessment will also help to identify: (i) how the rise in the dam can improve the contribution to water availability for the Helmand River given the arid / ephemeral characteristics of the river; (ii) the contribution and limitations required for a Helmand Basin wide response; (iii) how improved seasonal management of the flow can improve availability of environmental flows and identify a series of nodal points which could be used as indicators; (iv) how various datasets can be used to mimic and support wet/dry year phenomena through deployment of stand-alone, real-time measurement stations; and (v) how any shortfalls can be mitigated against.

7. Transboundary Water

257. It is anticipated that Output 2 utilizes a significant but small proportion of the water in the overall Helmand Basin. However, there is a need to maintain the larger perspective that key performance indicator of water management in the basin will ultimately be the quantity and quality of water released to the Sistan Basin and then across the border to Iran.

258. Therefore, of significance to this IEE is the international agreement between Iran and Afghanistan concerning the cross-border flows of the Helmand River system. According to the 1973 Treaty, Afghanistan is committed to sharing the water from Helmand River with Iran and supply it with 26 m^3 of water per second or 850 million m^3 per annum. The key questions is of timing and whether steady flows are required or whether obligations are based on minimum annual transfer. The answer to this will be based upon real-time monitoring.

Figure 20. Iranian Hamouns on the Border to Afghanistan



Source: Delft Hydraulics, Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran, 2006

259. The Arghandab River contributes about 17% of the annual discharge of Helmand River according to 2006 Delft Hydraulics study.[36] According to this study and table below, a contribution of approximately 1,000 million m^3/year is required on average to keep the sensitive ecosystem of the Iranian Hamouns (wetlands) alive.

Table 17. Monthly and Annual Discharges; Helmand, Arghandab, Khash, Farah Rivers (million m^3)

Station	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Aug	Sep	Annual	Period
Helmand at Kajaki	185	221	229	252	287	818	1509	1335	546	257	158	**5947**	**1947-71**
Arghandab at Qala-i-Bust	7	13	48	54	98	145	286	162	39	56	10	**924**	**1948-65**
Helmand at Char Burjak	165	174	258	311	409	604	1187	1348	570	290	207	**5692**	**1947-71**
Farah at Farah	2	3	18	67	237	426	519	173	54	16	3	**1519**	**1953-65**
Khash at Dilram	1	7	12	18	44	144	157	49	12	4	2	**451**	**1953-65**
Helmand at Kajaki	188	226	250	271	297	894	1648	1439	587	291	175	**6429**	**1953-65**
Arghandab at Qala-i-Bust	10	18	67	67	115	142	314	184	49	77	14	**1065**	**1953-65**
Helmand at Char Burjak	217	229	354	380	479	562	1216	1408	656	377	286	**6393**	**1953-65**

Source: Delft Hydraulics, Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran, 2006

260. The time series which Delft Hydraulics used refers to different periods, none of which are up to date (1947–1971; 1948–1965; 1953–1965). MEW flow measurements show an annual contribution of 888 million m^3 from the Arghandab River according to a time series during 1949–1980.

261. The total allocation to the Hamoons as per the 1973 Helmand Water Treaty is an average of 24m^3/s or an annual volume of about 760 million m^3. There are difficulties with the treaty, for a variety of reasons, including the natural ephemeral nature of the Arghandab River which naturally would experience years with no flow at all.

D. Socio-Cultural Environment

262. In October 2018, a baseline socio-economic survey was carried out in the district of Shah Wali Kot on a sample of households selected by income group. Socio-economic data was gathered through interviews with households and focus group discussions were held with key representatives. In addition, qualitative assessments on poverty, social and gender issues were conducted using qualitative survey tools. A further socio-economic survey on 25% of the affected households will be carried out and the results will be integrated after finalization of the report.

1. History

263. The history of the region before the coming of Islam (600-800s CE) is demarcated by the Persian Achaemenids (6th-4th century BCE), Alexander and the Greeks (4th century BCE), Asoka and Buddhism (3rd century BCE), Kanishka and the Kushans (1st century CE), the Persian Sasanians (100-600s CE), and the Iranian Huns (300-800s CE). Islamic civilization initially flourished under the Ghaznavids (900-1100s) and the Ghurids (1100-1200s) but this era ended with the Mongol invasion (1200s). The opening of the new maritime trade route between Europe

[36] Delft Hydraulics. 2006. Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran.

and the East Indies in the 1500s sent Afghanistan and all other areas along the traditional overland silk route into economic and cultural decline. During the latter half of the 1700s, Ahmad Shah Durrani liberated the area between the Hindu Kush and the Amu Darya from Persian and Indian influence, thereby creating modern Afghanistan.

264. Modern water management was introduced to Afghanistan in the mid-20th century. Under the monarchy (1919-1973), irrigation management was significantly improved, individuals were allocated water rights, the law on Irrigation (Qanun-i-Abyari) was published, and provincial Departments of Irrigation (Riyasat-i-Abyari) were established.[37]

265. During two decades of war from 1979 to 2001, irrigation systems and water supply fell into disrepair, and traditional community-based water management declined. Since then the government, with support of the donor community, has begun to rehabilitate and upgrade irrigation and water supply systems, and to restore community-based water management.

2. Ethnicity

266. Afghanistan is a multi-ethnic society. It consists of Pashtuns, Tajiks, Uzbeks, Hazaras, Turkmen, Pashais, Balochis, Khirgyz, Aimaqs, and others. There are also a few thousand Afghans of Indian origin.

267. In the Project area, 97% of the households speak Pashto, while 3% speaks Dari and Balochi. These ethnic groups are very much in the mainstream and do not fall under the definition of indigenous people based on ADB SPS (2009).

268. The religion of the majority of the Afghan population is the Sunni branch of Islam (approximately 84%). This is followed by Shia branch of Islam, approximately 15% in the country. There are also followers of other religions including Hinduism, Sikhism, etc., estimated as 1% of the total population.[38]

3. Infrastructure

269. Kandahar International Airport serves as southern Afghanistan's main airport for domestic and international flights. It is also used as a major military base as well as shipping and receiving of supplies for the NATO armies. Most international flights connect with Dubai, Germany, Turkey, Saudi Arabia, and Pakistan.

270. Kandahar is connected to Kabul by the Kabul-Kandahar Highway and to Herat by the Kandahar-Herat Highway.

4. Education

271. There were 303 schools and one University in Kandahar Province in 2003. The following table shows types of schools and number of pupils and students. Current data was not available.

[37] SMEC. 2008. "Balkh River Basin Management Plan. Report of Balkh River Integrated Water Resources Management Project". *ADB TA JFPR 9060-AFG.* Pp. 25.

[38] JICA. 2004. The study on urgent rehabilitation support program of agriculture in Kandahar, Afghanistan.

Table 18. Type of School and Number of Pupils, Students, and Teachers

School		Students / Pupils		Teachers	
Type	**Number**	**Sex**	**Number**	**Sex**	**Number**
Primary	220	Female	24,000	Female	425
Secondary	51	Male	161,000	Male	2,433
High School	32				
Total	**303**	**Total**	**185,000**	**Total**	**2,858**

Source: Department of Education, Kandahar Province

272. Kandahar University, which was established in 1992, has faculties of agriculture, engineering and medicine. The Faculty of Agriculture has departments of Agronomy, Soil Science, Horticulture, Forestry, and Biology.

273. In the project area only 2% men and 1% women hold a post-secondary degree. The majority of the population, 32% have no formal education, out of which 21% are women, followed by 44% that have attended primary school, out of which 19% are women. And 21% have secondary education, which include 6% women only. None of the persons hold a professional diploma or a master's degree. 42% of men are educated while only 26% women are educated. In Kandahar Province, the girls continue to be deprived of education due to customs and terrorist threats in rural areas. Kandahar is one of the provinces where the lowest number of girls graduate annually. Women, particularly girls, are concerned about their future and say that most of their families are not ready to let their daughters attend schools after primary education due to customs and demand for household work. Most of the girls only attend school up to lower grades. The main challenge in the people's view that the fathers and brothers do not allow girls to go outside the houses.

Table 19. Educational Levels of Household Members

	Never Attended School			Primary (1-5)			Secondary (6- 10)			Graduate		
	M	**F**	**T**	**M**	**F**	**T**	**M**	**F**	**T**	**M**	**F**	**T**
% of Total	11%	21%	**32%**	25%	19%	**44%**	15%	6%	**21%**	2%	1%	**3%**

Source: TRTA Consultants, 2019

5. Health

274. Only 39% of the population in Kandahar Province has access to health facilities. Only 6% of the female population has skilled birth attendance coverage. 37% of the population has access to safe drinking water. The table below shows trend and history of health facilities' establishment in Kandahar.

Table 20. Health Establishments in Kandahar Province

Type	2004	2005	2006	2007	2008	2009	2010	2011	2012
Regional hospital	1	1	1	1	1	1	1	1	1
Provincial hospital	0	0	0	0	0	0	0	0	0
District hospital	5	2	2	1	1	1	1	1	1
Comprehensive health center	15	19	18	17	16	17	17	24	24
Basic health center	19	22	21	16	15	16	18	21	21
Sub-health center	0	0	0	0	0	2	2	2	2
Mobile health center	0	0	0	0	0	2	3	2	3

Source: MoPH HMIS Department, Situational Analysis of Provincial Health Services.
Mhttp://moph.gov.af/Content/files/HMIS%20Provincial%20Profile%201391%20(English%20Version).pdf

275. The most common diseases faced by the population includes diarrhea, high blood pressure, cardiovascular disease, tuberculosis, malaria, typhoid fever, cholera, hepatitis A and E, respiratory infections, influenza and pneumonia. In children, diarrhea is the most common disease, followed by measles, typhoid, and polio. Polio is the leading cause of disability among those under 15 years old. About 4% of households have members that are disabled either due to polio, attacks, or accidents. Access to health services is difficult for the households residing in rural areas, on average, it involves travel of more than 10 km to reach to a dispensary or medical center.

6. Agriculture, Livestock and Fishery

276. There are two main types of agriculture in the Project area: field crops and orchards. The main cash crop for farmers in Kandahar are wheat, maize, corn, and barley; and in the rain fed areas melon and watermelon. Most orchards grow pomegranates, grapes, apricots, palms, figs, and peaches. The area under orchards was severely reduced during the drought and when trees were cut for firewood. War also destroyed some orchards, especially in Panjwayi district. The main international commercial crops are grapes, (Mewand, Panjwai and Zhari districts yield 60% of the total grapes produced in Afghanistan), pomegranates, and almonds. There are different varieties of grapes available which are being further processed (dried) through local and traditional mechanisms of (kishmish khana) to raisins (kishmish), and being traded. The fresh food trade is mainly between Kandahar and Pakistan, with some being sold to India and UAE as well.

277. The production of vegetables includes potatoes, onions, tomatoes, okra, leek, eggplant, squash, pepper, and cucumber, among others. Industrial crops include tobacco, cotton, sesame, and sugar extracts.

278. Before 1992, or the start of the civil war, there were 31 agricultural and one livestock cooperative in Kandahar Province. These cooperatives were getting assistance from the government, NGOs, and international organizations. 17 cooperatives have been established in 2002 / 2003 with 2,300 members.[39]

279. Fish caught in the dam are an additional source of income and food.[40] The following fish species are caught using fishing nets: Sheer mahi *(Clupisoma Naziri),* Common carp *(Cyprinus carpio)* and Mola Carplet *(Amblypharyngodon mola).*

7. Monthly Income and Economic Status

280. The average monthly income of all households is AF 32,075 ($414). The average income of well-off households is AF 48,000 ($620), the middle-income households have an average income of AF 30,800 ($398), while the average income of poor households is AF 17,300 ($223). The national poverty line is AF 2,064 per person per month, around $1 a day in current exchange rate terms which includes 2,100 kilocalories per person per day as well as necessary non-food expenditures on housing, clothing, education and transportation. The international extreme poverty line is $1.90 per day defined by the World Bank in October 2015. According to the national poverty line, only poor households come under the poverty line while according to the international poverty line, the middle-income group also falls under the poverty line (earn $1.8/person/day),

[39] Directorate of cooperatives. *Department of Agriculture and animal husbandry of Kandahar.*
[40] Verbal communication, ASBA Kandahar

while the well-off group is only $0.8/person/day above the international poverty line. The average income of the households is under the international poverty line ($1.84/person/day).

Table 21. Average Income of Households

Income Groups	Poor	Middle-Income	Well-Off
Average Monthly Income (AF)	17300	30800	48,000
Average Monthly Income ($)	223	398	620

Source: TRTA Consultants, 2019

281. A breakdown of the monthly expenses of the families reflect that the major share of income of households is spent on food, attributing to 40% of their income. For the poor households, the majority of their income is spent on food and social and religious festival and attributes to 3% of their income. The well-off households spend about 7% of their monthly income on family functions, religious festivals and tourism.

282. The surveyed population of working men consists of numerous sources of livelihoods. The majority of males (54%) are involved in agriculture and livestock rearing, while 13% are either involved in trade or run their businesses. 8% work as daily wage laborers, either in construction industry or agriculture. 3% of males render their services to the Afghan government, followed by micro businesses, working for private sector industries, and running micro business enterprises. 5% of males are reported as unemployed. A very small portion are employed in other occupations in the project area including in poultry, handicrafts, domestic workers, foreign employment, pensioners, owning small industries, and workers in the local industry.

Table 22. Occupational Status (Males)

Type of Employment	% of total
Farming plus livestock	54%
Trade/business	13%
Daily wage laborer	8%
Livestock and agriculture labor	5%
Gov't Service	3%
Micro businesses	3%
Business worker	2%
Professional-Private Job	2%
Activity that is not allowed by law	1%
Domestic Worker	1%
Handicrafts	1%
Poultry keeping	0.5%
Pensioner	0.5%
Own small Industry	0.5%
Foreign Employment	0.5%
Unemployed	5%
Total	**100%**

Source: TRTA Consultants, 2019

283. The majority of women (54%) are involved in agriculture that includes their involvement in their own farms, horticulture value chain, cattle rearing and poultry at the household level; 8% of women also work as seasonal daily wage laborers in the agricultural sector particularly in agriculture value chain, 8% work in the handicrafts sector, 3% work in stitching, followed by government and private sectors service particularly in rendering social services i.e. teaching, health workers etc. However, 21% of women are involved in unpaid household work only.

Table 23. Occupational Status (Females)

Type of Employment	% of total
Farming, livestock rearing and poultry	54%
Daily wage seasonal agriculture worker	8%
Handicrafts	8%
Stitching, tailoring	3%
Business worker	2%
Government Service	2%
Professional-Private	1%
Business owner	1%
Unpaid domestic work	21%
Total	**100%**

Source: TRTA Consultants, 2019

VI. ANTICIPATED PROJECT IMPACTS AND MITIGATION MEASURES

A. Methodology

Scoping

284. Before formally initiating the study, the environmental team carried out internal scoping of the assignment, in consultation with the design team. The scoping aimed to avoid duplication of effort by using the information and knowledge base already available within the design consortium. The scoping exercise included the following steps:

285. **Desk review**. The desk review compiled and reviewed all the known secondary and primary references. Data obtained from these sources was utilized extensively to establish data gaps in the preparation of this IEE report and for the purpose of preliminary design. Secondary research utilized the considerable body of work which has been produced by agencies regarding previous proposals to upgrade the Dahla Dam, including the now defunct Canadian CIDA investigations and partial implementation / rehabilitation of both the Dahla Dam and irrigation network, and the UK Department for International Development (DFID) funded Helmand River Basin Master Plan, a three-year study which specifically included the Arghandab River as a tributary. Simultaneously, the environmental team was drawing up the need to validate this information during its field surveys.

286. **Collaboration session**. The team held meetings and discussions with design team colleagues. This meeting was geared towards introducing all team members with each other and bringing uniformity of expectations among all.

287. **Reconnaissance surveys**. A field visit to Kandahar was conducted during 9-13 July 2018. The main irrigation canal, upper division weir for Output 2 and, saddle dams, spillway, main dam, proposed contractor's yard, and the reservoir for Output 1 were visited. Irrigation and farmer surveys were completed between April and October 2018, covering technical details and issues raised by the 120 community irrigation systems with combined water rights on 115,000 ha, comprising the three irrigated farming zones in the project area: (i) AIS; (ii) downstream of the Arghandab diversion weir; and (iii) upstream of the Arghandab diversion weir. The surveys were conducted for two purposes, namely to: identify (i) the scale of the community systems (which have been in operation for over 100 years) and the size of the cultivation area; and (ii) the priority needs for infrastructure improvement works, as expressed by the community, with as primary objective to raise the efficiency of irrigation water conveyance and distribution efficiency.

288. Although brief, these activities were aimed at achieving a common understanding on various issues of the IEE study. This included observing and determining the areas covered under the Project Area of Influence (AOI) as per the ADB Environmental Safeguards Good Practice Sourcebook (Dec 2012). This AOI may span:

(i) **Primary project site and ancillary facility sites** that will be developed, operated or managed by the client or its contractors. Examples of ancillary facilities include access roads, borrow pits, spoil disposal areas, pipelines, canals, tunnels, depots and construction camps.
(ii) **Associated facilities not funded by the project** but whose existence and viability are entirely dependent on the project and whose services are essential to project operation.
(iii) **Areas and communities potentially affected by cumulative impacts** from further planned development of the project, other sources of similar impacts in the

geographical area, any existing project or condition, and other project-related developments that are realistically defined at the time the assessment is undertaken.

(iv) **Area and communities potentially affected by induced impacts** from unplanned but predictable developments or activities caused by the project, which may occur later or at a different location.

289. The sections of the assessment relate to the impacts predicted for (i) the main channel, (ii) secondary channels, (iii) tertiary channels, (iv) weirs and diversion structures.

290. **Collaborative meetings with partners and government agencies**. During the reconnaissance survey the team had very positive meetings with the key partners at the provincial level, including community representatives. These meetings were then followed up with reciprocating meetings with partners in Kabul.

291. **Drafting and identification of data gaps**. Following clarification and greater understanding which resulted from the reconnaissance survey, data gaps were established, the TOR for ARES was assembled, and the draft IEE was commenced by the consulting team.

292. A dedicated field TRTA team mission is scheduled for the summer of 2019 to conduct a part of the ARES and improve baseline data needs, specifically focused upon a more detailed environmental survey. This survey will ensure that all baseline data has been assembled and assessed to assist with the detailed design phase.

293. **Potential impacts associated with the project**. The field visits identified potential impacts associated with the project in a range of categories, including physical, biological and socio-economic (such as occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods). The methodology adopted to analyze and assess both positive and negative impacts included utilization primary and secondary research methods. Presentation of the impacts has been categorized for (i) detailed design, (ii) construction, and (iii) operation, using a risk-based approach that offers impact significance with a rating.

294. Design needs to recognize the considerable on-site challenges which have both gone before and continue. This particularly includes the critical issue of upholding high standards of management during construction, implementation and longer-term infrastructure maintenance. To be successful, this IEE emphasizes that any initiatives require strong and vigorous ownership at the local community level. The positive impacts that the proposed construction can make on the health of the downstream river system, along with improvements in quality of life need to be in clear focus and balanced against at times high-risk environment from the security perspective.

295. A section on the cumulative impacts is included and addresses impact issues which might result from the combined impacts of all project components.

296. The social impacts of the project are discussed in detail in the resettlement action plan issued as separate document and are not repeated here. Major social impacts are summarized in this section.

297. The purpose of this section is to provide the background for the proposed mitigation measures and compensatory actions presented in the EMP section, and to justify the need for the proposed monitoring activities.

298. It is clear that some project impacts can be mitigated (i. e. construction works at the irrigation structures), whereas others can be fully or partly avoided (i.e. impacts related to construction activities as dust generation and noise, turbidity). Some impacts can be predicted with reasonable certainty, whereas additional monitoring during construction and first years of operation will be needed to adequately ascertain some others.

299. Construction works are small-scale, so any negative impact is minimal. The most important impact for the project is the removal of trees which will need to be replaced by replanting and adequately maintained to re-establish.

300. Noise, dust and vibration are routine construction phase impacts. Tenders include standard construction contract environmental safeguard clauses that require bids to include site EMPs. Mitigation of dust and noise is listed in the EMP.

301. Major impacts and mitigation measures are listed and described in the EMP. A risk-based approach is given based on impact significance and magnitude. Residual impact significance after implementation of mitigation measures has been provided.

B. Impacts During Detailed Design Phase

302. **Source Protection:** Source protection is a very important issue to facilitate sustainable water quality of the reservoir in the long run, and the detailed design stage should incorporate appropriate planning for the implementation of same. Unfortunately, no Afghan law is currently available for the definition of protection zones. The European Union Water Framework Directive (EU 2000/60) requires protection zones for drinking water abstraction areas without any detailed specifications. The German Water Law (WHG § 51 and § 52) defines three water protection zones. Land use of these zones accepted under this law is site-specific and depends on the existing groundwater and soil conditions (soil cover and permeability for water endangering substances).

303. Three water protection zones can be established to protect Dahla Dam and to prevent eutrophication (pollution of the dam with dissolved nutrients): (i) zone 1 is the dam itself; (ii) zone 2 is the area where groundwater needs at least 50 days to reach the source in order to prevent bacterial contamination; and (iii) zone 3 is the whole catchment of the source. Identification of zone 2 would need an additional hydrological survey at each site. Since this survey is not feasible under the TRTA, only two zones are suggested for an initial introduction of source protection. A water protection ordinance has to be developed by competent authorities (NEPA and MEW) for the reservoir according, but not limited, to the suggestions in the table below.

Table 24. Establishment of Two Water Protection Zones at Dahla Dam

Issue	Zone 1	Zone 2
Spatial definition	Reservoir + 500 m	Whole catchment of the reservoir and Arghandab River upstream of Dahla Dam
When	Signing	Signing
Establishment of limitations	- no industry (e.g. chemical industry) - no settlement or laundry activity - no use of fertilizers and chemicals (e.g. pesticides) - no grave yards in the vicinity - no uncontrolled infiltration of human excrement - no waste dumps or waste disposal sites	Only supervised car repair shops Supervised storage of water endangering substances

Issue	Zone 1	Zone 2
Restrictions or prohibitions	- no car repair shops and no car washing No military training, no excavations in the vicinity of zone 1 No storage of water endangering substances	Settlements upstream of the source to be equipped with water tight cesspits in the long run

Source: TRTA Consultants, 2018

304. The reservoir will be used for water supply of Kandahar City and villages. Therefore, the reservoir must be protected against pollution:

(i) A medium to long-term recommendation includes the development of a water "source protection" plan which will incorporate catchment management initiatives including community education and mobilization to implement.
(ii) Human excrement of upstream settlements has to be collected in cesspits to prevent contamination of the river and the reservoir;
(iii) No washing of clothes in the river and in the reservoir;
(iv) No littering of the reservoir and the upstream river reaches with waste and hazardous substances;
(v) Installation of cesspits in the upstream villages.

305. To adequately perform their function, cesspits need to be emptied regularly and the sludge needs to be disposed of in an appropriate manner. To raise the importance of this, a public awareness campaign is needed.

306. The importance of protecting water sources cannot be emphasized enough. Consideration should be given to recruiting the involvement of *mirabs* in an overall program of water protection, and they could assist in raising violations against citizens who offend. Additionally design stage should consider the development of WUAs, which could be established under the CDC's, but will most certainly require the involvement of *mirabs*. Additional purpose of the WUA's is to ensure that potential conflicts in water supply rights can be resolved appropriately.

307. Any storage of hazardous substances and fuel adjacent water source should require permission and environmental requirements of the competent authorities (e.g. NEPA) within the catchment of the reservoir. A designated fail-safe hazardous materials storage area would be ideal, but alternatively a dedicated safe-area which is a minimum of 200 m from water sources would be appropriate, with greater distance if the slope from storage area to water is over 10 degrees. The storage of these substances needs to be supervised by competent authorities. Hazardous substances and fuel have to be stored in double walled tanks or in collection trays. Gas stations have to be equipped with sealed surface, sand trap and fuel separators. Annual technical supervision of storage tanks by an authorized company is mandatory.

308. Eutrophication and algal bloom are not expected if water protection measures are implemented.

309. **Historical and Cultural Artefacts.** Impacts on archaeological monuments and historical / cultural sites will be mitigated by inspection of the project area. Archaeological experts will identify potential cultural sites before construction activities will start. Potential cultural sites will be preserved and moved if necessary.

310. **Upstream Catchment Stabilization**. Assessment through Google Earth and verified by flying over the Hindu Kush between Kabul and Kandahar indicates that the landscape supports limited grass and shrub plant material. Although it is unlikely that much can be done to stabilize

the soil, it is suggested that at least a preliminary overview is undertaken in order to (i) define if particular areas are contributing large volumes of sediment to the Arghandab system, and (ii) assess if stabilization is feasible in some of these areas at least on a pilot basis. As stated, security can present a serious problem in much of the upper catchment, and this will need to be taken into account in defining whether such a component is feasible or not.[41] Detailed design should therefore highlight the need for appropriate survey work to be carried out to assess viability of longer-term catchment stabilization programs, and strategically identify where those programs should be best focused.

311. **Subsequent Flow Beyond the Dam Wall**. With an average annual rainfall of just over 170 mm, agricultural activity in the Kandahar region is totally dependent upon supplementary irrigation. While anticipated climate change impacts upon rainfall, combined with both variance in occurrence of snow and the speed of meltdown, will contribute to uncertainty regarding flows into the dam, the foreseeable impact of the construction is positive for downstream livelihoods immediately beyond the dam wall. Agronomic strategies to adapt to changing dynamics will be of value. The raising of the dam wall will increase the opportunity to manage with greater efficiency the dynamic nature of the surface water flows downstream of the dam wall.

312. **Environmental Flows**. Of important consideration to the detailed design stage of Output 1 is the resolution of environmental flows to the river. As previously noted, the key indicator of the sustainability of those flows is the status of the Sistan Basin wetlands and subsequent flows into Iran. The Arghandab River contributes approximately 17% to the flows of the Helmand River, which in an ephemeral and arid-zone system is an important quotient. TRTA's Multi-sector Water Allocation Options Study sets out to define water releases from the dam for various uses and highlights that further study needs to be completed as part of the detailed design in order to determine appropriate environmental flows.

313. **Flows During Construction.** Detailed design stage will identify ways in which diversion canals can be used to maintain downstream water supply, irrigation and agriculture during construction with consideration given to livelihoods as well as flora and fauna.

314. Quarry sites / borrow pits will be identified and agreed with NEPA and verified with community leaders during the design phase to prevent uncontrolled sourcing of construction material. Soil/spoil disposal sites will be identified in advance and agreed with NEPA to mitigate any environmental impacts.

315. Standard construction environmental safeguard clauses will be part of the tender documents to avoid / mitigate construction related impacts (e.g. dust prevention, noise prevention). Transportation routes for construction material and heavy machinery and parking areas for heavy machinery will be identified by the contractor before construction phase in order to avoid / mitigate environmental and social impacts. These routes have to be agreed with the local community, police and the local government in advance.

316. Detailed design shall identify suitable locations for construction work camps, stockpile areas, storage areas, and disposal areas and other facilities near to the project locations. However, if it is deemed necessary to locate elsewhere, sites to be considered shall not promote social instability and result in destruction of property, vegetation, irrigation, and water bodies. None of these temporary facilities shall be located within 500 m of residential areas and rivers. Though the contractor will be free to decide locations, a list of feasible locations shall be included

[41] If however, a peace agreement is reached during the project period, more detailed assessment could be considered.

in the design specifications and plan drawings for approval by the Project Management Unit. These potential locations will have been discussed with representatives of community groups.

317. Working hours during the construction phase have to be agreed with the police and the local government in advance, especially for residential areas. In general, construction works shall be implemented during the day (e.g. 7.00 – 19.00 hours) to avoid unnecessary disturbances. Working during day-time is recommended due to security and road safety reasons but all times are to be verified with local communities.

318. Non-objection-certificate (NOC) will be applied at NEPA before construction activities to avoid and mitigate any additional foreseen environmental impacts in advance. NEPA queries and comments will be reviewed and included in a revised EMP. EMP and IEE/EIA will be part of the tender documents and part the contract.

319. The EMP and the subsequent Site-Specific EMP (SSEMP) developed by contractor aims to prevent and / or mitigate any environmental impacts as listed in described in the IEE/EIA report and the EMP. It becomes the contractual responsibility of the contractor to implement and monitor the EMP through the SSEMP. Incorporated into the SSEMP, the contractor will assume responsibility for all occupational health and safety issues on the site. A detailed waste management plan will be a component of the SSEMP, and specifically focused on avoiding uncontrolled dumping of all construction waste, and domestic waste associated with construction camps.

320. **Risk-Based Management Approach**. The risks associated with the detailed design stage are presented in the table below.

Table 25. Summary of Risk Management for Detailed Design and Pre-Construction Phase

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Protecting the source			XX	Identification of three water protection zones dedicated to maintaining water quality across the catchment.	Low
River flow compromised			XX	Establishment and refinement of environmental flow's regime.	Low
Contractor does not comply with EMP, including resource management, site hygiene, dust and noise generation turbidity in water			XXX	Careful development and implementation of the SSEMP by the contractor with appropriate budget and staffing resources.	Low
Historic monuments	X			Survey before construction including quarry pits.	Low
Quarry borrow pits		XX		Survey and agree before contract.	Low
Necessary resettlement of people			XX	Plan for compensation through implementation of LARP.	Low

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Adequate water supply for downstream users		XX		Ongoing water availability assessments.	Low
Breaching of canals due to natural hazards			X	EWS for all water users installed as part of output 2.	Med
Impediment to movement of people and animals		XX		Appropriate bridges for animals, people and small vehicles constructed.	Low
Social problems by the hiring of contracted people from outside			XX	Contract documentation will highlight to maximize the use of local labor.	Low

LARP = land acquisition and resettlement plan
Source: TRTA Consultants, 2019

321. The NOC should provide the basis of a Residual Impact Statement whereby the design integrity, safety measures incorporated, the strength of liaison with all partners and the conditions and expectations placed upon contractors can be shared with all.

C. Impacts During Construction Phase

1. Introduction

322. On-site management of environmental impacts during construction require a comprehensive approach to be successful. Much of the day-to-day management needs to be the responsibility of the contractor, who is responsible for developing, implementing and closely monitoring the performance of a Site-Specific Environmental Management Plan (SSEMP). The contractor's SSEMP manifests as both a site management tool and a legal document. The implementation of the SSEMP will be managed by the contractor's dedicated Environmental Officer.

323. Important potential impacts requiring systematic management, and which are individually itemized in the EMP, range (chronologically) from the siting, detailing and maintenance of the construction camp including access roads, storage of materials including fuels, tools and machinery, management of quarrying and associated works excavation, transportation and stewardship of all goods across the footprint of the site, impacts from excavation including protocols for managing any archaeological and cultural artefact, loss of vegetation and incorporation of subsequent re-vegetation plans. Additional important considerations include the mitigation of noise, dust, effects to air quality, occupational health and safety, disturbance to water quality, aquatic and bird life.

324. **Socio-economic Impacts and Employment Opportunities.** Overall, the socio-economic impact is expected to be positive. Wherever possible, priority will be given to employment of local people.

2. Impacts on the Physical Environment

325. Potential impact will be loss of landscape and viewshed value due to tree removal on the public right of way of the canals at construction sites. Tree plantation of native species at alternate

sites will be identified in consultation with local communities. Planting will be undertaken by the civil works contractor and will be a contract requirement.

a. Impacts and Mitigation Measures on Groundwater and Water Quality

326. **Impacts.** Impact on the water quality is likely during the construction phase. Turbidity will increase during construction works at the canals. This impact is expected during the whole construction stage. Potential impact arises from implementation and maintenance of the contractor`s yard, transport, maintenance of vehicles and handling and storage of lubricants and fuel. Runoff from stockpiled materials and chemicals from fuels and lubricants during construction works can contaminate surface water quality of adjacent bodies (Arghandab River, reservoir, irrigation channels). Project area receives rainfall, although mostly confined during the winter and spring months.

327. Dust will occur during the construction phase at the canals during the short-term. It will not impact the water quality of the canals.

328.

329. **Mitigation measures:** The contractor will select and manage disposal sites to avoid adverse impacts. The required provisions for contractor's yard are described and listed in the EMP. These are usual mitigation measures to be applied at any contractor's yard.

330. There is a need to prevent construction materials like soil, rocks, stones, riprap and gravel from falling into the water to prevent increased turbidity. Geotextile bags will be applied in the canals and construction works will be carried out during the dry season as the water level of the canals will be low at that time.

331. It is important that runoff from the construction areas, which may contain silt and chemical traces do not enter these water bodies. Impact will be temporary but needs to be mitigated.

332. Construction contractor will be required to:

(i) All earthworks be conducted during the dry season (summer, autumn) to prevent the problem of soil runoff during winter months;
(ii) Implement stockpiling of earth fill in the dry season and cover by tarpaulins;
(iii) Prioritize reuse of excess spoils and materials in the construction works. If spoils will be disposed, only designated disposal areas shall be used;
(iv) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
(v) Instigate fail-safe compound for potentially hazardous materials, or place storage areas for fuels and lubricants away from any drainage leading to water bodies;
(vi) Store fuel, construction chemicals etc., on an impervious floor, double walled tanks, also avoid spillage by careful handling;
(vii) Use collecting trays under containers / drums containing hazardous material;
(viii) Dispose any wastes generated by construction activities in designated sites; and
(ix) Conduct surface quality inspection according to the EMP.

b. Impacts on Topography, Soil and Geology

333. **Impacts**. There is no need to build construction roads along the canals for rehabilitation. Existing roads and field roads will be used for civil works, only small machinery will be used at secondary and tertiary canals. Landscape alteration from borrow pits and redundant canals left

unfilled post-construction, canal sedimentation, and water pollution from improperly managed excavation spoil can be expected. Table 4 in above section provide a summary of lining and estimates for the canals. The estimated quantities are:

(i) Excavation: 303,206 m^3;
(ii) Backfilling: 208,950 m^3;
(iii) Stone and boulder: 164,226 m^3;
(iv) De-siltation: 104,393 m^3.

334. These figures provide only a guide, and the contractor will be required to adequately assess requirements to make-good all canals and borrow pits as per the EMP.

335. **Mitigation measures**. It is important that the contractor ensure no contamination of adjacent arable soil during the rehabilitation works on canals. Potential contaminants could include cement, slurry, oil leakages from construction equipment and machinery etc. Appropriate precautionary measures should be taken to achieve this and documented in the SSEMP.

336. Contract provisions will state that the contractor must seek prior approval from the Project Management Unit (PMU) and NEPA on the selection of quarry sites. The contractor will fill in pits and redundant canals when no longer needed as a mitigation measure and cover with top soil. This will be a contract requirement.

337. The contractor will select and manage spoil disposal sites to avoid adverse impacts. Prior approval from the PMU on the selection of spoil sites will be undertaken. This will be a contract requirement. The PMU will ensure such spoil sites have been selected with community agreement. Spoil shall be used for filling as much as possible to minimize soil disposal, however it should not be used as a top soil. Removal of existing 300 mm of top soil to reveal a base for spoil and then replacement of top soil is recommended.

c. Air Quality

338. **Impacts**. The activities that could cause impact on ambient air quality are (i) dust generation from construction activity and (ii) air emission from construction equipment (like excavators, cranes, etc.) and material and waste transport vehicles.

339. There is a lot of potential for the creation of dust from the excavation of dry soil and its storage, and levelling on the ground. As stated earlier, the construction activity does not involve significant quantities of earth work. Various types of equipment and vehicles would be required for the construction activity. The exhaust emissions from these may degrade the ambient air quality. Considering the scale of work and use of equipment, the impact will not be significant.

340. Construction work, especially from earthwork activities, coupled with dry and windy working conditions, material and debris transport, and works along the public roads carrying significant traffic, have high potential to generate dust. Also, emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality. Anticipated impacts include dust and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons. Dust generation will be significant during construction. Increase in dust/ particulate matter in ambient air is detrimental, and may have adverse impacts on health and environment.

341. **Mitigation measures**. Action will be needed to reduce impacts on air quality at construction sites, by controlling dust. The contractor should therefore be required to:

(i) Barricade the construction area in the vicinity of settlements;
(ii) Initiate site clearance and excavation work only after barricading of the site is done;
(iii) Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes etc.), to the barricaded area;
(iv) Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area;
(v) Implement water spray during construction on roads and the construction site;
(vi) Cover or damp down by water spray on the excavated mounds of soil to control dust generation in settled areas;
(vii) Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process in settled areas;
(viii) Bring the material (aggregate and sand) when required;
(ix) Ensure speedy completion of work and proper site clearance after completion;
(x) Damp down unsealed/bad condition roads to avoid dust generation while using for transport of waste/material;
(xi) Use tarpaulins to cover loose material that is transported to and from the site by truck;
(xii) Control dust generation while unloading the loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside a barricaded area;
(xiii) Clean wheels and undercarriage of haul trucks prior to leaving construction site;
(xiv) Ensure that all equipment and vehicles used for construction activity are in good condition and are well maintained;
(xv) Ensure that all equipment and vehicles conform to emission and noise norms.

d. Impacts on Noise - Vibration

342. **Impacts**. Most of the works are to be implemented along the existing irrigation canals. Some shops (167) and houses (4) will need to be resettled. An estimated 322 affected persons are living on private land across the road on the other side of the canal embankment. These persons may be affected by noise during construction.

343. Increase in noise level may be caused by breaking of bitumen, operation of construction equipment like concrete mixers, and the transportation of equipment, materials, and people. Vibration generated from construction activity, for instance from the use of pneumatic drills, will have impact on nearby houses/buildings. Such impacts are expected to be short-term.

344. **Mitigations measures**. The construction contractor will be required to:

(i) Put in place a noise monitoring system which can identify any noise above acceptable standards. This will include real-time noise monitoring which ensures that no noise above 85 decibels is left unmanaged.[42] Contractor is to be responsible for to mitigate any noise levels above this level.
(ii) Plan activities in consultation with PMU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
(iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptor;
(iv) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;

[42] European Standards: https://osha.europa.eu/en/legislation/directives/82

(v) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
(vi) Consult local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

e. Impacts on Soil

345. **Impacts**. Output 2 will generate considerable movement of soil including from the de-siltation processes as well as site structural works. If not managed correctly, soil can be vulnerable to wind, sporadic rain activity etc.

346. **Mitigation measures**. Soil erosion will be prevented and mitigated by the following measures:

(i) Covering of stockpiles to prevent wind erosion;
(ii) Proper storage of top soil and reuse for landscaping;
(iii) Planting / landscaping of slopes;
(iv) fixing of slopes using concrete, geotextile;

f. Comprehensive Management of Waste

347. Contractor will be responsible for implementation of a comprehensive solid waste management plan. This will ensure that any potential contamination caused from on-site waste including for example, human waste, concrete slurry, oils and masonry waste being mixed with soils, water and vegetation will be identified and mitigated against.

3. Impacts on the Biological Environment

a. Impacts on Fauna and Flora

348. Construction activity is localized at existing canals. Widening of canals is not required. Felling of trees is necessary in some places to get access to canals for construction. It is estimated that about 1,832 timber trees and 3,855 productive trees will be removed. Trees shall be replanted at a 1:5 ratio.

349. No impact on fauna is expected. There may be indirect impacts due to tree removal. Birds will leave the construction site and search for existing habitats in the close vicinity. Construction activities shall not be implemented during the breeding season in spring.

4. Impacts on the Socio-Cultural Environment

350. Construction works will cause temporary disruption of irrigation water supplies at in-canal construction sites, or blockage of vehicle, pedestrian, and livestock movement. This impact will be managed by the civil works contractor who will provide temporary irrigation channels and roads/paths. This will be a contract requirement.

351. While not envisaged, there could be crop damage from temporary construction roads. The contractor will minimize/avoid damage through community consultation re timing and placement. If significant damage is expected, then the land acquisition and resettlement plan (LARP) will be updated and compensation to affected farmers provided.

352. No new irrigation channels will be built so no communities will be split. There will be a positive impact on work availability due to the need for temporary construction staff from the local area during the construction period. Temporary water supply distribution problems will be negated through temporary channels. Health and safety aspects of construction will be mitigated by the construction contractors. There will be no impact on any public infrastructure such as transmission lines.

353. Community and occupational health and safety and socio-economic impacts (including security risk evaluation) during construction phase and mitigation measures are listed in the EMP. Mitigation measures are routine construction housekeeping measures (e.g. provision of health and safety equipment to workers, provision of walk ways during construction, fencing of construction areas, parking of construction vehicles in designated parking areas only).

354. The total land acquisition required for the project is 35,940 m^2. This irrigated land owned by two sizeable farmers is required for the construction of the 600 m Babawali wasteway.

355. The project will also affect a total of 495 entities which includes 167 businesses, 4 homes, and 2 greenhouses occupying state land; and 322 affected persons living on private land across the road on the other side of the canal embankment, who will lose trees planted on the state-owned embankment. A mosque and a small cluster of graves, both on state land, are also impacted. A summary of impacts is provided in Table 26.

Table 26. Summary Impacts on Land Acquisition and Resettlement

Impacts	Unit	Quantity
Agricultural Land (irrigated)	m^2	35,940
Private Structures (homes and shops)	m^2	104,731
Community Structure (1 mosque)	m^2	40
Timber Trees	no.	1,832
Productive Fruit Trees	no.	3,855
Households losing > 10% irrigated land	no.	2
Households losing residential structure, relocating	no.	4
Households losing commercial structures, suffering business loss, relocating	no.	167
Vulnerable Households	no.	14

Source: TRTA Consultants, 2019

5. Summary

356. The risks associated with the construction stage are presented in the table below.

Table 27. Summary of Risk Management for Construction Phase

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Contractors Camp hygiene			XX	SSEMP and appropriate plans in place.	Low
Rehabilitation of irrigation canals		XX		EMP guidelines to follow; silt traps, careful recycling, tree planting.	Low
Water supply Interruption		XX		Establish temporary channels.	Low

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Water supply conflicts			XX	Recommended establishment of WUA's with *Mirabs.*	Low
Dislocation or involuntary resettlement of people			XX	Proper compensation through implementation of LARP.	Low
Move excavated spoil; dust and air quality		XX		Wet down, cover, clean vehicles, efficient operation.	Low
Removal of trees		XX		Maintain and replant 1:5.	Low
Disturbances to people			XX	Consult with community, cover all material when moving.	Low
Noise, vehicle movement		XX		Consult with community, agree on times.	Low
No employment of local people			XX	High preference for locals to be employed.	Low
Health and safety issues due to potential physical, chemical and biological hazards			XX	Compliance will be ensured during construction and operation of Project by Executing Agency following Government / EMP standards.	Low
Damage to cultural artefact		XX		Follow protocols; stop work, initiate survey of site.	Low
Water contamination			XX	Stewardship through SSEMP by contractor.	Low
Loss of ecological and aesthetic services		XX		Remedial works implemented.	Low
Impact on birdlife	XX			Post completion make-good and site clean-up.	Low
Impact on cropping			XX	Consultation and compensation.	Low

LARP = land acquisition and resettlement plan
Source: TRTA Consultants, 2019

D. Impacts During Operation Phase

1. Impacts on the Physical Environment

a. Impacts on Topography, Soil and Geology

357. Improvement of the irrigation system will increase the green belt on both sides of the river and will have a positive effect on the landscape.

358. The flat topography, and the resulting poor natural surface and subsurface drainage caused soil salinity problems. Application of modern drip technology and capacity building will reduce this risk. Application of modern irrigation technologies will reduce elimination / washing out of nutrients in the upstream and midstream area and will reduce salinization in the downstream area.

359. Soil salinity problems will be managed as follows:

(i) Reduction of irrigation through advanced farming technology in the upstream and midstream area will cause a decline of the ground water table. Currently, this area is over-irrigated and salination occurs;
(ii) Compaction of the soils will be avoided to improve drainage of water;
(iii) Deep rooted crops will be used to remove excess water;
(iv) Salt tolerant crops will be planted;
(v) Deep tillage will be reduced to avoid bringing up salts from deeper soil horizons;
(vi) Seepage will be reduced after rehabilitation of adjacent canals.

360. Littering of canals and agricultural land with solid waste is very common. People are washing clothes in the canals using washing detergents. Water of canals and agricultural land are contaminated with sewage from Kandahar City and from adjacent villages. Water-borne diseases are widespread. The introduction of a centralized waste collecting system is required. Waste has to be dumped on a licensed landfill. Construction of a sewage system and treatment of the sewage in a wastewater treatment plant will be required in the near future but are however not part of this TRTA.

361. Application of modern irrigation technology will reduce soil erosion, soil degradation including washing out of nutrients and ions. Salinization of soil will decrease.

362. Canal bank protection will have a positive impact on terrestrial ecology by preventing soil and vegetation from being washed away. Flooding will also be reduced from watershed interventions, as well as the improvement of intakes. Improved water availability will reduce the impact of droughts.

363. Alternative farming technologies will mitigate soil erosion and soil degradation. Direct drilling as a tool for small farmers instead of disc ploughing will reduce soil erosion (wind erosion and water erosion). The direct drilling machine is very simple in providing minimum disturbance to the soil yet breaking through the pan and making fracture lines in the soil for moisture infiltration and improved plant root development. This farming technique helps to improve the porosity and enable the microorganisms to act more efficiently. In contrast, traditional disc ploughing causes impeded soil drainage leading to poor crop growth, soil erosion and degeneration of soil structure.[43]

364. Where farmers are given the opportunity to increase inputs such as water, it follows that they will be confident to invest in additional inputs to improve productivity. This would include the increased application of fertilizer and pesticides and it is important for sustainability to be maintained that a regime of correct application rates be promoted. Over-use of all inputs can have detrimental effects upon the farming system. Therefore, Extension support by DAIL will aim to promote improved management of all inputs based upon empirical evidence.

b. Impact on Water Resources

365. Hydrologic changes through managed irrigation flows are expected to be positive. Erosion, and sedimentation will decrease compared to the existing situation. There will be improved availability of water for environmental flows. Impacts on groundwater is expected to be dynamic due to reduced water velocity on hillsides which will increase water infiltration.

366. Due to the historical trend of general uncertainty in water availability, farmers tend to take as much water as they can during their turn, more likely than not exceeding actual needs as long

[43] 19th International Farm Management Congress, direct drillings as a tool in conservation agriculture for small farmers July 2013. www.ifmaonline.org - Congress Proceedings

as water is available. This will result in a rise in the groundwater table and, particularly in low areas, may result in salt accumulation in the soil. Introduction of drip irrigation and associated capacity building will reduce this risk.

367. Water will also be required for cooling engines in tractors and diesel pumps, for refrigeration through chilled water jackets on ice machines, for diluting agro-chemicals used in pest and disease control, and in maintaining buildings, making bricks, cleaning and sanitizing buildings for crop or input sorting and storage. No impact on groundwater is expected from these activities.

368. If sufficient water is available for field crops at the right time, and if it is of good quality and clarity, then it can be expected that the same water resource will be used in many other land-based functions. Some will be diverted for human direct use in place of shallow wells in the family compound. Training in water sanitization will also, therefore, be required as part of a water use extension program for farmers. Impact on groundwater is not expected.

369. Efficiency or productivity of water use will be improved due to investments, e.g. modern irrigation technologies to deliver water to the plant roots. These technologies will increase the water availability.

370. Alternative practices from traditional inefficient flood irrigation to improved land levelling, sprinkler, drip, and other piped water delivery systems will increase the efficiency of water used for irrigation and reduce the consumption of ground water. Losses through evaporation will be reduced.

371. A mobile phone-based application has been suggested that can be used by farmers and *mirabs,* linked to a rural land use database, where farmers could request irrigation water and receive advice on irrigation rates, technologies, and water availability for their crops. Introduction of this information technology will increase the water efficiency and reduce uncontrolled and less effective ground water consumption.

372. Rehabilitation of the irrigation system will reduce water losses from canals and the whole irrigation infrastructure. Drip irrigation will be introduced to reduce water losses and evaporation, soil erosion and sedimentation in the canals.

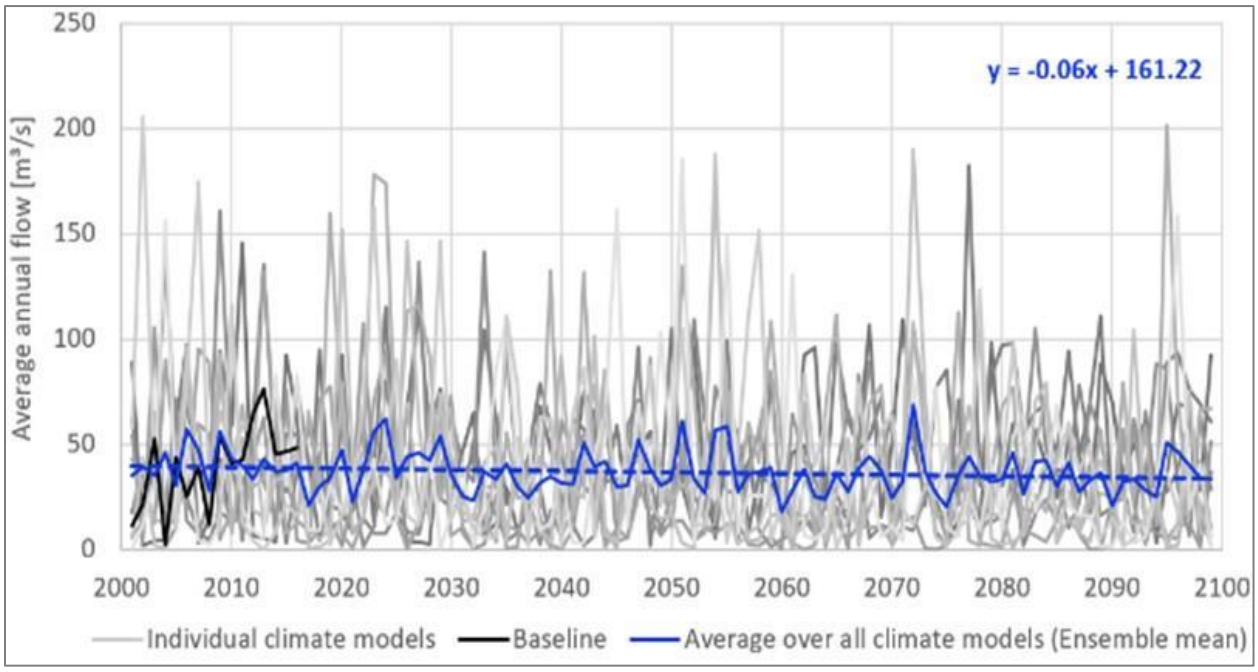
a. Impact on Air Quality and Noise

373. A positive impact on air quality and noise reduction is expected during operation of the improved irrigation system due to enlargement of the green belts including irrigated land on both sides of the river.

b. Impacts from Climate Change

374. The trends of the hydrological study show slightly decreasing average and minimum inflows to the reservoir and an increase in extreme inflow events. A change in the erosive force of the discharge events is expected.

Figure 21. Average Annual Flow into the Arghandab Reservoir



Source: TRTA Hydrological study, 2018

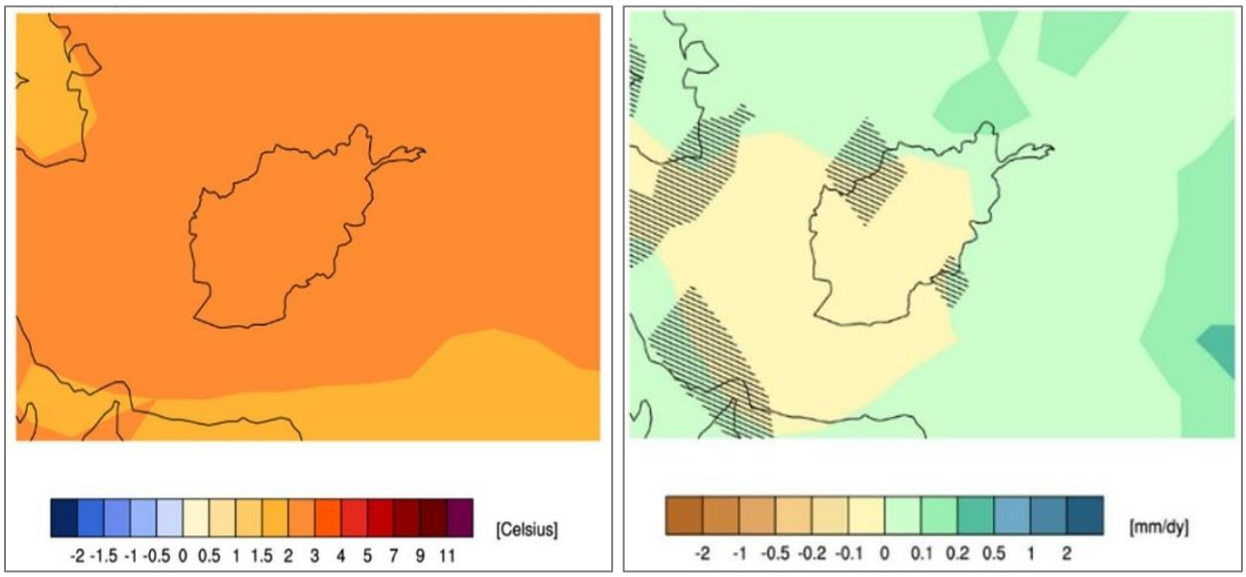
375. The occurrence of unexpected and changing weather patterns including heavy rain events and the incidence of drought can be expected to increase in future. For example, at the beginning of March 2019 heavy rain, wind and flash floods occurred in Kandahar District. All rivers and canals were full. Many houses were destroyed in Shah Wali Kot, Arghandab, Zheray, Panjwayi, and Dand districts including Kandahar City. Floods increased water level in Dahla Dam around 2.31 m. Currently there is only around a 4 m gap between level of existing water level and spillway and the dam overflowed.

376. As a result of this weather event, the UN Office for the Coordination of Humanitarian Affairs (OCHA) (No 6) reported: "4,698 households (more than 33,000 people) have been identified as requiring humanitarian assistance as a result of flooding". Across eight provinces and Kandahar City, 1,855 houses have been destroyed and 2,841 houses have been partially damaged by flooding. There was further rain on 10 March, although no new flooding incidents have been reported.

Figure 22. Heavy Rain and Flood in Arghandab River Valley below the Dam, March 2019

Source: TRTA Consultants, 2019

Figure 23. Mean Temperature and Precipitation Forecast at Dahla Dam until Year 2100



Source: KNMI Explorer 2018. https://climexp.knmi.nl/start.cgi

377. The mean annual temperature has increased at a rate of +0.5°C per decade over the last 30 years. Future projections from global climate models suggest a strong increase in temperature. For the end of the century, a warming in the range of +2.1 to +5.6°C (compared to the reference period from 1971 to 2000) linked to an increase in evaporation is likely. Furthermore, a strong increase in the duration of heat waves as well as a medium-strong reduction in the length of cold spells is projected. As a result, the period over which meltdown occurs is becoming shorter, a phenomenon which will have a great influence upon river dynamics.

378. For the annual total rainfall amounts, no substantial changes were observed over the last 30 years. Climate models project no clear trends for future annual total precipitation, however globally it is recognized that an increase in uncharacteristic weather events will have greater incidence. For the end of the century, a change in annual total precipitation in the range of -12%

to +8% (compared to the reference period from 1971 to 2000) is likely. Furthermore, projections suggest a tendency towards more intense and considerably more frequent heavy rainfall events as well as a slight increase in the duration of dry spells.

379. For the climatic water balance (precipitation and evaporation), a tendency towards a decrease is projected for the future in Afghanistan. Regarding annual mean wind speed, global climate model projections show a slight tendency towards a decrease, whereas for solar irradiance the projections suggest no clear trend over the 21st Century. However, the skill of the global models in reproducing mean wind speed and solar irradiance is limited.[44]

380. The following figures show climate graphs of KNMI climate explorer for Afghanistan. Changes in mean temperature and precipitation are shown. The climate projection is based on CMIP5 data ensemble. The periods during 1934–2018 and during 2018–2100 were compared (84 years into the past and 82 years into the future from 2018).

381. The following scenario is analyzed: RCP4.5 (Representative Concentration Pathway 4.5): quicker action to limit greenhouse emissions with emissions peaking in 2040 and strong decline until 2080.

382. Under the RCP4.5 scenario, a temperature increases of up to 2°C is expected for Afghanistan until the end of the 21st Century, linked to a slight decrease in precipitation.

383. It cannot be excluded that climate change, especially reduction of annual rainfall and temperature rise, will reduce biodiversity and initiate desertification in Afghanistan and in the project area. Worldwide reduction of greenhouse gas emissions could mitigate this scenario.

384. Afghanistan generates 44.7% of its electric energy from fossil energy sources (coal, wood and fuel[45]). A reduction of fossil energy sources and increase of renewable energy sources (wind and hydropower) would decrease the release of greenhouse gases (e.g. carbon dioxide).

385. With a dam raise of 13.6 m, the hydropower project investment component will generate approximately 143,038 MWhr. GHG savings will be 49,348.11 tons per year assuming that the import of electric power from Turkmenistan will be reduced. Electric power in Afghanistan is generated from fossil energy (natural gas) in Turkmenistan.

386. Atmospheric emissions are primarily associated with emissions of fuel combustion by-products including carbon dioxide (CO_2), sulfur dioxide (SO_2), nitrogen oxide (NOx), and particulate matter (PM), resulting from the operation of mechanized equipment or from combustion by-products from the disposal or destruction of crop residues.

387. GHG emissions, including nitrous oxide (N_2O), methaneCH_4), and ammonia (NH_3), may result from the use of fertilizers.[46] These impacts can be mitigated through modern farm practice as follows:

(i) Use biofuels instead of fossil energy (if feasible);
(ii) Favor solar drying of crops;
(iii) Avoid burning of organic material (straw, organic waste);
(iv) Enhance soil aeration;

[44] Climate Fact Sheet Afghanistan. 2018. Climate Service Centre Germany.
[45] Worldata.info. *Energy Consumption in Afghanistan*. https://www.worlddata.info/asia/afghanistan/energy-consumption.php
[46] International Finance Cooperation. 2018. Environmental, Health, and Safety Approaches for Annual Crop Production. www.ifc.org/ehsguidelines.

(v) Place fertilizers at adequate depth under aerobic conditions.

388. Alternative technologies will contribute to a sustainable climate-resilient farming:

(i) Solar driven pumps will reduce GHG emissions compared to conventional diesel pumps;
(ii) Use of the direct drilling machine will enhance aeration of the soil and prevent formation of methane and N_2O.

2. Impacts on the Biological Environment

389. No negative impact and fauna and flora is expected during the operation phase. Following positive impacts are expected:

(i) Increase of green spaces due to increased irrigation area. Formation of biotopes for birds of prey to hunt on agricultural land is expected. Biotopes for songbirds may increase due to increase of biota/green spaces;
(ii) Trellising of plants keeps plants off the ground. It prevents fruit rotting before harvesting and reduces the use of fungicides and pesticides. Increase of insects is expected (bees).

3. Impacts on the Socio-Cultural Environment

390. Expansion of value-added activity to other farm outputs will increase employment opportunity and the regional economy, as well as add stability to direct farm incomes related to crop production. More sustainable employments are expected in the on / off farming.

391. Strengthening and expanding agri-cultural value chain activity will also ensure farmers get timely access to other essential farm inputs besides water, so they can make effective use of improved irrigation, add to off-farm rural employment and improve farmers' capture of higher market value from agricultural produce.

392. Impacts on the social environment will be positive due to a reduction in poverty from improved farm incomes, and an increase in work availability due to an increase in farm labor requirements. The project will also have a positive impact on domestic and livestock water supply through the construction of water access points. No new irrigation channels will be built, so no communities will be split.

393. 52 persons drowned in the irrigation canals in 2017.[47] This year a lot less because there is no water in the canal during most of the time due to severe drought. Raising of the dam will increase the water available for irrigation in the canals and drowning risk will increase in parallel. Mitigation measures to prevent drowning are as follows:

(i) Design of shallow side pools off the canals where people can fetch water to prevent them to go into the canals;
(ii) Design of shallow ramps to the canals for safe access;
(iii) Construction of hand rails on the canal banks.

4. Summary

394. The risks associated with the construction stage are presented in the table below.

[47] TRTA communication with ASBA Kandahar, 2018

Table 28. Summary of Risk Management for Operation Phase

Risk	Potential impact significance No-Action			Mitigation / Monitoring / Notes	Potential Impact significance Post Action
	Low	Med	High		
Too much water used for farming irrigation		XX		Implementation of Stage 1 and 2 of environmental flows and education program	Low
Erosion of river / canal banks		XX		Increase to canal bank protection	Low
Minimal benefit to farmers of system		XX		Strengthen mirabs, provide training	Low
Flows going to groundwater		XX		Positive impact on groundwater re-charge	Low
Reduction in down-stream water supply during peak seasons		XX		Evaluated as part of ARES study and multi-sector water allocation options study	Low
Salinity build up due to irrigation increase		XX		Improve drains, laser levelling, deep rooted perennials	Low
Drowning in canals		XX		Implement construct details to minimize risk	Low
Inputs increase; fertilizer and pesticides			XX	Extension work through DAIL	Low
Climate change Impact on farming			XX	Promote climate-smart agriculture	Med
Greater waste generation			XX	Recycle of waste where possible	Low

Source: TRTA Consultants, 2019

E. Summary of Impacts

395. The total land acquisition required for the project is 35,940 m^2. This irrigated land owned by two sizeable farmers is required for the construction of the 600 m Babawali wasteway. The project will also affect a total of 495 entities which includes 167 businesses, 4 homes, and 2 greenhouses occupying state land; and 322 affected persons living on private land across the road on the other side of the canal embankment, who will lose trees planted on the state-owned embankment (1,832 timber trees and 3,855 productive fruit trees). A mosque and a small cluster of graves, both on state land, are also impacted.

396. Irrigation rehabilitation can be an environmentally benign activity in typical baseline environment conditions with the provision of feasible and appropriate mitigation measures. Potentially adverse impacts included ensuring continued irrigation delivery during construction and managing minor construction impacts.

397. Salinization of the soil will be reduced after introduction of advanced agricultural practices including drip irrigation, laser field levelling, use of deep rooting plants, growing of salt tolerant crops, elimination of seepage from canals.

398. Climate-smart technologies adopted for irrigation and crop input management will be introduced. Farmers will use drip/sprinkler irrigation, laser field levelling and bed systems.

399. Impacts are summarized and listed in the EMP. Mitigation measures are proposed accordingly.

F. Limitations of the IEE

400. The level of detail and comprehensiveness of an environmental assessment should be commensurate with project complexity and the significance of its potential impacts and risks. This IEE identifies and focuses on the limited potential impacts and risks of the Output 2 subprojects. Project IEEs are generally limited to the direct impacts of the project. This approach directly distances itself from a wider range of impacts, including:

(i) **Cumulative impacts:** The environmental impacts of multiple plans, projects and other actions;
(ii) **Indirect, secondary or induced impacts:** These are impacts that occur several steps away from the original action;
(iii) **Global impacts:** Impacts that go beyond the local, project level, for instance climate change.

401. As the subprojects do not have a broad range of potential significant impacts and risks, a broader assessment of direct, indirect, cumulative and induced impacts, has not been undertaken.[48]

402. The impacts of climate change have been assessed in this report. However, given the uncertainty around projections of climate change impacts in Afghanistan, it is difficult to model future environmental conditions (e.g. annual precipitation, intensity of rainfall patterns, temperature changes, and levels of atmospheric dust). The impact of climate change in the future is essential for water availability in the project area.

403. Ecological surveys such as the fish biological survey and the ornithological survey at the dam are snapshots of the baseline environment. They give only a good indication of the baseline environment. Additional indicator species (e.g. migratory birds) and their respective habitats might not have been assessed and will not be considered in the water management plan of the reservoir.

404. The security situation is an essential limiting factor of ecological surveys at the dam. There is high-risk that assessment of habitats and wild life will be incomplete due to security reasons. Access to existing wetlands, shallow water zones, reed and the estuary of the river is limited or not possible.

405. Baseline information regarding the physical, biological and the socio-cultural environment is incomplete or not available. Data gaps have been recognized in the project area, such as:

(i) Data on flora and fauna including species lists;
(ii) Endangered species;
(iii) Sensitive and unregistered habitats;
(iv) Current flow data of Arghandab River and its tributaries;
(v) Water quality data of water courses (dam, canals, and the Arghandab River).

406. Identification of project impacts is limited and can be incomplete. A sustainable water management plan for the dam can be developed only after completion of detailed biological and ornithological surveys. Each survey has to be conducted for at least half a year to assess

[48] ADB (2012). Environment safeguards, a good practice sourcebook. Para. 29.

migratory birds, nesting habitats and breeding habitats for birds and fish. Any changes in the seasonal occurrence of species shall be recorded.

407. Impacts on the Arghandab and on the Helmand River basin could not be identified due to a lack of data including:

(i) Registration of all water intakes;
(ii) Flow measurements and water consumption of existing water intakes;
(iii) Drainage and backflow into the river;
(iv) Registration of waste / human excrement discharge points.

408. As suggested in other sections, a master plan for the whole river basin is required.

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

409. Impacts and proposed mitigation measures summarized and described above are itemized in the EMP and Mitigation Measure Summary. It is expected that the EMP will be reviewed and developed to a greater level of detail as required during the detailed design stage. Responsibilities for mitigation implementation (pre-construction to operation) are shown. The major responsibility for implementing construction mitigation measures will rest with the contractors selected to implement civil works packages. These contractors will work under the supervision and overall management of the PMU.

410. Mitigation of operation-phase impacts involves capacity building of responsible institutions (ASBA, DABS, MAIL, MRRD, DAIL and MEW), and the implementation of mitigation measures by these strengthened institutions. Capacity building to implement operation-phase mitigation will be planned by MAIL. The planned capacity building activities will be delivered by staff or contract trainers under their supervision to staff/members of the ASBA, who will be responsible for implementing operation-phase mitigation. A detailed program for capacity building will be developed during the detail design stage.

411. The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; sensitivity, scale, nature, and magnitude of its potential impacts. Significance (degree) and magnitude (geographical extent) of the impacts have been evaluated and included in the EMP. Further, the EMP provides adequate opportunities towards course correction to address any residual impacts during construction and operation.

412. Impacts during the construction phase refer to construction activities to be conducted during rehabilitation of the irrigation system.

413. Impacts during the operation phase refer to:

(i) Operation of the irrigation system;
(ii) Agricultural activities carried out by the project.

Table 29. EMP and Mitigation Measures Summary

Project activity	Potential impact	Mag	Sig	Proposed mitigation	Institutional responsibility	Cost estimates
Pre-rehabilitation of irrigation system and design phase						
Development and approval of SSEMP	Contractor ignorant of environmental responsibilities	M	H	Contractor employs person responsible for implementation of SSEMP.	Contractor, PMU	Part of construction costs
Identify historical monuments	historical monuments discovered during construction phase will result in interruption of construction activities	L	L	Implement archaeological survey before the construction phase.	MEW, MAIL, DAIL, IAs, PMU, Archaeology Institute Kabul	Part of detailed design
Source quarried materials	Landslides, erosion, sedimentation, landform/landscape/viewshed degradation at/near quarry sites	H	M	Investigate and accept/reject commercial quarries / local quarry sites for acceptable environmental impacts.	MEW, PMU, MAIL, DAIL, IAs, Archaeology Institute Kabul	Included in MEW PMU staff costs and construction contractor costs
Baseline data	Any changes in water quality, air noise levels during construction can be measured against baseline	M	H	Ongoing monitoring of water, air and noise during construction and then operation as applicable.	MEW, MAIL, DAIL, IAs, PMU,	Included in ARES
Ensure resettlement of affected people	Anger and social conflict	H	H	Develop and Implement LARP.	MEW, MAIL, DAIL, IAs, PMU	Part of detailed design
Ensuring adequate water supply for all	Anger and social conflict downstream	H	H	Implement WUA's and ongoing water availability assessments.	MEW, MAIL, DAIL, IAs, PMU, CDC's	Part of detailed design
Engineering confidence to ensure canals can withstand average floods	Breaching of canals due to natural hazards	H	H	Appropriate design for average floods, Institute EWS and collaboration with WUAs / *Mirabs.*	MEW, MAIL, DAIL, IAs, PMU	Part of detailed design
Construct canal bridges	Impediment to movement of people and animals	M	M	Bridges to allow for greater movement by people and animals.	MEW, MAIL, DAIL, IAs, PMU	Part of detailed design
Ensuring local people hired	Anger and social conflict if all work goes to outsiders	H	H	Contract documents to stipulate that wherever possible, workforce is sourced locally.	Contract and Contractor	Part of detailed design
Tendering Completed and Contractor Appointed prior to Construction						
Commence excavation	Disturbance, damage, loss/theft of physical cultural resources	M	M	Prior to commencing excavation at any location, an archaeologist will inspect the excavation sites, and based on the findings, undertake rescue archaeology and/or monitor excavation activities as needed.		

Rehabilitation of the irrigation system						
Commence construction	Non-compliance with legal requirement for environmental clearance	H	L	Prepare and submit environmental clearance application to NEPA, Track and respond to NEPA queries.	MEW, MAIL, DAIL, IAs, PMU	Part of construction costs
Operation of contractor's camp	Impact on ground water, surface and irrigation water, soil at the contractor's yard	M	H	• Layout plan of work camp including description of precautionary measures; • Sewage management plan; • Waste management plan; • Description and layout of equipment maintenance area; • Description of lubricant and fuel storage facilities area.	PMU, contractor	Part of construction costs
Rehabilitation of the irrigation system	Impact on soil	M	M	• Dispose roadway rubble on a waste disposal site, if there is any; • Top soil of 0.3 m depth shall be removed and stored separately under tarpaulin during excavation work, and after construction the same soil shall be replaced on the top; • Avoid scheduling of excavation work during heavy rain; • Complete the excavation and foundation during dry weather; • In unavoidable circumstances, protect open trenches from entry of rain water by raising earthen bunds with excavated soil.	PMU, contractor	Part of construction costs
Rehabilitation of the irrigation system	Temporary increase in fine sand and silt runoff	M	M	• Use of silt traps; • Adequate construction supervision; • Careful deposition of soil spoil arising from excavation work; • Spoil shall be used as fill.	PMU, contractor	
Rehabilitation of the irrigation system	Temporary closure of irrigation system	M	M	• Use of temporary diversion weirs through canal or flexible house tubes.		
Rehabilitation of the irrigation system	Loss of landscape, viewshed value, and habitat value due to tree removal on the public right of way of canals at construction sites	M	M	• Tree plantation of native species at alternate sites will be identified in consultation with local communities.	PMU, contractor	Part of construction costs
Rehabilitation of the irrigation system	Temporary disruption of irrigation water supplies at in-canal construction sites, or	M	M	• The civil works contractor will provide temporary irrigation channels and roads/paths. This will be a contract	PMU, contractor	Part of construction costs

	blockage of vehicle, pedestrian, and livestock movement			requirement. Works, where possible, will be prioritized during the late autumn and winter seasons, depending on the weather and accessibility.		
Rehabilitation of the irrigation system	Impact on ambient air quality due to dust generation	M	M	• Cover or damp down by water spray on the excavated mounds of soil to control dust generation in populated areas; • Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process; • Bring the material (aggregate and sand) as and when required; • Ensure speedy completion of work and proper site clearance after completion; • Damp down unsurfaced/bad condition roads to avoid dust generation while using for transport of waste/material; • Use tarpaulins to cover loose material that is transported to and from the site by truck; • Control dust generation while unloading loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside barricaded area; • Clean wheels and undercarriage of haul trucks prior to leaving construction site; • Do not allow access in the work area except workers to limit soil disturbance and prevent access by fencing.	Contractor, PMU	Part of construction costs
Rehabilitation of the irrigation system	Impact on air quality due to emissions from construction equipment/ vehicles	M	M	• Ensure that all equipment and vehicles used for construction activity are in good condition and are well maintained; • Ensure that all equipment and vehicles confirms to emission and noise norms.	Contractor, PMU	Part of construction costs
Rehabilitation of the irrigation system	Removal of vegetation/trees for construction	M	M	• Avoid tree cutting. • In unavoidable cases, plant five trees of same species for each tree that is cut for construction. • Maintain trees during establishment phase.	Contractor, PMU	Part of construction costs Local employment for the maintenance of trees during establishment

				• Bushes and grasses shall be cleared only in actual construction area, all other preparatory works (material storage) shall be conducted on barren lands without vegetation.		
Rehabilitation of the irrigation system	Disturbance to business, people, activities and socio-cultural resources due to construction work	M	H	• Limit dust by removing waste soil quickly; by covering and watering stockpiles, and covering soil with tarpaulins when carried on trucks; • Provide wooden walkways/planks across trenches for pedestrians and metal sheets where vehicle access is required.	Contractor, PMU	Part of construction costs
Rehabilitation of the irrigation system	Disturbance/nuisance/noise due to construction activity including haulage of material/waste	M	M	• Plan transportation routes in consultation with rural authorities, road department, and Police; • Schedule transportation activities by avoiding peak traffic periods; • Use tarpaulins to cover loose material that is transported to and from the site by truck; • Control dust generation while unloading the loose material at the site by sprinkling water; • Clean wheels and undercarriage of haul trucks prior to leaving construction site; • Educate drivers: limit speed between 20-25 km/h in settlements and avoid use of horn; • Earmark parking place in town for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement; • Prepare a traffic guiding concept for the construction period; • Provide prior information to local people about work; • No night-time construction activities including material/waste haulage.	Contractor, PMU	Part of construction costs
Rehabilitation of the irrigation system	Socio-economic benefits from employing local people in construction work	H	H	• To the extent possible labor force must be drawn from the local community.	Contractor, PMU	Part of construction costs

Rehabilitation of the irrigation system	Safety risk – public and worker	H	H	• Follow standard and safe procedures for all activities – such as provision of shoring in deep trenches (>2 m); • Exclude public from the site – enclose construction area, provide warning and sign boards, security personnel; • Provide adequate lighting to avoid accidents; • Ensure that all workers are provided with and use appropriate Personal Protective Equipment - helmets, hand gloves, boots, masks, safety belts (while working at heights etc.); • Maintain accidents records and report regularly.	Contractor, PMU	Part of construction costs
Rehabilitation of the irrigation system	Historical, archaeological findings during excavation	M	M	• Contractor shall put in place a protocol for conducting any excavation work, to ensure that any findings are recognized, and measures are taken to ensure they are protected and conserved. This will involve: ○ Having excavation observed by a person with archaeological field training; ○ Stop work immediately to allow further investigation if any findings are suspected; Calling the state archaeological authority if a finding is suspected and taking any action they require to ensure removal or protection on-site.	Contractor, PMU	Part of construction costs
Rehabilitation of the irrigation system	Cumulative impacts – repeated disturbance to roads and people	M	M	• Schedule the construction activities in harmony with the other ongoing works; Schedule works before road work.	Contractor, PMU	Part of construction costs
Rehabilitation of the irrigation system	Contamination of surface water	H	H	• Store fuel tanks away from surface water on a safe location minimum 50 m distance to surface water; • Provide modern non-leaking equipment; • Refuel engines at minimum distance of 50 m to surface waters; • Provide adhesive agent for mineral oil: Excavation and disposal of waste and contamination.	Contractor, PMU	Part of construction costs

Rehabilitation of the irrigation system	Loss of ecological services and aesthetic value of trees removed from construction sites	M	M	Tree planting, five trees to be planted to replace each tree which is cut.	MEW PMU, construction contractors	Included in MEW PMU staff costs and cost of civil works
Rehabilitation of the irrigation system	Impact on landscape	L	L	Loss of landscape and viewshed value, landform alterative/destruction, erosion, landslides, sedimentation, and water pollution from quarries used to source or created to obtain construction materials.		
Rehabilitation of the irrigation system	Impact on water quality (turbidity) of canals from improperly managed excavation spoil	L	M	The contractor will select and manage spoil disposal sites to avoid adverse impacts. Prior approval from the PIU on the selection of spoil sites will be undertaken. This will be a contract requirement. The PMU will ensure such spoil sites have been selected with community agreement.		
Landscape disruption (impacts on topography) from borrow pits and redundant canals left unfilled post-construction	Impact on bird life (vibration, noise)	L	L	The contractor will fill in of pits and redundant canals when no longer needed. This will be a contract requirement.		
Construction roads	Crop damage from temporary construction roads, cutting of trees	H	H	Community consultation. road siting and timing. If significant impact, compensation to be implemented, if tree cutting is expected five trees of the same species will be planted.		
Operation of vehicles and equipment; generation of liquid and solid waste	Excessive noise, dust, air / water pollution, fuel/oil spills, pollution from improper liquid/solid waste disposal	M	M	Routine construction housekeeping measures per contractor.		
Rehabilitation of the irrigation system	Cutting of fruit trees	H	H	Planting of five trees for each tree to be cut, compensation measures to be paid for crop failure.	Contractor, PMU, MEW	Part of construction cost

Operation and maintenance of the irrigation system						
Rehabilitation of the irrigation system	Farmers take additional environmental flow water for farming	M	M	Environmental flow regime applied over time along with community education campaign.	NEPA, ASBA, MAIL, DAIL, IAs	Included in NEPA costs
Rehabilitation of the irrigation system	Erosion of canal banks, impact on terrestrial ecology	M	M	Canal bank protection will also have a positive impact on terrestrial ecology from preventing soil and vegetation from being washed away.	MEW PMU MAIL, DAIL, IAs, contractor	Included in MEW staff costs
Rehabilitation of the irrigation system	Suboptimal irrigation and agricultural benefits	M	M	Establish and strengthen mirabs, IAs and provide training on O&M and improved management of water.	MEW PMU ASBA contractor	
Rehabilitation of the irrigation system	Impact on ground water	M	M	Improved water management will improve hydrological conditions.	MEW PMU ASBA contractor	
Rehabilitation of the irrigation system	salinization	M	M	Reduce present and potential waterlogging through improved drainage improvement.	MEW PMU ASBA contractor	
Rehabilitation of the irrigation system	Risk of drowning in the canals	M	M	- Design of shallow ramps for safe access; - Incorporation of shallow or stepped side pools off the canals for safe access; - Construction of hand rails on the canal banks.	MEW, PMU, design consultant	Part of design costs
Agricultural development						
Agricultural development	Soil salinization	H	H	- Reduce deep tillage, mulching instead; - Maintain the water table at a low level; - Avoid compaction; - Plant crops that use available soil moisture; - Remove excess water by using deep rooted plants; - Grow salt tolerant crops; - Eliminate seepage from adjacent canals; - Drip irrigation.	MAIL, DAIL, IAs, farmers, MEW, PMU	
Agricultural development	Erosion	M	M	- Apply best agricultural practice: - Promotion of Conservation Agriculture principles including direct drilling instead of disc ploughing; - Laser levelling to prevent intensive flooding; - Drip irrigation instead of flooding.	MAIL, DAIL, IAs, farmers, MEW, PMU	

Agricultural development	Impact on water quality and on biodiversity due to intensive use of fertilizers and pesticides	H	H	- No use of restricted pesticides listed in the Stockholm Convention; - Use pesticides labeled under international standards; - Application of best technologies and techniques; - Reduction of pesticide runoff through disseminating information to farmers and training on the safe use of pesticides; - Optimization of nutrient application to avoid eutrophication; - Introduction of IPM; - Crop rotation, crop diversification will reduce application of fertilizers and pesticides; - Incorporating green manure / organic manure into soil from composting instead of fertilizers.	MAIL, DAIL, IAs, farmers, MEW, PMU	
Agricultural development	Impact on air quality, air humidity	L	L	- Cultivation of 2,3 or 5 rows of trees as shelter belts improves the local air quality, adjusting temperature and humidity levels over the irrigated field. - Wind breaks reduce crop evaporation.	MAIL, DAIL, IAs, farmers, MEW, PMU	Part of construction costs
Agricultural development	Climate impact on farming	H	H	Promotion of conservation agriculture principles and sustainable climate-resilient farming practices, drip/sprinkler irrigation, laser field levelling and bed systems.	MAIL, DAIL, IAs, farmers, MEW, PMU	Part of construction costs
Generation of biodegradable waste during processing of agricultural products	Impact on air, water resources	H	H	- Disposal of biodegradable waste on licensed disposal site; - Use of biodegradable waste as natural fertilizers in agriculture.	Operator of processing facilities, PMU	
Use of process water	Impact on water resources due to use of water for processing	M	M	Reuse of process water after treatment.	Operator of processing facilities, PMU	
Generation of GHG in cooling facilities	Impact on climate	M	M	Isolation of cooling facilities will reduce power consumption needed for cooling.	Operator of cooling facilities, PMU	Part of construction costs

H-high; IA- implementing agency; M- Medium and L-Low; Mag-magnitude; O&M- operation and maintenance; Sig-significance; LARP = land acquisition and resettlement plan

Source: TRTA Consultants, 2018

B. Environmental Monitoring Plan

414. A program of monitoring will be required to ensure that all concerned agencies take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether additional measures may be necessary. Regular monitoring of mitigation measures by contractors will be conducted and overseen on behalf of MAIL. Monitoring during construction stage will be conducted by the contractor in line with ADB requirements.

415. Environmental monitoring involves: (i) sampling program for systematic collection of data/information relevant to environmental assessment and project environmental management, and (ii) analysis of samples and data/information collected, and interpretation of data and information. Environmental monitoring is carried out before, during, and after construction phase. Environmental monitoring will be implemented to detect changes in the key quality parameters. The results of the monitoring program are used to evaluate the following: (i) magnitude and significance of the environmental impacts, and (ii) efficiency of the environmental protection measures.

416. Environmental monitoring includes a sampling program. The collected data will show whether objectives have been achieved (e.g. effectiveness of mitigation measures). The monitoring program has to take into account its practicability considering the technical, financial, and capability of the institutions that will carry out the program and period of monitoring that will be needed to achieve the objectives. The monitoring plan includes implementing institutions. Locations and frequency of monitoring are listed.

417. Most of the mitigation measures are fairly standard methods of minimizing disturbance from building in rural and urban areas (maintaining access, planning work to minimize public inconvenience and traffic disruptions, finding uses for waste material, etc.). Monitoring of such measures normally involves making observations in the course of site visits, although some require more formal checking of records and other aspects.

418. A monthly monitoring frequency is recommended at this stage and might have to be adjusted during construction and operation. Monthly reports should present aggregate data in table and figure format, accompanied by narrative explanation and interpretation. A separate section should summarize the water quality situation and changes related to the project and project activities.

419. Monitoring will be implemented by an independent Consultant. The Consultant will prepare monthly monitoring reports during construction and operation. Reports will be submitted to NEPA for final approval.

420. Environmental training will be conducted before the beginning of construction activities. The training will involve the construction supervision, environmental engineers and work force. The training will focus on implementation of mitigation measures as listed in the EMP, waste management, storage of hazardous substances, oil spill prevention, noise and dust prevention soil management, noise and air quality monitoring, etc.

421. The project implementing unit (PIU) will consist of responsible parties such as MAIL, MRRD, MEW local government of Kandahar, and the contractor.

Table 30. Environmental Monitoring Plan

Mitigation measures	Parameters to be monitored	Location	Measurements	Frequency	Responsibility
Construction Phase					
Monitoring of water quality	Compare against baseline data	Representative temporary channels	According to WB – IFC standards	Monthly	Contractor, PMU, MEW
All design related mitigation measures	Inclusion in the project design	Documentation	Design review	As needed	Contractor, PMU, MEW
All construction related mitigation measures	Implementation on-site	All construction sites	Observations on/off site; interviews with people and workers	Weekly	Contractor, PMU, MEW
Mitigation measures related to air quality	Air quality monitoring (NO_2, SO_2, CO, PM)	Construction site Camp site, 5 locations along canals	According to WB – IFC standards	Monthly	Contractor, PMU; MEW
Mitigation measures related to noise	noise levels monitoring most particularly noise over 85 DB	Construction site Camp site, 5 locations along canals close to settlement and human activity	According to WB – IFC standards	monthly	Contractor, PMU; MEW
Operation Phase					
Long-Term Surveys					
Conduct ground water monitoring	Ground water level	wells of AUWSSC		monthly	Contractor, AUWSSC
Ongoing routine surface water quality monitoring	Compare against baseline data	Representative temporary channels	According to WB – IFC standards		
Environmental Flows	Farmer acceptance and visible response with riparian vegetation	Key identified nodal points along river	Documentation of regrowth and community involvement	monthly	NEPA, ASBA, PMU
Planting and establishment maintenance of trees as compensation measure	Counting of planted trees	on-site			Construction supervision and locally employed community members
Watering of trees	Watering of trees				

Source: TRTA Consultants, 2018

C. Implementation Arrangements

422. MAIL and MRRD as Output 2 Implementing Agencies will be responsible to set up their own PIU which include specified environmental monitoring staff. Implementation support consultants will be provided by the project (TORs and positions are in the PAM).

423. The contractor has the following obligations:

(i) To prepare and implement the SSEMP;[49]
(ii) To employ an Environmental Consultant responsible for developing and implementing the construction phase SSEMP and for providing the corresponding information on a weekly basis to the Supervision Consultant.

424. The Supervision Consultant is responsible for environmental capacity building, monitoring of implementation of SSEMP and for developing quarterly reports.

425. MRRD PIU will be responsible for the supervision of the works to be carried out under Community Development Contract. Environmental Specialists will be hired on a full-time basis in MRRD/MAIL Central Program Management Office.

426. The EMP is divided into the three critical stages of the project: (i) detailed design, (ii) construction / implementation and (iii) operation.

427. It is critical for the success of the EMP that the contractors understand and implement the SSEMP with competence and conviction. Monitoring of the contractor will be the responsibility of the PIUs, however the assumption behind the IEE is that there is a professional obligation which the contractor must assume for implementation to be successful. It is therefore critical that the contractor has the technical capability to develop and implement day-to-day management systems related to the complete range of physical and social issues.

D. Performance Indicators

428. The desired outcome from the implementation of the EMP is that there is both understanding and confidence that the full spectrum of potential issues foreseen during the project feasibility and formulation have been addressed. The following table summarizes and outlines a spectrum of indicators and targets which can be tracked over time.

Table 31. Performance Measurement Indicators

Issues	Inputs (resources)	Outputs (activities)	Intermediate outcome	Final outcome (environmental impact)
SSEMP Implementation	*Document*	*Overall Resource stewardship*	*Contractor responsible for site*	*Comprehensive management and minimal impacts*

Source: TRTA Consultants, 2019

E. Budget

429. The environmental monitoring costs cover the environmental monitoring for air, water quality and noise, on-site testing instruments, logistic support and maintenance costs. Total estimated cost for environmental monitoring, implementation at construction sites along the irrigation channels have been estimated. The breakdown of monitoring costs of construction and operational phases of the dam are also calculated and in the following table. The

[49] The SSEMP shall be endorsed by the Supervision Consultant and endorsed by the PIUs.

Agriculture and Irrigation Implementation Support Consultant package described in the PAM lists TORs based on the following.

Table 32. Cost Estimate for Environmental Monitoring Team in DAIL PIU

Position	Remarks	Number	Approximate salary (AFG)	Construction phase (24 months) (AFG)
Environmental Expert	Engineer or scientist having sufficient experience of dealing with environmental issues	1	45,340	1088,160
Junior Environmentalist	Engineer or environmentalist having experience of dealing with environmental issues at Project level	1	22,670	544,080
Administrative and Support Staff	One Computer Operator, one Admin Officer, one Office Assistant and one driver	4	40,000	960,000
Total		**6**	108,010	2,592,240

Source: TRTA Consultants, 2018

Table 33. Environmental Monitoring Cost for Construction Phase (24 Months)

Monitoring parameters	Monitoring Locations/ sources	Monitoring frequency	No of sites	No. of Samples during Construction	Unit rate (AFG)	Total amount (million AFG)
Air Quality Monitoring (NO_2, SO_2, CO, PM)	Construction site Camp site, 5 locations along the irrigation channels	Monthly	7	252	5668	1,428,336
Noise Levels Monitoring	Construction site, Camp site	Monthly	7	252	850	214,200
GRAND TOTAL						**1,642,536**

Source: TRTA Consultants, 2018

VIII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Consultations During TRTA

430. Project communities have been consulted and informed in an ongoing, continuous process involving meetings with heads of villages and discussions with individual persons. The consultation process will continue throughout the project implementation phases. A similar procedure will be carried out throughout all project phases.

431. A summary of consultations carried out during the TRTA under Output 2 is shown in Table 34.

Table 34. Summary of Consultations in Villages

No	Date	District	Village	Type of consultations	Participants
1	23.03.2019	Kandahar City Zone No. 12	Dabaro Pull	Chief of village and elders	7
2	18.03.2019	Arghandab	Baba Sahib	Chief of village and elders	10
3	22.03.2019	Arghandab	Keshata Mazria	Chief of village and elders	9
4	16.03.2019	Arghandab	Kheshki	Chief of village and elders	9
5	17.03 2019	Arghandab	Mohammad Yaquob Kalach	Chief of village and elders	10
6	22.03.2019	Kandahar City Zone 12	Mashinano	Chief of village and elders	8
7	21.03.2019	Arghandab	Merakhwaran	Chief of village and elders	9
8	17.03.2019	Arghandab	Usmani Mena	Chief of village and elders	10
9	16.032019	Arghandab	Sayedano Kalacha	Chief of village and elders	9
	Total				**81**

Source: TRTA Consultants, 2019

432. The team of environmental and social experts have been and will continue to conduct public consultations. Consultations have been arranged with the consent of the local stakeholders and according to the Afghan Administrative Guidelines for the Preparation of Environmental Impact Assessments (June 2008), the Environment Law (Article 19), and ADB's Public Communications Policy (2011). People have the right to be informed about and to participate in ADB projects.

433. Three consultative workshops and stakeholder meetings were held on Dahla Dam Multi-Sector Water Allocation Options in Kandahar and Kabul in November 2018, December 2018 and January 2019; during which environmental concerns were raised by participants.

434. The key environmental concerns raised by participants during the workshops can be summarized as follows:

(i) The participants thought that they are already facing water shortages;
(ii) Most of the biodiversity is found upstream and in or around the dam, where water is available during all months of the year;

(iii) Downstream lands are mostly private and people irrigate their crops when they need using their own boreholes;
(iv) Some species of birds living downstream fly to the upstream areas, when there is no water in the downstream areas. When an amount of water is allowed in the river for the environment, people will use that amount for irrigation;
(v) The participants thought that unless a strong water management system is created, environment flows will not be effectively utilized;
(vi) The Dahla Dam area is a picnic spot, families from all Kandahar City gather there on Thursdays. Participants requested the project to further improve the recreational area. For financial sustainability of the project, the government should collect a fee for admission to the park;
(vii) Conduct awareness campaign on the environmental issues and raise the awareness of people;
(viii) Train law enforcement agencies on environmental issues and enforcement, for example people illegally cutting trees and hunting protected species of birds.

435. A Consultative Workshop on Output 1 Key Land Acquisition and Resettlement, Environmental Impacts was held on 6-9 April in Kandahar City. The Project's anticipated environmental impacts and extent of impacts were presented to affected people's representatives and other stakeholders and public concerns were discussed and evaluated.

436. Baseline socio-economic surveys for all project investment components have included household level questions to gauge how much people agreed or disagreed with the following statements:

(i) I am worried that water pollution may be affecting the health of my family;
(ii) Litter and garbage are a big problem in the area where I live;
(iii) I am worried that air pollution (either inside my house, or outdoors) may be affecting the health of my family;
(iv) I want to learn more about what I can do to make the environment better for myself and my family;
(v) People in my community are not aware of or concerned about the environment;
(vi) Climate change is making it more difficult for me to earn a livelihood.

B. Consultations During Detailed Design

437. The following criteria and methodology will be used for carrying out public consultations according to ADB's Public Communications Policy:

(i) Local communities and individuals who are directly or indirectly affected, are identified;
(ii) The local communities will be informed through public consultation, with briefings on the project interventions, including its benefits;
(iii) The environmental concerns and suggestions made by the participants are be listed, and discussed, and suggestions accordingly incorporated into the EMP.
(iv) Some other disclosing information methods to be considered are:
(v) information campaigns, the media;
(vi) public meetings;
(vii) focus group discussions;
(viii) household/individual interviews/discussions;
(ix) workshops/seminars;
(x) project websites; and

(xi) local information boards.

438. The most commonly used approaches to consultations, information sharing and engagement with stakeholders are outlined as follows:

(i) Wide community consultations include a broad representation of the communities;
(ii) Targeted Stakeholders Consultations include specific groups of affected persons such as affected business owners, affected people (AP) losing agricultural land, etc.
(iii) Workshops include representatives of local authorities and representatives of the project communities;
(iv) Focus group discussions include representatives of local authorities, communities, women groups, youth groups, and any other third parties to discuss specific project-related issues and gather participants' opinions, suggestions and concerns.
(v) Key informant interviews are conducted mostly during the project preparation phase to generate information and ideas about project.
(vi) Face-to-face meetings with the APs are held to clarify confidential information on the compensation amount, particular entitlements related to the APs' affected assets, complaints or concerns related to the project, as needed.
(vii) Questionnaires/interviews may include socio-economic questionnaires, census questionnaires, poverty assessments, gender-related interviews, etc.

439. Consultation proceedings should be properly documented. The essential documents should include:

(i) Summary,
(ii) List of the key issues raised by the participants,
(iii) Agreed actions,
(iv) Photographic records, and
(v) List(s) of participants.

440. Careful coordination and cooperation among the various stakeholders in the Project will be necessary. Key stakeholders include the Government of Islamic Republic of Afghanistan, MEW, MAIL, DABS, ASBA, NEPA, Archaeology Institute Kabul, AUWSSC, Afghan Land Authority (ARAZI), and the Governor of Kandahar. Additional key stakeholders will include directly project-affected persons, farmers of the area to be inundated, and residences who will suffer from inundation. NEPA will supervise compliance of environmental standards during the construction phase and operation phase (noise, air quality, water quality).

441. The minutes of the consultations, together with scanned signatures of the participants should be included in the monthly reports. The data should be disaggregated by gender, with the key information recorded at the top of the minutes, stating the number of participants, the number of men and the number of female participants.

442. The active involvement of NGOs and organizations representing women and other vulnerable groups is seen by MEW as essential in fostering positive community participation in the program and ensuring that the views and wishes of the disadvantaged are heard and acted upon.

C. Public Disclosure

443. ADB SPS (2009) requires the provision of relevant project information in a timely manner, at an accessible place and in a form and language(s) understandable to the affected persons and other stakeholders. Information disclosure involves delivering information about a proposed project to the AP and other stakeholders. The purpose of the information disclosure requirements specified under ADB SPS (2009) is to facilitate engagement of people so that a constructive relationship between the parties is established at the outset and maintained over the life of the project. Special efforts should be made to reach vulnerable groups lacking access to public media and information exchange.

444. A copy of the final, approved IEE in English will be disclosed on ADB's website, while a copy of the final LARP in Pashto will be disclosed on the IA website and at the District Governor's and other local authorities' offices. The LARP in Pashto will also be disclosed to the APs at the relevant local elders' offices in the project communities.

445. The public consultation and disclosure program with all interested and affected partied will remain a continuous process throughout the Project implementation during pre-design, design and construction phase.

IX. GRIEVANCE REDRESS MECHANISM

446. **The Afghan Law on Land Acquisition 2017,** Article 34, 'Objection against Decision of Technical Panel' stipulates the grievance redress mechanism as follows:

(i) Whenever the owner or his/her legal representative is not satisfied regarding compensation of the expropriated property, he/she may present his/her objection statement with the reasons, within (60) days after the date of receiving information about compensation, to the Expropriating Authority.
(ii) The Expropriating Authority shall assess the objection stated in paragraph (1) of this article within 30 days and take appropriate decision.
(iii) Whenever the claimant is not satisfied with the decision of the Expropriating Authority, the issue shall be referred to a jury. The jury consists of: representative of relevant Union of Engineers, representative of Afghanistan Chamber of Commerce and Industries and representative of the people of the expropriated area.

447. The decision of the jury is final if the parties agree; otherwise the issue shall be referred to a competent court.

448. The existing grievance redress system may be used in conjunction with the project-related grievance redress mechanism (GRM). A project-specific GRM will be established to receive, evaluate, and facilitate the resolution of affected parties' concerns, complaints, and grievances about the social and environmental performance at the level of the project. The GRM will function during all phases of the project implementation. The GRM will aim to provide a time-bound and transparent mechanism to address and resolve social and environmental concerns linked to the project.

449. The GRM is a formalized way for the PMU to identify and resolve concerns and people's grievances. It offers the displaced and AP a forum to voice their concerns, seek clarifications to their queries, or register complaints related to the project's performance. The scope of the GRM addresses issues related to involuntary resettlement, social and environmental performance, and information disclosure.

450. The fundamental objectives of the GRM are:

(i) To reach mutually agreed solutions satisfactory to both, the project and the AP, and to resolve any grievances locally, in consultation with the aggrieved party;
(ii) To facilitate the smooth implementation of the Project, particularly to cut down on lengthy litigation processes and prevent delays in project implementation;
(iii) To facilitate the development process at the local level, while maintaining transparency as well as to establish accountability to the APs.

451. The GRM will cover issues related to social, environmental and other safeguard issues under the ADB safeguard covenants and Afghan law. The AP will be fully informed of their rights and of the procedures for addressing complaints whether orally or in writing during the consultations and surveys. Care will be taken to prevent grievances rather than relying solely on the redress process. This will be achieved through careful design and implementation, by ensuring full participation and consultation with the AP and by establishing extensive communication and coordination between the affected communities, the executing agency, and local governments in general.

452. The GRM consists of the project-specific systems which will be established at the project and district levels and as a regular system established at the IA. Grievance Redress Committees (GRC) will function for the duration of Project implementation.

453. The GRC will be formed by the IA and Local Authorities as a permanent and functional structure, engaging personnel of the IA from all departments to work on land acquisition, resettlement and environmental issues and complaint resolution. The IA will specify that representatives of local/community authorities, elders, auditors, displaced persons and any other persons or entities can be included in the committee as members.

454. The IA follows ADB's Grievance Redress Procedure to address any dissatisfaction and complaints by residents regarding its activities. This procedure will be applied to address any complaints or grievances during the implementation of the project.

455. The project will establish a GRM to ensure greater accountability immediately after the Project implementation begins. The IA will prepare a GRM, acceptable to ADB, and establish a special committee to receive and resolve complaints/grievances or act upon reports from stakeholders on misuse of funds and other irregularities, including grievances due to resettlement. The special committee will (i) make public the existence of this GRM; (ii) review and address grievances of stakeholders of the project, in relation to either the project, any of the service providers, or any person responsible for carrying out any aspect of the project; and (iii) proactively and constructively respond to them.

456. The GRM will be established at three levels: (i) Project/District level; (iii) Province level and (iii) General Governor's Office level. If the complaint cannot be resolved at these three levels, a complaint will have a choice to lodge his/her complaint at the related court. The IA is oriented towards resolving complaints at the project level through negotiations with community leaders and representatives of affected persons. These discussions will be conducted by the PMU and will involve the affected groups and members of the relevant GRC, and the site manager and chief engineer of the construction contractor, if necessary. If a case cannot be resolved in this way it will be submitted to the IA GRC, led by the PMU Director. The committee will consist of representatives of the community districts, elders and mirabs; and representatives of the governmental offices in Kandahar, such as ASBA Kandahar, MAIL, MRRD, MEW, Shura, PMU, Supervision Engineer site manager, social and environmental safeguard officer's complaint officer.

457. The GRM for the project is outlined below and consists of three levels with time-bound schedules for addressing grievances.

458. The first level and most accessible and immediate venue for the fastest resolution of grievances is the Shura and the District Governor representative. The District Governor representative with help of Shura and other GRC members, convenes a meeting of the GRC in the project area and conducts proceedings informally to reach an amicable settlement between the parties. The report of the committee is recorded in writing, and copies are provided to the parties involved. For this program, the GRC will be required to meet and reach a decision within 14 days of receiving a complaint (verbally or in writing) from an affected person or his representative.

459. Should the grievance remain unresolved or the AP is not satisfied with the decision, the grievance can be lodged with the province Governor's Office which will make a decision within 45 days.

460. If a person is dissatisfied with the ruling of the Province Governor's Office decision, s/he or her/his representative may lodge their grievance with the General Governor's Office in Kabul which will make a decision within 60 days. If the appellant is still not satisfied, s/he has the right to take his case to the public courts.

461. At the project level, the PMU environmental/social officer will be responsible for processing and placing all papers before the PMU GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued, and decisions carried out. In the event that a grievance is not addressed at the previous levels, the affected person can seek legal redress of the grievance in the appropriate courts. The following table summarizes the envisaged grievance resolution process.

Table 35. Grievance Resolution Process

Steps	Process
Level 1	The complaint is informally reviewed by the GRC at the District Governor office with assistance of Shura, affected persons' representative and other GRC members, which takes all necessary measures to resolve the dispute amicably.
Level 2	• If the grievance is not solved at the previous level, the GRC at the Provincial Governor's Office will review the grievance and make a decision within 45 days. • The decisions will be issued by the conveyor and signed by other members of the GRC. The case record will be communicated to the complainant by the GRC at the provincial level. The grievance redress at this stage shall be completed within 45 days.
Level 3	If the aggrieved person is unsatisfied with the GRC decision at the provincial level, the next option will be to lodge grievances with the Grievance Redress Committee at the General Governor's Office (Kabul). The Governor's Office will convey its decisions to the aggrieved person within 60 days after receiving the complaint.
Level 4	If the decision fails to satisfy the aggrieved person/s, they can pursue further action by submitting their case to the appropriate court of law (local courts) without reprisal. The aggrieved person can take legal action over the amount of compensation or any other issues, e.g. occupation of their land by the contractor without their consent, damage or loss of their property, restrictions on the use of land/assets, environmental concerns such as dust caused by the contractor's machinery, etc.

Source: TRTA Consultants, 2019

462. In addition, the complainant can appeal the decision and bring the case to the ADB Accountability Mechanism. The project level GRM does not in any way, impede the access of the complainants to the ADB Accountability Mechanism (AM)[50] or the country's judicial or administrative remedies. Should the complainant wish to register a complaint with the ADB AM, the focal person should provide the complainants the ADB AM contact information.

463. There will be four-stage procedures for redress of grievances and complaints, however APs will have the right to move to a court of law at any stage. These are as follows:

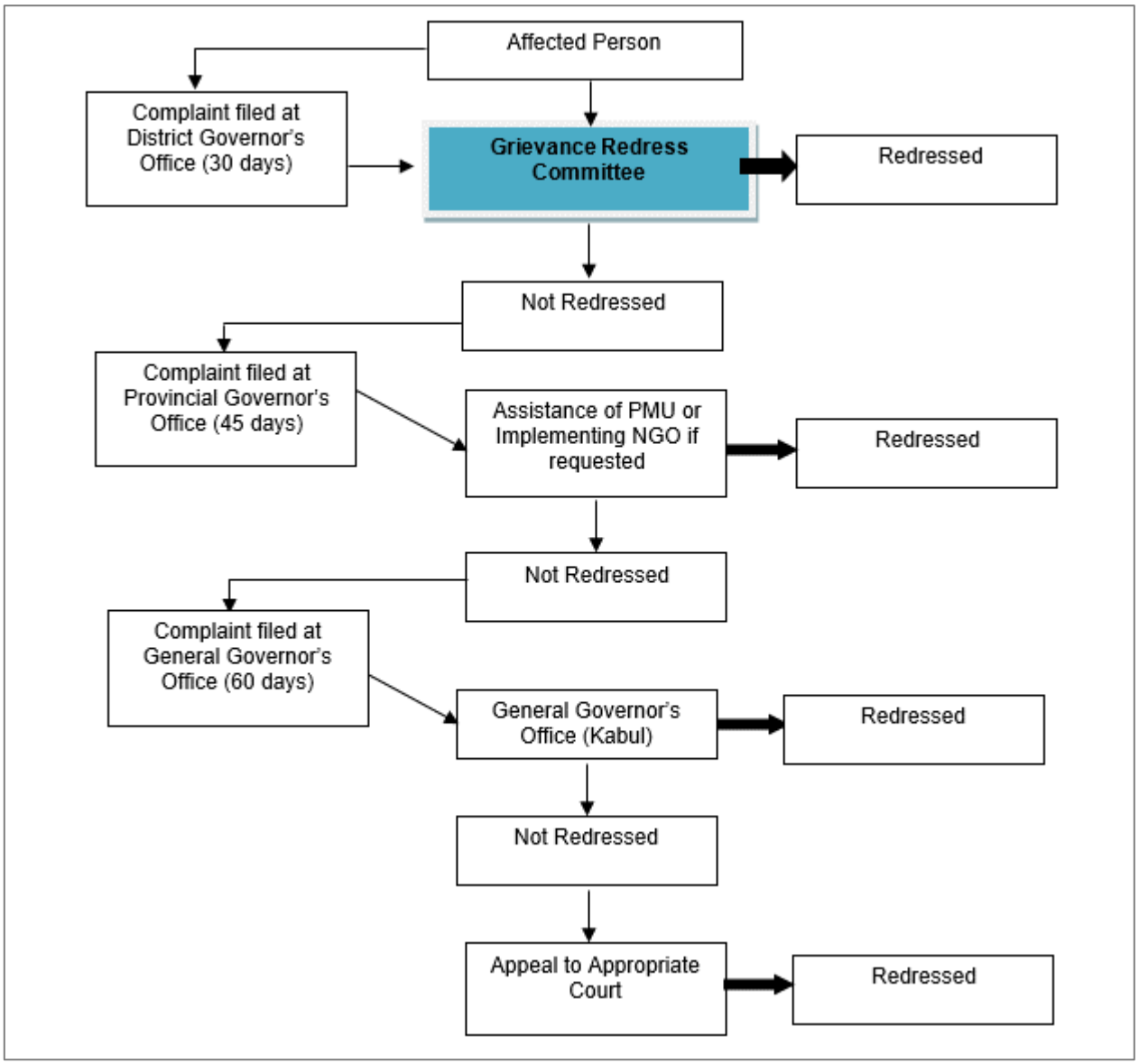
(i) Complaints are to be filed at the District Governor offices. The district government with the help from Shura, NGO, and PMUs resettlement or environmental team is obliged to reply and explain the decision within 30 days from the date the complaint was received. The GRC will assist the District Governor offices in the mediation and resolution of conflict.

[50] ADB. 2017. "ADB Accountability Mechanism: Annual Report". Manila. Accessible at: www.adb.org/site/accountability-mechanism/main

(ii) If AP is unsatisfied or has no reply from the District Governor's Office, grievances can then be lodged with the Province's Governor offices. The Governor's Office will issue the final decision within 45 days.
(iii) If AP is unsatisfied or has no reply from the province Governor office, grievances can them be lodged with the General Governor Office in Kabul. The General Governor office will issue the final decision within 60 days.
(iv) The AP always has final recourse through Afghanistan's legal channels and referred to the appropriate courts; however, every effort will be made to avoid this since the system is presently critically weak. Should the AP want to pursue legal recourse, in a court of law at anytime, however, the IA through its DDT will ensure that support is given to the AP to prepare a case.

464. The grievance redress process is shown in the following figure.

Figure 24. Grievance Resolution Process



Source: TRTA Consultants, 2019

X. CONCLUSIONS AND RECOMMENDATIONS

465. The environmental impacts of Outputs 2 have been assessed and described in the previous sections of this document. Potential impacts were identified in relation to design, location, construction and operation of the components. Mitigation measures have been developed to reduce all negative impacts to acceptable levels.

466. Mitigation measures were identified during the feasibility stage:

(i) The overarching mitigation measure is to ensure the contractor development, refinement and successful implementation of the SSEMP. This document formalizes and transfers the understanding and responsibility of stewardship for the construction site, human resources and the quality of work;
(ii) Rehabilitation of canals will reduce water losses and seepage;
(iii) Target water releases from Dahla Dam for irrigation as well as EF's;
(iv) Drip irrigation promotion to reduce soil erosion and salinization;
(v) Drip irrigation will cause a decline in accessions to the water table and ground water levels should fall accordingly;
(vi) Trellising plants will reduce the use of fungicides and pesticides and will have a positive impact on fauna (insects) and flora;
(vii) Adoption of 'Conservation Agriculture' principles including promotion of chisel ploughing and direct drilling instead of deep disc ploughing will reduce soil erosion;
(viii) Improved laser guided levelling of land will improve water use, promote an even percolation of irrigation water;
(ix) Compaction of soils will be avoided to improve drainage of water;
(x) Deep rooted crops will be used to promote the drawing up of groundwater from greater depth, thus assisting in lowering groundwater levels;
(xi) Replacement planting and maintenance of trees where any have been lost to construction;
(xii) Salt tolerant crops will be planted to avoid impacts on crop yield;
(xiii) Promotion in the use of solar driven pumps instead of diesel pumps will reduce GHG emissions.

467. The idea in this project would be to optimize the use of these resources and enhance productivity per unit inputs and economic and social status of these farmers will improve. Farmers will earn more and would be able to return part of the income into continuous production and processing. The practice of rotation crop and year-round farming with correct input management would give them a full year occupation and continuous incomes.

468. Agri-value chain investment will be undertaken in ways which avoids environmental degradation, and which assures mitigation of long-term climate change effects.

469. Drainage canals shall be maintained regularly to increase backflow of water into the Arghandab River. The drained water volume will increase the environmental flow in the river. The environmental flow is needed to sustain aquatic life and habitats.

470. ASBA Kandahar and mirabs shall identify the owners of abandoned canals which are clogged with sediments and vegetation and request that they maintain them. Currently these canals prevent watering of subsequent canals and important routine maintenance is required.

471. Regardless of these and various other actions taken during the IEE process and in developing the project, there will be impacts on the environment during rehabilitation of the

canals. Appropriate avoidances/mitigation/enhancement measures have been suggested for the likely impacts that are identified.

472. During the construction phase, impacts mainly arise from generation of dust from soil excavation and refilling; and from the disturbance to residents and traffic by the construction work. These are common impacts associated with the construction processes, and there are well developed methods for their mitigation. Various measures are suggested including:

(i) Utilizing surplus soil for beneficial purposes;
(ii) Measures to reduce/control dust generation (cover/damp down by water spray; consolidation of top soil, cover during transport etc.);
(iii) Providing prior public information and planning the work in consultation;
(iv) Avoiding night-time construction activities.

473. Although limited, this environmental assessment process also identified opportunities for environmental enhancement. Certain measures suggested in this regard include:

(i) Employing the local people in construction work as much as possible to provide them with a short-term economic gain;
(ii) Employing local people in operation and maintenance of Output 2;
(iii) Improvement of livelihood of farmers due to improved availability of irrigation water;
(iv) Reduction of GHG emissions.

474. The main beneficiaries of Output 2 will be the farmers, who will be provided with water for irrigation. This will improve the quality of life and the livelihood of people.

475. Littering of canals and the Arghandab River with solid waste is very common. Water of canals is contaminated with sewage from Kandahar City and from adjacent villages. Introduction of a centralized waste collecting system is required. Waste has to be dumped on a licensed landfill.

476. The following preconditions have to be followed for a sustainable operation of the canals:

(i) Introduction of a waste collection system in villages and settlements around the dam (waste segregation, safe disposal of waste without endangering water resources, design of waste concept, introduction of waste fees);
(ii) Registration and safe disposal of existing waste dumps;
(iii) Littering of the environment, especially littering of waste in open water courses must be fined;
(iv) Laundry in the dam, Arghandab River and canals will not be allowed to protect water resources, laundry only in a distance of at least 50 m from the dam, canals and rivers (awareness campaign is needed);
(v) Disposal and treatment of sewage (design of decentralized technical simple solutions like reed beds, wetlands, septic tanks, system based on gravity).

477. It is recommended that an updated water master plan for the management of the Helmand River basin including Arghandab River Basin canals and rivers is needed after the raise of the dam. A successful water management program starts with a comprehensive strategic plan. The plan will provide information about current water uses and charts a course for water efficiency improvements, conservation activities, and water-reduction goals. Such a masterplan would focus on the following issues:

(i) Establishment of ongoing environmental flows for the rivers to ensure river health throughout the entire Helmand Basin. Incorporate a medium-term capacity building program for NEPA to develop and implement the masterplan and the environmental flows;
(ii) Registration and mapping of industrial, domestic and agricultural use of water resources;
(iii) Registration and prosecution of illegal water extraction;
(iv) Registration of existing locations of waste water discharge;
(v) Definition of water protection areas and measures for preservation and monitoring;
(vi) Identification and registration of wetlands, swamps of ecological value, suggestions for preservation (limited human land use and access, limited use of fertilizers and pesticides, limited hunting, monitoring of species and breeding habitats);
(vii) Prevention of uncontrolled and illegal settlements and illegal land use;
(viii) Calculation of investment costs;
(ix) Suggestions for financing.

478. Results of the master plan should aim to be enforced in national law.

479. Opportunities are there during the detailed design and pre-construction phase to put in place appropriate planning and ensure that envisaged problems and challenges can be mitigated against. This include putting in place the a comprehensive EMP from which the contractor can develop the SSEMP, ensuring constancy of water supply during construction, and applying applicable specifications to minimize effects of potential flooding. In addition, social issues such as resettlement, favorable treatment to local communities for employment generation and improving the ease of people and animal movement across the revitalized irrigation network can be addressed. During construction the major mitigation measures are anticipated to be managed through the SSEMP incorporating close collaboration with the beneficiary community and the MEW / DAIL, IA's and PMU. The documentation and administrative framework is expected to positively influence the both quality and delivery of the project. Operationally the project offers far greater opportunity for management of all agricultural inputs (e.g. water, fertilizer, pesticides) as well as promoting greater levels of climate-smart farming practices

480. The challenges and limitation of working in Afghanistan cannot be underestimated. Afghanistan is recognized as being one of the most insecure environments in which such a study can be conducted. Although there has been generous cooperation between the TRTA, partners and government agencies, the insecurity has been a major driver in determining the limitations of what could be done. Firmly associated with both the insecurity and the lengthy period of the civil war, is the lack of contemporary data on which analysis and conclusions can be made. While government agencies are willing partners in assisting with the TRTA, both their human resource capacity and lack of physical resource add to the general state of inferior data. These issues can be overcome but they require longer time than what logical planning would determine. This IEE has been a victim of such shortfalls.

IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Land Acquisition And Resettlement Framework

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

Land Acquisition and Resettlement Framework

July 2019

AFG: Arghandab Integrated Water Resources Development Project

Output 2: Reliability of irrigation water supply increased
(LAR impact anticipated)

Output 3: Agricultural water productivity improved
(no LAR impact anticipated)

Output 4: Capacity in water resource management and use strengthened
(no LAR impact anticipated)

Prepared by the Ministry of Finance, Islamic Republic of Afghanistan for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 9 July 2019)

Currency unit	–	afghani (AF)
AF1.00	=	$0.0124545099
$1.00	=	AF80.2922

ABBREVIATIONS

ADB	–	Asian Development Bank
AH	–	affected household
AIS	–	Arghandab Irrigation System
AP	–	Affected person
APC	–	Affected persons committee
ASBA	–	Arghandab Sub-Basin Authority
AUWSSC	–	Afghanistan Urban Water Supply and Sewerage Corporation
COI	–	Corridor of impact
CSC	–	Construction Supervision Consultant
DDT	–	Due Diligence Team
DPC	–	Displaced Persons Committee
EA	–	Executing Agency
EMA	–	External Monitoring and Evaluation Agency
FGD	–	Focus Group Discussion
GRC	–	Grievance Redress Committee
GRM	–	Grievance Redress Mechanism
IRS	–	International Resettlement Specialist
LAL	–	Land Acquisition Law
LAR	–	Land Acquisition and Resettlement
LARF	–	Land Acquisition and Resettlement Framework
LARP	–	Land Acquisition and Resettlement Plan
MAIL	–	Ministry of Agriculture Irrigation and Livestock
MEW	–	Ministry of Energy and Water
MOF	–	Ministry of Finance
MRRD	–	Ministry of Rural Rehabilitation and Development
MUDL	–	Ministry of Urban Development and Land
NGO	–	Non-Governmental Organization
PMU	–	Project Management Unit
R&R	–	Resettlement and Rehabilitation
ROW	–	Right-of-way

WEIGHTS AND MEASURES

ha	–	hectare
kg	–	kilogram
km	–	kilometer
m	–	meter
m^2	–	square meter
m^3	–	cubic meter

GLOSSARY

Affected Household (AH)	–	All members of a household residing under one roof and operating as a single economic unit, who are adversely affected by the Project. It may consist of a single nuclear family or an extended family group.
Affected persons (APs)	–	All of the people affected by the project through land acquisition, relocation, or loss of incomes and includes any person, household (sometimes referred to as project affected family), firms, or public or private institutions. APs therefore include; i) persons affected directly by the right-of-way acquisition, or construction work area; (ii) persons whose agricultural land or other productive assets such as trees or crops are affected; (iii) persons whose businesses are affected and who might experience loss of income due to the project impact; (iv) persons who lose work/employment as a result of project impact; and (v) people who lose access to community resources/property as a result of the project.
Compensation	–	Payment in cash or kind for an asset to be acquired or affected by a project at replacement cost at current market value.
Cut-off-date	–	The date after which people will NOT be considered eligible for compensation, i.e., they are not included in the list of APs as defined by the census. Normally, the cut-off date is the date of the detailed measurement survey.
Detailed measurement survey	–	The detailed inventory of losses that is completed after detailed design and marking of project boundaries on the ground.
Encroachers	–	People who move into the project area after the cut-off date and are therefore not eligible for compensation or other rehabilitation measures provided by the project.
Entitlement	–	The range of measures comprising cash or kind compensation, relocation cost, income rehabilitation assistance, transfer assistance, income substitution, and relocation, which are due to business restoration due to APs, depending on the type and degree nature of their losses, to restore their social and economic base.
Eligibility	–	Any person(s) who at the cut-off-date was located within the area affected by the project, its sub-components, or other sub-project parts thereof, and are affected by the project. Eligibility is irrespective of (a) formal legal rights to land, (b) customary claim to land or asset, or (c) no recognizable legal right or claim to the land APs are occupying.
Inventory of losses	–	The pre-appraisal inventory of assets as a preliminary record of affected or lost assets.
Jerib	–	Traditional unit for measurement of land in Afghanistan. One Jerib is equivalent to 2,000 m^2 of land. One hectare consists of 5 jeribs.
Land acquisition	–	The process whereby a person is compelled by a public agency to alienate all or part of the land she/he owns or possesses, to the ownership and possession of that agency, for public purposes, in return for fair compensation.
Non-titled	–	Those who have no recognizable rights or claims to the land that they are occupying and includes people using private or state land without permission, permit or grant, i.e., those people without legal

		title to land and/or structures occupied or used by them. ADB's policy explicitly states that such people cannot be denied compensation.
Poor	–	Those falling below the official national poverty line which is $1 per day person as income in this case.
Replacement cost	–	The method of valuing assets to replace the loss at market value, or its nearest equivalent, plus any transaction costs such as administrative charges, taxes, registration, and titling costs. Where national law does not meet this standard, the replacement cost will be supplemented as necessary. Replacement cost is based on market value before the project or dispossession, whichever is higher. In the absence of functioning markets, a compensation structure is required that enables affected people to restore their livelihoods to levels at least equivalent to those maintained at the time of dispossession, displacement, or restricted access. For loss that cannot easily be valued or compensated for in monetary terms (e.g. access to public services, customers, and supplies; or to fishing, grazing, or forest areas), attempts are made to establish access to equivalent and culturally acceptable resources and earning opportunities.
Severely Affected Household	–	Includes those AHs (i) losing 10% or more of their productive land/income generating assets (ii) physically displaced household and (iii) households losing commercial/business establishments.
Significant impact	–	Defined as; (i) being physically displaced from housing, or (ii) losing ten per cent or more of their productive assets (income generating).
Vulnerable	–	Particularly disadvantaged households who might suffer disproportionately or face the risk of being marginalized from the effects of land acquisition and resettlement. These are; (i) female-headed households with and/or without dependents; (ii) disabled household heads; (iii) poor households as defined by the official poverty line; (iv) elderly households with no means of support; (v) households without security of tenure; (vi) cultural or ethnic minorities; and (vii) refugees or internally displaced people.

NOTE

(i) In this report, "$" refers to US dollars.

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EXECUTIVE SUMMARY

The Asian Development Bank (ADB) has provided Transaction Technical Assistance (TRTA) at the request of the Government of the Islamic Republic of Afghanistan (the Government) for the design of a project to improve water resources management, irrigated agriculture, and urban water supply, including a provision for generation of hydropower for Kandahar City and its surrounds.

The Project that will be funded by ADB includes four outputs: (i) Dahla dam capacity increased; (ii) reliability of irrigation water supply increased; (iii) agricultural water productivity improved; and (iv) capacity in water resource management and use strengthened. The present Land Acquisition and Resettlement Framework (LARF) is mainly concerned with Output 2.

Current project design for Outputs 3 (Agricultural water productivity improved) and 4 (Capacity in water resource management and use strengthened) do not entail any infrastructure development or construction activities. Thus, no land acquisition and resettlement impacts are anticipated on Outputs 3 and 4 of the proposed project. In this regard, this LARF is mainly focused on details of Output 2 and additional details may be expected to be provided during land acquisition and resettlement plan preparation stage.

This LARF has been prepared for the Ministry of Energy and Water (MEW) as part of the financing request to ADB for processing the Arghandab Integrated Water Resources Development Project. This LARF comprises the rehabilitation impacts of the Arghandab Irrigation System (AIS) main canal passing through the districts of Arghandab, Dand and Daman in Kandahar province. The major settlements and associated irrigated lands located along the Project Canal are Khuja Molke, Maranjan, Mohammad Yaqob Kalacha, Delawar Khan Kalacha, Sardi, Saiydan Kalacha, Sarkari Bagh, Pesht, Joye, Zela, Mazrea, Sochala, Chand Gul, Gul Kalacha, Mazrea, Baba Sahib Dorahi,Tarnak, Meyanji and Mulla Kochi villages.

The Arghandab Sub-basin Authority (ASBA) is responsible for the management of river flow and operation of Dahla Dam, delivering water to the community irrigation system intakes on the river and to those receiving water via turnouts on the AIS canals. At the field level, irrigation services are provided by the community-assigned water bailiffs (mirabs) to the various sub-divisions and individual farms within the community irrigation systems.

Much of the Arghandab irrigation area infrastructure is in poor condition and inefficient, resulting in water delivery losses of up to 60% of dam outflow to community-managed irrigation groups and their farm fields. Siltation has raised the canal beds in some places above diversion gates, so large areas cannot be irrigated. Most of the community irrigation canals were manually established over 100 years ago, and deterioration of their earthen lining has resulted in large water transmission losses. Many farmers rely upon diesel-engine (or/and solar) to power pumps which supply irrigation water from boreholes drilled on the farms. As a result, the water table is dropping.

The AIS currently has a large modern weir and intake on the river and provides an irrigation and drainage service to 54 of the 120 community systems in the valley. The balance of 66 community irrigation systems each has their own intake on the Arghandab River. Very few of these have a permanent diversion structure (a low diversion/flow-guidance wall) and a gated intake structure. Most have an open intake, and being earthen, are prone to damage from high-flow events (increasing with climate change), and the intakes and canals are severely eroded. In many places, the erosion has resulted in the canal water level dropping far below farmers' fields, so pumping is required. Losses in water transmission from the dam to farm fields may be as much as 60%.

Irrigation infrastructure managed by both the ASBA and the mirabs needs to be modernized to reduce water losses and efficiently deliver water at critical times in the crop cycles. Irrigation modernization is expected to increase the current river basin irrigated area from 54,088 ha to between 65,000 and 90,000 ha, depending on precipitation and water flow into the reservoir.

ASBA, the operator of the AIS is reclaiming its right-of-way. The main canals are about 30 meters wide with original right-of-way (ROW) of 31 meters from each side of canal. These were duly transferred to ASBA is the minimum required to maintain the required level of water delivery and integrity of the design of the canals. This action by ASBA is causing the Land Acquisition and Resettlement (LAR) impacts. All activity during the project will take place strictly within the ROW. The project design will not consider any widening of canals, extension of ROW or canal rerouting. Land acquisition is required for the extension of the Babawali wasteway. The LARF covers the LAR impacts found in Output 2 due to the upgrading of the ASBA infrastructure in the Tarnak Main canal (flow control and monitoring; gates; canal restoration; bridges; drainage works; de-siltation) and the extension of the Babawali wasteway. The upgrades to community related infrastructure will be designed during implementation and has no anticipated impacts, and Output 3 (agricultural water productivity improved) will have no infrastructure component and therefore no LAR impacts.

This LARF has been prepared in accordance with Afghanistan's Laws and ADB SPS (2009). The area is inhabited primarily by the Pashtun and a small Tajik minority. Both, in Afghanistan's national context cannot be classified as Indigenous people as per ADB's definition. The LARF has been prepared in consultation with stakeholders and affected people to address the impact of measures necessarily required for infrastructure modernization, particularly the removal of encroachments from the canal banks that obstruct maintenance and rehabilitation.

The project will affect a total of 495 households with 3,960 affected persons[1], where 163 households with 1,304 persons will be severely affected:

(i) 2 households severely affected losing 35,940 m^2 of agricultural irrigated land (for the Babawali Wasteway);
(ii) 4 households severely affected losing their homes, to be relocated;
(iii) 160 households severely affected losing businesses;
(iv) 335 households losing trees (320 losing trees only) planted on the state-owned embankment;
(v) 9 households losing smaller structures such as water wells.

Based on the analysis of national laws and legislation provisions and ADB involuntary resettlement policies, the following basic resettlement principles were adopted for this LARF:

(i) Negative impacts on APs must be avoided or minimized whenever feasible.
(ii) Where negative impacts are unavoidable, the persons displaced by the project and vulnerable groups will be identified and assisted in improving or regaining their standard of living.
(iii) Information related to the preparation and implementation of the land acquisition and resettlement plan will be disclosed to all stakeholders and people's participation will be ensured in planning and implementation. Land Acquisition and Resettlement Plans (LARPs) with resettlement impacts will be disclosed to the APs.

[1] Number of households is calculated based on eight persons per household as the identified average number of persons in one household identified during surveys in these areas.

(iv) LARP preparation, approval, and implementation for the project is to be conducted as per the Land Acquisition Law of Afghanistan (2017) and ADB SPS 2009. Adequate compensation is to be paid for properties to be acquired. Additional support is provided to meet the replacement value of the acquired property.

(v) Before taking possession of the acquired lands and properties, compensation, resettlement and livelihood rehabilitation assistance (where applicable) will be paid in accordance with the provisions described in this LARF.

(vi) Assistance for relocation and applicable allowances for severely affected and vulnerable households will be provided as per ADB social safeguards provisions.

(vii) An entitlement matrix for different categories of affected persons will ensure a systematic and fair approach to compensation. A contingency will be maintained in the budget for those who may not have been present at the time of the census survey.

(viii) Compensation will be provided at full replacement cost, free of depreciation, transfer costs or eventual salvaged materials.

(ix) The final compensation eligibility cut-off date is the impact survey (census and inventory) date. People who move into the project area after the cut-off-date will not be entitled to any assistance. An appropriate grievance redress mechanism will be established at the district level to ensure speedy and effective resolution of disputes.

(x) Compensation will include not only immediate losses, but also temporary loss of business and livelihood, and employment on project civil works

(xi) As lands to be acquired from farmers are a portion of respective plot, therefore, land-for-land compensation will not be considered.

(xii) Lack of formal legal land title should not be a bar to compensation or rehabilitation;

(xiii) Particular attention will be paid to AH headed by women and other vulnerable groups, and appropriate assistance will be provided to improve their status. Other compensation/ rehabilitation provisions will equally apply across gender lines.

(xiv) Consultations with the APs will continue during the implementation of resettlement and rehabilitation works.

(xv) Compensation and rehabilitation is to be provided before the land is acquired and the full compensation of affected assets will be a condition for the initiation of civil works.

(xvi) No objection for the contractors' mobilization in the field will be given if compensation/ rehabilitation has been provided in full to the APs.

A draft Entitlement matrix has been prepared accordingly and shall be finalized during the LARP stage.

The Ministry of Finance will be the Executing Agency (EA) of the Project. The Project will have multiple implementing agencies, including MEW, Afghanistan Urban Water Supply and Sewerage Corporation (AUWSSC); Da Afghanistan Breshna Shekat (DABS), Afghanistan's national power utility; the Ministry of Agriculture, Irrigation and Livestock (MAIL); and the Ministry of Rural Rehabilitation and Development (MRRD). A program steering committee will be established to coordinate program implementation. (MEW will be the Implementing Agency (IA) and will establish a Project Management Unit (PMU) which will manage the Project on a day-to-day basis. MEW will be responsible for Land Acquisition and Resettlement for the Project.

A PMU will be established to implement resettlement activities and a Grievance Redress Mechanism will be put in place. In addition, an Implementing Consultant to be involved in the preparation and implementation of the land acquisition and resettlement plan, and an independent

External Monitoring and Evaluation Agency (EMA) to provide external monitoring services should be engaged. Following the approval of the LARF, the LARP will be prepared by the Implementing Consultant with the EA.

A preliminary measurement survey and census was conducted from 1 March to 30 March 2019 to assess the baseline impact and prepare this LARF. Compensation eligibility will be limited by a cut-off date to be set on the day of the beginning of the AP Census and detailed measurement survey (DMS) during LARP preparation. The LARP shall be approved by ADB and the government and disclosed to APs prior to the award of the civil work contract.

The total estimated cost for land acquisition and resettlement for this Project is AF 560,375,800 ($7,397,700), where the project will finance AF 520,841,799 ($6,875,799).

I. INTRODUCTION AND PROJECT DESCRIPTION

A. Background

1. The Government of the Islamic Republic of Afghanistan (the Government) requested the Asian Development Bank (ADB) for technical assistance to prepare an investment project to improve water resource management, irrigated agriculture, domestic and industrial water supply for Kandahar City, and to augment electric power in Kandahar City and surrounds. A transaction technical assistance (TRTA) to prepare the Arghandab Integrated Water Resources Development Project was approved by ADB on 8 December 2016, with a Letter of Agreement approved by the government on 17 January 2016. The Ministry of Energy and Water (MEW) is the lead counterpart agency.

2. The Project funded by ADB comprises four outputs: (i) Output 1: Dahla dam capacity increased; (ii) Output 2: reliability of irrigation water supply increased; (iii) Output 3: agricultural water productivity improved; and (v) Output 4: capacity in water resource management and use strengthened. The overall outcome of the Project will be its contribution to improved water resource management and rural economic growth.

3. This Land Acquisition and Resettlement Framework (LARF) has been prepared for Output 2 and 3. The LARF provides an assessment of the LAR impacts and costs. The LARF follows relevant Afghan laws, and *ADB's Safeguards Policy Statement of 2009* (SPS 2009). Its preparation involved: (i) census survey of affected population, (ii) asset valuation/documentary research on affected plots, (iii) and consultations with the AH.

B. Description of the Project

4. Under Output 2, for both the AIS and the community-managed systems, the project will modernize irrigation infrastructure, monitoring and control systems, and increase climate resilience for all farmers, including planning and delivery of water in a timely manner to 90% of AIS area farmers. There are two sub-components: (i) support to the AIS operating entity for improvement of irrigation and drainage services; and (ii) support to village communities for improvement of community irrigation services.

5. Outputs 3 (Agricultural water productivity improved) and 4 (Capacity in water resource management and use strengthened) do not entail any infrastructure development or construction activities and thus, no land acquisition and resettlement impacts are anticipated on Outputs 3 and 4 of the proposed project. In this regard, this LARF is mainly focused on details of Output 2.

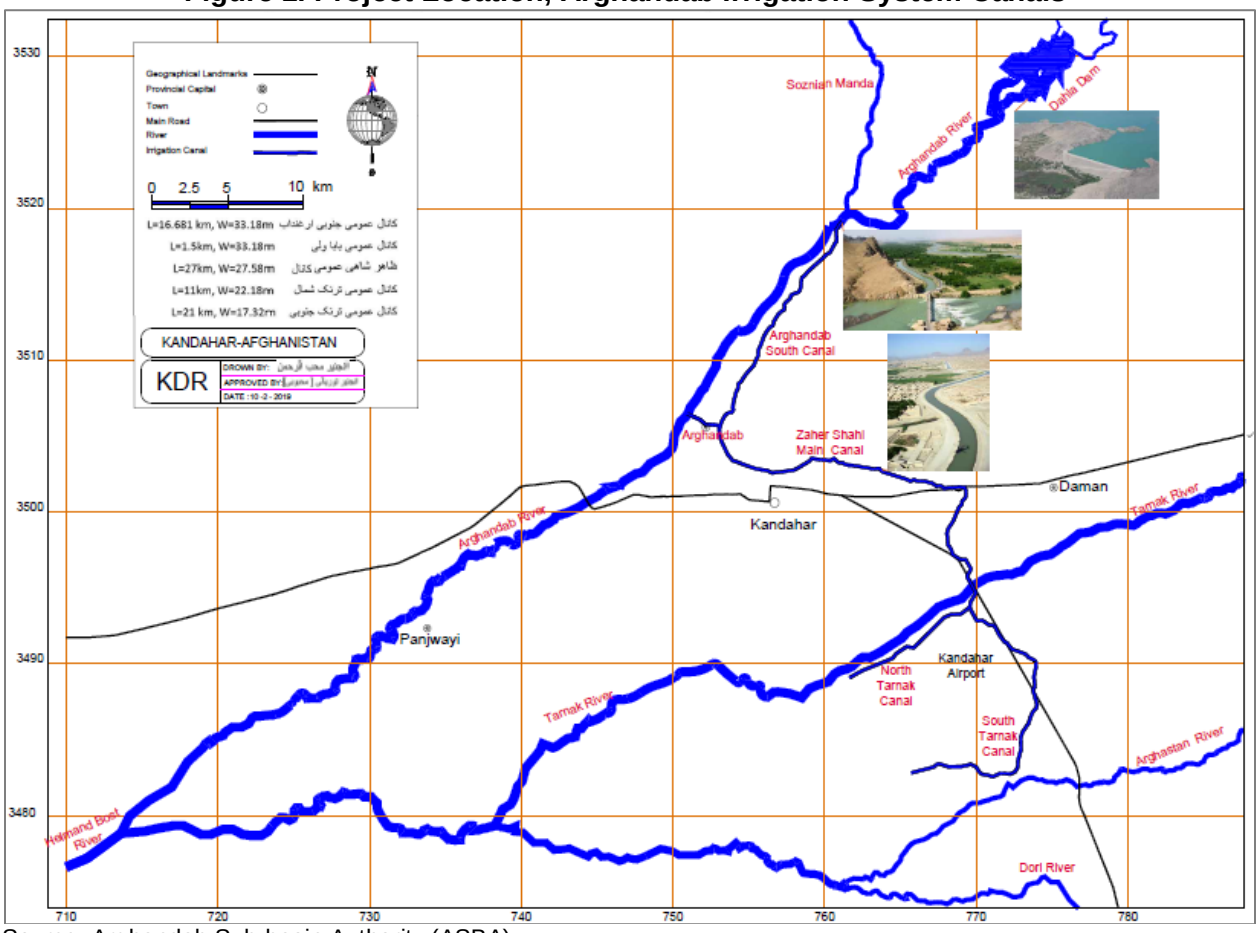
6. Modernizing ASBA-managed infrastructure is essential to address problems of severe water delivery losses, vulnerability to extreme rainfall flows, canal erosion, and to improve control and therefore ability to improve timeliness and efficiency of irrigation supply. Lining and retaining wall works are proposed along the main canal and branches; and new bridges and de-siltation are required. Accompanying the rehabilitation works is the extension of the Babawali Wasteway Channel (Option 1: 600 m in length). The project will support this activity through provision of a budget to ASBA of $10.0 million to be used for the following infrastructure types of work according to their priorities: flow control and monitoring; gates; canal restoration; bridges; drainage works; de-siltation; extension of Babawali wasteway; and canal safety measures. No new canals will be built.

7. The Arghandab Irrigation System (AIS) main canal consists of the following:

(i) Arghandab South Canal (Length = 16.681 km, Width = 33.18 m), starts and ends in Arghandab district.
(ii) Babawali Canal (Length = 1.5 km, Width = 33.18 m), first branch starts and ends in Arghandab District. The Babawali Wasteway is located at the end of Babawali Canal.
(iii) Zahir Shahi (Lowe Weyala) Main Canal (Length = 27 km, Width = 27.58 m), starts in Kandahar and ends in Daman district.
(iv) North Tarnak Canal (Length = 11 km, Width = 22.18 m), starts and ends in Daman District.
(v) South Tarnak Canal (Length = 21 km, Width = 17.32 m), starts and ends in Daman District.

8. The location of the Arghandab Irrigation System canal is shown in Figure 1.

Figure 1. Project Location, Arghandab Irrigation System Canals



Source: Arghandab Sub-basin Authority (ASBA)

9. The engineering options for infrastructure rehabilitation and improvement of canals will involve either rehabilitation or construction of new syphons, flow central gates, flow diversion structures/boxes, culverts and lining of canals. No new canals will be built. No widening or extension of canals is foreseen.

10. Babawali Wasteway is the Arghandab Irrigation System's principal wasteway and situated at the end of Arghandab South Main Canal, upstream of the tunnel section of a neighboring canal. The wasteway is to be operated in case of an emergency, such as a sudden blockage, for example due to collapse of the tunnel or of one of the inverted syphons. Such a blockage without the wasteway will result in the water level in the canal increasing and overtopping the banks; likely to cause serious damage to the city.

11. The project will trigger LAR impacts along these canals due to ASBA, the operating agency, reclaiming its legal ROW, which over the years has been encroached by shops. Any subsequent project works, after the ROW is vacated, will be strictly restricted to this ROW.

C. Objective of the LARF

12. The aim and objective of this LARF is to lay out the framework to compensate all unavoidable negative impacts caused due to the Project, to resettle the displaced persons, and to restore their livelihoods. The LARF also provides a guideline on the implementation of land acquisition, resettlement and rehabilitation through proper compensation and assistance as per safeguards requirements of ADB and the laws of Afghanistan. The issues identified and addressed in this document are as follows:

(i) Assessment of the type and extent of loss of land and non-land assets, loss of livelihood or income opportunities and collective losses, such as common property resources and social infrastructure;
(ii) Identification of impacts on, vulnerable groups and assessment of other social issues related to the Project.
(iii) Public consultation and people's participation in the Project;
(iv) Assessment of existing legal and administrative framework and formulation of resettlement policy for the Project;
(v) Development of entitlement matrix, including provisions for relocation assistance and restoration of businesses/income;
(vi) Resettlement and Rehabilitation (R&R) cost estimate including provision for funds; and Institutional framework for the implementation of the plan, including grievance redress and monitoring and evaluation.

D. Eligibility cut-off date

13. A preliminary measurement survey and census was conducted from 1 March to 30 March 2019 to assess the baseline impact and prepare this LARF. Compensation eligibility will be limited by a cut-off date to be set on the day of the beginning of the AP Census and detailed measurement survey (DMS) during LARP preparation.

14. The cut-off date and eligibility process was explained to affected people's representatives during the April 2019 consultative workshop on resettlement. The announcement of the cut-off date to APs will formally be announced at the end of the DMS.

II. SCOPE OF LAND ACQUISITION AND RESETTLEMENT

A. Introduction

15. During the course of the census and impact survey a total of 164 affected shops, 4 homes that will have to relocate, and 1 mosque that will be totally damaged have been identified. No alternative program design was considered as the affected shops are encroaching on the ROW of existing canals. Possible mitigation measures should be applied during the LARP preparation process.

16. A structured questionnaire was used to collect detailed information on affected households and properties in the Project area. The information was collected for a full understanding of the Project impacts in order to develop mitigation measures and a resettlement plan for the APs, which was recorded in a database. The objective of the census survey was to generate an inventory of all affected assets including land, fruit and non-fruit trees, and structures/buildings; and to compile a list of all affected families and people; taking into account the social and economic impacts of land acquisition and resettlement. Information collected through the census includes: (i) type and extent of impact by physically measuring the size of affected land and structures; (ii) magnitude of impact with respect to the total land holdings of the AP, (iii) number of affected trees and crops; and (iv) unit rates for land, crops, trees, and structures. The major findings and magnitude of possible impacts are discussed in the following sections.

17. The following section deals in detail about the findings of the census and the impact of land acquisition and resettlement.

B. Impacts Assessment

1. Summary

18. The project will affect a total of 495 households with 3,960 affected persons[2], where 163 households with 1,304 persons will be severely affected:

(i) 2 households severely affected losing 35,940 m^2 of agricultural irrigated land (for the Babawali Wasteway);
(ii) 4 households severely affected losing their homes, to be relocated;
(iii) 160 households severely affected losing businesses;
(iv) 335 households losing trees (320 losing trees only) planted on the state-owned embankment;
(v) 9 households losing smaller structures such as water wells.

19. A summary of involuntary resettlement impacts is provided in Table 1 below**Error! Reference source not found.**.

[2] Number of households is calculated based on eight persons per households as identified average number of persons in one household identified during surveys in these areas.

Table 1. Summary Impacts on Land Acquisition and Resettlement

Impacts	Unit	Quantity
I. Land		
Agricultural Land irrigated	m^2	35,940
Total Affected Land	m^2	**35,940**
II. Structures		
Private Structures (homes and shops)	m^2	104,731
Community Structure (mosque)	m^2	40
Total Affected Structure	m^2	**104,771**
III. Trees		
Timber Trees	No	1,832
Productive Fruit Trees	No	3,855
Total Affected Trees	No	**5,687**
IV. Community Facilities		
Community facilities (mosque), relocating	No	1
Graveyard	No	1
Total Community Facilities	No	**1**
V. Households		
Households losing agricultural land *	No	2
Households losing trees [a]	No	320
Households losing residential structure, relocating *	No	4
Households losing commercial structures, relocating *	No	160
Households losing water wells or other small structure	No	9
Total Affected Households	No	**495**
Severely Affected Households	No	163
Severely Affected Persons [b]	No	1,304
Vulnerable Households	No	14

[a] A total of 335 households are losing trees: 320 households losing trees only, 1 household losing residential structure and trees, and 14 households losing commercial structures and trees.
[b] Based on an average of eight persons per household.
* Severely affected households.

1. Land Impacts

20. The total land acquisition required for the project is 35,940 m^2 (17.97 Jeribs). This irrigated land is owned by two sizeable farmers and is required for the construction of the 600 m Babawali wasteway (Table 2).

Table 2. Details of Land to be lost permanently by Type

Type of Land	Location/purpose	Total Affected Area (m^2)
I. Agricultural Land Irrigated	**Babawali wasteway**	35,940
	Sub-total	35,940
II. Non-Agricultural land		
Residential/Commercial	Sub-total	0
Total		**35,940**

21. Figure 2 shows the new alignment of the Babawali wasteway and the land to be impacted.

Figure 2. Babawali Wasteway Alignment

Source: TRTA Consultants and Google Earth, 2019

2. Crops

22. No damage to crops is anticipated due to the Project. The two owners of the Babawali Wasteway land will be allowed to harvest their crops before construction works begin. In case the land is needed while the crop is in the field, compensation will be paid.

3. Trees

23. A total of 335 AHs are losing 5,687 trees planted in state land beyond the boundary of their private land. None are losing more than 10% of their income by losing these trees. Out of these trees, 3855 are fruit bearing trees and 1,832 are non-fruit bearing timber trees. Details of the trees are given in Table 3. All the affected fruit trees are productive.

Table 3. Details of Affected Trees

Type of Trees	Number
Fruit trees (pomegranate, apricot)	3,855
Timber trees	1,832
Total Trees	**5,687**

4. Impact on Structures

24. Details of affected structures by type of construction are given in the Table 4.

Table 4. Details of Affected Structures

Type of Construction Material		Total Area of Structure (m^2)
I. Houses/shops		
Mud/brick/wood, mud/tin roof		90,846.91
Reinforced Concrete Cement (RCC)		13,924.61
	Sub-total	**104,771.52**
II. Community Facilities – Mosque		
Mud/brick/wood, mud/tin roof		40
	Sub-total	**40**
	Total	**104,811.52**

5. Relocation of Affected Households

25. A total of 4 AHs are losing residential structures, that have encroached the canal bank ROW. Besides compensation for the structure these AHs will be provided with transitional livelihood and relocation allowances.

6. Business/Income Losses

26. A total of 160 households will be affected by the loss of their businesses: 157 shops/assorted merchandise businesses, 2 greenhouses and a diesel driven flour mill will be permanently affected by the Project's rehabilitation measures to restore the ROW of the canal. TThe land that they are on belongs to ASBA/state owned. Besides compensation for structures, a loss of business allowance along with a transitional livelihood and relocation allowance will be provided. These businesses are owner operated and no employees were identified.

Table 5. Details of Business/Income Loss

Business/Income Losses (owners)	AH
Assorted merchandise *	157
Green House	2
Flour mill	1
Total	**160**

* Most AHs have one shop; however, a few owners have between 2 to 4 shops. The total number of affected shops is 179.

Figure 3. Marajan Village Affected Businesses

Figure 4. Sarband Bridge Affected Businesses

Figure 5. Dabaro Bridge Affected Businesses

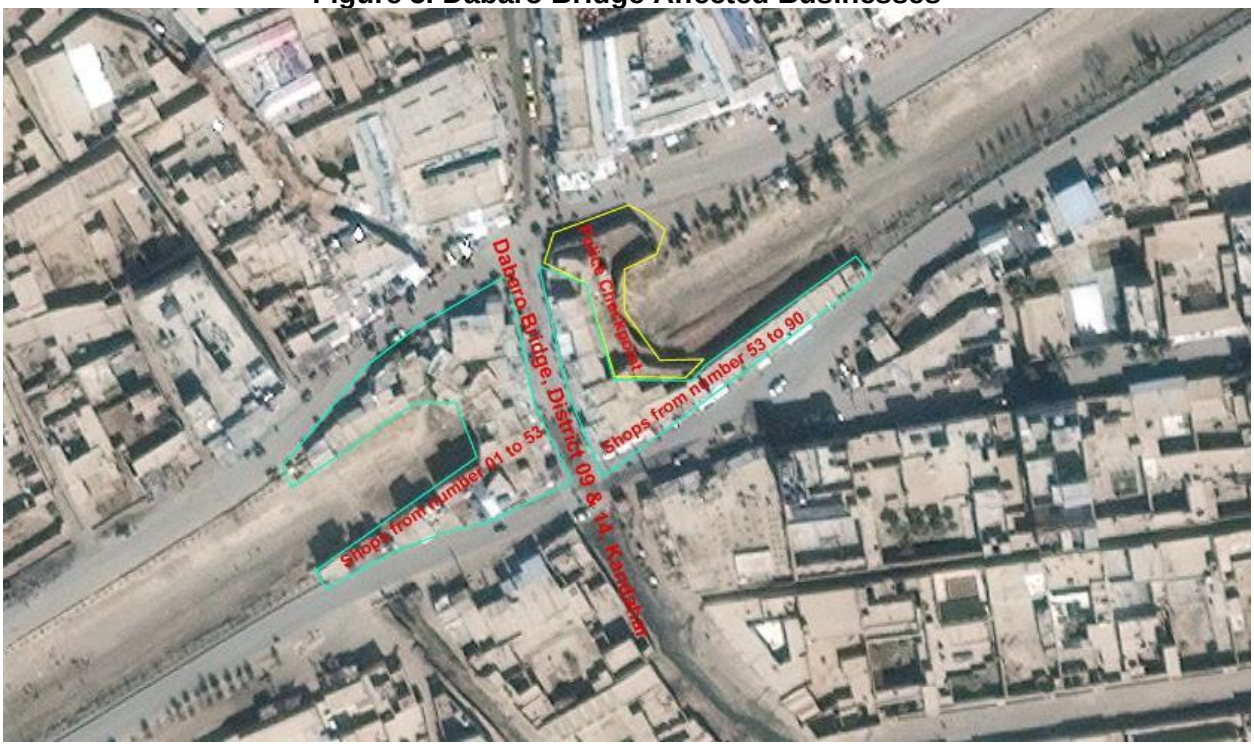


Figure 6. Delawar Kahn Kalacha Village Affected Businesses

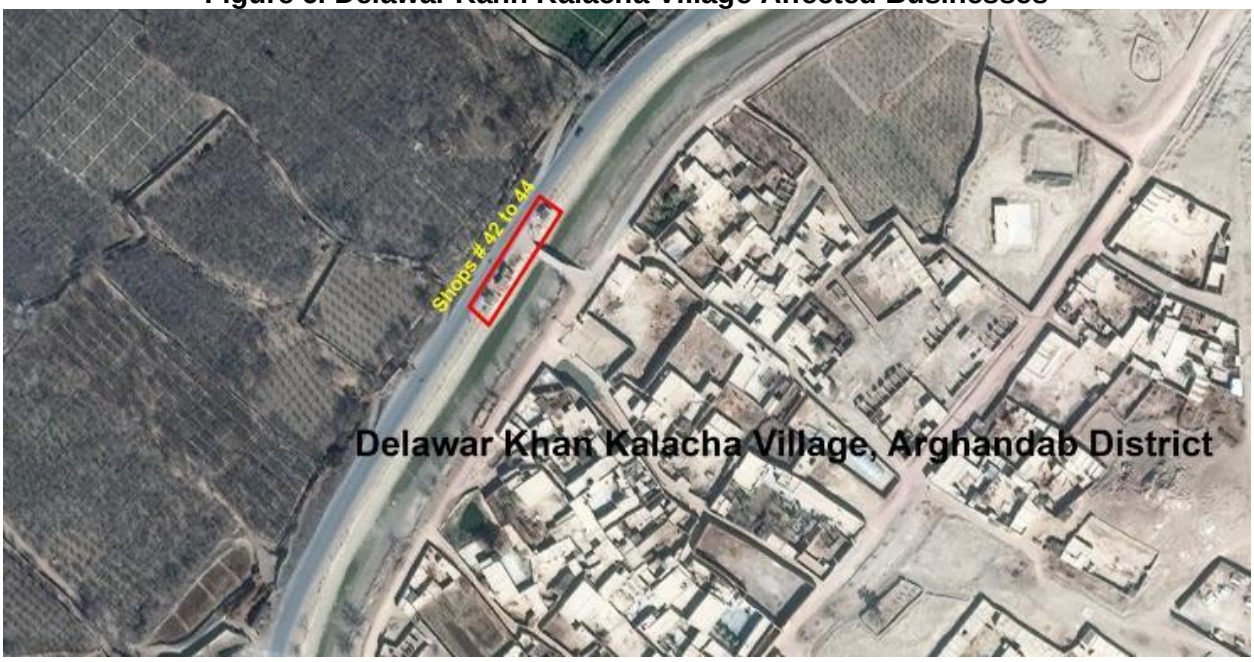


Figure 7. Khwaja Mulk Village Affected Businesses

7. Households with Severely Affected Agricultural Land

27. Two neighboring farmers are losing a little over 10% of their irrigated land to the Babawali wasteway structure being constructed by the project. Both these farmers are entitled and eligible in accordance with the Project entitlement matrix to get a severity of agricultural impact allowance. They are losing a combined total of 35,940 m^2 of irrigated land. No others were severely impacted.

8. Vulnerable Households

28. AHs headed by female, disabled or elderly persons, or those below the poverty line are considered as vulnerable households. The total number of vulnerable households affected by the project is 14. 13 households are below poverty line, and one is considered vulnerable because it is “woman headed”. These vulnerable households were recognized and verified as vulnerable by their neighbors and the rest of the community (Table 6).

Table 6. Details of Vulnerable Households

Type of Vulnerability	No. of AHs
Women headed households	1
Below poverty line households by income	13
Total Vulnerable Households	**14**

9. Relocation and Restoration

29. All 187 entities; 4 houses, 164 shops, 2 greenhouses, 1 flour mill and 1 community facility (mosque) losing structures are required to relocate. They are squatting in state land on the embankment of the canal. They will however be paid compensation for their non- land assets including the structure, any trees they have planted and commensurate resettlement allowances to help them relocate and support them during the transition.

Table 7. Homes, Shops and Community Structure Losses

Types of Structure	No	Extent of Loss
Houses	4	Permanently affected and must relocate
Shops	179	Permanently affected and must relocate
Mosque	1	Permanently affected and must relocate
Greenhouses	2	Must relocate
Flour mill, diesel driven	1	Must relocate
Total	**187**	

30. Besides receiving compensation at replacement value and requisite allowances, the LARP implementation NGO will facilitate the displaced households, if they so wish, to help identify and purchase residential land in their preferred localities in collaboration with local Jirgas/ Shuras. To further abet the resettlement process and livelihood improvements of the displaced households the LARP Implementation NGO will organize a Displaced Persons Committee (DPC), and if there is an interest, the NGO will attempt to link the DPC with existing microcredit or livelihood development programs in the area. Another avenue that could be explored would be to establish a market for the displaced businesses in collaboration with town authorities or relevant Jirgas/Shuras.

31. Although prepared to provide appropriate alternative land for the purpose of rebuilding the potentially impacted community facilities, considerations should be made to adjust the alignment to avoid the demolition of the mosque. However, the concerned communities have shown no reservations regarding moving these structures and endorse the integrity of the proposed design as this does not, according to them, in any manner violate belief or religious sentiment as long as appropriate alternative land and replacement of the structures is provided. If rebuilding is not possible and compensation is to be provided, this will be determined during the LARP preparation stage.

III. SOCIOECONOMIC PROFILE

A. General

32. A baseline socioeconomic survey of a sample of project target population was conducted for Kandahar city and rural districts from October to November 2018 in order to assess the overall socioeconomic conditions of the project target households on the basis of various socioeconomic indicators. The survey area covered 10 urban districts of Kandahar city and 7 rural districts of Kandahar province including Arghandab, Dand, Daman, Zheri, Panjwai, Maiwand and Shah Wali Kot. The instruments used were a questionnaire for the baseline socioeconomic survey, focus group discussions and in-depth/key informant interviews. Data collection was done after conducting orientation of the survey team to enable them to collect field data. Socioeconomic data consisted of basic socioeconomic information such as demographic features, occupation, income and living conditions, land ownership status, land tenancy patterns, housing conditions, household assets, access to basic amenities available to them, poverty status, household income and expenditures levels, education levels, and gender analysis. The findings of the surveys and studies of the target population are applied to the affected population as the sample was taken from the same geographical areas.

33. Baseline socioeconomic details of 25% of the affected households will be collected during the finalization of the implementation ready LARP. This will be collected through a sample survey using the sample structured questionnaire provided in Appendix 1.

34. This component will affect a total of 495 entities which includes 164 businesses, 4 homes, and 2 greenhouses occupying state land; and 322 affected persons living on private land across the road on the other side of the canal embankment, who will lose trees planted on the state-owned embankment. Of those impacted, 25% of those affected will be randomly selected for the survey.

B. Socioeconomic and Demographic Details

35. The following section deals with various socioeconomic indicators and the socioeconomic status of the households in the project area.

1. Composition of Households by Gender and Age

36. Table 8 reflects the composition of household data by gender and age. It reflects an explosive youth population, as 80% of the population is below 40 years of age. A total of the male and female population reflects that there are more men than women.

Table 8. Gender and Age Composition of Households

Age Group	Age group (%)	Male (%)	Female (%)
0-14 years	37	54	46
15-24	21	49	51
25-39	22	50	50
40-64	18	49	51
65+	2	52	48
Total	**100**	**52**	**48**

2. Size of Households

37. The average household size in Kandahar City is 7, and in villages the average size is 8. 24% live in nuclear family units and 76% in extended units, which shows a predominance of extended families particularly in rural areas. The extended families include paternal grandparents,

their children, one or three families with parents and their children in one compound led by the male grandparent or elder son as household head. The head of household is responsible to look after all social matters including managing income and expenditures.

3. Ethnic Composition of Households

38. 97% of the households speak Pashto, while 3% speak Dari or Balochi. The ethnic groups are very much in the mainstream and do not fall under the definition of indigenous people based on ADB SPS (2009).

4. Formal Educational Attainment

39. The education levels of surveyed population not only reflect their ability to read or write; it is also a reflection of the ability of the local population to improve their lifestyle and to empower themselves. Table 9 reflects that only 2% of men and 1% of women hold a post-secondary degree. The majority of the population, 32% have no formal education, out of which 21% are women, followed by 44% that have attended primary school, out of which 19% are women. 21% have secondary education, which includes 6% of women only. None of the persons surveyed hold a professional diploma or a master's degree. 42% of men are educated while only 26% women are educated. In Kandahar province, girls continue to be deprived of education due to customs and terrorist threats in rural areas. Kandahar is one of the provinces where the lowest number of girls graduate annually. Women, particularly girls, are concerned about their future and say that most of their families are not ready to let their daughters attend schools after primary education due to customs and demand for household work. Most of the girls only attend school up to lower grades. The main challenge in the people's view is that the fathers and brothers do not allow girls to go outside the house.

Table 9. Educational Levels of Household Members

	Never Attended School			**Primary (1-5)**			**Secondary (6- 10)**			**Graduate**		
	Male	Female	**Total**	Male	Female	**Total**	Male	Female	**Total**	Male	Female	**Total**
% of Total	11%	21%	**32%**	25%	19%	**44%**	15%	6%	**21%**	2%	1%	**3%**

5. Health Status

40. The most common diseases faced by the population includes diarrhea, high blood pressure, cardiovascular disease, tuberculosis, malaria, typhoid fever, cholera, hepatitis A and E, respiratory infections, influenza and pneumonia. In children, diarrhea is the most common disease, followed by measles, typhoid, and polio. Polio is the leading cause of disability among those under 15 years old. About 4% of households members are disabled either due to polio, attacks, or accidents. Access to health services is difficult for the households residing in rural areas, on average, it involves a travel of more than 10 km to reach to a dispensary or medical center.

Table 10. Health Status of Household Members

S. No.	**Diseases reported**	**Male**	**Female**
1	Diarrhea	40%	35%
2	Blood Pressure	22%	20%
3	Cardiovascular	21%	18%
4	Tuberculosis	16%	19%
5	Malaria	18%	16%
6	Typhoid fever	18%	15%
7	Cholera	10%	10%
8	Hepatitis A and E	12%	9%

S. No.	Diseases reported	Male	Female
9	Respiratory infections	9%	15%
10	Influenza and Pneumonia	13%	9%
11	Cancer	6%	8%
12	Diabetes	4%	3%
13	Stroke	3%	2%
14	Congo fever	1%	0.5%
15	Leishmaniosis	2%	0.5%
16	Rabies	1%	0.5%

6. Occupational Status of Males

41. Table 11 shows that the surveyed population of working men consists of numerous sources of livelihoods. The majority of males (54%) are involved in agriculture and livestock rearing, while 13% are either involved in trade or run their own businesses. 8% work as daily wage laborers, either in the construction industry or agriculture. 3% of males render their services to the Afghan government, followed by micro businesses, working for private sector industries, and running microbusiness enterprises. 5% of males are reported as unemployed. A very small portion are employed in other occupations in the project area including in poultry, handicrafts, domestic workers, foreign employment, pensioners, owning small industries, and workers in the local industry.

Table 11. Occupational Status (Males)

Type of Employment	% of total
Farming plus livestock	54%
Trade/business	13%
Daily wage laborer	8%
Livestock and agriculture labor	5%
Government Service	3%
Micro businesses	3%
Business worker	2%
Professional-Private Job	2%
Activity that is not allowed by law	1%
Domestic Worker	1%
Handicrafts	1%
Poultry keeping	0.5%
Pensioner	0.5%
Own small Industry	0.5%
Foreign Employment	0.5%
Unemployed	5%
Total	**100%**

7. Occupational Status of Females

42. Table 12 reflects the occupational status of women in the project area. The majority of women are involved in agriculture that includes their involvement in their own farms, horticulture value chains, cattle rearing and poultry at the household level; 8% of women also work as seasonal daily wage laborers in the agricultural sector particularly in agriculture value chains, 8% work in the handicrafts sector, 3% work in stitching and tailoring, followed by government and private sector service particularly social services i.e. teaching, health workers etc. However, 21% of the women are involved in unpaid household work only.

Table 12. Occupational Status (Females)

Type of Employment	% of total
Farming, livestock rearing and poultry	54%
Daily wage seasonal agriculture worker	8%
Handicrafts	8%
Stitching, tailoring	3%
Business worker	2%
Government Service	2%
Professional-Private	1%
Business owner	1%
Unpaid domestic work	21%
Total	**100%**

8. Coping mechanism by middle income and poor during economic crises

43. Middle income and poor household in villages stated that in case of economic crises, they sell livestock, send their male children to work, borrow money from relatives, and receive food and money from better off relatives. A few families send females to work and receive charity from different organizations. The middle income and poor in urban areas sell their assets, send their male children to work, borrow money from relatives, or buy groceries on credit from shopkeepers of their vicinity. In a few cases they send women and girls to work. The main cause of economic crisis in the villages is drought or natural disaster, and in urban areas the cause is lack of employment.

C. Income and Expenditure

1. Households Income and Poverty

44. The average monthly income of households is AF 32075 ($414).[3]The average monthly income of well-off households is AF 48,000 ($620) or $2.75 /person/day, the middle income households have an average monthly income of AF 30800 ($398) or $1.76 /person/day, while the average monthly income of poor households is AF 17300 ($223) or $2.75 /person/day. The national poverty line is AF 2,064 per person per month, around $1 a day in current exchange rate terms which includes 2,100 kilocalories per person per day as well as necessary non-food expenditures on housing, clothing, education and transportation

Table 13. Average Income of Households

Income Groups	Poor	Middle Income	Well-Off
Average HH Monthly Income (AF)	17,300	30,800	48,000
Average HH Monthly Income ($)	223	398	620

HH = household

2. Average Monthly Expenses of the Households

45. A breakdown of the monthly expenses of the families reflect that the major share of income of households is spent on food, attributing to 40% of their income. For the poor households, the majority of their income is spent on food and social and religious festival and attributes to 3% of their income. The well-off households spend about 7% of their monthly income on family functions, religious festivals and tourism.

[3] The average household size in Kandahar City is 7 and in rural areas is 8, for the poverty estimates, the average size of the households is taken as 7.5.

Table 14. Household Expenditure Patterns

Expenditure items	% of total expenses
Food	40%
House (Rent / Repair, etc.)	11%
Clothing	6%
Medical	9%
Social, Religious festivals	3%
Transport	7%
Education	5%
Firewood/ Kerosene / Gas	5%
Family Functions	3%
Electricity	4%
Entertainment (Radio / TV / trips, etc.)	3%
Water and Sanitation	3%
Telephone (landline / cellphone)	1%
Total	**100%**

3. Ownership of Dwellings

46. A majority of the well-off and middle income dwellers in the project area own their own houses. 15% of the middle income families and 5% of the poor live in rented dwellings while 3% live in temporary shelters.

Table 15. Type of Dwelling Ownership

Type	% of Total
Own House	76%
Rented House	20%
Temporary shelters	3%
Other	1%

4. Land Ownership Patterns

47. The lands of 97% of owned houses are registered in the names of males, only 2% women have ownership of residential lands in their names, and 1% are in the names of both men and women.

Table 16. Land Ownership Patterns by Gender

Ownership	% of Total
Husband	97%
Wife	2%
Both	1%

5. Access to Mobile Phones

48. 81% of the surveyed households have access to a mobile phone, and there often at least one mobile phone per household.

6. Use of Social Media

49. The majority of social media users are mostly literate, with no difference across gender, but evidence shows that illiterate users also enjoy social media for pictures, video content, or voice messages. There is limited use of social medial in rural areas. About 80% of social media users are the residents of Kandahar City and have at least been to high school, 21.5% of the social media users are students. This is true for both male (22%) and female respondents (20%), the female users are teachers and housewives. Male respondents on the other hand have a more varied set of occupations as they are shopkeepers (18%), government servants (10%),

employees of development organizations or companies (11%). The coverage is rural areas is underserviced and internet access remains the main barrier to social media access.

7. Access to Roads

50. 76% of population have access to the roads, while 24% who have access to dirt tracks until they reach to the main roads.

D. Water and Sanitation

1. Water Supply

51. Infrastructure in Kandahar in general, and water supply facilities in particular have not been able to keep up with the city's rapid expansion in population and have created serious environmental problems such as contamination of surface water and groundwater. The increasing population is attributed primarily to the influx of people from rural areas, increasing the proportion of low-income families in the city. This change in city demographics is not only negatively affecting economic growth but also the city's ability to pay for and sustain needed infrastructure improvements. Kandahar City is currently predominantly relying on groundwater as a water source. All existing water wells managed by the Afghanistan Urban Water Supply and Sewerage Corporation (AUWSSC) within the Project area are drawing water from the deep aquifer 60-200 m below Kandahar. However, 70-80% of the population relies on private shallow wells which are predominately tapping into the shallow unconfined aquifer which is impacted by surface contamination such as untreated wastewater. The shallow wells are often polluted and vulnerable to drought. The shallow aquifer is recharged by the Arghandab, Tarnak, and Arghistan rivers as well as by local irrigation canals. Some wells could fall seasonally or permanently dry because of increased withdrawals, if they are not deepened.

52. The public piped water supply system currently provides about 8,148 m^3 of water per day through separate piped networks. According to AUWSSC[4], about 70% of the existing water supply network is estimated to have leaking pipes, and non-revenue water (NRW) is likely to be in the region of 50 to 60%, although no flow monitoring records are available. AUWSSC in their planning allow for NRW of between 49.8 and 68.8% for 2018. An investigation into the sources of water used for domestic consumption in Kandahar revealed that a majority of the people rely on private tube wells (49%), while 19% rely on public hand pumps and neighbors for the water. Only 8% of the population are relying on taps.

53. The majority of the rural population depends on dug wells followed by shared public wells, communal taps and rain water. No households purchase bottled water or use natural ponds.

Table 17. Sources of Water

Source of water	Percentage
Tap only	8%
Tap and tube private wells	7%
Private tube well	49%
Public hand pump and neighbors	19%
Tap, public hand pumps, and neighbors	5%
Street vendor	13%

54. The highest number of cases of water borne diseases are associated with those that used public hand pumps or relied on their neighbors (42%), followed by private tube wells (24%), public hand pump (19%), and street vendors (13%). The water of shallow groundwater is contaminated

[4] AUWSSC, 2018. *AUWSSC Plan, Planning Monitoring and Evaluation Table*, 2016-2020.

by wastewater. Water produced from the municipal wells and private wells in Kandahar City is currently not being treated. Surface water used for domestic purposes is also untreated.

Table 18. Water Treatment before Drinking

Water treatment	% of Households
Use as it is	**94%**
Boil	**3%**
Filter	2%
Total	**100%**

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2. Sanitation

55. A dedicated sewage system is non-existent. Onsite (households) facilities such as septic tanks and manual collection are used to collect and discharge sewage. Table 19 shows that 52% of the households have access to flush or water pour toilets, 47% have dry pit latrines, and 1% practice open defecation.

Table 19. Type of Toilets

Item	% of Households
Flush / water pour toilet	52%
Dry pit	47%
No toilet / open defecation	1%

E. Agriculture

56. The severe drought has significantly worsened the agricultural situation in Kandahar province, due to which it has been facing chronic food insecurity. The drought has strongly affected the agriculture system in the province as lack of sufficient surface water has resulted in drying up of the orchards and reduction in crop cultivation. People pay for each liter of water since the only alternative remaining is the underground water being pumped from deep bore-wells through diesel water-pumps, which is very costly. This has often caused farmers to turn to poppy cultivation which is considered as the only cash crop paying for the production expenses under current circumstances.

57. There are two main types of agriculture in the Project area: field crops and orchards. The main cash crop for farmers in Kandahar are wheat, maize, corn, and barley; and in the rain fed areas melon and watermelon. Most orchards grow pomegranates, grapes, apricots, palms, figs, and peaches. The area under orchards was severely reduced during the drought and when trees were cut for firewood. War also destroyed some orchards, especially in Panjwayi district. The main international commercial crops are grapes, (Mewand, Panjwai and Zhari districts yield 60% of the total grapes produced in Afghanistan), pomegranates, and almonds. There are different varieties of grapes available which are being further processed (dried) through local and traditional mechanisms of (kishmish khana) to raisins (kishmish) and being traded. The fresh food trade is mainly between Kandahar and Pakistan, with some being sold to India and UAE as well.

58. The production of vegetables includes potatoes, onions, tomatoes, okra, leek, eggplant, squash, pepper, and cucumber, among others. Industrial crops include tobacco, cotton, sesame, and sugar extracts.

F. Gender

59. In general, the Kandahar province has a very restricted cultural environment for women. Women do not have same contribution in social and economic life as men. About 95% of the

women always stay at home and do not come out into public areas, with some exceptions in case of urgent issues like health problems or similar issues. Women are supposed to hide their faces and body completely, particularly in rural areas. The gender gaps are widespread in health, education, access to and control over resources, economic opportunities and power and political voice, and women and girls bear the direct cost of these inequalities.

60. Across all income levels, male members of the household make all the decisions about household expenditure. In only around 4% of the households do women decide where the money would be spent, and in around 9% of the households do men and women jointly make these decisions. Women's participation in community development activities is extremely low, (less than 5%), and women's participation in public sector services is also less than 5%.

61. Women are involved in providing services in the education and health sector and mainly in agriculture sector. Women play a critical role in agricultural production, 32% overall involvement, accounting for a majority of the workforce in the livestock and poultry sectors, and approximately half of the workforce in the farming and horticulture sectors. Some agricultural activities (land preparation, sowing, contact with the mirab over water delivery, on-farm irrigation) are carried out exclusively by men, regardless of social group. Women are involved in weeding, harvesting, post-harvest handling, and looking after livestock. Numbers of livestock are limited for all social groups. As the wealth of the household increases, all these activities (apart from looking after the livestock) become increasingly male dominated. Women face a number of constraints due to gender gaps on access to resources that restrict their participation in the agriculture sector, these constraints include:

(i) **Access to assets:** the absence of official identification (*tazkera*) limits women's access to government and assistance under development projects (e.g, subsidized inputs), and lack of assets (land) to offer as collateral limit their access to agriculture credit.

(ii) **Balance of power and decision-making:** women traditionally have had little decision-making authority on land use (e.g., what crops to grow and when), farm labor allocation, input purchasing (including access to irrigation water), or crop marketing. There are no female agriculture extension workers.

(iii) **Knowledge, beliefs, perceptions:** rural women have low literacy and numeracy rates, and they face cultural norms (related to safety and security) that limit their mobility outside of their residential compounds to engage in economic and other activities.

(iv) **Practices and participation:** most of the women are involved in small-scale, subsistence (not commercially-oriented), unpaid activities that take place within their residential compounds, such as kitchen gardens, post-harvest processing, and the raising of livestock and poultry production.

IV. RESETTLEMENT POLICY, LEGAL FRAMEWORK AND ENTITLEMENT

A. Overview

62. Decades of conflict and instability in Afghanistan have resulted in a complex and uncertain land administration and management system. The legal framework governing land rights is fragmented and includes formal (constitutional and civil law), religious, and customary law. Land rights are perceived to be highly insecure and are the source of the majority of disputes brought before the formal court system as well as non-statutory (informal) dispute resolution bodies such as shuras and jirgas. The legal and policy framework for land rights and the property registration system are still being developed. An estimated 80% of households in Afghanistan have no formal documentation that can be used to acquire or prove their rights to land and as such they have limited recourse to the formal court system. The Ministry of Justice estimates that 90% of Afghans rely solely on customary law due to a lack of trust in the integrity of formal institutions. The situation is compounded by the lack of a comprehensive cadastral and titling system based on electronic records, and the fact that only one third of the land in Afghanistan has ever been surveyed.

B. Legal Framework

63. The formal laws most relevant to the acquisition of land and property for public interests and resettlement are:

(i) The Civil Law of the Republic of Afghanistan (1977) (the Civil Code);
(ii) The Constitution of Afghanistan (2004);
(iii) Afghanistan National Land Policy (2007);
(iv) Environment Law (2007);
(v) Access to Information Law (2014);
(vi) The National Policy for Internally Displaced Persons (2014);
(vii) National Regulations for Environmental and Social Impact Assessment (2017);
(viii) The Law on Land Acquisition (2017);
(ix) Land Management Law (2017), replacing the Law on Managing Land Affairs (2008);
(x) Afghanistan National Land Policy (2018);
(xi) Presidential Decree on the Registration of Properties in Urban Informal Settlements (2018).

64. The Civil Law of the Republic of Afghanistan (1977) (the Civil Code) guarantees comprehensive rights of ownership and inheritance of land for both men and women. It provides general principles and rules on moveable and immovable property. The Civil Code also deals with land rights, restrictions of ownership, joint ownership, termination of joint ownership through sub-division, allocation of benefits, conditions of possession, transfer of ownership, patrimony and distribution. It classifies land as public and private.

65. **The Constitution of Afghanistan (2004)** enshrines ownership of land and protects lands from seizure by the state unless made for the public interest and the owner is provided with fair compensation. It guarantees equality of rights and duties for men and women.

66. **The Afghanistan National Land Policy (2007)** aims to provide every Afghan with access to land, promote and ensure a secure land tenure system, encourage the optimal use of land resources, establish an efficient system of land administration and ensure that land markets are efficient, equitable, environmentally sound, and sustainable to improve productivity and alleviate poverty. The policy addresses a multitude of issues relevant to land tenure such as tenure

insecurity, competing systems for characterizing land, the lack of equity, transparency and accountability in the distribution and acquisition of land, problems of integration between formal and informal systems, land grabbing, informal and unplanned developments, property rights protection mechanisms, dispute resolution, proof of rights to land; and overlapping and uncoordinated land management systems.

67. **The Environment Law (2007)** was written by the United Nations Environment Program (UNEP) with input from the Government of Afghanistan. It is based on international standards and takes Afghanistan's specific environmental conditions into account. Importantly, the law requires the active consultation and involvement of local communities in decision-making processes relating to the sustainable use, rehabilitation and conservation of land, forests and other natural resources. The law states that affected persons must be given the opportunity to participate during each phase of a project. Proponents of development projects are required to apply for an environmental permit before implementation of the project by submitting an initial environmental impact assessment to the National Environmental Protection Agency (NEPA) to determine potential adverse effects and possible impacts. The law envisages a Board of Experts to review and assesses applications before a permit is issued.

68. **The Access to Information Law (2014)** is based on Article 50 of the Constitution of Afghanistan. It aims to increase the transparency and accountability of government and non-government institutions to citizens. It guarantees citizens' right of access to information, defines the responsibility of government and non-government organizations to provide information, and structures the public process of requesting information and the provision of information by government organizations. The law is based on the principle that all information held by the government is presumed to be public. The law does not apply to situations where access to information is harmful to others' rights or presents a risk to public security. The law stipulates that information disseminated by public authorities must be made in a way which is accessible to and useable by the public.

69. **The National Regulations for Environmental and Social Impact Assessment (2017)** indicate that the National Environmental Protection Agency (NEPA) is responsible for both social and environmental impact assessment, which are part of a single process. They set out the procedures for conducting environmental and social impact assessments (ESIAs). The regulations categorize projects according to their level of impact and detail the required processes for each category of project impact. The regulations require effective application of ESIA procedures and the monitoring of environmental and social management plans.

70. **The Law on Land Acquisition (2017)** replaces the Law on Land Expropriation (2009) and provides the legal basis for land acquisition and compensation. Its objectives are to:

(i) allow fair acquisition of individuals' properties;
(ii) regulate the methods of determination of properties to be acquired;
(iii) allow implementation of urban master plans and all other plans for projects of public interest;
(iv) determine the standards for appraisal of fair compensation for properties subject to acquisition;
(v) allow the transfer of government owned properties for the implementation of projects of public interest;
(vi) provide for resettlement of the owners of properties acquired as part of major national projects;
(vii) ensure that property owners and all other people affected by the process of expropriation are compensated; and

(viii) increase the positive impact of expropriation on people.

71. The law states that municipal authorities are responsible for enforcement of the law in areas covered by urban master plans areas while the Ministry of Urban Development and Land (MUDL) is responsible for rural areas. Article 5 defines 'public interest' projects for which property and assets may be expropriated. Articles 9-12 define the responsibilities of the expropriating authority, affected persons and evaluation committee. The law requires the establishment of a panel tasked with developing a bill of valuation for expropriated properties, and a resettlement committee, which are both headed by the provincial governor. It defines how different types of assets are to be valued and compensated, the timing of compensation payments and the procedures and responsibilities of the resettlement committee.

72. **The Land Management Law (2017)** is intended to replace the Law on Managing Land Affairs (2008), although it is still under discussion by the National Assembly. The law aims to create a legislated unified, reliable land management system with a standardized system for land titling, sub-division, and registration. Its goals include the prevention of illegal land acquisition and distribution, ensuring access to land for the people, and defining the conditions for the appropriation of lands. The law confirms that government lands are regulated by the Ministry of Urban Development and Land (MUDL) (Previously ARAZI) and that public welfare projects on government lands must be approved by MUDL.

73. **The National Land Policy (2018)** deals with land tenure and land acquisition. It indicates that compensation for expropriated land or revocation of rights over land must be enforced by the law and conducted in accordance with the Constitution of Afghanistan. The law provides that property may only be expropriated through defined legal procedures for specific purposes and that no law may permit arbitrary deprivation of property rights. Monetary compensation for expropriated land is based on the value of the land prior to the announcement of the development project being pursued in the public interest.

74. **The Presidential Decree on the Registration of Properties in Urban Informal Settlements (2018)** provides an avenue for residents of informal urban areas to receive land occupancy certificates which legitimizes and guarantees residents' right to stay in their homes without the fear of eviction.

75. All land in Afghanistan can be classified as privately owned, community owned, government owned, or publicly owned. These classifications are recognized by the 2007 National Land Policy. Properties owned by individuals, families or businesses are considered private land. Community land is property owned by communities which is equitably available for use by all its members. Government land includes registered government land which is used for the provision of public services, unregistered land which is “deemed public land” as well as land without proven individual ownership. Public land is land that belongs to the people of Afghanistan as a whole and is entrusted to the government for the benefit of all people.

76. Ownership is the most common type of tenure in Afghanistan. Ownership may be grounded in formal or customary law, and ownership rights can extend to all land classifications. Ownership confers the right of exclusive possession of land, and owners are entitled to use and dispose of land freely. The Law on Managing Land Affairs (2008) indicates that all land that has not been proven to be private is deemed government owned land. However, many disputes have arisen over government land because the definition of 'government land' remains unclear despite the various laws that have attempted to define it. A number of presidential decrees have expanded the type of land that the government can own and the distinction between government and publicly-owned land has become less clear.

77. Leaseholds can be established between private parties, subject to requirements for written leases that detail the land and agreement of the parties regarding the length of the lease and payment terms. Private land leases are mostly governed by customary law. Landowners often contract with sharecroppers to cultivate land and the parties agree on terms regarding shares of the outputs and payment.

78. **Rights of Access. The Law on Managing Land Affairs (2008**) provides that lands such as pastures are public land which neither the state nor individuals can possess (except as otherwise provided by Sharia) and which must be kept unoccupied to allow activities such as grazing. Customary law allows individuals and communities to obtain exclusive or non-exclusive access to such lands; however, such lands do not belong to them. Pasture lands are the most controversial type of land in Afghanistan and up to 70% of lands in the country are used for this purpose.

79. **Occupancy Rights**. In general, landholders in formal settlements have formal rights to the land they occupy. Occupants of informal settlements, including squatters, usually have some type of informal rights that are based on principles of customary law, the nature of the land, and the means by which the occupants took possession of the land, although these are limited. The 2007 Land Policy permits the regularization of rights to informal settlement holdings.

80. **Mortgage**. Formal and customary law recognize two types of land mortgage: (i) debt secured by the land, and (ii) a mortgage in which the lender remains the landowner until the borrower repays the debt. The latter is the most common type of mortgage in Afghanistan.

C. Land Registration

81. Land is registered by deeds which are formal legal documents that certify a person's ownership of a piece of land. Article 5 of the 2008 Law on Managing Land Affairs details the types of documents that can be considered a deed. A deed can be a court-registered proof of land ownership document, a government decree proving purchase of the land from the government, tax payment documents, water rights documents, registered customary deeds and formal titles. Court judges draft and archive deeds. Immovable property is also registered in land registration and taxation books. People can use land as collateral if they have a legal title or use it to prove ownership when claims or disputes arise.

82. While authorities have made a number of efforts to introduce a formal registration system in Afghanistan, only a third of the country's land has been surveyed. Only 10% of rural properties are covered by deeds, and archives are often outdated and inaccurate. As earlier systems were based on self-report rather than a cadaster, land is often underestimated or overestimated for tax reasons. The switch to a cadastral system with the 2008 Law on Managing Land Affairs did not resolve these problems as cadastral records and court-based records sometimes do not match.

83. The department of ARAZI is the owner of all governmental lands in Afghanistan. During this process ARAZI's role will be to confirm the governmental and private lands during surveys. ARAZI in previous years was a part of Ministry of Agriculture, in 2015 it was announced as an independent department. Later it was incorporated under the MUDL but ARAZI is now a section of MUDL with the same name and responsibilities. MUDL intends to carry forward the cadaster work and reconcile the court-based records with the cadaster.

84. Authorities have had difficulty with registering community owned lands and distinguishing between people who own and lease a particular land plot. As the land registration system has evolved over time, other ways have emerged apart from deeds to prove ownership. Ownership

may also be proved through community certification, cadastral records, records from previous governments and customary documents such as bills of sale and purchase, wills, pawn agreements, plot sub-divisions and witness accounts. Even if no documentary evidence of ownership exists, a person may claim land if they are putting it to productive use.

D. Land Acquisition and Resettlement

85. The Constitution of Afghanistan (2004), the Law on Managing Land Affairs (2008) and the Law on Land Acquisition (2017) entitle the Government of Afghanistan to acquire private or government- owned land for public purposes which according to law will be upon payment of fair market value. According to these laws, compensation is based on rates determined by the legally constituted resettlement committee. If a land and property are acquired by the government for public purposes, the owner is entitled to receive (i) the value of land; (ii) the value of residential houses and buildings; and (iii) the value of trees and orchards and other assets on the land.

86. A person, who loses his /her residential land plot, is entitled to receive a new plot of land of the same value. If they wish, they can receive a residential plot on government property in exchange under proper procedures. Under current law, when private landholdings are acquired for public purposes, compensation is paid to the owner based on the category and location of the land and the value of land for compensation is determined by a valuation committee consisting of the following members:

(i) The Provincial Governor, head of the Committee;
(ii) The Mayor, deputy head of the Committee;
(iii) Director of ARAZI/MUDL
(iv) Representative of cadaster survey of ARAZI/ MUDL;
(v) Representative of Directorate of Agriculture, Irrigation and Livestock;
(vi) Representative of Directorate of Urban Development and Housing;
(vii) Representative of Directorate of Justice;
(viii) Representative of Directorate of Public Works;
(ix) Representative of *Mastofiat*;
(x) Representative of Expropriating Authority; and
(xi) Representative of Afghanistan Chamber of Commerce and Industries.

87. The land acquisition process is initiated with the constitution of the committee". If affected persons and their legal representatives are not satisfied with the compensation for an expropriated property, they can present their objection to the Expropriating Authority within 60 days of being notified about their compensation, and the Expropriating Authority shall assess the appeal within 30 days. If the affected person is still dissatisfied, the matter is referred to a jury consisting of (i) a representative of the relevant union of engineers; (ii) a representative of the Afghanistan Chamber of Commerce and Industries; and (iii) a representative of the people of the area subject to expropriation. The decision of the jury is final if the parties agree; otherwise the matter is referred to a competent court.

88. The whole process is based on a negotiated approach and the affected person is included as a member of this legally constituted committee. The committee thus also performs the tasks of a grievance redress committee.

89. Overall, the above laws/regulations provide that the principle of compensation at full replacement cost is reasonable and legally supported. The laws also identify the types of damages eligible for compensation and indicate that compensation is to be given both for loss of physical assets and for the loss of income.

E. ADB's Policy on Involuntary Resettlement

90. Three important elements of ADB's involuntary resettlement policy are: (i) compensation to replace lost assets, livelihood, and income; (ii) assistance for relocation, including provision of relocation sites with appropriate facilities and services; and (iii) assistance for rehabilitation to achieve at least the same level of well-being with the project as without it. For any ADB operation requiring involuntary resettlement, resettlement planning is an integral part of project design, to be dealt with from the earliest stages of the project cycle, and considering the following basic principles:

(i) Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons, including a gender analysis, specifically related to resettlement impacts and risks.

(ii) Carry out meaningful consultations with affected persons, host communities, and concerned non-government organizations. Inform all displaced persons of their entitlements and resettlement options. Ensure their participation in planning, implementation, and monitoring and evaluation of resettlement programs. Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and Indigenous Peoples, and those without legal title to land, and ensure their participation in consultations. Establish a grievance redress mechanism to receive and facilitate resolution of the affected persons' concerns. Support the social and cultural institutions of displaced persons and their host population. Where involuntary resettlement impacts and risks are highly complex and sensitive, compensation and resettlement decisions should be preceded by a social preparation phase.

(iii) Improve, or at least restore, the livelihoods of all displaced persons through (i) land based resettlement strategies when affected livelihoods are land based where possible, or cash compensation at replacement value for land when the loss of land does not undermine livelihoods, (ii) prompt replacement of assets with access to assets of equal or higher value, (iii) prompt compensation at full replacement cost for assets that cannot be restored, and (iv) additional revenues and services through benefit sharing schemes where possible.

(iv) Provide physically and economically displaced persons with needed assistance, including the following: (i) if there is relocation, secured tenure to relocation land, better housing at resettlement sites with comparable access to employment and production opportunities, integration of resettled persons economically and socially into their host communities, and extension of project benefits to host communities; (ii) transitional support and development assistance, such as land development, credit facilities, training, or employment opportunities; and (iii) civic infrastructure and community services, as required.

(v) Improve the standards of living of the displaced poor and other vulnerable groups, including women, to at least national minimum standards. In rural areas provide them with legal and affordable access to land and resources, and in urban areas provide them with appropriate income sources and legal and affordable access to adequate housing.

(vi) Develop procedures in a transparent, consistent, and equitable manner to ensure that people will maintain the same or better income and livelihood status.

(vii) Ensure that displaced persons without titles to land or any recognizable legal rights to land are eligible for resettlement assistance and compensation for loss of non-land assets.

(viii) Prepare a resettlement plan elaborating on displaced persons' entitlements, the income and livelihood restoration strategy, institutional arrangements, monitoring and reporting framework, budget, and time-bound implementation schedule.
(ix) Disclose a land acquisition and resettlement plan, including documentation of the consultation process in a timely manner, before project appraisal, in an accessible place and a form and language(s) understandable to affected persons and other stakeholders. Disclose the final resettlement plan and its updates to affected persons and other stakeholders.
(x) Conceive and execute involuntary resettlement as part of a development project or program. Include the full costs of resettlement in the presentation of project's costs and benefits. For a project with significant involuntary resettlement impacts, consider implementing the involuntary resettlement component of the project as a stand-alone operation.
(xi) Pay compensation and provide other resettlement entitlements before physical or economic displacement. Implement the resettlement plan under close supervision throughout project implementation.
(xii) Monitor and assess resettlement outcomes, their impacts on the standards of living of displaced persons, and whether the objectives of the resettlement plan have been achieved by taking into account the baseline conditions and the results of resettlement monitoring. Disclose monitoring reports.

F. Comparison of ADB SPS (2009) with Afghan Laws and Legislation

91. Overall, the legislation of Afghanistan adequately reflects the major provisions of the ADB Safeguards Policy Statement (2009) with some differences already reconciled in practice on ADB financed projects. The most significant of these differences is that Afghan legislation/regulations place emphasis on the definition of formal property rights and on how the acquisition of properties for public purposes is to be implemented and compensated, while ADB policy emphasizes both the compensation of rightfully-owned affected assets and the general rehabilitation of the livelihood of affected people (AP) and affected households (AH).

92. Because of this, ADB policies complement the Afghan legislation/regulations with additional requirements related to (i) the economic rehabilitation of all AP/AHs (including those who do not have legal/formal rights to the assets acquired by a project); (ii) the provision of indemnities for loss of business and income, and (iii) the provision of special allowances covering AP/AH expenses during the resettlement process or covering the special needs of severely affected or vulnerable AP/AHs. In addition, while Afghan laws provide for some level of consultations, extensive public consultations are not required for preparation of a LARP. The differences between Afghan law/regulations and ADB SPS (2009) are outlined in Table 20.

93. The solutions outlined have been suggested for the Project to reconcile gaps between Afghan laws/regulations and ADB Policy (ADB's SPS 2009) by ensuring compensation at full replacement cost of all items, the rehabilitation of informal settlers, and the provision of subsidies or allowances for AHs who will be relocated, suffer business losses, or will be severely affected.

94. Compared to Afghan laws and legislation, ADB requirements contain potential additional requirements related to:

(i) livelihood restoration of affected people, including those who do not have legal or formal rights to the assets that are affected;
(ii) the provision of indemnities for loss of business and income;

(iii) the provision of special allowances that cover expenses during the resettlement process;
(iv) the covering of the special needs of severely affected or vulnerable people; and the requirement to prepare plans to guide any necessary land acquisition and compensation.

Table 20. Comparison of Afghan Laws on LAR and ADB Resettlement Policies

Land Acquisition Law (LAL)	ADB SPS (2009)	Remarks/Solutions
National legislation provides for public consultation, although it is not necessarily comprehensive.	Public consultations and participation are an integral part of ADB's policies, and it is a continuous process from the conception, preparation and implementation stages through to the post implementation period. APs should be fully informed/ consulted in resettlement and compensation options.	Public consultation and participation of affected people are required throughout the project process from planning through implementation, including public notifications of physical works activities.
Land acquisition for public interest is to be compensated based on equal/fair value according to current market rates. In case of residential land, land-for-land compensation is offered. Affected land, structures, orchards, vines, trees will be valued by provincial and local officials.	APs should be compensated for all their losses at replacement cost	Market value is the way to assess replacement rate. ADB Policies and national laws agree on this point. The provision under this LARP further stipulates that houses, crops, and trees will also be compensated at replacement rates.
National laws provide for compensation for those who have deeds of ownership as well as those with usufruct or customary rights.	Lack of title should not be a bar to compensation and/ or rehabilitation. Non-titled landowners receive rehabilitation assistance.	This provision in the LARP provides for compensation at market rates for titled and customary users and rehabilitation for non-titled land holders
Land owners/user rights on an affected land plot will be terminated 3 months prior to the start of civil works and after full compensation is provided to APs. The termination of the owner/user right would not affect their rights to collect their last harvest from the land, except if there is an emergency which may prevent harvest collecting.	APs should receive timely compensation.	Crop losses are compensated to landowners, tenants, or sharecroppers as applicable, regardless of title. This LARP provides for crops compensation whether they have been harvested or not to avoid civil works delay and pressures on land users to harvest before it is fully ripe. Land users harvesting their crops after notification of the land occupation date will not lose any part of their due compensation.
Compensation at replacement rate will be given for land, house, crops, trees and other losses. No consideration is	The APs should be compensated and/ or assisted so that their economic/social future is	Rehabilitation for income losses and for relocation costs will be given if these impacts occur.

Land Acquisition Law (LAL)	ADB SPS (2009)	Remarks/Solutions
given to income losses or relocation costs.	generally as favorable as it would have been without the project.	
Afghan resettlement laws do not distinguish between legalizable and non-legalizable APs. Both treated as non-legal, and in some circumstances such land is not compensated.	SPS (2009) requires that legalizable APs are identified, legalized then compensated. Non-legalizable APs to be compensated for all non-land income (buildings, trees, crops, income etc.)	Reconciliation needed for principle and application. ADB principles have been applied on a case by case basis on previous projects.
Afghan law does not deal with compensation for loss of land leases separately.	Compensation for loss of lease is to be provided at cash cost. This is achieved by providing a comparable leased plot or cash compensation for remaining time on original lease.	ADB principles have been applied on a case by case basis on previous projects. Technical aspects of lease compensation need to be improved.
Afghan law does not mention deductions for depreciation, salvaged construction materials and transaction costs. Construction materials belong to APs once compensated for.	Compensation to be given at replacement cost free of depreciation, salvaged materials and transaction costs.	Compensation should be clarified so that APs know that compensation is provided free of depreciation or transaction costs.
No specific provisions under Afghan law deal with compensation for business losses.	All losses, including income, opportunity loss liabilities to third parties, are compensated.	Past ADB practice has been to compensate lost income based on tax records for the number of months of business disruption for a maximum of 12 months. Unregistered businesses to be compensated based on maximum non-taxable income.
Trees belonging to legalizable and non-legalizable APs are not compensated.	Compensation is to be paid at market rate irrespective of legal and occupancy status.	The entitlement matrix should ensure that all APs receive fair market rate compensation for trees.
Legalizable and non-legalizable APs are not compensated for crop losses. Compensation only provided for sown seeds, fertilizers and farming costs. Even legal APs are not compensated for crops unless they are near. bloom and grains are visible.	Compensation is to be paid at market rate irrespective of legal and occupancy status. All APs to receive compensation for lost opportunity as well as investment costs.	The entitlement matrix should ensure that all APs receive fair market rate compensation for trees and crops, as well as the costs for seeds, fertilizers and farming costs.
Afghan laws do not have specific provisions for the compensation of APs who lose their job due to the acquisition of land	Formal and informal employees should be rehabilitated, considering actual income losses of both temporarily and permanently affected employees.	The entitlement matrix should ensure that temporarily and permanently affected employees receive adequate compensation.
Afghan laws do not require the	ADB requires a broad LAR	ADB SPS (2009) requirements

Land Acquisition Law (LAL)	ADB SPS (2009)	Remarks/Solutions
preparation of a stand-alone LARP detailing background information and compensation. Impacts assessment primarily based on official records, and verification of records through detailed measurement survey for registered assets only.	planning process, with early identification of LAR impacts, based on detailed measurement survey, APs census, socioeconomic survey etc. Extensive public consultations are required.	should be followed strictly.
Afghan laws do not provide for extensive public consultations or contain specific disclosure instructions.	Extensive and meaningful public consultations should be held, and APs allowed to participate in all parts of the project lifecycle.	ADB's requirements complement and improve on the requirements of Afghan law.

G. Draft Entitlement Matrix

95. Various entitlements provided under the plan are described below in the draft entitlement matrix, Table 21. This may be edited as specific LARP will be developed for the project adverse impacts.

Table 21. Draft Entitlement Matrix

Item	Application	Eligibility	Compensation Entitlements
Agricultural/ residential/ commercial land loss	Land affected by right-of-way (ROW)	AP with title, formal/customary deed, or traditional land right as vouched by local Jirga, elders or Community Development Council.	Compensation at replacement cost either through replacement plots or in cash based on full replacement cost to be negotiated and agreed with the AP and approved by the council of Ministers. The government of Afghanistan can acquire private or government owned land for public purposes upon payment of fair market value. All fees, taxes, or other charges, as applicable under relevant laws are to be borne by the project. The rate for agricultural irrigated land was calculated at between 500-1000 AF/ m^2
Residential and commercial buildings loss	Residential/ commercial structure affected	Owners of structures (including informal settlers)	Cash compensation for affected structure and other fixed assets at replacement cost of the structure free of depreciation, taxes/fees and salvaged materials. In case of partial impacts full cash assistance to restore remaining structure. If more than 25% of the building's floor area is affected, cash compensation will be computed for the entire building based on AP's will and compliance with building safety requirement.

Item	Application	Eligibility	Compensation Entitlements
			Right to salvaged material from demolished structure Rental allowance of 3-6 months for loss of residential building
Crop losses	Crops on affected land	Owners of crops / sharecroppers	Cash compensation equal to replacement cost of crop lost plus cost of replacement seeds for the next season.
Tree or perennial crops Losses	Trees or perennial crops on affected land	Owner of trees (including informal settlers)	Fruit bearing trees or perennial crops will be compensated at the value of 1 harvest multiplied by the number of years needed to re-grow a tree at the same productive level of the tree lost and the full replacement cost of a saplings for each grown tree. Non–fruit bearing/timber trees will be valued based on the market value of their dry wood volume. The compensation of the tree will be free of deduction for the value of the wood left to the AH.
Business losses by shop owners and employees	Permanent / temporary business losses along the ROW	Business / shop owners (including informal settlers), employees	Cash compensation for net income loss for the duration of business stoppage (maximum up to 3 months for temporary loss and an equivalent of 6 months income for permanent loss). The compensation for business loss will be calculated based on tax receipts or when these are not available based on fixed rates.[a] Employees: indemnity for lost wages equivalent to three months income.
Transitional Livelihood Allowance	Residential/Commercial Structures affected	All Ahs	Relocated owners/renters will receive a transitional allowance for livelihood losses at AF 7,500 for 3 months = 22,500
Relocation Allowance	Residential/Commercial Structures affected	All Ahs	Relocated owners/renters (including informal settlers) will receive a relocation allowance of AF 7,500
Assistance to vulnerable AH	Affected by land acquisition, resettlement etc.	AH which are: female–headed; poor (below poverty line) or headed by handicapped/disabled persons, internally displaced persons, refugees, returnees, kuchis/nomads	Vulnerable households will be provided an additional three months of average household income allowance (AF 45,000) as assistance. Preferential employment in the project construction.

Item	Application	Eligibility	Compensation Entitlements
Severe impacts	More than 10% of property and/or income loss	All severely affected AHs including informal settlement	Additional crop compensation for 1 year's yield of the affected agricultural land and/or, for other non-agricultural impacts: an allowance covering 12 months of the national minimum subsistence.
Loss of Community sites, Cultural, Religious, or Government Sites	Temporary or permanent loss due to the Project's activities	Community/ Affected households	Conservation, protection and cash compensation for replacement (schools, communal centers, markets, health centers, shrines, other religious or worship sites, and tombs). Cash compensation for affected structures based on the above structures entitlements.
Impact on irrigation channels	Temporary or permanent loss due to the Project activities	Community/ affected households	Irrigation channels are diverted and rehabilitated to previous standards.
Temporary loss of land	Temporary use of land during construction	AP with title, formal/customary deed, or traditional land right as vouched by local Jirga, elders or Community Development Council.	Cash compensation based on local land rental rates for the duration of use and restoration at the end of the rental period.
Unidentified Impacts		AH or individuals	Unforeseen impacts compensated based on above entitlements during project implementation by the EA.

[a] This fixed rate will be based on the average net income of project areas as determined by the surveys conducted during LARP preparation.

V. PUBLIC CONSULTATION AND DISCLOSURE

A. General

96. According to ADB SPS (2009), APs must be meaningfully consulted and provided with opportunities to participate in the planning and implementation of the LARP. Under the same principles, APs must be informed in an appropriate and timely manner of the planning process outcomes, as well as the schedules and procedures for the preparation and implementation of the LARP, including entitlements, payment procedures, and relocation.

97. The flow of information is a two-way communication process between the borrower/client and APs, and a platform where all relevant information is taken into consideration in the project planning and implementation phases. Meaningful and continuous consultations create a platform for the stakeholders' participation/inclusion in the project processes. To ensure peoples' participation in the planning phase of this project and to treat public consultation and participation as a continuous two-way process, numerous events were arranged at various stages of project preparation. Aiming at promotion of public understanding and fruitful solutions of developmental problems such as local needs of canal users and problem and prospects of resettlement, various stakeholders (affected persons, government officials, local community, elected representatives of the people were consulted through focus group discussions, individual interviews and formal consultations). The options of alternative design were also discussed to meet their local needs and to achieve speedy implementation of the project with peoples' participation.

98. Public participation and community consultation have been taken up as an integral part of the social and environmental assessment process of the Project. Initial public consultation has been carried out in the Project areas with the objectives of minimizing probable adverse impacts of the project through alternate design solutions with the aim to be wide and open to all people that would like to participate.

99. Meetings were held with Khuja Mulk village Arghandab District (March 16, 2019), Aromashin and Gach Khano villages in Kandahar city area (March 20 and 22, 2019), Marnjan village (March 17, 2019), and Daman district villages (March 20, 2019). The participants of these events included community leaders, local shura leaders and affected community members. Consultations have also been carried out with special emphasis on vulnerable groups. The key informants during the project preparation phase included both individuals and groups namely:

(i) Heads and members of households likely to be affected;
(ii) Groups/clusters of APs;
(iii) Jirgas/shuras;
(iv) Government agencies/departments;
(v) Other project stakeholders with special focus on APs belonging vulnerable groups.

B. Process of Community Consultations

100. The consultation process established for the project has employed a range of formal and informal consultations at this stage. As per the requirement, the present consultation has followed three main levels. They are as individual consultation through a questionnaire, Focus Group Discussions (FGDs) through structured open-ended interviews, and formal and informal discussion with various government officials, other stakeholders and civil society.

C. Individual Consultations

101. Individual consultations were held with all the affected households whose property fall under the canal design. A door-to-door census was done by administering a questionnaire in order to know the socioeconomic condition of the APs.

102. Community-level discussions were held in different sensitive areas by conducting various FGDs. The views of the people on social, environmental and resettlement issues are always essential for suggesting the requisite mitigations. Discussions were also held with the owners and stakeholders of the various cultural properties, such as mosques, gravesites, etc. A total of 9 community-level meetings were held in 9 locations (Arghandab, Dand, Daman Districts and District 12 of Kandahar city,) between 16 March to 23 March 2019 (Summary in Table 23). These consultations were attended by APs, local government authorities and community elders. A total of 81 people participated in these meetings. The benefits of the project were explained in detail to them and their views were solicited on the relocation of such properties from their present locations. The summary of the public consultations is presented below. The main involuntary resettlement concerns with the project relates to the impact it will have on the businesses along the canal, particularly those located centrally next to a couple of bridges that provide easy access to customers. The shops are encroaching on the embankment of the canal and will have to be removed to enable rehabilitation.

103. In the process of public consultation, it was observed that most of the people are concerned about their livelihood issues. The majority fear the loss of the commercial activities which will have direct impact on their livelihood. However, it is noted that the loss of livelihood will be very minimal and can be well compensated by the project. Most of the people consulted welcomed the project.

104. The major findings of the consultations held at various locations are summarized as follows.

(i) Most of the people are aware of the project and are willing to render the support whenever required, including security support.
(ii) People suggested a proper compensation package to be granted to those who are losing their properties.
(iii) Most of the APs know that the commercial activities and structures along the canal are mostly on the government land and are considered to be squatters. They are willing to shift from their present location, but at the same time the people expected that the authorities should be considerate towards their problems and they seek some assistance to restore their livelihood.
(iv) They were also concerned about compensation. People requested all the shops displaced should get adequate compensation and advance notice before construction of the project.
(v) People expressed that proper measures needed to be taken to restore loss of livelihood by displacement.
(vi) Government Departments should join hands with NGOs during the implementation of LARP.
(vii) Government should provide adequate land to landless people for their relocation.
(viii) The compensation should be based on the current market value.
(ix) They also support the project since they will be getting jobs during the construction.
(x) People consented to cooperate if adequate compensation is given.
(xi) Requests for facilities and amenities like drinking water or lighting was requested during the construction phase.

(xii) APs requested for local representation in the project activities
(xiii) Contractors should be advised by the project authority to employ local people with due consultation with the local community and with the elected bodies.
(xiv) Points were raised to involve the small local contractor during construction period.
(xv) Participants suggested that the success of the project implementation depends on the security situation also. Therefore, the involvement of local people will be highly advisable so that the security problems may be managed adequately.

Table 22. Summary of Concerns Raised in Public Consultations

Issues/Concerns Raised	Mitigation Measures
▪ People in general are in favor of the Project and are supportive if they will receive compensation. People welcomed the effort to rehabilitate the canal that will benefit the area. ▪ Support included providing for the maintenance and security of the canal. ▪ Concern about getting jobs as a result of the project. ▪ Concern for loss of land and structures ▪ Concern for loss of business units and livelihood ▪ Concern for compensation rates, timing, and mechanism ▪ Concern about the quality of construction ▪ Concern about the maintenance of the rehabilitated infrastructure. ▪ The project team raised the issue of the imminent impact on the mosque. The project team during meetings also raised the issue of the Etifaq mosque in Haji Abdul Ghafor Aka mosque in Sarkari Bagh area belong to Arghandab District and also has a few graveyards in Lal Mir Laly Hotal area belonging to Daman District is impacted by the alignment of the canal as it stands now.	▪ Welcoming the widening and improvement of the canals in public interest including their own the communities and the Jirgas and shuras where reconciled and expressed enthusiasm about the prospect of the mosques being rebuilt with proper design and materials. ▪ The proposed canal construction is limited to existing ROW, no new canals will be built ▪ Loss of land and structures shall be compensated and financial assistance shall be provided to overcome the income loss during the reestablishment period. ▪ Provision of adequate notice for clearing ROW and beginning civil works. ▪ Compensation will be paid before work is taken up in the affected areas, ▪ The community and the Jirga/shura were quite clear that it would not matter and the grave sites and mosque could be conveniently shifted to a new location, without violating any religious norms or sentiments.

105. Proper safety measures need to be adopted for preserving cultural property like mosques, burial grounds, gravesites, etc. This should be replaced by the project authority if there is any damage. However, this will require the consent of the community and due consultation. The project team raised the issue of the imminent impact on one mosque. The project team during meetings raised the issue of the Haji Abdul Ghafor Aka mosque in Sarkari Bagh area belong to Arghandab District and also has a few Graveyard in Lal Mir Laly Hotal area belong to Daman District is impacted by the alignment of the canal as it stands now. The community and the Jirga/ Shura believed that the grave could be conveniently shifted along with the mosque to a new location, without violating any religious norms or sentiments. Welcoming the improvement of the canals in public interest, including their own, the communities, the Jirgas and Shuras were reconciled and expressed enthusiasm about the prospect of the old mosque being rebuilt with proper design and materials.

106. People advised that there are no archaeological sites or any protected place in the vicinity of the project area and none will be impacted by the rehabilitation of the irrigation canals. No new canals are anticipated that would be near to archaeological sites or protected places. Should any impacts be discovered during implementation, impacts on archaeological monuments and historical / cultural sites will be mitigated by inspection of the project area. Archaeological experts will identify potential cultural sites before any activities will start. Potential cultural sites will be preserved and moved if necessary.

D. Continuation of Public Consultations

107. The consultations will continue throughout the project cycle. The effectiveness of resettlement implementation is directly related to the degree of continuing involvement of those affected by the project. Several additional rounds of consultations with the APs will be required during the detailed engineering design and subsequently during the LARP implementation. Consultations during the detailed engineering design and LARP implementation will involve agreements on compensation, assistance options, and entitlement package and income restoration.

108. The other round of consultations will occur when compensation and assistance are provided, and actual resettlement begins. Information disclosure is pursued for effective implementation and timely execution of the LARP.

109. For the benefit of the community in general and APs in particular, the LARP shall be made available at the concerned offices of MEW. The Project Management Unit (PMU) will provide information on Resettlement policies and features of the LARP.

110. For continued consultations, the following steps are envisaged in the project:

(i) The NGOs to be involved in implementation of the LARP will organize public meetings and will apprise the communities about the progress in the implementation of resettlement, social and environmental activities.
(ii) There will be Grievance Redress Committees (GRC). The APs will be associated with such committee along with their representatives.
(iii) NGOs will organize public meetings to inform the community about the compensation and assistance to be paid. Regular update of the progress of the resettlement component of the project will be placed for public display at the PMU offices.
(iv) All monitoring and evaluation reports of the resettlement components of the project will be disclosed in the same manner as that of the LARP.
(v) Key features of the entitlements will be displayed along the Project corridor.
(vi) Together with the NGO, the PMU will conduct information dissemination sessions at major intersections and solicit the help of the local community leaders to encourage the participation of the APs in LARP implementation.
(vii) Attempts will be made to ensure that vulnerable groups understand the process and to take their specific needs into account.

E. Disclosure of LARP

111. For transparency in planning and for further active involvement of APs and other stakeholders, the project information will be disseminated through disclosure of resettlement planning documents. A resettlement information pamphlet containing information on compensation, entitlement and resettlement management adopted for the Project will be made available both in Pashto and Dari (local languages) and distributed to all APs. Each AP will be provided information regarding specific entitlements. The NGO to be hired for involvement in the implementation activities will keep the affected people informed about the impacts, the compensation and assistance proposed for them, and will facilitate addressing any grievances.

112. They will hold special meetings to orally brief those who are illiterate regarding their entitlements, the compensation methods and means of recourse to grievances redress mechanisms established for the Project. In addition, literate members of the community shall

provide the same assistance to the less literate affected persons as necessary. The copy of the LARP will be made available with PMU and district governments, and will be available for the APs as and when asked for. A copy of the LARP and the summary pamphlet will be disclosed in ADB's website in English. Moreover, as required in the new ADB public communications policy, monitoring reports on the LARP implementation will also be posted on the ADB website.

Table 23. Summary of Consultations by Village

No	Date	District	Village	Type of consultations	Participants
1	23.03.2019	Kandahar City Zone No. 12	Dabaro Pull	Chief of village and elders	7
2	18.03.2019	Arghandab	Baba Sahib	Chief of village and elders	10
3	22.03.2019	Arghandab	Keshata Mazria	Chief of village and elders	9
4	16.03.2019	Arghandab	Kheshki	Chief of village and elders	9
5	17.03.2019	Arghandab	Mohammad Yaquob Kalach	Chief of village and elders	10
6	22.03.2019	Kandahar City Zone 12	Mashinano	Chief of village and elders	8
7	21.03.2019	Arghandab	Merakhwaran	Chief of village and elders	9
8	17.03.2019	Arghandab	Usmani Mena	Chief of village and elders	10
9	16.03.2019	Arghandab	Sayedano Kalacha	Chief of village and elders	9
	Total				**81**

VI. INSTITUTIONAL ARRANGEMENTS

A. General

113. This section deals with roles and responsibilities of various institutions for the successful implementation of the LARP. The primary institutions to be involved in the process are as follows:

(i) MEW;
(ii) PMU;
(iii) Due Diligence Team (DDT) at PMU Level;
(iv) Construction Supervision Consultant (CSC);
(v) Implementing Non-government Organization (NGO);
(vi) The GRC;
(vii) Community Councils;
(viii) ARAZI/ MUDL;
(ix) Land committees;
(x) Council of Ministers;
(xi) Governors;
(xii) External Monitoring Agency.

114. While MEW is a permanent governmental body, the rest will be mobilized specifically for the project as special arrangements described in the sections below. Other permanent institutions that deal with land acquisition are the Ministry of Urban Development and Land that maintains the cadaster and convenes valuation committees; the village estate councils which help resolve ownership disputes; and the provincial and district governors who contribute to the security of the construction process.

B. Project Management Unit

115. A PMU will be established for the implementation of the ADB financed projects. The PMU is headed by a Director. It has separate teams to oversee different aspects of the Project and liaise with stakeholders. These teams will oversee technical and engineering functions under each contract, legal matters, due diligence on new projects, safeguards, finance and administration, evaluation, monitoring and reporting, and results measurement and capacity development (training, policy advisory, management information systems and procedures). The staff in PMU and ASBA is cognizant of ADB SPS 2009 but will need additional capacity development to carry out the resettlement work. To address this, the PMU will engage the services of national and international staff. The budget to run it will cater for a core team of experts and then leave sufficient contingencies to engage short-term advisors to undertake specific jobs at short notice. The services of advisors will be secured from firms and directly from individuals. The PMU will have a Due Diligence Team (DDT) consisting of social and environmental specialists for safeguard monitoring of the Project.

C. Due Diligence Team at PMU Level

116. The DDT will be formulated as part of the PMU. The DDT will work closely with other staff of the PMU and will be specifically looking after the safeguards issues. The DDT will assist the PMU in getting all the necessary clearances and implementation of the resettlement activities prior to the start of any civil works. The DDT will be supported by an International Resettlement Specialist (IRS) and one National Resettlement Specialist (NRS). Similarly, there will be one International Environment Specialist (IES) who will be assisted by a National Environmental

Specialist (NES). Both the international and national resettlement specialists will work closely with the PMU.

117. **Resettlement Specialist (International) at PMU Level.** The candidate to be selected as IRS is desired to have similar prior experience in resettlement and social development planning and implementation and LAR capacity building. The IRS will be assisted by PMU staff, and the implementing NGO, for planning and implementation of resettlement activities in the project.

118. The specific functions of the PMU in regards to resettlement management are:

(i) Overall planning, implementation and monitoring of R&R activities in the Project;
(ii) Ensure availability of budget resettlement activities; MEW as the expropriating agency will make a budgetary allocation at the Ministry of Finance (MOF) and the MOF will release the funds the Afghanistan Bank to the AP's individual bank once the LARP is prepared and approved.
(iii) Liaison with line agencies related to the preparation and implementation of the LARP;
(iv) Select and appoint the implementing NGOs;
(v) Coordinate with line departments, implementing NGO and CSC,
(vi) Provide training and mentoring on LAR matters.

D. Construction Supervision Consultant

119. The CSC will closely work with the PMU to support in monitoring, supervision and coordination of all activities related to resettlement implementation. The CSC will deploy sufficient local and international expertise on resettlement.

120. The CSC will:

(i) Supervise the project implementation;
(ii) Ensure that project-specific social mitigating measures are incorporated into the contract documents;
(iii) Work in close coordination with PMU and the engineering team;
(iv) Verify implementation and assess impacts of the LARP through the conduct of necessary surveys and investigations.

E. Implementing NGO

108. The NGO will play the role of a facilitator and will work as a link between the PMU and the APs. Further the NGO will educate the APs on the need to implement the Project, on aspects relating to land acquisition and R&R measures, and ensure proper utilization of various compensations extended to the APs under the R&R entitlement package. The major LARP implementation responsibilities will be with the implementing NGO. The NGO will:

(i) Work under close coordination of the PMU, and the DDT to implement the LARP.
(ii) Involve the shura and local leaders, wherever necessary to implement the LARP to facilitate transparency in the process and public participation.
(iii) Assist the PMU in dissemination of the LARP and other resettlement related information.
(iv) Take the lead in joint verification and identification of APs.
(v) Identify AHs whose lands can be acquired through negotiated purchase or through expropriation.
(vi) Identify absent AHs.

(vii) Carry out a census of the APs and identify the vulnerable households (if required).
(viii) Identify training needs of APs for income generation activities and ensure that they are adequately supported.
(ix) Counsel, generate awareness and resolve the grievances of the affected persons.
(x) Put forth the unresolved grievances of the APs to the GRC.
(xi) Generate awareness about the livelihood restoration activities, and help the APs to make informed choices. This includes assisting APs in participating in government development programs.
(xii) Prepare sub-project level plans for implementation of LARP.
(xiii) Assist APs in opening an account in the nearest local bank needed for transferring compensation payments.
(xiv) Organize and assist affected persons committees (APCs) and representatives.
(xv) Participate in public meetings as and when required.
(xvi) Submit periodic LARP implementation reports to the PMU.

VII. GRIEVANCES REDRESS MECHANISM

121. The various queries, grievances and problems that are likely to be generated among the APs and that might require mitigation, include the following:

(i) APs that are not enlisted;
(ii) Losses not identified correctly;
(iii) Compensation/assistance that is inadequate or not as per entitlement matrix;
(iv) Disputes about ownership;
(v) Delay in disbursement of compensation/assistance; and
(vi) Improper distribution of compensation/ assistance in case of joint ownership.

122. An efficient grievance redress mechanism will assist the APs in resolving queries and grievances. The main objective in providing redress mechanism is to avoid potential delays on the commencement of construction works for the project; and address and resolve the issues and grievances raised by the APs. The APs should be aware of the procedures on the resolution of grievances, which the resettlement team will inform to project stakeholders during project disclosures and public consultations.

123. **Article 34 of Afghanistan's Law on Land Acquisition** 2017 details the grievance redress mechanism as follows:

(i) Whenever the owner or his/her legal representative is dissatisfied with the compensation of the expropriated property, he/she may present his/her reasoned objections statement to the Expropriating Authority within 60 days of the date on which they received information about their compensation.
(ii) The Expropriating Authority shall assess the objection stated in Paragraph 1 of this article within 30 days and make an appropriate decision.
(iii) Whenever the claimant is not satisfied with the decision of the Expropriating Authority, the issue shall be referred to a jury. The jury consists of a representative of relevant Union of Engineers; a representative of the Afghanistan Chamber of Commerce and Industries; and a representative of the people of the expropriated area.

124. The decision of the jury is final if the parties agree; otherwise the issue is referred to a competent court.

125. The existing grievance redress system may be used in conjunction with the project-related GRM. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of affected parties' concerns, and grievances about the issues related to the project. The GRM will function during all phases of the project implementation. It will provide a time-bound and transparent mechanism to address and resolve grievances arising from the implementation of the project.

126. The GRM is a formalized way for the PMU to identify and resolve concerns and people's grievances. It offers affected persons a forum to voice their concerns, seek clarifications to their queries, or register grievances related to the project's performance. The scope of the GRM addresses issues related to involuntary resettlement, social and environmental performance, and information disclosure.

127. The APs will have the right to file grievances and/or queries on any aspect of the project, including land acquisition and resettlement. Under the adopted grievance mechanism, the APs

may appeal any decision, practice or activity related to the project. All possible avenues will be made available to APs to voice their grievances. The PMU will ensure that grievances on any aspect of the project are addressed in a timely and effective manner.

128. The fundamental objectives of the Grievance Redress Mechanism are to:

(i) Reach mutually agreed solutions satisfactory to both the Project and the APs, and to resolve any grievances locally, in consultation with the aggrieved party;
(ii) Facilitate the smooth implementation of the LARP (if required), particularly to cut down on lengthy litigation processes and prevent delays in project implementation; and
(iii) Facilitate the development process at the local level, while maintaining transparency as well as to establish accountability to the affected people.

129. The GRM will cover issues related to social, environmental and other safeguard issues under the ADB safeguard covenants and Afghan law. The APs will be fully informed of their rights and the procedures for addressing grievances, orally and in writing during the consultations and surveys, and will be informed again when the compensation is disbursed. Care will be taken to prevent grievances rather than relying solely on the redress process. This will be achieved through careful LAR design and implementation, by ensuring full participation and consultation with the APs, and by establishing extensive communication and coordination between the affected communities, the EA, and local governments in general.

130. The GRC will be formed by MEW and Local Authorities as a permanent and functional structure, engaging personnel of MEW from all departments to work on LAR issues and grievance resolution. The MEW will specify that representatives of local/community authorities, elders, auditors, displaced persons and any other persons or entities can be included in the Committee as members.

131. The MEW follows ADB's Grievance Redress Procedure to address any dissatisfaction and grievances by residents regarding its activities. This is set out in the ADB Resettlement Policy Framework (ADB Safeguard Policy Statement, 2009). This procedure will be applied to address any grievances during the implementation of Component 2.

132. The GRM will be established at three levels: (i) Project/District level; (iii) Province level and (iii) General Governor's office level. If the grievance cannot be resolved at these three levels, a complainant will have a choice to lodge his/her grievance at the related court. MEW is oriented towards resolving grievances at the project level through negotiations with community leaders and representatives of affected persons. These discussions will be conducted by the PMU and will involve the affected groups and members of the relevant GRC, and the site manager and chief engineer of the construction contractor, if necessary. If a case cannot be resolved in this way it will be submitted to the grievance redress committee, led by the PMU Director. The GRM for the project is outlined below and consists of three levels with time-bound schedules for addressing grievances.

133. The committee consists of representatives of the community districts, elders and Mirabs; and representatives of the governmental offices in Kandahar, such as ASBA Kandahar, MEW, Shura, PMU, Supervision Engineer site manager, social and environmental safeguard officer, and grievances officer.

134. The first level and most accessible and immediate venue for the fastest resolution of grievances is the Shura and the District Governor representative. The District Governor's

representative with help of Shura and other GRC members, convenes a meeting of the GRC in the project area and conducts proceedings informally to reach an amicable settlement between the parties. The report of the committee is recorded in writing, and copies are provided to the parties involved. For this program, the GRC will be required to meet and reach a decision within 14 days of receiving a grievance (verbally or in writing) from an affected person or his representative.

135. Should the grievance remain unresolved or the AP is not satisfied with the decision, the grievance can be lodged with the Province Governor's office which will make a decision within 45 days.

136. If a person is dissatisfied with the ruling of the Province Governor Office decision, s/he or her/his representative may lodge their grievance with the General Governor's Office in Kabul which will make a decision within 60 days. If the appellant is still not satisfied, s/he has the right to take his case to the public courts.

137. At the project level, the PMU environmental/social officer will be responsible for processing and placing all papers before the PMU GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued, and decisions carried out. In the event that a grievance is not addressed at the previous levels, the affected person can seek legal redress of the grievance in the appropriate courts. The following table summarizes the envisaged grievance resolution process.

Table 24. Grievance Resolution Process

Steps	Process
Level 1	The grievance is informally reviewed by the GRC at the District Governor office with assistance of Shura, affected persons' representative and other GRC members, which takes all necessary measures to resolve the dispute amicably.
Level 2	• If the grievance is not solved at the previous level, the GRC at the Provincial Governor's Office will review the grievance and make a decision within 45 days. • The decisions will be issued by the conveyor and signed by other members of the GRC. The case record will be communicated to the complainant by the GRC at the provincial level. The grievance redress at this stage shall be completed within 45 days.
Level 3	If the aggrieved person is unsatisfied with the GRC decision at the provincial level, the next option will be to lodge grievances with the Grievance Redress Committee at the General Governor's Office (Kabul). The Governor's Office will convey its decisions to the aggrieved person within 60 days after receiving the grievance.
Level 4	If the decision fails to satisfy the aggrieved person/s, they can pursue further action by submitting their case to the appropriate court of law (local courts) without reprisal. The aggrieved person can take legal action over the amount of compensation or any other issues, e.g. occupation of their land by the contractor without their consent, damage or loss of their property, restrictions on the use of land/assets, environmental concerns such as dust caused by the contractor's machinery, etc.

Source: TRTA Consultants, 2019

138. In addition, the complainant can appeal a GRM decision and bring the case to the ADB Accountability Mechanism. The project level GRM does not in any way impede the access of the complainants to the ADB Accountability Mechanism (AM)[5] or the country's judicial or administrative remedies. Should the complainant wish to register a complaint with the ADB AM, the focal person should provide the complainants the ADB AM contact information.

[5] www.adb.org/site/accountability-mechanism/main

139. As the concept of compensation is new to the Government of Afghanistan, the DDT will design a pro-forma letter to be used by APs for filing their complaints or grievances. The DDT will also establish a liaison with the Office of the District Governor to receive a copy of each grievance filed, track the grievance and prepare monthly reports on the status of the filed grievances, to be included in the regular progress reporting of the Project.

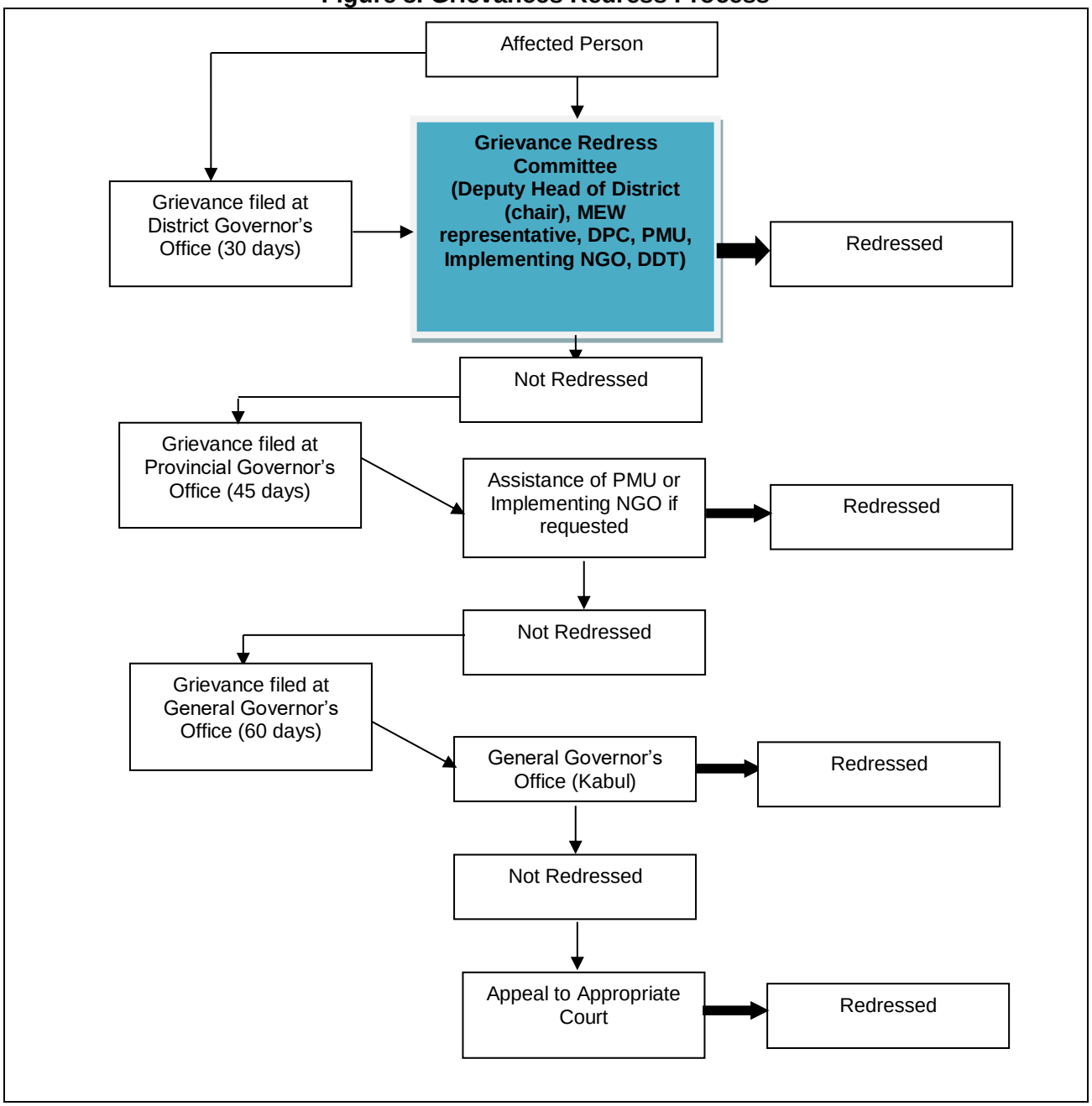
140. Additionally, the implementing NGO will help the APs in preparing the grievance and sending it to the concerned authority, at the appropriate level, and in pursuing it. For this purpose, the NGO will establish a Grievance Redress Unit that will rotate, between 4 central locations along the canal length, at least once a month at each location.

141. There will be four-stage procedures for redress of grievances, however APs will have the right to move to a court of law at any stage. These are as follows:

(i) Grievances are to be filed at the District Governor's offices. The district government with the help from Shura, NGO and PMUs resettlement team is obliged to reply and explain the decision. The GRC will assist the district governor offices in the mediation and resolution of conflict.
(ii) If AP is unsatisfied or has no reply from the District Governor's office, grievances can then be lodged with the Province's Governor offices. The Governor's office will issue the final decision within 45 days.
(iii) If AP is unsatisfied or has no reply from the province governor office, grievances can them be lodged with the General Governor Office in Kabul. The General Governor office will issue the final decision within 60 days.
(iv) The AP always has final recourse through Afghanistan's legal channels and cases can be referred to the appropriate courts; however, every effort will be made to avoid this since the system is presently critically weak. Should the AP want to pursue legal recourse, in a court of law at anytime, however, MEW through its DDT and implementing NGO will ensure that support is given to the AP to prepare a case.

142. The APs can call upon the support of the NGO to assist them in presenting their grievances or queries to the GRC if necessary. The NGO will act as an in-built grievance redress body. The APs, who are not satisfied with the decision of the GRC, will have the right to take the grievance to the Judiciary. Taking grievances to the Judiciary will be avoided as far possible and the NGO will make utmost efforts at reconciliation at the level of the GRC, and MEW will make every effort to solve the issue before going to the court as a last resort. The grievance redress process is shown in Figure 8.

Figure 8. Grievances Redress Process



Source: TRTA Consultants, 2019

VIII. RESETTLEMENT BUDGET AND FINANCING

A. General

143. The resettlement cost estimate for this Project includes eligible compensation, resettlement assistance, and support costs for LARP preparation and implementation. The support cost, which includes staffing requirements, monitoring and evaluation, and the involvement of an implementing NGO in project implementation, and other administrative expenses are part of the overall project cost. The unit cost for land and other assets in this budget has been derived through rapid field appraisal, consultation with affected families, relevant local authorities and reference from old practices. Contingency provisions have also been made to take into account variations from this estimate. Some of the features of this R&R cost estimate are outlined below:

(i) Compensation for acquired land at the rates approved by the local governments;
(ii) Compensation for all structures and other immovable assets at their replacement cost;
(iii) Compensation for crops and trees for all kind of land acquisition;
(iv) Assistance in lieu of the loss of business/ wage income/ employment and livelihood;
(v) Assistance for shifting of the structures;
(vi) Assistance for the documentation and administrative fees;
(vii) Assistance for vulnerable groups for their livelihood restoration;
(viii) Cost for implementation of LARP.

144. The Government will bear the cost of land, and ADB will provide funding for resettlement assistance. The responsibility for the allocation of land acquisition funds lies by law with the expropriating agency, in this case MEW and ASBA.

B. Compensation Valuation

1. Assets Valuation

145. **Land valuation** has been done based on TRTA consultation meetings with the APs. For land compensation only legally owned land holders AHs with (i) titles, (ii) official deeds, (iii) unofficial written deeds, or (iv) declaration from Shura, Jirgas or elders of the village estate *(manteqa)* were considered. In Afghanistan, there are no open markets for sale or purchase of land. Generally, very negligible land registration takes place officially in respect of sale/purchase of land. Moreover, there are no established official rates for various types of lands. As such, determining the optimum rate payable to the affected households losing lands was an important task. The location and type of land influenced the actual price per square meter. As per the site survey, the nearer the land to a build-up area (e.g. village proper), the higher the valuation and perception of the affected households.

146. The valuation is arrived at by the legally constituted committee which has AP representation. As a general trend, land closer to the village core is valued higher than land in the periphery. The legal framework requires the convening of the provincial evaluation committee with members nominated according to the law.

147. The rates were determined based on the type and location of the land affected which is presented in Table 25.

Table 25. Land Rates

Type of Land/ Classification of Land	Location	Rate (AF) per m^2
(i) Agricultural Land Irrigated Land	From Qazi Bagh to Meyanji village in Arghandab district	500
	Babawali Wasteway	1000
Non-irrigated land	*No Non-irrigated Land impacted*	
(ii) Non-Agricultural Land Residential	*No residential Land impacted*	
Commercial	*No commercial Land impacted*	

148. **Structure** loss valuation was done based on 'replacement cost' free of depreciation and other costs. Replacement costs are calculated in consultation with the local governments and provincial MEW engineers. The replacement costs are arrived at by assessment of market value for replacement of structures and include costs of material, labor and transport. There are only temporary structures in the Project area. Unit rates for temporary structures is given in Table 26.

Table 26. Details of Structure Compensation

Item	Rate (AF) per m^2
Structure (Mud, brick)	3100
RCC concrete	8400

149. **Tree** compensation for fruit trees is calculated for each main tree type at annual average production multiplied with value/kg at market prices and number of years needed to re-grow the tree to the same productive level, including the cost of the full replacement cost of saplings. Preliminary assessment shows that all AHs losing trees have sufficient remaining land to replant trees. The detailed calculations are given in Table 27.

Table 27. Compensation of Fruit Trees

Tree	Average Annual Yield (kg)	Rate (AF/kg) (Market prices)	Years to re-grow to productive level	Rate per tree (AF)
Pomegranate	40	46	5	9200
Apricot	90	20	5	9000
Berry	65	30	6	9750

150. Based on these calculations it was found that the rates of fruit trees vary from AF 9,000 to 9458. A uniform rate of AF 9000 is considered for all fruit trees in consultation with the APs.

151. Compensation for non-fruit trees is calculated based on the cost of reproducing the tree to the level of growth it was cut. Compensation of non-fruit trees is calculated based on the statistics of common wood tree in the project area. Waly (Timber tree) is a common wood tree in the project area. The general height of the tree is 10 m and girth of 0.5 m and produces about 1,000 kg of firewood. The cost of firewood per kg is AF 5.5 and hence the cost of tree is calculated as AF 5500. The compensation of the tree will be free of deduction for the value of the wood left to the AH.

2. Income Restoration / Other Allowances

152. The project will not require the preparation of a relocation plan. The project's resettlement strategy is to provide compensation for all lost assets at replacement cost in order that APs incomes and livelihoods are not adversely affected and where possible improved. All APs whose livelihoods are affected will be supported for income losses and those whose livelihoods are affected adversely provide them with livelihood restoration measures (including allowances and interventions for severely affected, poor and vulnerable APs). To further abet livelihood

improvements, the LARP implementation NGO will organize a Displaced Persons Committee (DPC). If there is an interest, the NGO will attempt to link the DPC with existing microcredit or livelihood development programs in the area. Another avenue that could be explored would be to establish a market for the displaced businesses in collaboration with town authorities or relevant Jirgas/Shuras. Coordination will also be made with local governments in assisting DPs find alternative locations for their affected residences and businesses. The NGO will organize a DPC to facilitate planning, coordination and displaced persons feedback in these livelihood restoration measures.

(i) **Income Restoration Allowance for Business Losses -** compensation for permanent business losses will be in cash for the period deemed necessary to re-establish the business (6 months). Business losers will receive AF 10,000 a month based on the average monthly business income of shops that are more or less similar and obtained during the LARP census survey. The sum of this allowance will be adjusted if necessary in light of information collected and if payments are delayed beyond a year.

(ii) **Vulnerable Group Allowance -** Vulnerable people (APs below the poverty line, women headed households, disabled person headed households, etc.) will be given assistance in the form of a one-time allowance for vulnerability. Business losers will receive AF 10,000 a month based on the average monthly business income of shops that are more or less similar as obtained during the LARP census. The sum of this allowance will be adjusted if necessary in light of information collected if payments are delayed beyond a year. Vulnerable AHs will be entitled to receive AF 30,000 and receive priority in employment in project-related jobs.

(iii) **Transitional Allowance-** Affected households or renters forced to relocate will receive a transitional allowance for livelihood losses for 3 months at AF 5,000 per month.

(iv) **Relocation Allowance-** Affected households forced to relocate will receive a relocation allowance for transportation of AF 7,500.

(v) **Severe Agricultural Land Impacts–**When greater than 10% of an AP's agricultural land is affected, the AP will get an additional allowance for severe impacts equal to the market value of a year's net income crop yield of the land lost.

153. In addition to livelihood restoration entitlements, AHs will be given preference for non-skilled jobs during the construction phase of the project. Small business workshops for the shop owners will also be carried out every three months for the first year. Following these, the implementing NGO may also assist the AHs in identifying and providing access to livelihood linkages. Linkages to other demand driven community infrastructure or enterprise development programs or microcredit and social programs in the area will also be facilitated where possible.

C. LARP Implementation and Support Cost

154. Implementing NGO: The unit cost for hiring the implementing NGO has been calculated on a lump sum basis at AF 5,000,000. External Monitoring and Evaluation Agency: The unit cost for hiring one EMA has been calculated on a lump sum basis at AF 1,500,000.

155. Costs will be updated during LARP preparation based on consultations and feedback received. A 10% contingency has been added.

D. Cost Estimate and Budget

156. The detailed cost estimate for each type of compensation has been derived based on the above unit rates. The total compensation payable for each type of loss/allowance is shown below.

157. **Compensation for Land**: The total compensation payable for land works out to AF 35,940,000, details are shown in Table 28.

Table 28. Compensation for Land

Type of Land	Location	Rate (AF/m^2)	Affected Area (m^2)	Total (AF)
Agricultural Land Irrigated	Babawali Wasteway	1000	35,940	35,940,000
Total			**35,940**	**35,940,000**

158. **Compensation for houses/shops**: The total compensation payable for structures of houses/shops totals AF 398,592,145. The details are shown in Table 29.

Table 29. Compensation Payable for Structures

Item	Rate (AF/m^2)	Affected Area (m^2)	Total (AF)
Houses/Shops (Mud, brick, wood made)	3,100	90,846.91	281,625,421
Reinforced Cement concrete (RCC)	8,400	13,924.61	116,966,724
Total		**104,771.52**	**398,592,145**

159. **Compensation for Trees**: The total compensation payable for the trees amounts to AF 44,771,000. The details are shown in Table 30.

Table 30. Compensation for Trees

Type of Trees	No. of Trees	Unit Rate (AF/tree)	Total (AF)
Timber Trees	1,832	5,500	10, 076,000
Fruit Trees	3,855	9,000	34, 695,000
Total	**5,687**		**44,771,000**

160. **Compensation for Business Losses**: The total compensation payable for business loss amounts to AF 9,480,000. The details are shown in Table 31.

Table 31. Compensation for Business Loss

Type of Loss	No AH	Rate (AF)	Total (AF)
Shops Business Loss	158	10,000 x 6 months	9,480,000
Total			**9,480,000**

161. **Allowances**: The total amount payable for allowances amounts to AF 4,649,400. The details are shown in Table 32.

Table 32. Details of Allowances

Type of Allowance	No AH	Rate (AF)	Total (AF)
Vulnerable Allowance for households below poverty line and / or women headed households	14	30,000	420,000
Transitional Allowance	172	5,000 x 3 months	2,580,000
Relocation Allowance	172	7,500	1,290,000
Severe Agricultural Land Impact Allowance	35,940	10	3,59,400
Total			**4,649,400**

E. Summary of Total Cost

162. The total estimated resettlement cost for the Project is **AF 560,375,799** equivalent to **$7,397,700** ($1 = 75.75 AF). The land cost is $474,455 and non-land costs are $6,039,505. Details of the LARP cost are given in Table 33.

Table 33. Total Resettlement Budget

No.	Item	Unit	Rate per Unit (AF)	Quantity	Cost (AF)
A	**Land**				
	Agricultural Irrigated Land				
	Babawali Wasteway	m^2	1000	35,940	35,940,000
	Sub-Total (A)	**m^2**		**35,940**	**35,940,000**
B	**Structures**				
	Houses/Buildings (Mud/brick/wood)	m^2	3100	90,846.91	281,625,421
	Reinforced Cement concrete (RCC)	m^2	8400	13,924.61	116,966,724
	Sub-Total (B)			**104,771.52**	**398,592,145**
C	**Trees**				
	Non-fruit Timber Trees	No.	5500	1,832	10,076,000
	Fruit Trees	No.	9000	3,855	34,695,000
	Sub-Total (C)			**5,687**	**44,771,000**
D	**Business/Income Loss**	AH	10,000 x 6	158*	**9,480,000**
E	**Other Allowances**				
	Relocation Allowance	AH	7,500	172	1,290,000
	Transitional Allowance	AH	5000 x 3	172	2,580,000
	Vulnerability Allowance	AH	30,000	14	420,000
	Severe Agricultural Land Impact Allowance	AH	10	35,940	359,400
	Sub-Total (E)				**4,649,400**
	Total (A+B+C+D+E)				**493,432,545**
F	**Support Costs for LARP Implementation**				
	Implementing NGO	Lump sum	11,000,000	1	11,000,000
	Independent Monitoring Agency	Lump sum	5,000,000	1	5,000,000
	Sub-Total (F)				**16,000,000**
	Total Cost				**509,432,545**
	Contingency at 10 %				50,943,254
	Total LARP Budget (in AF)				**560,375,799**
	Total LARP Budget (in $) ($1=AF 75.75)				**7,397,700**

* 150 get permanent loss and 16 temporary loss. Allowance for temporary loss (16 APs) is half of permanent.

F. Budget by Funding Source

163. The following table summarizes the budget as per the source of financing. The cost for land will be met by the Government and the cost of resettlement shall be met out of the funds provided by ADB under the Grant. The details are shown in Table 34.

Table 34. Summary of Budget by Funding Source

Purpose	Amount (AF)
I. Funding by the Government of Afghanistan	
Land	35,940,000
Total (I)	**35,940,000**
II. Funding by ADB	
Structures	398,592,145
Trees	44,771,000
Business/Income Losses	9,480,000
Relocation Allowance	1,290,000
Transitional Allowance	2,580,000
Vulnerability Allowance	420,000
Severe Agricultural Land Impact Allowance	359,400
Fees for NGOs and Monitoring Consultant	16,000,000
Sub-total (II)	**473,492,545**
Contingency (10%)	473,4925
Total (II) in AF	**520,841,799**
Total (II) in $	**6,875,799**

IX. IMPLEMENTATION SCHEDULE

A. General

164. The implementation schedule for the resettlement plan will be scheduled in accordance with the overall project implementation. The EA/IA will make sure that resettlement planning is carried out before the award of the civil works contract. All activities related to the LARP will be implemented before the commencement of civil works. All unanticipated impacts will be quantified through a detailed measurement survey carried out during the LARP preparation along with a census of eligible affected persons, who shall be compensated through a corrective action plan.

165. The construction period for all components of the Project is tentatively scheduled for five years. Public consultation, international monitoring and grievance redress will be undertaken intermittently throughout the project duration. However, the schedule is subject to modification depending on the progress of the project activities. As part of advance actions following Project negotiations, the EA will establish the PMU, GRC, and appoint the NGO for resettlement implementation. The proposed LARP activities are divided in to three categories based on the stages of work and process of implementation. The details of activities involved in these phases are as follows: (i) Draft LARP finalization for approval; (ii) finalization of implementation ready LARP; (iii) LARP implementation; and (iv) start of civil works.

1. LARP Preparation

166. The preparation of the LARP involves detailed measurement surveys, confirmation of the census surveys, and socioeconomic surveys based the conceptual/preliminary design plans prepared by the TRTA and subject to further validation based on the detailed engineering design; discussion of preliminary valuation with the District Governments; ADB review and approval; Government approval; draft LARP disclosure; and signing.

167. MEW will initiate at the earliest stage of the project: (i) verification of collected land and other affected property ownership documents with MUDL, Governors' Office, local committees and other relevant authorities at the earliest stage of the project; (ii) allocation of funds for land from the government budget.

2. Finalization of implementation ready LARP

168. The finalization of the implementation ready LARP involves activities associated with the finalization of the detailed engineering design; further consultations with the affected households including filling up of data gaps by conducting detailed measurement surveys based on the final detailed engineering design; preparation of a final version of the LARP; and approval by both ADB and the Government of Afghanistan.

B. Project Preparatory Stage (Pre-Implementation)

169. Setting up relevant institutions for the resettlement activities will be the major task during the preparatory stage during the pre-implementation phase. The major activities to be performed in this period include establishment of a PMU, DDT along with the appointment of both international and domestic resettlement specialists in the DDT. Additionally, the implementing NGO needs to be appointed at this stage, which will be followed by setting up of the GRC.

C. LARP Implementation Phase

170. The LARP, at this stage, needs to be approved by ADB and will be disclosed to the APs. Upon the approval of the LARP, all the arrangements for the compensation and the disbursement

needs to be done which includes payment of all eligible assistance; relocation of APs; initiation of economic rehabilitation measures; site preparation for delivering the site to contractors for construction and finally commencement of the civil works. MEW as the expropriating agency will make a budgetary allocation at the MOF and the MOF will release the funds the Afghanistan Bank to the AP's individual bank once the LARP is prepared and approved.

171. A PMU will be established to implement resettlement activities and a Grievance Redress Mechanism will be put in place. Upon completion of the LARP by the detailed design consultant, the EA/PMU will review and approve the document including the compensation rates. The PMU will submit the approved LARP to ADB for an approval. The detailed and final LARP will include the final impact assessment, detailed measurement surveys, preparation of individual parcel maps and updating of compensation rates. The final LARP will be disclosed after approval by ADB and MEW.

172. Meanwhile, all arrangements will be set for signing the contract agreement with the APs and the process will be executed for land purchase where necessary and compensation agreements. After completion of the LARP implementation and full payment of compensation to all APs, and independent monitoring expert will check if all provisions stipulated in the LARP are completed and prepare the LARP Implementation Report. The EA will award civil works contracts (signing of contract awards) after the LARP Implementation Report is reviewed and approved by ADB.

D. Monitoring and Evaluation Period

173. Internal monitoring will be the responsibility of the PMU, DDT and the implementing NGO. This will start early during the project when implementation of the LARP starts and will continue through to the completion of the project. The independent monitoring and evaluation by an external monitoring agency (EMA) will start immediately after the start of the construction and will be carried out intermittently on a half yearly basis.

E. LARP Implementation Schedule

174. A draft timeline for LARP preparation, implementation and post implementation has been prepared in accordance with different steps covered under this LARP. See details in Table 35 and Figure 9.

Table 35. LARP Implementation Schedule

No.	Activity	Responsibility	Date
A) LARP Finalization			
1	Definition of engineering and design	TRTA	2018-2019
2	Surveys/consultation	TRTA	March 19
3	LARF drafting	TRTA	April 19
4	ADB review and approval of LARF	ADB	May 19
5	Government approval of LARF	EA / MUDL	June 19
6	Disclosure	Consultant / PMU / ADB	June-Sep 19
7	Project appraisal	ADB	July 19
8	Project approval	ADB	Sep 19
B) Review, Update and Finalization of Implementation Ready LARP			
1	Design implementation	EA	Nov 19
2	Final engineering design of canal and Babawali wasteway	EA	Dec 19
3	Review surveys and valuation of data	Consultant	Jan 20
4	Re-surveying to fill DMS data gaps	Consultant	Jan-Feb 20
5	Updating resettlement leaflet and distribution to AHs	Consultant	Feb 20

No.	Activity	Responsibility	Date
6	Proposal of rates to MOF/MUDL	PMU	Feb 20
7	LARP update and final valuation	Consultant	Feb-Mar 20
8	Negotiations with APs to agree and sign off on entitlement packages	PMU/Consultant	Apr-May 20
9	Allocation of LAR funds	EA	June 20
10	Staffing of PMU and DDT in place	EA	June 20
11	ADB review and approval of LARP	ADB	June 20
12	Government approval of LARP	EA/MUDL	June 20
13	Disclosure	Consultant / PMU / ADB	June 20
14	Contract Awards Signing	ADB/PMU	July 20
C) LARP Implementation			
1	Contracting of Implementing NGO and consultants	Consultant / PMU	June 20
2	Compensation delivery	PMU, District Government	Sep 20
3	Internal monitoring	CSC, PMU	Apr-Oct 20
4	Preparation of compliance report	EMA	Oct 20
5	No objection from ADB to start civil works	ADB	Oct 20
D) Start of Civil Works			
1	Start of civil works	Construction Contractor	From Nov 20
2	Preparation of evaluation report	EMA	Nov 22

175. A tentative schedule for LARP activities in the project including various sub-tasks and timeline matching with civil work schedule is prepared and presented in Figure 9.

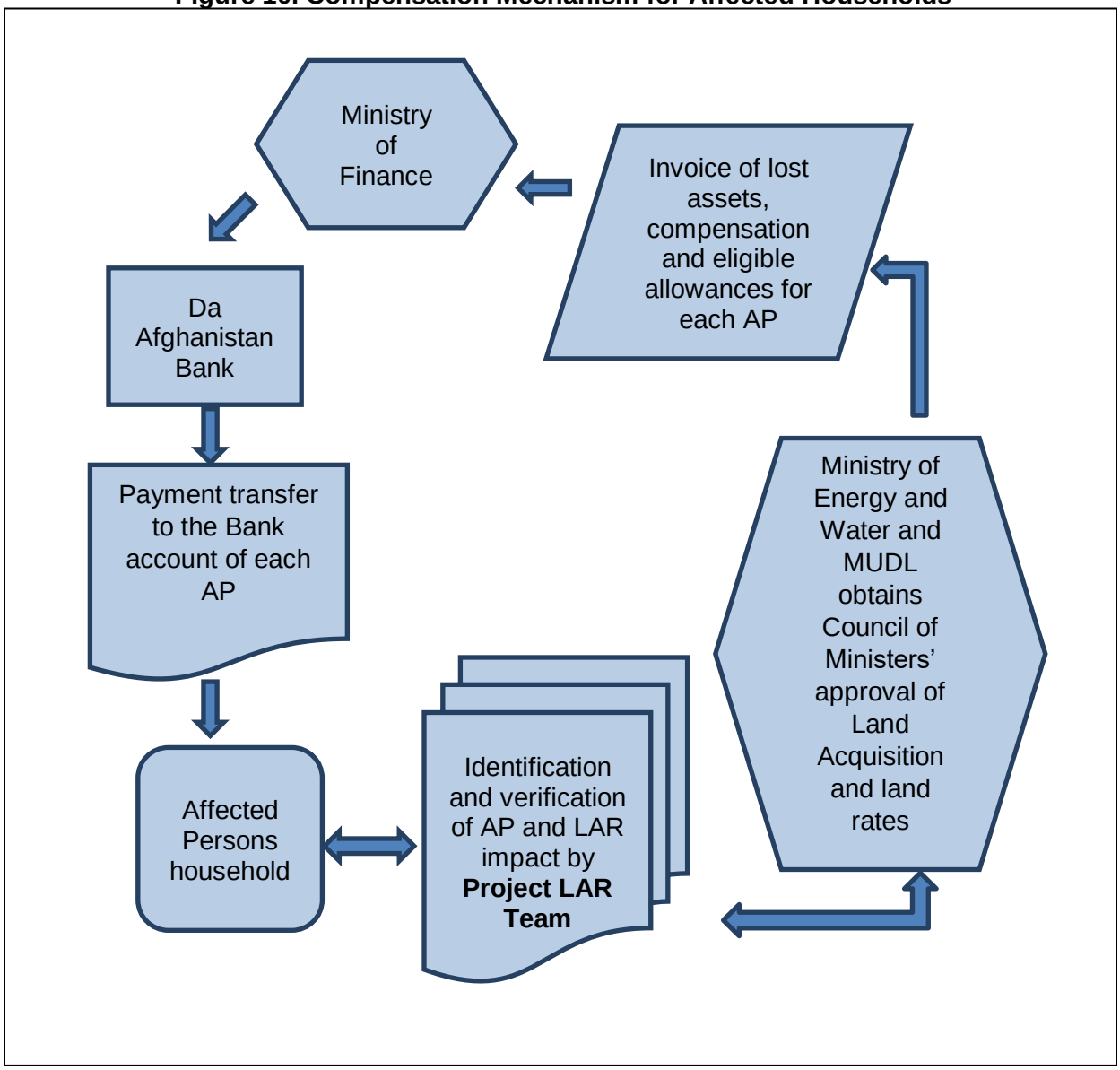
Figure 9. Indicative LARP Implementation Schedule

Milestones/Activities	2019												2020											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
A) LARF Finalization																								
1. Finalization of engineering and design (2019 - 2021)																								
2. Surveys/Consultation																								
3. LARF Drafting																								
4. ADB review and approval of LARF																								
5. Government approval of LARF																								
6. Disclosure																								
7. Project appraisal																								
B) Review, Update and Finalization of Implementation Ready LARP																								
1. Design implementation																								
2. Final definition of alignment																								
3. Review surveys and validation of data																								
4. Re-surveying to fill DMS data gaps																								
5. Updating resettlement leaflet and distribution to AHs																								
6. Proposal of rates to MOF																								
7. LARP update and final valuation																								
8. Negotiations with APs to agree and sign off on entitlement packages																								
9. Allocation of LAR funds																								
10. Staffing of PMU and DDT in place																								
11. ADB review and approval of LARP																								
12. Government approval of LARP																								
13. Disclosure																								
14. Contract award signing																								
C) LARP Implementation																								
1. Contracting of Implementing NGO/Consultants																								
2. Compensation Delivery																								
3. Internal/External Monitoring																								
4. Preparation of Compliance Report																								
5. No Objection from ADB to start civil works																								
D) Start of Civil Works																								
1. Start of civil works																								
2. Preparation of evaluation report																								

F. Compensation Delivery Mechanism

176. The sample compensation delivery mechanism to be approved by the local government and MEW is presented in Figure 10. The EA will ensure allocation of funds and availability of resources for compensation and assistance to the affected households and for smooth implementation of the Project R&R activities. MEW will plan in advance in its annual budget to keep this cost for the R&R activities. During the LARP preparation, MUDL will verify ownership of land documents, collected by the LAR team comprising survey teams for the DMS and census surveys, conducted under the guidance of the supervision consultants and their resettlement specialist. The Council of Ministers will approve the land acquisition process, and the MOF will release to the Afghanistan Bank payments to be made through local banks into the individual bank accounts of AP's. The provincial governors will chair the provincial valuation committees constituted under law.

Figure 10. Compensation Mechanism for Affected Households



X. MONITORING AND EVALUATION

A. General

177. LARP implementation will be closely monitored to provide the PMU with an effective basis for assessing resettlement progress and identifying potential difficulties and problems. Internal monitoring will be undertaken by the PMU. Monthly progress reports will be prepared and submitted to the PMU. The EA will appoint an independent agency to undertake external monitoring. The independent agency will monitor sub-projects twice a year and submit reports directly to the EA. The EA will submit all external monitoring reports to ADB for review. The monitoring and evaluation system will involve:

(i) Administrative monitoring including but not limited to daily planning, implementation, feedback and troubleshooting, individual AP file maintenance, progress reporting;
(ii) Socioeconomic monitoring including but not limited to: case studies, using baseline information for comparing AP socioeconomic conditions, evacuation, demolition, salvaging materials, morbidity and mortality, communal harmony, dates for consultations, number of grievances and resolutions; and
(iii) Impact evaluation monitoring including but not limited to income standards restored or improved.

B. Internal Monitoring

178. Internal monitoring will be carried out routinely by the PMU either directly or through the services of a consultant and assisted by the local authorities responsible from this project area. The results will be communicated to ADB through the quarterly project implementation reports. Indicators for the internal monitoring are related to process and immediate outputs and results. The monthly reports will be consolidated quarterly in the standard supervision reports to ADB.

179. Specific monitoring benchmarks (where applicable) will include:

(i) Timeliness, information campaigns, quality of information and consultation with APs;
(ii) Status of land acquisition and payments of land compensation;
(iii) Compensation for affected structures and other assets;
(iv) Payments for all losses (if adverse impacts occur during the project implementation);
(v) Income/livelihood restoration activities (if affected); and
(vi) Results of income restoration activities, where necessary.

C. External Impact Monitoring and Evaluation

180. ADB SPS 2009, requires monitoring activities to correspond with the Project's risks and impact. The Project as a whole, will be classified as category 'A' for the involuntary resettlement (even if some of the project components are classified as category 'B' or 'C'. Therefore, external monitoring will be carried out by an external monitoring specialist or company for the Project activities.

181. External monitoring will occur in two phases: i) due diligence validation of LARP implementation through the preparation of a compliance report; and ii) final evaluation of the rehabilitation program (one year after the end of LARP implementation). The objectives of the external evaluation are to:

(i) During and immediately after LARP implementation:
   a. Verify that all AH have received their compensation and entitlement as per the LARP. The EMA will review all compensation totals and ascertain whether compensation was provided correctly and to everyone.
   b. Prepare a compliance report based on which ADB will decide whether to provide no objection to the beginning of civil works.

(ii) One year after the end of LARP implementation:
   a. Assess whether APs have improved living standards, in terms of income, housing, access to basic amenities, ownership of land and material assets;
   b. Monitor schedules and achievement of targets; and
   c. Evaluate whether social development objectives of the project are achieved.

182. An external monitoring and evaluation agency (EMA) with prior experience in resettlement implementation monitoring and evaluation will be engaged by the MEW. Immediately after LARP implementation the agency will prepare a compliance report assessing whether all APs have been compensated as required by this LARP. Based on the results of the compliance report, ADB will give no objection to start civil works.

183. In addition, one year after the conclusion of LARP implementation the EMA will carry out a study to document the following: (i) restoration of income levels; (ii) changes and shifts in occupation patterns; (iii) changes in AP type of housing and asset ownership; (iv) assessment of APs access to amenities, such as water, electricity, and transportation; and (v) performance of the NGO, and PMU in resettlement implementation.

184. The EMA will monitor the entire process of LARP implementation and submit at the end the compliance report directly to the EA which will then transmit it to ADB.

D. External Monitoring Agency Tasks

185. The EMA will closely monitor the implementation of the LARP and engage in the following tasks: (i) review of LARP and Information pamphlet disclosure; (ii) review of action taken by the PMU to compensate the APs with particular attention to the way this action fits the stipulation of the LARP; (iii) review all compensation tallies; (iv) verify whether the compensation is provided thoroughly to all APs and in the amounts defined in the LARP and in the AP contracts; (v) assess the satisfaction of the APs with the information campaign and with the compensation/rehabilitation package offered to them; (vi) review the legalization process and assess its effectiveness; (vii) review grievances cases; (vii) carry out an AP satisfaction survey with a 23% sample of the APs.

186. Immediately after the implementation of the LARP the EMA will prepare the Compliance Report. The report will include the following:

(i) Assessment of the way the compensation has been carried out in relation to the stipulations of the LARP;
(ii) Verification that all APs have been compensated in the amounts stipulated in the LARP;
(iii) Assessment of the accuracy of survey and asset valuation;
(iv) Assessment of the effectiveness and thoroughness of the legalization process;
(v) Review of grievance cases and of their solution;
(vi) Assessment of the rehabilitation program for severely affected and vulnerable APs;
(vii) Assessment of the satisfaction of the APs;
(viii) Lesson learned to be applied to the next projects, and;

(ix) General assessment of LARP implementation and recommendations to ADB regarding the provision of the No Objection Letter to start the civil works.

187. The EMA will carry out its activities in close communication with the PMU and will engage in desk activities and field activities and for this s/he will hire an appropriate number of assistants to carry out the AP satisfaction survey and to review the compensation tallies. The monitoring activities assigned to the consultant will start immediately after Government approval of the LARPs and will last until LARP implementation is concluded.

E. Reporting

188. Internal monitoring will be reflected in the standard project implementation reports submitted quarterly to ADB. The EMA compliance report will be sent to ADB as a stand-alone document. A final evaluation study will be included in the standard project implementation report a year after LARP implementation was concluded.

APPENDIXES

Appendix 1. Sample Socioeconomic Survey

Arghandab Integrated Water Resources Development Project
Questionnaire for Socioeconomic Survey of Affected Households

Questionnaire ID # Date: Signature:

Name of Surveyor:
Checked by: Date: Signature

Location of Interview:

Confidentiality: The information obtained from this survey will be used to understand the current socioeconomic status of the affected households surveyed for the purpose of preparing Land Acquisition and Resettlement Plan under the Transaction Technical Assistance of the Arghandab Integrated Water Resource Management Project. The information obtained from the survey will not be used in any way that will disclose the identity of any individual.

"Household" (HH) means people living in a dwelling who prepare and/or eat their meals together.

Note: The HEAD of the Affected HOUSEHOLD (AHH) should ideally participate in the survey and be the RESPONDENT to the questions below. If the RESPONDENT is NOT the household head, it should be the SPOUSE of the household head. In cases where both are not available, get answer from a responsible member of the AHH.

Write the number of the answer given in the respective box. For any questions if respondent does not willing to answer put [-], for questions that are not relevant put [NA] and if does not know the answer put [X].

Tell very clearly to respondent that personal information is optional

1 - Household (HH) Data

1.1	Who is the Respondent? [1] Husband, [2] Wife, [3] Other)		
1.2	Is s/he the head of the household? [1] Yes, [2] No,		
1.3	Name of Respondent	**1.4**	Parentage:
1.5	Cell No:	**1.6**	National Identify Card No.
1.7	Gender:	**1.8**	Age:
1.9	Tribe:		
1.10	Temporary Address		
1.11	Permanent Address		
1.12	Is your HH ever displaced due to civil unrest? If no, go to next section		[1] Yes, [2] No
1.13	[1] If yes, how many times=	[2]	When? Year(s)
1.14	**What caused your displacement?**		

[1] Insurgency [2] Communal conflict [3] Organized crime [4] General insecurity [5] Weak rule of law [6] Ethnic persecution [7] Natural disaster [8] Drought [9] Violence Against Women [10] Other, please specify

1.15 Current status of Displacement

1 - Household (HH) Data

[1] Displaced & returned to own place/area of origin [2] Displaced & settled in Kandahar city [3] Displaced & living in a temporary irregular/informal settlement [4] Camp [5] Other, Specify ……

1.16 Impacts of Displacement on your Household:

[1] Poverty [2] Malnutrition [3] Unemployment [4] Underemployment [5] Loss of Housing [6] Loss of Land [7] Loss of other assets, please specify [8] Loss of social networks [9] Substance abuse [10] Family problems [11] Improved Security [12] Increased insecurity [13] Other, please specify

2. Household Nutrition Status

2.1 In the past week, on average, how many meals per day has your household eaten?

[1] Male [2] Female

2.2 In the past week, what did your Household eat? (give the variety of food eaten during the week)

Meal	Male			Female		
2.2.1 Breakfast						
2.2.2 Lunch						
2.2.3 Dinner						
2.2.4 Other						

2.3 In the past <u>six months</u> has your household, or any members of your household, had to do any of the following due to financial constraints/difficulties, answer as many as are relevant. (1=Yes, 2=No)

		Yes/No	By Women	By Men
2.3.1	Sold livestock or other household assets (please specify)			
2.3.2	Sold personal assets e.g. jewelry due to financial issues			
2.3.3	Accepted gifts of food or money from friends or relatives			
2.3.4	Got food aid from NGOs, charity organizations or others			
2.3.5	Women start earning			
2.3.6	Stopped sending children to schools/college			
2.3.7	Sent male children to work			
2.3.8	Sent female children to work			
2.3.9	Sent children male to live with relatives who are better off			
2.3.10	Sent female children to live with relatives who are better off			
2.3.11	Sent male children to Madrassas			
2.3.12	Sent female children to Madrassas			
2.3.13	Borrowed money			

2.3	**In the past six months has your household, or any members of your household, had to do any of the following due to financial constraints/difficulties, answer as many as are relevant. (1=Yes, 2=No)**			
2.3.14	Other, specify			

3 - Income and Expenditure

3.1 How much do you spend monthly on average for the following items? (AF)

	Food Items	Cost		**Non-Food Items**	Cost
3.1.1	Meat		3.1.15	Shampoo	
3.1.2	Vegetables		3.1.16	Toothpaste	
3.1.3	Pulses		3.1.17	Clothing	
3.1.4	Fruit		3.1.18	Shoes	
3.1.5	Milk		3.1.19	Soap	
3.1.6	Butter / Cheese		3.1.20	Washing Soap or washing powder	
3.1.7	Cooking Oil		3.1.21		
3.1.8	Eggs		3.1.22	Perfume	
3.1.9	Sugar		3.1.23	Cosmetics	
3.1.10	Flour		3.1.24	House (Rent/Repair etc.)	
3.1.11	Rice		3.1.25	Education	
3.1.12	Spices		3.1.26	Transport	
3.1.13	Water		3.1.27	Fire wood/ Kerosene / Gas	
3.1.14	Water Supply		3.1.28	Sanitation	
Other (specify)			3.1.29	Electricity	
Other (specify)			3.1.30	Telephone (Land & Cell)	
Other (specify)			3.1.31	Medical	
Other (specify)			3.1.32	Entertainment (Radio /TV/Trips etc.)	
Other (specify)			3.1.33	Social, Religious festivals	
Other (specify)			3.1.34	Family Functions	
Other (specify)			3.1.35	Gas/Fire Wood/Kerosene oil	

3.2 Who decides on the major household expenditure? (1= Male, 2= Female, 3 = Both)

3.3 What is your Household's monthly average income from the following sources (AF)

3.3.1	Wages or salary	
3.3.2	Money earned from agriculture/fishing/livestock	

3 - Income and Expenditure

3.3.3	Pension	
3.3.4	Money received from charity/NGOs etc.	
3.3.5	Remittances from relatives or friends	
3.3.6	Rental income	
3.3.7	Self-Employment	
3.3.8	Money from family business	
3.3.9	Other, specify	

3.4 Does your Household Save? (1 =Yes, 2 =No)

3.5 If yes, Give details of the savings.

	Male members	Monthly Amount		Female members	Monthly Amount
3.5.1 In Bank/s					
3.5.2 Kept in the House					
3.5.3 Community Group Savings					
3.5.4 Other, specify					

3.6 Have you taken any Loan? (1=Yes, 2=No)

3.7 If yes, Give details of the loan (If two persons getting different interest rates from same source, indicate both with slash)

	Male members	Interest rate	Female members	Interest rate
3.7.1 Bank Loan				
3.7.2 Money Lender				
3.7.3 Micro Finance Companies				
3.7.4 Relatives/Friends				
3.7.5 Community Group Savings				
5.7.6 Other (Specify)				

4 - Ownership of Assets

Does your household own any of the following? (1= Yes, 2 = No)

	Yes/No	*Register in the Name of Male / Female (If applicable)*		Yes/No	*Register in the Name of Male / Female*
4.1.1 Land- Non-Agriculture			4.1.19 Washing Machine		
4.1.2 Land- Agriculture			4.1.20 Refrigerator		

4 - Ownership of Assets

4.1.3 House		4.1.21 Solar Light	
4.1.4 Cows/Goats		4.1.22 Kerosene Lamp	
4.1.5 Poultry		4.1.23 Petro max Lamp	
4.1.6 Cow		4.1.24 Computer or Laptop	
4.1.7 Radio		4.1.25 Sewing machine	
4.1.8 TV		4.1.26 Motor Bike	
4.1.9 DVD /CD player		4.1.27 Car/Van	
4.1.10 Mobile Phone		4.1.28 Three wheeler	
4.1.11 Basic furniture		4.1.29 Push Bicycle	
4.1.12 Sofa/ Settee		4.1.30 Micro Wave	
4.1.13 Brass Utensils		4.1.31 Geyser	
4.1.14 Stainless Utensils		4.1.32 Iron	
4.1.15 Clay/ Plastic Utensils		4.1.33 Out board motors	
4.1.16 Kerosene Stove		4.1.34 Aquaculture equipment	
4.1.17 Sewing Machine		4.1.35 Air Conditioner	
4.1.18 Motorized Pump		4.1.36 Internet Access	
		4.1.37 Computer	

5. Average household expenditure

On food and non-food items

Food Items	**Qty. (Kgs/Month)**	**Cost (AF/Month)**	**Non-Food Items**	**Qty.**	**Cost (AF/Month)**	**Cost (AF/Yr)**
5.1.1 Meat (*beef*/*chicken*)			5.1.18 Clothes			
5.1.2 Vegetables			5.1.19 Shoes			
5.1.3 Fruit			5.1.20 Soap (No)			
5.1.4. Milk			5.1.21 Clothes washing power/soap			
5.1.5. Ghee/Butter			5.1.22 Education/fee			
5.1.6 Cooking oil			5.1.23 Healthcare/ medicine			
5.1.7 Cheese			5.1.24 Electricity bills			
5.1.8 Eggs			5.1.25 Landline phone/ bills			
5.1.9 Sugar			5.1.26 Mobile cards/ bills			
5.1.10 Flour			5.1.27 Internet cards/ cable bills			
5.1.11 Rice			5.1.28 Fire/fuel wood			
5.1.12 Pulses			5.1.29 Kerosene oil as fuel			

4 - Ownership of Assets

5.1.13 Spices			5.1.30 Perfumes/ Cosmetics		
5.1.14 Water/ mineral water			5.1.31 Gas/LPG		
5.1.15 Shampoo			Other (specify)		
5.1.16 Toothpaste			Other (specify)		
Other (specify)			Other (specify)		
Other (specify)			Other (specify)		
Other (specify)			Other (specify)		

6. Housing

6.1 What type of dwelling unit does your household live in?

[1] Own House; [2] Leased/ Rented; [3] Temporary house/hut; [4] Other, specify

6.2 How long has your HH lived in this house?

> 15 Years	10 - 15 Years	5 - 10 Years	3 - 5 Years	<3 Year

6.3 If living in own house, who owns the house/dwelling unit? (1= husband, 2= Wife, 3= Both, 4= others, specify)

6.4 [1] Have title or ownership documents; [2] Lease or rent; [3] Have an agreement with the owner or local authority to use it; [4] Don't own it, don't have an agreement with owner (squat/non-titled); [5] Other (specify)

6.5 If lease or rent, how much your monthly rent or lease cost (AF)?
If on lease or rent, agreement is in the name of (1= husband, 2= Wife, 3= Both, 4= others, specify)

6.6 State the quality of the House Construction
(1=mud, 2=Concrete, 3=mix)
Comments:

6.7 What is the main source of power used for lighting your house?
[1] Electricity; [2] Kerosene; [3] Solar Power; [4] Solar Lights; [5] Other, Specify

7 - Water Supply

7.1 What is your main source of drinking water supply?

7.1.1 Drinking		7.1.2 Cooking		6.1.3 Washing	
7.1.4 Bathing		7.1.5 Other purposes			

[1] Pipe water (AUWSSC); [2] Dug well; [3] Tube Well; [4] Shared well by limited HH; [5] Common well or tap); [6] Bottled water; [7] Rainwater collection (containers, tank, jar, etc.) [8] Natural pond;[9] Other source (Specify)

8 - Sanitation

8.1 What type of toilet does your household use?

[1] Flush/water pour toilet; [2] Dry pit / VIP latrine; [3] Bucket emptied elsewhere; [4] Open toilet (forest, beach, stream etc.); [5] Other, specify

8.2 If answer to 7.1 is 1 or 2, who owns the latrine?

[1] Own the toilet, do not share it with other households; [2] Own the toilet but share it with other households; [3] Neighbor owns the toilet; [4] Public toilet; [5] Other, Specify

9 - Health Status

9.1 How many male members (in the following age groups) in your household have experienced any of the following illness or affliction in the last year? Answer as many as are relevant.

	Gender (Male/Female)	< 5 years old	6 - 18 years old	19 - 55 years old	> 56 years old	Treatment Provided by
9.1.2 Tuberculosis						
9.1.3 Dysentery						
9.1.4 Skin Disease						
9.1.5 Diarrhea						
9.1.6 Respiratory infections						
9.1.7 Hookworm/other worms						
9.1.8 Hepatitis A or E						
9.1.9 Gastro-intestinal problems						
9.1.10 Eye/ear infection						
9.1.11 Typhoid/paratyphoid						
9.1.12 Schistosomiasis						
9.1.13 Anemia						
9.1.14 Fever						
9.1.15 Sexually transmitted infection						
9.1.16 Kidney Diseases						
9.1.17 Parasites						
9.1.18 Filaria						
9.1.19 Dengue						
9.1.20 Loose Motion						
9.1.21 Jaundice/Hepatitis						
9.1.22 Malaria						
9.1.23 Others (Specify)						

9.2 How many males (in the following age groups) in your household suffer from a long-term/chronic illness or disability? Answer as many as are relevant.

	Gender (male/female)	< 5 years old	6 - 18 years old	19 – 55 years old	> 56 years old
9.2.1 Cancer					
9.2.2 Leukemia					
9.2.3 Cholera					
9.2.4 Respiratory infections					
9.2.5 Asthma					
9.2.6 Chronic bronchitis					
9.2.7 Psychological or mental disorder					

9.2	How many males (in the following age groups) in your household suffer from a long-term/chronic illness or disability? Answer as many as are relevant.					
	9.2.8 Physical disability or impairment					
	9.2.9 HIV / AIDS					
	9.2.10 Cardiac Problems					
	9. 2.11 Other (specify					

9.3	In the past 3 months have any people from your household with health problems NOT SOUGHT treatment at a health facility or provider? (1=Yes, 2=No)
9.4	*If answer to 9.**3** is yes*, what is the MAIN reason for any MALE not seeking treatment at health facility or provider? [1] Health problem was not serious enough; [2] Too difficult to get there - bad roads; [3] Too difficult to get there - lack of transport; [4] Could not get time off from work; [5] Consultation and/or treatment too expensive; [6] The service and/or treatment provided is not good quality; [7] Embarrassed to disclose; [8] Fear / lack of confidentiality; [9] There is no cure for the health problem; [10] Other, specify
9.5	I*f answer to 9.3**.5** is yes*, what is the MAIN reason for any FEMALE not seeking treatment at health facility or provider? [1] Health problem was not serious enough; [2] Too difficult to get there - bad roads; [3] Too difficult to get there - lack of transport; [4] Could not get time off from work; [5] Consultation and/or treatment too expensive; [6] The service and/or treatment provided is not good quality; [7] Men are too busy and could not accompany them; [18] Not have a man available to travel with [19] Restriction on women's mobility [20] Not culturally appropriate for women to consult male doctor [22] There is no cure for the health problem; [23] Other, specify below

10- Environment

10.1 On a scale of 1 to 6, for each of the following statements, indicate the degree to which you agree or disagree or don't know:

	(tick appropriate box in columns to the right)	1 (strongly disagree)	2 (disagree)	3 (neither agree nor disagree)	4 (agree)	5 (strongly agree)	6 (don't know)
10.1.1	Litter and garbage are a big problem in the area where I live.						
10.1.2	I am worried that water pollution may be affecting the health of my family.						
10.1.3	I am worried that air pollution (either inside my house, or outdoors) may be affecting the health of my family.						
10.1.4	People in my community are not aware of or concerned about the environment.						
10.1.5	I want to learn more about what I can do to make the environment better for myself and my family.						
10.1.6	Drought is a serious concern in this area						
10.1.7	Climate change is making it more difficult for me to earn a livelihood.						

11- Community Participation

11.1 Indicate the status of participation of you & your spouse in the community based organizations -**Formal Groups**

	Name of Organization-Formal Group (religious/cultural/other	Organization led by Male		Organization let by Female		Mix Male and Female	
		Male	Female	Male	Female	Male	Female
11.1.1	Membership- Husband						
11.1.2	Membership- Wife						
11.1.3	Office bearer -Husband						
11.1.4	Office bearer -Wife						
11.1.5	Others, Specify						

11.2 Indicate the status of participation of you & your spouse in the community based organizations -**Informal Groups**

	Name of Organization-Informal Group (religious/cultural/other)	Organization led by Male		Organization let by Female		Mix Male and Female	
		Male	Female	Male	Female	Male	Female
11.2.1	Membership- Husband						
11.2.2	Membership- Wife						
11.2.3	Leader -Husband						
11.2.4	Leader -Wife						
11.2.5	Other members of HH						

11.3 How do you learn about the local news?
(Give 4 priorities)

[1] TV; [2] Radio; [3] Newspapers; [4] Internet; [5] Mobile Phone; [6] Posters; [7] Brochures; [8] Neighborhood; [9] Friends; [10] Working Place; [11] Others, Specify ……

11.4.1	Male	1	2	3	4		
11.4.2	Female	1	2	3	4		

12 Access to social amenities

	Social Amenities	Availability in village/ or at site (Tick)	If not available, then distance (km)	Remarks
12.1	Road			
12.2	Electricity			
12.3	Primary school for boys			
12.4	Primary school for girls			
12.5	Middle school for boys			
12.6	Middle school for girls			
12.7	High school for boys			
12.8	High school for girls			
12.9	Water supply/tap water			
12.10.	Water filter plant			
12.11	Landline telephone			

12	Access to social amenities				
12.12	Mobile phone/ cell				
12.13	Health care center/ BHU/ Dispensary				
12.14	Natural gas				
12.15	Sewage/ drainage system				
12.16	Filling station (Fuel- petrol/ diesel)				
12.17	Filling station (gas)				
12.18	Fuel Agency				
12.19	Cable television/ dish				
12.20.	Access to internet				
12.21	Access to non-perennial canal water				
12.22	Access to perennial canal water				
12.23	Access to clean drinking sweet water				
12.24	Market for inputs				
12.25	Market for output				
	Other services (specify)				

13	Other assets	
	Type	**Value (AF)**
13.1	Business Property	
13.2	Farm Machinery & Implements	
13.3	Other (Specify_____)	
13.4	Other (Specify_____)	
13.5	Trees	
	Other (Specify_____)	

14. Livestock inventory			
	Type	**No.**	**Present Value (AF)**
14.1	Buffaloes		
14.2	Cows		
14.3	Horse		
14.4	Donkey		
14.5	Camel		
14.6	Sheep/Goat		
	Other		

15. Sources of Household Income				
	Source	**Daily Income**	**Monthly Income**	**Annual Income**
15.1	Salary			
15.2	Wage			
15.3	Agriculture			
15.4	Livestock			
15.5	Business			
15.6	Production at Household			
15.7	Woodlots/Timber			
15.8	Remittance			
15.9	Pension			

15. Sources of Household Income
Other (specify)

16. Women's participation in different activities				
	Activities	**(Tick)**	**Extent of Participation (hrs/day)**	**% distribution**
16.1	Household activities			
16.2	Child caring			
16.3	Farm/crop activities			
16.4	Livestock rearing			
16.5	Sale & Purchase of Goods			
16.6	Produce Goods			
16.7	Do formal Job/Service			
16.8	Health care of others in the family			
16.9	Social obligations (marriage, birthday & other functions)			
16.10.	Other income generation activities			

17. Detail of Labor Force in the Household							
	17.1	17.2	17.3	17.4	17.5	17.6	17.7
	No of Male of in AHs in Labor Age	No of Female in AHs in Labor Age	No of Male in AHs Earning from Affected Business	No of Male in AHs Earning from other Sources	No of Female in AHs Earning from other Sources	No of Male of AHs Actively Specify Looking for Jobs or Work (in case of work: skilled or unskilled, describe nature of skill)	No of Female of AHs Actively Looking for Jobs/Work (Specify) (in case of work: skilled or unskilled, describe nature of skill)

18. Security				
18.1	How safe (male) in your community feel?			
	[1] Very safe	[2] Somewhat safe	[3] Not safe	[4] Very unsafe
18.2	How safe (female) in your community feel?			
	[1] Very safe	[2] Somewhat safe	[3] Not safe	[4] Very unsafe
18.3	What is the main security threats to male exist?			
	[1] Smuggling	[2] Insurgency	[3] Organized crime	[4] Security forces
	[5] External actors	[6] Others, specify		
18.4	What main security threats to female exist?			
	[1] Smuggling	[2] Insurgency	[3] Organized crime	[4] Security forces
	[5] External actors	[6] Others, specify		

18. Security			
18.5	Who do male rely on for your security?		
	[1] Local militia/warlord	[2] Insurgent groups	[3] Local police
	[4] Afghan National Army	[5] Community network	[6] Others, specify
18.6	Who do female rely on for your security?		
	[1] Local militia/warlord	[2] Insurgent groups	[3] Local police
	[4] Afghan National Army	[5] Community network	[6] Others, specify
18.7	What local peace actors exist for male in your community?		
	[1] To Local Shura/elders	[2] NGOs	
	[3] Imam	[4] Other religious leaders, please specify	[5] Other, Specify
18.8	What local peace actors exist for female in your community?		
	[1] To Local Shura/elders	[2] NGOs	
	[3] Imam	[4] Other religious leaders, please specify	[5] Other, Specify

19. Perception about possible Impacts/Effects of the Project					
	impact/Effect	**Increase (Tick)**	**Extent of Impact (minor/substantial/high)**	**Decrease (Tick)**	**Extent of Impact (minor/substantial/high)**
19.1	Employment opportunities				
19.2	Living standard				
19.3	Unemployment				
19.4	Income generating activities				
	Other (specify)				

20. How often do you visit the market to purchase grocery/food and other household items?							
	Purpose	**Gender**	**Times in a Week**	**Times in a Month**	**Seasonal (specify)**	**Transaction Spend cash**	**Transaction In-Kind**
20.1							
20.2							
20.3							
20.4							
20.5							
20.6							
20.7							

21. General remarks of the respondents

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_____
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_____
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22. General observations of interviewer

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IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Resettlement Framework

Document Date: 22/10/2019

Project No. 2000002332

Asia and the Pacific Division
Programme Management Department

Resettlement Framework

July 2019

AFG: Arghandab Integrated Water Resources Development Project

Output 1: Dahla Dam capacity increased

Prepared by the Ministry of Finance, Islamic Republic of Afghanistan for the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 9 July 2019)

Currency unit	–	afghani (AF)
AF1.00	=	$0.0124545099
$1.00	=	AF80.2922

ABBREVIATIONS

ADB	–	Asian Development Bank
ASBA	–	Arghandab Sub-basin Authority
ARAZI	–	Afghanistan Land Authority
AH	–	Affected Household
AP	–	Affected Person
CBO	–	Community Based Organization
CSC	–	Construction Supervision Consultant
DABS	–	Da Afghanistan Breshna Sherkat
DD	–	Detailed Design
DDT	–	Due Diligence Team
DMS	–	Detailed Measurement Survey
EMA	–	External Monitoring Agency
EA	–	Executing Agency
ESIA	–	Environmental and Social Impact Assessment
FCAS	–	Fragile and Conflict Affected Situation
FS	–	Feasibility Study
GRC	–	Grievance Redress Committee
GRM	–	Grievance Redress Mechanism
IA	–	Implementing Agency
IOL	–	Inventory of Lost Assets
LAR	–	Land Acquisition and Resettlement
LARP	–	Land Acquisition and Resettlement Plan
LARC	–	Land Acquisition and Resettlement Commission
LFT	–	Land Acquisition and Resettlement Field Team
MEW	–	Ministry of Energy and Water
MOF	–	Ministry of Finance
MRRD	–	Ministry of Rural Rehabilitation and Development
M&E	–	Monitoring and Evaluation
MUDL	–	Ministry of Urban Development and Land
PIB	–	Project Information Booklet
PSM	–	Project Safeguards Manager
PMU	–	Project Management Unit
ROW	–	Right of Way
SES	–	Socioeconomic Survey
SESU	–	Social and Environment Safeguard Unit
SPS	–	Safeguard Policy Statement
TRTA	–	Transaction Technical Assistance

NOTES

(i) In this report, "$" refers to US dollars.

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GLOSSARY

Affected Household (AH)	All members of a household residing under one roof and operating as a single economic unit, who are adversely affected by the Project. It may consist of a single nuclear family or an extended family group.
Affected Person (AP)	Person affected by the project through land acquisition, relocation, or loss of incomes and includes any person, household (sometimes referred to as project affected family), firms, or public or private institutions. APs therefore include; i) persons affected directly by the right-of-way acquisition, or construction work area; (ii) persons whose agricultural land or other productive assets such as trees or crops are affected; (iii) persons whose businesses are affected and who might experience loss of income due to the project impact; (iv) persons who lose work/employment as a result of project impact; and (v) people who lose access to community resources/property as a result of the project.
Eligibility	Any person(s) who at the cut-off-date was located within the area affected by the project, its sub-components, or other subproject parts thereof. Eligibility is irrespective of (i) formal legal rights to land, (ii) customary claim to land or asset, or (iii) no recognizable legal right or claim to the land APs are occupying.
Entitlement	The range of measures comprising cash or in-kind compensation, relocation cost, rehabilitation assistance, transfer assistance, income substitution, and relocation which are due to APs, depending on the type, degree and nature of their losses, to restore their social and economic base.
Land acquisition	The process whereby a person is compelled by the Government through the Executing Agency of the Project to alienate all or part of the land s/he owns or possesses in favor of the State due to the implementation of the Project or any of its components in return for consideration.
Replacement cost	The method of valuing assets to replace the loss at market value, or its nearest equivalent, plus any transaction costs such as administrative charges, taxes, registration, and titling costs. Where national law does not meet this standard, the replacement cost will be supplemented as necessary. Replacement cost is based on market value before the project or dispossession, whichever is higher. In the absence of functioning markets, a compensation structure is required that enables APs to restore their livelihoods to levels at least equivalent to those maintained at the time of dispossession, displacement, or restricted access. For loss that cannot easily be valued or compensated for in monetary terms (e.g. access to public services, customers, and supplies; or to fishing, grazing, or forest areas), attempts are made to establish access to equivalent and culturally acceptable resources and earning opportunities.
Rehabilitation	The measures required to (i) restore access to public facilities, infrastructure, and services; (ii) cultural property and common property resources; (iii) mitigate loss of access to cultural sites, public services,

	water resources, grazing, or forest resources including establishment of access to equivalent and culturally acceptable resources and income-earning opportunities; and, (iv) restore the economic and social base of APs severely affected by the loss of assets, incomes, and employment. All such people will be entitled to rehabilitation assistance measures for restoring incomes and living standards. Such measures must be determined in consultation with APs, including any APs whose rights might not be formally recognized.
Resettlement	Full or partial, permanent or temporary physical displacement (relocation, loss of residential land/ or shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) resulting from (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to parks and protected areas. The definition applies to impacts experienced, regardless of whether it involves actual relocation.
Land acquisition and resettlement plan	Time-bound action plan prepared to compensate and/or mitigate the impacts of resettlement.
Relocation	Physical shifting of APs from his/her pre-project place or residence, place of work or business premises.
Severely Affected Household	Include those AHs (i) losing 10% or more of their productive land/income generating assets (ii) physically displaced AH and (iii) households losing commercial/business establishments.
Informal Settlers	Non-legalizable AHs losing agricultural land plot, which is the only land plot owned by AH and provides main source of income for AH.
Vulnerable Households	Particularly disadvantaged households who might suffer disproportionately or face the risk of being marginalized from the effects of land acquisition and resettlement. These are; (i) female-headed households with and/or without dependents; (ii) disabled household heads; (iii) poor households as defined by the official poverty line1; (iv) elderly households with no means of support; (v) households without security of tenure; (vi) cultural or ethnic minorities; and (vii) refugees, returnees or internally displaced people.

1 At the time of writing, the latest poverty line determined under Afghans Living Conditions Survey (ALCS) 2016/2017, the latest poverty line has been determined as 2,064 AFN per capita per month".. Current values will be applied at the time of assessment.

EXECUTIVE SUMMARY

The Asian Development Bank (ADB) has provided Transaction Technical Assistance (TRTA) at the request of the Government of the Islamic Republic of Afghanistan (the Government) for the design of a project to improve water resources management, irrigated agriculture, and urban water supply, including a provision for generation of hydropower for Kandahar City and its surrounds.

The project will improve the productivity of water in the Arghandab valley. Four outputs are envisaged: (i) Dahla dam capacity increased; (ii) reliability of irrigation water supply increased; (iii) climate resilient and productive irrigation technologies and practices introduced; (iv) post-farm value chains developed; and (v) capacity in water resource management and use strengthened.

The project is classified as category A for involuntary resettlement impacts. The present Land Acquisition and Resettlement Framework (LARF) is concerned with Output 1. A separate LARF has been prepared for Output 2. Both sub-components 1a and 1b will have resettlement impacts.

Sub-component 1a. Main dam and six saddle dams raised. MEW will supervise the design, procurement and construction required to increase the capacity of Dahla Dam full reservoir level by 13.6 m and increasing the storage from its current 290 million m^3 to 780 million m^3. There will be three phases: (i) ongoing assessment and resettlement of people affected by the dam raise and road realignment; (ii) design and pre-construction planning; and (iii) construction and completion of works.

Sub-component 1b. Road realignment. A 9.3 km long section of the Bamiyan – Kandahar highway in Shah Wali Kot will be realigned to a safe level above Dam Crest Flood height of 1154 metres above sea level. MRRD will implement the design and construction of the road realignment, including 23 culverts and two passages along the route. Construction activities will start once the final design of the dam raising has been confirmed. MEW, on behalf of MRRD, will implement and complete the resettlement of affected people, including the 600m stretch through Shabjuy village and right of way. A total of 27 affected households (AHs) have been identified; 17 will lose irrigated land, 4 will lose orchard land and pomegranate trees, and 6 share-croppers will lose a portion of their cropping arrangement and standing crops. There is no severely AHs as all will be losing less than 10% of their total holdings.

The draft LARF follows relevant Afghan laws, and ADB's Safeguards Policy Statement (2009). The reservoir expansion caused by the dam raising will inundate at least 22 villages, fully or partially, requiring by far the most significant and extensive resettlement under the project. The draft LARF indicates first estimates of LAR impacts for the reservoir expansion, saddle dams and road realignment, and specifies an entitlement matrix for compensation, including options for livelihood rehabilitation. Access restriction due to security concerns has precluded the conduct of a socio-economic survey of the villages to be resettled, as well as limiting meaningful consultations that would normally be part of LARF preparation. The LARF instead outlines processes and methodologies to be followed during project implementation in conducting surveys, public consultations, and information disclosure for multiple LARP preparation, implementation and monitoring. An entitlement matrix (EM) is proposed, which may be modified if impacts identified at the time of social impact assessment are not captured under the currently proposed EM. MEW shall ensure that the expanded reservoir impoundment does not commence until relocation, compensation and livelihood restoration measures are implemented in accordance with the LARPs and verified by external monitoring reports, accepted by ADB and disclosed.

Project implementation will follow the safeguard procedures laid out in the LARF. CPMO in MEW will be established to implement resettlement activities. For the task of resettlement implementation, MEW will have a Due Diligence Team. MEW CPMOs will ensure that LARF and LARP contents are locally disclosed; LARPs are submitted to ADB for review and acceptance and further disclosure prior to civil works contract award; ADB acceptance of compliance reports verified by external monitor prior to civil works commencement; and that mitigation measures are incorporated into civil works designs and contracts. A Grievance Redress Mechanism will be put in place. Meaningful consultations will continue to be conducted with affected persons (APs) throughout the project implementation phase. In addition, MEW with the concurrence of ADB, will engage an Implementing Consultant to be involved in the implementation of the LARP, and an independent External Monitoring and Evaluation Agency to provide external monitoring services, including six-monthly reports on LARP implementation, grievance redress and livelihood restoration.

Given the importance of the resettlement, consideration should be given to oversight of the process by the MOF, as executing agency, or Presidential Office.

Compensation eligibility will be limited by a cut-off date to be set on the day of the beginning of the AP Census and detailed measurement survey. APs who settle in the affected areas after the cut-off date will not be eligible for compensation. The process related to the cut-off date was explained to APs at the workshop held in Kandahar in April 2019.

The total estimated cost of resettlement for Output 1 is AF 1,445,930,287 ($19,274,872): AF 1,414,131,487 ($18,855,086) for sub-component 1a and AF 31,798,800 ($419,786) for sub-component 2b.

I. PROJECT DESCRIPTION

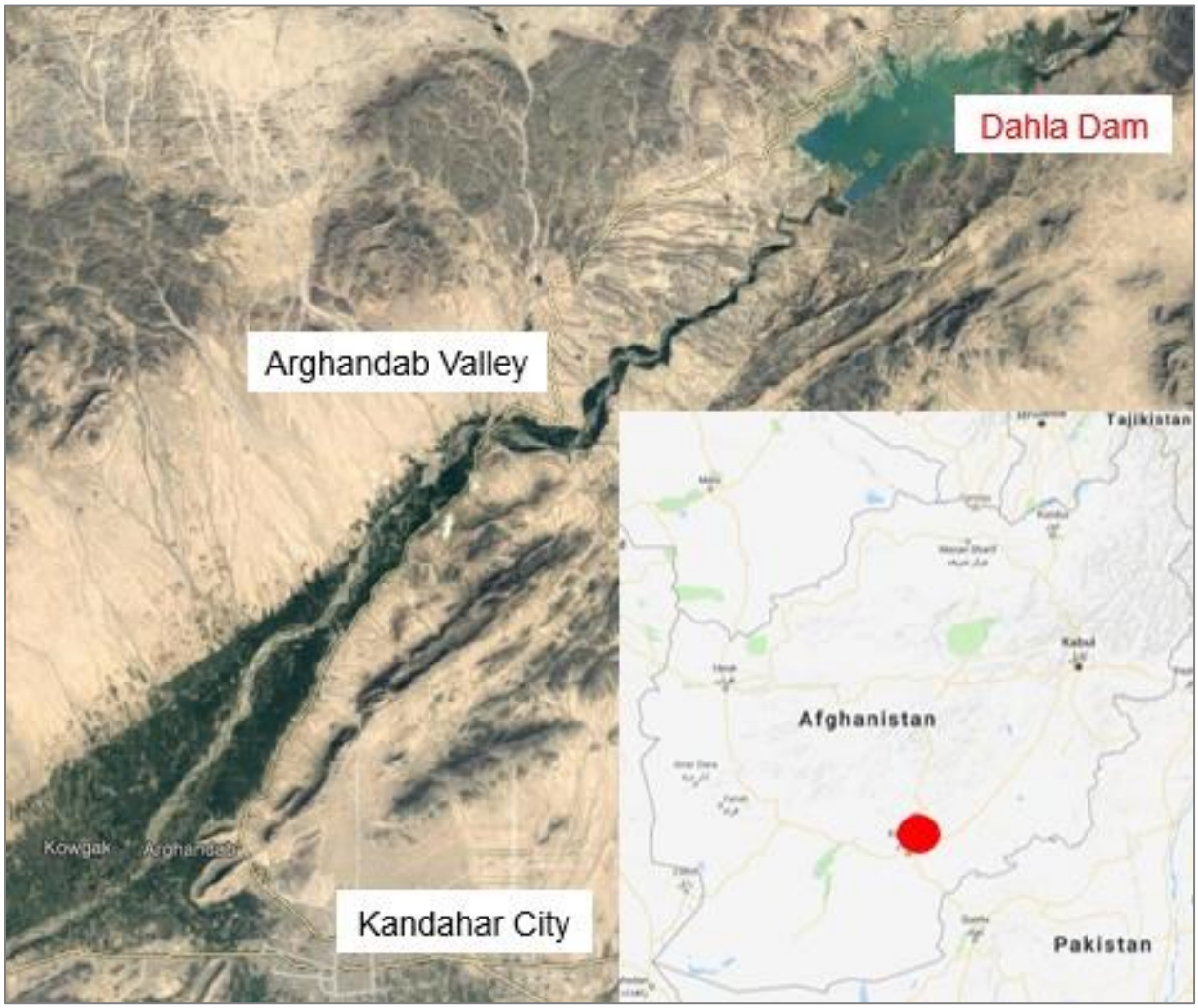
1. The project will improve the productivity of water in the Arghandab valley. Four outputs are envisaged: (i) Dahla dam capacity increased; (ii) reliability of irrigation water supply increased; (iii) climate resilient and productive irrigation technologies and practices introduced; (iv) post-farm value chains developed; and (v) capacity in water resource management and use strengthened.

2. The project is classified as category A for involuntary resettlement impacts. The present Land Acquisition and Resettlement Framework (LARF) is concerned with Output 1. A separate LARF has been prepared for Output 2. Both sub-components 1a and 1b will have resettlement impacts. The LARF has been based on the preliminary design and parameters as detailed below.

A. Sub-component 1a. Main Dam and Six Saddle Dams Raised

3. Dahla Dam is the largest dam in Kandahar Province, and the second largest in Afghanistan. It is located approximately 35 km northeast of Kandahar City on the Arghandab River. Its location is presented in Figure 1 below.

Figure 1. Dahla Dam Location

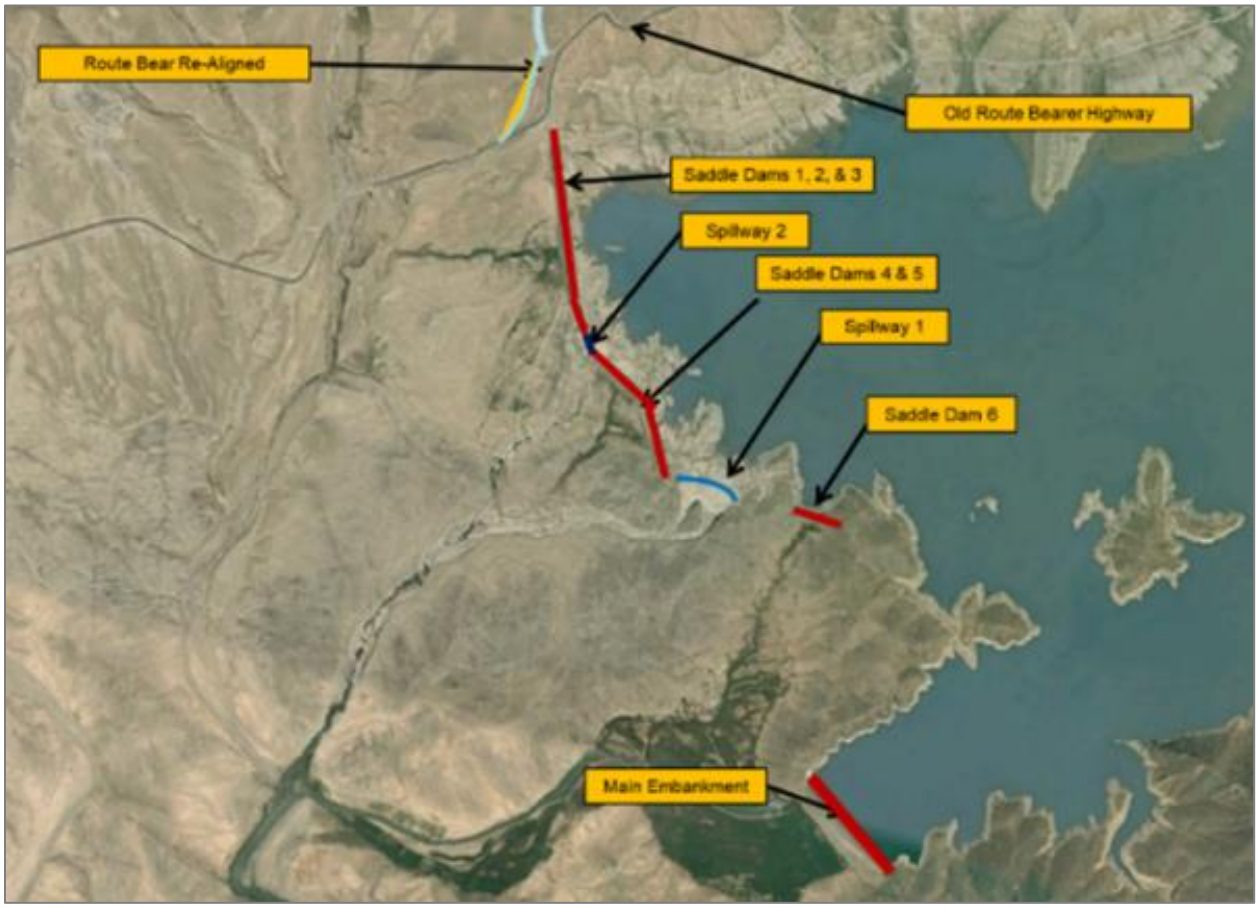


Source: TRTA Consultants. 2019

4. Dahla Dam was constructed in 1952 to store 478 million m^3 of water mainly for irrigation and flood control purposes. During 66 years of dam operation, the Arghandab reservoir has lost about 40% of water storage due to sedimentation and is currently estimated to store about 288 million m^3 of water at Full Supply Level of 1,135.4 m (WGS84 elevation).[2] Considering a sedimentation rate of 2.7 million m^3 per year, in a no project scenario, the dam would be filled with sediments with no water storage in about 100 years and the dam would be decommissioned. This would have a very critical impact on irrigation and agriculture of the Arghandab valley and livelihoods for those that depend on water from the reservoir. It shall be noted that over 64,000 hectares of farmlands are solely dependent on Dahla Dam.

5. The output 1 project involves rehabilitation and raising of the main embankment of Dahla Dam, its six saddle dams, and two new spillways by 13.6 m (Figure 2). It is envisaged that the implementation of Output 1 will take approximately five years.

Figure 2. Dahla Dam: Main Embankment, Saddle Dams and Spillways Location



Source: USACE, TAM Construction Management Plan Concept of Operation, 30 April 2014, Dahla Dam Improvements

6. Raising Dahla Dam by 13.6 m will add an additional storage of about 500 million m^3 to the existing 288 million m^3 reservoir and will be a significant opportunity to generate and add electricity to the grid. Dahla reservoir once raised should have a life of over 200 years. When raised, the

[2] World Geodetic System 1984: WGS84 is an Earth-centered, Earth-fixed terrestrial reference system and geodetic datum. WGS84 is based on a consistent set of constants and model parameters that describe the Earth's size, shape, and gravity and geomagnetic fields.

Dahla Dam is envisaged to provide water for domestic and municipal water supply, irrigation, hydropower and environmental flows.

7. The availability of water in the sub-basin, along with the rest of Afghanistan, is highly seasonal and erratic, with frequent droughts affecting agriculture, living standards, and the local economy. The inflows to Dahla reservoir are mainly from snowmelt in the Hindukush mountains. These inflows are typically high and for a short duration spread over typically three to four months. The reservoir's additional buffer capacity will maximize storage during these high inflow months and above average years.

B. Sub-component 1b. Road realignment

8. The proposed dam raise requires realignment of a section of the existing Route Bearer Highway also known as Kandahar-Bamiyan Highway in Shah Wali Kot District of Kandahar. The Route Bearer Highway passes the project area along the right abutment of saddle dam 1. The highway was realigned at limited reaches for an 8 m raise of the Dahla Dam in 2014. The figure below shows a map of Dahla Dam and the location of the current highway.

Figure 3. Dahla Dam and Current Highway Location

9. Existing Route Bearer is a two-lane single carriage highway. The highway is 7.3 m wide of paved area and has 1.5 m shoulders on both sides. Existing alignment passes mainly along barren hilly areas with limited or no inhabitant adjacent to it. Shahjuy is the only village in this stretch. No drains exist along the existing route and water flow naturally along the road embankment in natural topography. No embankment damage was noted due to non-availability of drains along the route. There are number of culverts and one existing causeway. Several of the existing culverts were destroyed by the improvised explosive device attacks. The photo below shows the existing route bearer highway.

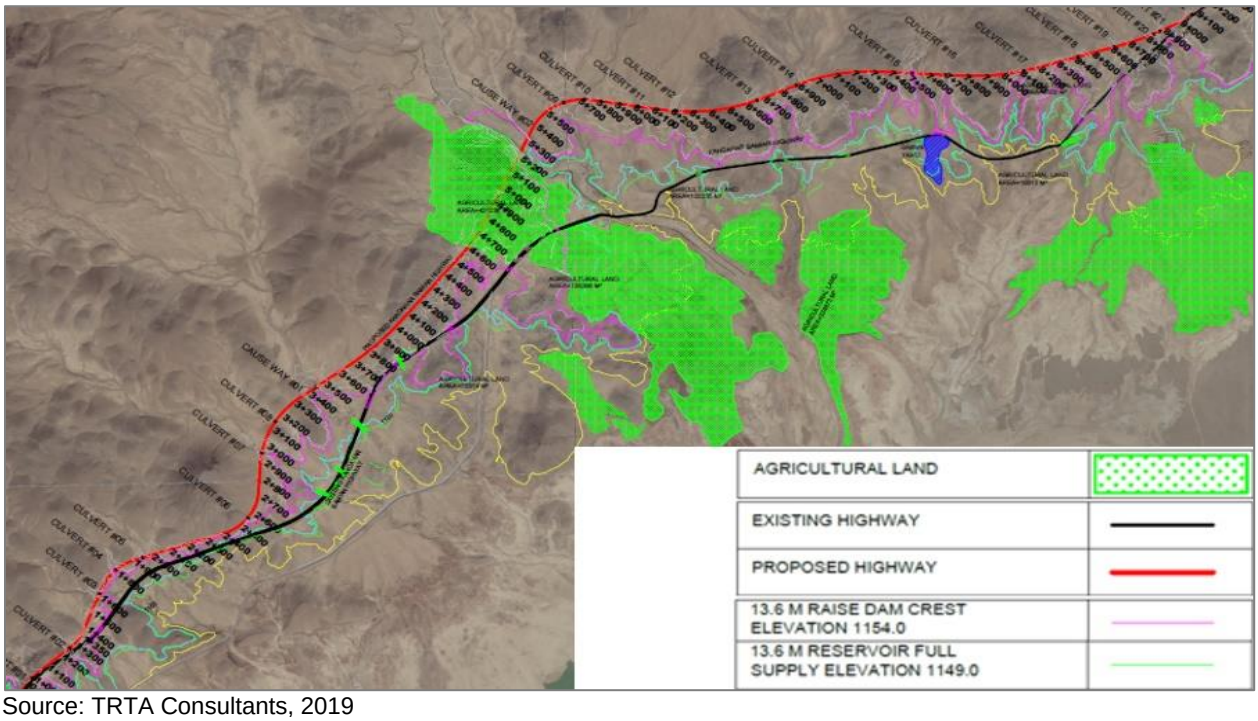
Figure 4. Photo of the Existing Route Bearer Highway

Source: TRTA Consultants, 2018

10. The proposed realigned highway will be 9.3 km long and passes mostly through barren hilly terrain. This includes 850 m stretch of existing highway for rehabilitation / repair. The new construction will be limited to about 8.45 km. The proposed alignment design was considered based on number of issues like all time safe travel for road users even in case of dam crest flood i.e. above 1,154 m (WGS 84 elevation), possibility of future extension to motorway, possibility for dual carriageway, minimum cut and fill or balance cut and fill, minimal effect on commute distance and travel time for users. 23 culverts and two super passages (causeways) are proposed along the route. It was noted that number of existing culverts were destroyed and due to security risks, it was preferred to defer design of bridge along the super passage. The detailed design of the highway prepared by the TRTA in 2019 is according to the American Association of State Highway and Transportation Officials standard.

11. Figure 5 shows the proposed realigned highway and existing highway with the 13.6 m raise at dam crest flood and at full supply elevation.

Figure 5. Proposed Realignment of Route Bearer Highway



Source: TRTA Consultants, 2019

II. SCOPE OF LAND ACQUISITION AND RESETTLEMENT

A. Sub-component 1a. Main Dam and Six Saddle Dams Raised

12. Raising the Dahla Dam by 13.6m will cause impact on people's land, crops, homes and other buildings and structures. Multiple communities will be fully or partially inundated by the reservoir and more may be indirectly affected. There will be significant impacts on livelihoods. Surveys to date indicate that approximately 600 houses and 5,800 people will be physically displaced by the reservoir expansion.

13. The borrower/client has the obligation to prepare multiple resettlement plans, for the involuntary resettlement impacts resulting from the project. The objective of the resettlement plan is to ensure that the livelihoods and standards of living of Affected Persons (APs) are improved, or at least restored to pre-project (physical and/or economic) levels and that the standards of living of the displaced poor and other vulnerable groups are improved by providing adequate housing, security of land tenure; and steady income and livelihood sources. The resettlement plans will address all relevant requirements specified in ADB Safeguard Policy Statement 2009 (ADB SPS 2009) requirement, and the level of detail and comprehensiveness of the resettlement plans will correspond to the significance of involuntary resettlement impacts. The outline of the LARP as per ADB SPS 2009, can be found in Appendix 3 of this document.

14. This LARF will guide the process of identification and addressing of LAR issues including compensation as per ADB SPS (2009) guidance.

15. The objective of the LARF is to provide a policy framework for the land acquisition and resettlement for Arghandab Integrated Water Resource Development Project Output 1: Raising the Dahla Dam. The resettlement principles underpinning this resettlement framework are that persons affected by the Project will be better off, or at least no worse off than before resettlement; that their assets and livelihoods affected by the project will be compensated at full replacement cost; and that APs will receive assistance to relocate and re-establish their livelihoods.

16. The general principles of the land acquisition and resettlement are outlined by ADB SPS (2009) and related national Afghan laws and regulations:

(i) Involuntary resettlement should be avoided where feasible or minimized to the extent possible. During the project preparation process, consideration of technical options shall involve a concurrent assessment of potential associated land acquisition impacts so that, where feasible, design alternatives to minimize such impacts can be identified as early as possible.

(ii) Where it is not feasible to avoid resettlement, APs will be assisted in their efforts to improve their livelihoods and standards of living to a level at least equal to those in their previous living situation.

(iii) APs will receive proper compensation based on a calculation of the real replacement cost of the assets they lose as a result of the project. Any affected assets and all eligible persons will be compensated.

(iv) APs will be fully consulted and should receive proper information on their rights and will be provided with opportunities to participate in the planning and implementation of land acquisition and resettlement.

(v) This Policy Framework provides guidelines and a set of procedures for land acquisition and resettlement for APs.

17. The following categories of APs are envisaged:

(i) APs that possess legal land certificates and have documentation proving ownership by the head of their village:
(ii) These APs will receive compensation for the land, loss of crops, buildings and structures, and any other fixed assets.
(iii) APs will receive transport allowance to move their belongings.
(iv) APs whose income will be affected due to the resettlement, will receive rehabilitation assistance to increase their ability to restore/improve their livelihoods.
(v) APs that occupy land in residential, commercial or industrial zones in the project area, but do not hold a certificate or legal title:
(vi) APs will receive compensation for land, buildings and structures; and fixed assets affected by the Project.
(vii) APs who need to relocate will receive a transport allowance to move their belongings.
(viii) APs that suffer a decline in income due to resettlement will also receive rehabilitation assistance to restore/improve their livelihoods.
(ix) APs that occupy public land on sites such as rivers, roads, parks, or other public facilities in the project area and are recorded in the socioeconomic survey, will receive compensation for all non-land assets at replacement cost.
(x) APs who are tenants and are recorded in the socioeconomic survey will be assisted to find a new rental property or housing site of similar value to the one they lost.

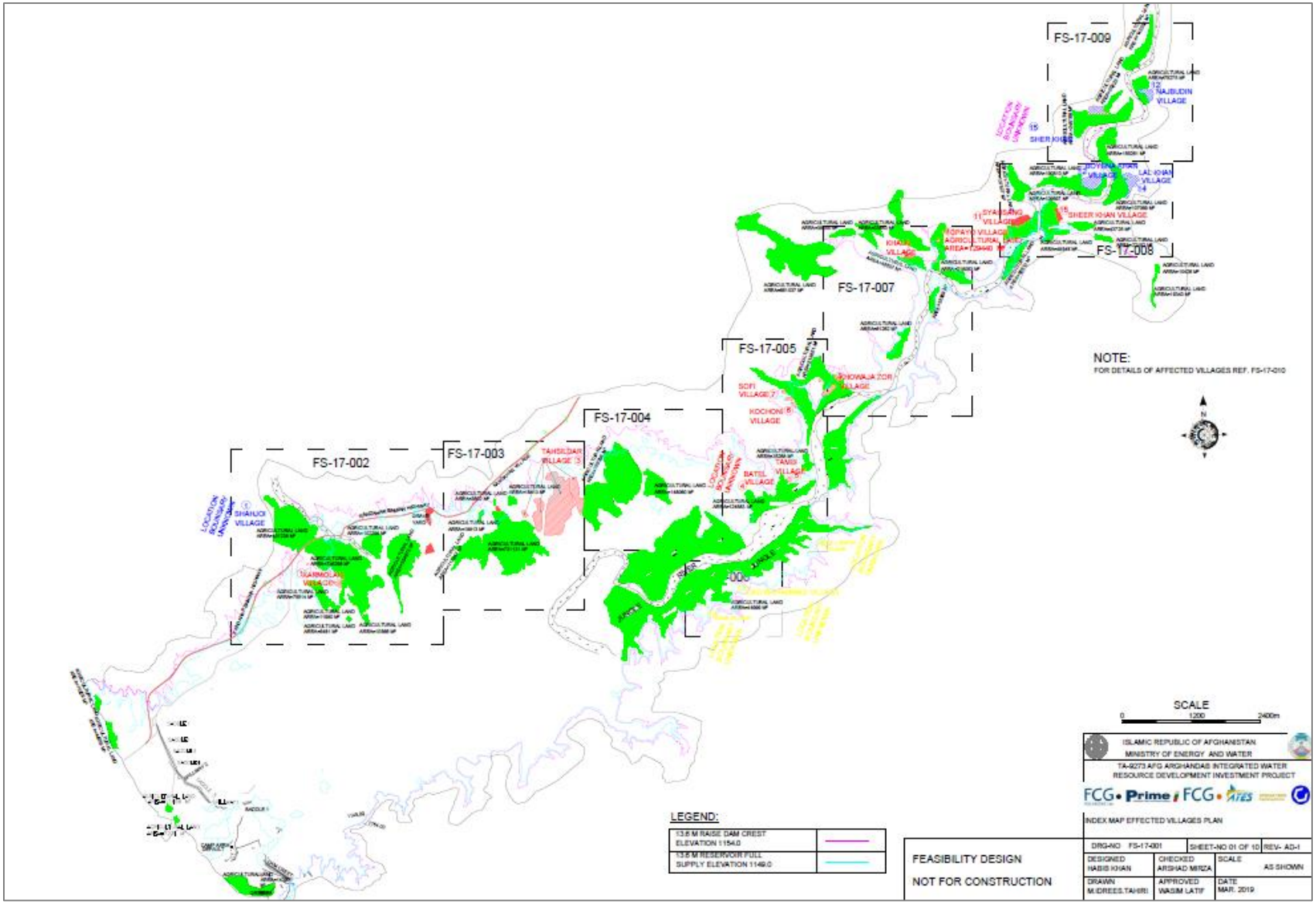
18. All public and community buildings and assets will be restored during the project implementation at newly developed relocation site which will have infrastructure and services available to the relocated people.

19. It must be noted that the area of Dahla Dam and specifically the villages where people will be impacted by the dam raise lies in an insecure area, and that to date it has not been possible to generate all field data. Access to the affected villages was restricted and surveyors were several times turned away at the villages when trying to collect accurate information or carry out consultations. According to the May 2018 Special Investigator General for Afghanistan Reconstruction Report,[3] Shah Wali Kot District was not under Government of Afghanistan control and was an area contested by Anti-State Armed Groups. Given these realities, consultation were held through several workshops and satellite imagery was analysed to determine estimated resettlement impacts caused by the 13.6 m raise of Dahla Dam.

20. A preliminary map of the affected areas is presented in Figure 6.

[3] https://www.sigar.mil/pdf/quarterlyreports/2018-07-30qr.pdf

Figure 6. Map of Affected Areas



Source: TRTA Consultants, 2019

21. This LARF has been prepared during project preparation for MEW, the implementing agency (IA) of Output 1, to highlight procedures and compensation entitlements for planning/implementing LAR tasks at the community level. The communities estates, along with their inventories of orchards, irrigated crop land, dwellings, community facilities, irrigation systems and familial social networks constitute the area that will be inundated by the raising of the dam, and from which inhabitants will have to evacuate.

22. **The formulation of a LARF during project preparation** ensures that definitive arrangements and agreements for LARP preparation between the Borrower and ADB are in place before grant approval. The LARP preparation will be an integral part of project implementation – it will be central to driving project activities and timelines, including the initiation of civil works. In a Fragile and Conflict-Affected Situation (FCAS) environment, it will accord more time and an unhurried approach to the LARP process by leveraging the main contracts' security arrangement and achieve more interaction with the APs, without usual security concerns, to develop collaborative relocation and restoration plans. More importantly, using the LARF approach enables the APs, as in a community demand driven approach, to select their compensation options for different categories of impact such as loss of residence, or loss of agricultural land and choose 'cash' for one impact and compensation and 'in-kind' for the other impact and compensation. The LARF establishes clear guidance for screening, impact categorization and assessment, eligibility and entitlements, consultation, institutional arrangements, as well as monitoring, and thus ensures compliance with ADB safeguards objectives, principles and requirements, and more importantly, the social safeguard assurances being sought by the community. The LARF in English will be posted on the ADB website and it will also be translated into Pashto and Dari and disclosed on the MEW website.

23. **Land Acquisition and Resettlement Field Teams (LFTs)**, mobilized by the Arghandab Sub-Basin Authority (ASBA) will mentor physically and economically APs, to register themselves and their families in Census Surveys of affected households (AH) as the first step in formulating Community level Land Acquisition and Resettlement Plans (LARP). This will be followed by Detailed Measurement Surveys (DMS) of land and non -land assets, consolidated in an Inventory of Lost Assets (IOL) for each respective AH.

24. LFTs will also help APs acquire ownership documentation for the lost land verified by the Ministry of Urban Development and Land (MUDL) (previously ARAZI (Afghanistan Independent Land Authority)). An officer from MUDL will be member/secretary of the resettlement Due Diligence Team (DDT) which will include, and coordinate all concerned local, district, provincial and central departments that are concerned with the land acquisition and resettlement process, triggered by the dam raising. As villages in the dam inundation areas may not have any ownership records, the project will establish procedures through which land use will be confirmed for land compensation purposes.

25. Apart from physical measurements for the compensation of land and non-land assets, the loss of livelihoods and the interconnectedness of different value chains and the impacted habitat needs to be understood. Only with such an understanding, coupled with agreement on sites for relocation, can appropriate and relevant measures be planned and implemented for restoration of livelihoods in relocated habitats.

26. No impact on Indigenous Peoples (IPs) is expected for the Project. Special attention will be given to identifying and addressing the needs of disadvantaged groups such as the landless, the impoverished, minority and war displaced persons, and female-headed households through measures included in respective village-level LARPs in order to improve and restore their livelihoods (in addition to the monetary compensations for affected assets and applicable

allowances). Also, tribal and customary land use shall be taken into account in resettlement planning.

B. Sub-component 1b. Road realignment

27. The realigned Route Bearer Highway alignment will cross the following three villages:

(i) Landai Showraw village: The road realignment will cross the rainfed and pasture land of the village. There is no structure, irrigated land or orchards that will be affected

(ii) Shahjuy village: The road realignment will cross pasture land, and irrigated agricultural land. Agricultural land, orchards, and trees will be affected

(iii) Lowar Arab village: The road realignment will cross the rainfed and pasture land of the village. There is no structure, irrigated land and orchards which will be affected.

Figure 7. Highway Realignment and Affected Shahjuy Village

Note: The current highway can be seen in grey and the proposed highway is marked in black.

28. An impact survey and census were conducted on 30 March 2019 to assess the baseline impact and prepare this LARF. A total of 27 AHs have been identified;[4] 17 will lose irrigated land, 4 will lose orchard land and pomegranate trees, and 6 share-croppers will lose a portion of their cropping arrangement and standing crops. There is no severely AHs as all will be losing less than 10% of their total holdings.

[4] The exact number of APs has not been identified. Considering an average of 8 persons per households, the total number of APs is estimated at 216.

29. A summary of involuntary resettlement impacts is provided in Table 1.

Table 1. Summary Impacts on Land Acquisition and Resettlement

Impacts	Unit	Quantity
I. Land		
Agricultural land – irrigated	m^2	117,550
Total affected land	m^2	**117,550**
II. Structures		
Private structures	m^2	0
Community structures	m^2	0
Total affected structures	**m^2**	**0**
III. Trees		
Timber trees	no	0
Productive fruit trees	no	2,440
Total trees	**no**	**2,440**
IV. Households affected		
Households losing < 10% irrigated land	no	21
Households losing fruit trees	no	4
Households losing crops (share-croppers)	no	6
Total Households affected	**no**	**27**

1. Irrigated Land

30. Private irrigated land in the amount of 117,550 m^2 (58.775 *jeribs*) will be impacted. Details are provided in Table 2.

Table 2. Details of Impacted Land

Type of Land impacted	Current use	Area (m^2)	Number of AH
Agricultural Land Irrigated	Orchard	15,250	4
	Cropping	102,300	17
Total		**117,550**	**21**

2. Trees

31. 2,440 pomegranate trees will be affected by the road realignment. No timber trees will be impacted.

Table 3. Details of Affected Trees

Type of Trees impacted	Number of trees
Total fruit trees (pomegranate)	2,440
Total timber trees	0
Total trees (fruit and non-fruit trees)	**2,440**

III. LEGAL FRAMEWORK

A. Overview

32. Decades of conflict and instability in Afghanistan have resulted in a complex and uncertain land administration and management system. The legal framework governing land rights is fragmented and includes formal (constitutional and civil law), religious, and customary law. Land rights are perceived to be highly insecure and are the source of the majority of disputes brought before the formal court system as well as non-statutory (informal) dispute resolution bodies such as shuras and jirgas. The legal and policy framework for land and property registration system are still being developed. An estimated 80% of households in Afghanistan have no formal documentation that can be used to acquire or prove their rights to land and as such they have limited recourse to the formal court system. The Ministry of Justice estimates that 90% of Afghans rely solely on customary law due to a lack of trust in the integrity of formal institutions. The situation is compounded by the lack of a comprehensive cadastral and titling system based on electronic records, and the fact that only one third of the land in Afghanistan has ever been surveyed.

33. In Shah Walikot District and Arghandab District, the land situation is further compounded by areas being outside of government control and under the control of non-state armed groups. Ensuing rounds of military actions have displaced people and caused land loses.

B. Legal Framework

34. The formal laws and policy most relevant to the acquisition of land and property for public interests and resettlement are:

(i) The Constitution of Afghanistan (2004);
(ii) Afghanistan National Land Policy (2007);
(iii) Environment Law (2007);
(iv) Access to Information Law (2014);
(v) The National Policy for Internally Displaced Persons (2014);
(vi) National Regulations for Environmental and Social Impact Assessment (2017);
(vii) The Law on Land Acquisition (2017);
(viii) Land Management Law (2017), replacing the Law on Managing Land Affairs (2008);
(ix) Afghanistan National Land Policy (2018);
(x) Presidential Decree on the Registration of Properties in Urban Informal Settlements (2018).

35. **The Constitution of Afghanistan (2004)** enshrines ownership of land and protects lands from seizure by the state unless made for the public interest and the owner is provided with fair compensation. It guarantees equality of rights and duties for men and women.

36. **The Afghanistan National Land Policy (2007)** aims to provide every Afghan with access to land, promote and ensure a secure land tenure system, encourage the optimal use of land resources, establish an efficient system of land administration and ensure that land markets are efficient, equitable, environmentally sound, and sustainable to improve productivity and alleviate poverty. The policy addresses a multitude of issues relevant to land tenure such as tenure insecurity, competing systems for characterizing land, the lack of equity, transparency and accountability in the distribution and acquisition of land, problems of integration between formal and informal systems, land grabbing, informal and unplanned developments, property rights

protection mechanisms, dispute resolution, proof of rights to land; and overlapping and uncoordinated land management systems.

37. **The Environment Law (2007)** was written by the United Nations Environment Program (UNEP) with input from the Government of Afghanistan. It is based on international standards and takes Afghanistan's specific environmental conditions into account. Importantly, the law requires the active consultation and involvement of local communities in decision making processes relating to the sustainable use, rehabilitation and conservation of land, forests and other natural resources. The law states that APs must be given the opportunity to participate during each phase of a project. Proponents of development projects are required to apply for an environment permit before implementation of the project by submitting an initial environmental impact assessment to the National Environmental Protection Agency (NEPA) to determine potential adverse effects and possible impacts. The law envisages a Board of Experts to review and assesses applications before a permit is issued.

38. **The Access to Information Law (2014)** is based on Article 50 of the Constitution of Afghanistan. It aims to increase the transparency and accountability of government and non-government institutions to citizens. It guarantees citizens' right of access to information, defines the responsibility of government and non-government organizations to provide information, and structures the public process of requesting information and the provision of information by government organizations. The law is based on the principle that all information held by the government is presumed to be public. The law does not apply to situations where access to information is harmful to others' rights or presents a risk to public security. The law stipulates that information disseminated by public authorities must be made in a way which is accessible to and useable by the public.

39. **The National Regulations for Environmental and Social Impact Assessment (2017)** indicate that the National Environmental Protection Agency (NEPA) is responsible for both social and environmental impact assessment, which are part of a single process. They set out the procedures for conducting environmental and social impact assessments (ESIAs). The regulations categorize projects according to their level of impact and detail the required processes for each category of project impact. The regulations require effective application of ESIA procedures and the monitoring of environmental and social management plans.

40. **The Law on Land Acquisition (2017)** replaces the Law on Land Expropriation (2009) and provides the legal basis for land acquisition and compensation. Its objectives are to:

(i) Allow fair acquisition of individuals' properties;
(ii) Regulate the methods of determination of properties to be acquired;
(iii) Allow implementation of urban master plans and all other plans for projects of public interest;
(iv) Determine the standards for appraisal of fair compensation for properties subject to acquisition;
(v) Allow the transfer of government-owned properties for the implementation of projects of public interest;
(vi) Provide for resettlement of the owners of properties acquired as part of major national projects;
(vii) Ensure that property owners and all other people affected by the process of expropriation are compensated; and
(viii) Increase the positive impact of expropriation on people.

41. The law states that municipal authorities are responsible for enforcement of the law in areas covered by urban master plans areas, while the Afghan Land Authority (ARAZI), under the

Ministry of Urban Development and Land (MUDL) is responsible for rural areas.[5] Article 5 defines 'public interest' projects for which property and assets may be expropriated. Articles 9-12 define the responsibilities of the expropriating authority, APs and valuation committee. The law requires the establishment of a panel tasked with developing a bill of valuation for expropriated properties, and a resettlement committee, which are both headed by the provincial governor. It defines how different types of assets are to be valued and compensated, the timing of compensation payments and the procedures and responsibilities of the resettlement committee.

42. **The Land Management Law (2017)** is intended to replace the Law on Managing Land Affairs (2008), although it is still under discussion by the National Assembly. The law aims to create a legislated unified, reliable land management system with a standardized system for land titling, subdivision, and registration. Its goals include the prevention of illegal land acquisition and distribution, ensuring access to land for the people, and defining the conditions for the appropriation of lands. The law confirms that government lands are regulated by MUDL (ARAZI deputy section) and that public welfare projects on government lands must be approved by MUDL.

43. **The National Land Policy (2018)** deals with land tenure and land acquisition. It indicates that compensation for expropriated land or revocation of rights over land must be enforced by the law and conducted in accordance with the Constitution of Afghanistan. The law provides that property may only be expropriated through defined legal procedures for specific purposes and that no law may permit arbitrary deprivation of property rights. Monetary compensation for expropriated land is based on the value of the land prior to the announcement of the development project being pursued in the public interest.

44. **The Presidential Decree on the Registration of Properties in Urban Informal Settlements (2018)** provides an avenue for residents of informal urban areas to receive land occupancy certificates which legitimizes and guarantees residents' right to stay in their homes without the fear of eviction.

45. **Land**. All land in Afghanistan can be classified as privately owned, community owned, government owned, or publicly owned. These classifications are recognized by the 2007 National Land Policy. Properties owned by individuals, families or businesses are considered private land. Community land is property owned by communities which is equitably available for use by all its members. Government land includes registered government land which is used for the provision of public services, unregistered land which is “deemed public land” as well as land without proven individual ownership. Public land is land that belongs to the people of Afghanistan as a whole and is entrusted to the government for the benefit of all people.

46. Ownership is the most common type of tenure in Afghanistan. Ownership may be grounded in formal or customary law, and ownership rights can extend to all land classifications. Ownership confers the right of exclusive possession of land, and owners are entitled to use and dispose of land freely. The Law on Managing Land Affairs (2008) indicates that all land that has not been proven to be private is deemed government-owned land. However, many disputes have arisen over government land because the definition of 'government land' remains unclear despite the various laws that have attempted to define it. A number of presidential decrees have expanded the type of land that the government can own and the distinction between government and publicly-owned land has become unclear.

47. Leaseholds can be established between private parties, subject to requirements for written leases that detail the land and agreement of the parties regarding the length of the lease and payment terms. Private land leases are mostly governed by customary law. Landowners often

[5] ARAZI was an independent department prior to 2019. In 2019, ARAZI was integrated to MUDL as a deputy section of the Ministry. ARAZI conserved its name, jobs and responsibilities in this process.

contract with sharecroppers to cultivate land and the parties agree on terms regarding shares of the outputs and payment.

48. **Rights of Access. The Law on Managing Land Affairs (2008**) provides that lands such as pastures are public land which neither the state nor individuals can possess (except as otherwise provided by Sharia) and which must be kept unoccupied to allow activities such as grazing. Customary law allows individuals and communities to obtain exclusive or non-exclusive access to such lands; however, such lands do not belong to them. Pasture lands are the most controversial type of land in Afghanistan and up to 70% of lands in the country are used for this purpose.

49. **Occupancy Rights**. In general, landholders in formal settlements have formal rights to the land they occupy. Occupants of informal settlements, including squatters, usually have some type of informal rights that are based on principles of customary law, the nature of the land, and the means by which the occupants took possession of the land, although these are limited. The 2007 Land Policy permits the regularization of rights to informal settlement holdings.

50. **Mortgage**. Formal and customary law recognize two types of land mortgage: (i) debt secured by the land, and (ii) a mortgage in which the lender remains the landowner until the borrower repays the debt. The latter is the most common type of mortgage in Afghanistan.

C. Land Registration

51. Land is registered by deeds which are formal legal documents that certify a person's ownership of a piece of land. A deed can be a court-registered proof of land ownership document, a government decree proving purchase of the land from the government, tax payment documents, water rights documents, registered customary deeds and formal titles. Court judges draft and archive deeds. Immovable property is also registered in land registration and taxation books. People can use land as collateral if they have a legal title or use it to prove ownership when claims or disputes arise.

52. While authorities have made a number of efforts to introduce a formal registration system in Afghanistan, only a third of the country's land has been surveyed. Only 10% of rural properties are covered by deeds, and archives are often outdated and inaccurate. As earlier systems were based on self-report rather than a cadaster, land is often underestimated or overestimated for tax reasons. The switch to a cadastral system with the 2008 Law on Managing Land Affairs did not resolve these problems as cadastral records and court-based records sometimes do not match.

53. Authorities have had difficulty with registering community-owned lands and distinguishing between people who own and lease a particular land plot. As the land registration system has evolved over time, other ways have emerged apart from deeds to prove ownership. Ownership may also be proved through community certification, cadastral records, records from previous governments and customary documents such as bills of sale and purchase, wills, pawn agreements, plot subdivisions and witness accounts. Even if no documentary evidence of ownership exists, a person may claim land if they are putting it to productive use.

D. Land Acquisition and Resettlement

54. The Constitution of Afghanistan (2004), the Law on Managing Land Affairs (2008) and the Law on Land Acquisition (2017) entitle the Government of Afghanistan to acquire private or government- owned land for public purposes upon payment of fair market value. According to these laws, compensation is based on rates determined by the legally constituted resettlement committee. If a land and property are acquired by the government for public purposes, the owner

is entitled to receive (i) the value of land; (ii) the value of residential houses and buildings; and (iii) the value of trees and orchards and other assets on the land.

55. A person, who loses his /her residential land plot, is entitled to receive a new plot of land of the same value. If they wish, they can receive a residential plot on government property in exchange under proper procedures. Under current law, when private landholdings are acquired for public purposes, compensation is paid to the owner based on the category and location of the land and the value of land for compensation is determined by a valuation committee consisting of the following members:

(i) The Provincial Governor, head of the Committee;
(ii) The Mayor, deputy head of the Committee;
(iii) Director of MUDL
(iv) Representative of cadaster survey of MUDL;
(v) Representative of Directorate of Agriculture, Irrigation and Livestock;
(vi) Representative of Directorate of Urban Development and Housing;
(vii) Representative of Directorate of Justice;
(viii) Representative of Directorate of Public Works;
(ix) Representative of *Mastofiat*;
(x) Representative of Expropriating Authority; and
(xi) Representative of Afghanistan Chamber of Commerce and Industries.

56. The land acquisition process is initiated with the constitution of the committee by the provincial governor at the request of the IA. If APs and their legal representatives are not satisfied with the compensation for an expropriated property, they can present their objection to the Expropriating Authority within 60 days of being notified about their compensation, and the Expropriating Authority shall assess the appeal within 30 days. If the AP is still dissatisfied, the matter is referred to a jury consisting of (i) a representative of the relevant union of engineers; (ii) a representative of the Afghanistan Chamber of Commerce and Industries; and (iii) a representative of the people of the area subject to expropriation. The decision of the jury is final if the parties agree; otherwise the matter is referred to a competent court.

57. The whole process is based on a negotiated approach and the AP is included as a member of this legally constituted committee. The committee thus also performs the tasks of a GRC.

58. Overall, the above laws/regulations provide that the principle of compensation at full replacement cost is reasonable and legally supported. The laws also identify the types of damages eligible for compensation and indicate that compensation is to be given both for loss of physical assets and for the loss of income.

E. ADB's Policy on Involuntary Resettlement

59. Three important elements of ADB's involuntary resettlement policy are: (i) compensation to replace lost assets, livelihood, and income; (ii) assistance for relocation, including provision of relocation sites with appropriate facilities and services; and (iii) assistance for rehabilitation to achieve at least the same level of well-being with the project as without it. For any ADB operation requiring involuntary resettlement, resettlement planning is an integral part of project design, to be dealt with from the earliest stages of the project cycle, and considering the following basic principles:

(i) Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons, including a gender analysis, specifically related to resettlement impacts and risks.

(i) Carry out meaningful consultations with APs, host communities, and concerned non-governmental organizations. Inform all displaced persons of their entitlements and resettlement options. Ensure their participation in planning, implementation, and monitoring and evaluation of resettlement programs. Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and Indigenous Peoples, and those without legal title to land, and ensure their participation in consultations. Establish a GRM to receive and facilitate resolution of the AP' concerns. Support the social and cultural institutions of displaced persons and their host population. Where involuntary resettlement impacts and risks are highly complex and sensitive, compensation and resettlement decisions should be preceded by a social preparation phase.

(ii) Improve, or at least restore, the livelihoods of all displaced persons through (i) land-based resettlement strategies when affected livelihoods are land based where possible, or cash compensation at replacement value for land when the loss of land does not undermine livelihoods, (ii) prompt replacement of assets with access to assets of equal or higher value, (iii) prompt compensation at full replacement cost for assets that cannot be restored, and (iv) additional revenues and services through benefit sharing schemes where possible.

(iii) Provide physically and economically displaced persons with needed assistance, including the following: (i) if there is relocation, secured tenure to relocation land, better housing at resettlement sites with comparable access to employment and production opportunities, integration of resettled persons economically and socially into their host communities, and extension of project benefits to host communities; (ii) transitional support and development assistance, such as land development, credit facilities, training, or employment opportunities; and (iii) civic infrastructure and community services, as required.

(iv) Improve the standards of living of the displaced poor and other vulnerable groups, including women, to at least national minimum standards. In rural areas provide them with legal and affordable access to land and resources, and in urban areas provide them with appropriate income sources and legal and affordable access to adequate housing.

(v) Develop procedures in a transparent, consistent, and equitable manner to ensure that people will maintain the same or better income and livelihood status.

(vi) Ensure that displaced persons without titles to land or any recognizable legal rights to land are eligible for resettlement assistance and compensation for loss of non-land assets.

(vii) Prepare a resettlement plan elaborating on displaced persons' entitlements, the income and livelihood restoration strategy, institutional arrangements, monitoring and reporting framework, budget, and time-bound implementation schedule.

(viii) Disclose a land acquisition and resettlement plan, including documentation of the consultation process in a timely manner, before project appraisal, in an accessible place and a form and language(s) understandable to APs and other stakeholders. Disclose the final resettlement plan and its updates to APs and other stakeholders.

(ix) Conceive and execute involuntary resettlement as part of a development project or program. Include the full costs of resettlement in the presentation of project's costs and benefits. For a project with significant involuntary resettlement impacts, consider implementing the involuntary resettlement component of the project as a stand-alone operation.

(x) Pay compensation and provide other resettlement entitlements before physical or economic displacement. Implement the resettlement plan under close supervision throughout project implementation.

(xi) Monitor and assess resettlement outcomes, their impacts on the standards of living of displaced persons, and whether the objectives of the resettlement plan have been achieved by taking into account the baseline conditions and the results of resettlement monitoring. Disclose monitoring reports.

F. Comparison of ADB SPS 2009 with Afghan Laws and Legislation

60. Overall, the legislation of Afghanistan adequately reflects the major provisions of the ADB Safeguards Policy Statement (2009) with some differences already reconciled in practice on ADB-financed projects. The most significant of these differences is that Afghan legislation/regulations place emphasis on the definition of formal property rights and on how the acquisition of properties for public purposes is to be implemented and compensated, while ADB policy emphasizes both the compensation of rightfully-owned affected assets and the general rehabilitation of the livelihood of APs and AHs.

61. Because of this, ADB policies complement the Afghan legislation/regulations with additional requirements related to (i) the economic rehabilitation of all AP/AHs (including those who do not have legal/formal rights to the assets acquired by a project); (ii) the provision of indemnities for loss of business and income, and (iii) the provision of special allowances covering AP/AH expenses during the resettlement process or covering the special needs of severely affected or vulnerable AP/AHs. In addition, while Afghan laws provide for some level of consultations, extensive public consultations are not required for preparation of a LARP. The differences between Afghan law/regulations and ADB SPS 2009 are outlined in Table 4.

62. A policy has been adopted for the Project to reconcile gaps between Afghan laws/regulations and ADB Policy (ADB's SPS (2009)) by ensuring compensation at full replacement cost of all items, the rehabilitation of informal settlers, and the provision of subsidies or allowances for AHs who will be relocated, suffer business losses, or will be severely affected.

63. Compared to Afghan laws and legislation, ADB requirements contain potential additional requirements related to:

(i) livelihood restoration of AP, including those who do not have legal or formal rights to the assets that are affected;
(ii) the provision of indemnities for loss of business and income;
(iii) the provision of special allowances that cover expenses during the resettlement process;
(iv) the covering of the special needs of severely affected or vulnerable people; and the requirement to prepare plans to guide any necessary land acquisition and compensation.

Table 4. Comparison of Afghan Laws on LAR and ADB Resettlement Policies

Land Acquisition Law (LAL)	ADB SPS (2009)	Remarks/Solutions
National legislation provides for public consultation, although it is not necessarily comprehensive.	Public consultations and participation are an integral part of ADB's policies, and it is a continuous process from the conception, preparation and implementation stages through to the post implementation	Public consultation and participation of AP are required throughout the project process from planning through implementation, including public notifications of physical works activities.

Land Acquisition Law (LAL)	ADB SPS (2009)	Remarks/Solutions
	period. APs should be fully informed/ consulted in resettlement and compensation options.	
Land acquisition for public interest is to be compensated based on equal/fair value according to current market rates. In case of residential land, land-for-land compensation is offered. Affected land, structures, orchards, vines, trees will be valued by provincial and local officials.	APs should be compensated for all their losses at replacement cost	Market value is the way to assess replacement rate. ADB Policies and national laws agree on this point. The provision under this LARP further stipulates that houses, crops, and trees will also be compensated at replacement rates.
National laws provide for compensation for those who have deeds of ownership as well as those with usufruct or customary rights.	Lack of title should not be a bar to compensation and/ or rehabilitation. Non-titled landowners receive rehabilitation assistance.	This provision in the LARP provides for compensation at market rates for titled and customary users and rehabilitation for non-titled land holders
Land owners/user rights on an affected land plot will be terminated three months prior to the start of civil works and after full compensation is provided to APs. The termination of the owner/user right would not affect their rights to collect their last harvest from the land, except if there is an emergency which may prevent harvest collecting.	APs should receive timely compensation.	Crop losses are compensated to landowners, tenants, or sharecroppers as applicable, regardless of title. This LARP provides for crops compensation whether they have been harvested or not to avoid civil works delay and pressures on land users to harvest before it is fully ripe. Land users harvesting their crops after notification of the land occupation date will not lose any part of their due compensation.
Compensation at replacement rate will be given for land, house, crops, trees and other losses. No consideration is given to income losses or relocation costs.	The APs should be compensated and/ or assisted so that their economic/social future is generally as favorable as it would have been without the project.	Rehabilitation for income losses and for relocation costs will be given if these impacts occur.
Afghan resettlement laws do not distinguish between legalizable and non-legalizable APs. Both treated as non-legal, and in some circumstances such land is not compensated.	SPS (2009) requires that legalizable APs are identified, legalized then compensated. Non-legalizable APs to be compensated for all non-land income (buildings, trees, crops, income etc.)	Reconciliation needed for principle and application. ADB principles have been applied on a case by case basis on previous projects.
Afghan law does not deal with compensation for loss of land leases separately.	Compensation for loss of lease is to be provided at cash cost. This is achieved by providing a comparable leased plot or cash	ADB principles have been applied on a case by case basis on previous projects. Technical aspects of lease compensation

Land Acquisition Law (LAL)	ADB SPS (2009)	Remarks/Solutions
	compensation for remaining time on original lease.	need to be improved.
Afghan law does not mention deductions for depreciation, salvaged construction materials and transaction costs. Construction materials belong to APs once compensated for.	Compensation to be given at replacement cost free of depreciation, salvaged materials and transaction costs.	Compensation should be clarified so that APs know that compensation is provided free of depreciation or transaction costs.
No specific provisions under Afghan law deal with compensation for business losses.	All losses, including income, opportunity loss liabilities to third parties, are compensated.	Past ADB practice has been to compensate lost income based on tax records for the number of months of business disruption for a maximum of 12 months. Unregistered businesses to be compensated based on maximum non-taxable income.
Trees belonging to legalizable and non-legalizable APs are not compensated.	Compensation is to be paid at market rate irrespective of legal and occupancy status.	The entitlement matrix should ensure that all APs receive fair market rate compensation for trees.
Legalizable and non-legalizable APs are not compensated for crop losses. Compensation only provided for sown seeds, fertilizers and farming costs. Even legal APs are not compensated for crops unless they are near. bloom and grains are visible.	Compensation is to be paid at market rate irrespective of legal and occupancy status. All APs to receive compensation for lost opportunity as well as investment costs.	The entitlement matrix should ensure that all APs receive fair market rate compensation for trees and crops, as well as the costs for seeds, fertilizers and farming costs.
Afghan laws do not have specific provisions for the compensation of APs who lose their job due to the acquisition of land	Formal and informal employees should be rehabilitated, considering actual income losses of both temporarily and permanently affected employees.	The entitlement matrix should ensure that temporarily and permanently affected employees receive adequate compensation.
Afghan laws do not require the preparation of a stand-alone LARP detailing background information and compensation. Impacts assessment primarily based on official records, and verification of records through DMS for registered assets only.	ADB requires a broad LAR planning process, with early identification of LAR impacts, based on DMS, APs census, socioeconomic survey etc. Extensive public consultations are required.	ADB SPS (2009) requirements should be followed strictly.
Afghan laws do not provide for extensive public consultations or contain specific disclosure instructions.	Extensive and meaningful public consultations should be held, and APs allowed to participate in all parts of the project lifecycle.	ADB's requirements complement and improve on the requirements of Afghan law.

IV. ENTITLEMENTS

A. Principles and Policies Adopted for this Project

64. Based on the analysis of national laws and legislation provisions and ADB involuntary resettlement policies, the following basic resettlement principles will be adopted for this project:

(i) Negative impacts on APs must be avoided or minimized whenever feasible.
(ii) Where negative impacts are unavoidable, the persons displaced by the project and vulnerable groups will be identified and assisted in improving or regaining their standard of living.
(iii) Information related to the preparation and implementation of the land acquisition and resettlement plan will be disclosed to all stakeholders and people's participation will be ensured in planning and implementation. LARPs with resettlement impacts will be disclosed to the APs.
(iv) Land acquisition for the project is to be conducted as per the Land Acquisition Law of Afghanistan (2017) and ADB SPS (2009). Adequate compensation is to be paid for properties to be acquired. Additional support is provided to meet the replacement value of the acquired property.
(v) Before taking possession of the acquired lands and properties, compensation, resettlement and livelihood rehabilitation assistance (where applicable) will be paid in accordance with the provisions described in this LARP.
(vi) Assistance for relocation and applicable allowances for severely affected and vulnerable households will be provided as per ADB social safeguards provisions.
(vii) An entitlement matrix for different categories of APs will ensure a systematic and fair approach to compensation. A contingency will be maintained in the budget for those who may not be present at the time of the census survey.
(viii) People who move into the project area after the cut-off-date will not be entitled to any assistance. An appropriate grievance redress mechanism will be established at the district level to ensure speedy and effective resolution of disputes.
(ix) Consultations with the APs will continue during the implementation of resettlement and rehabilitation works.
(x) Compensation and rehabilitation is to be provided before the land is acquired.

B. Compensation Eligibility and Entitlements

65. APs that are entitled to compensation, or at least rehabilitation, under the project include:

(i) All APs who lose land covered by a legal title/ traditional land rights, those with legalizable land, or non-legalizable land;
(ii) Tenants and sharecroppers, whether registered or not;
(iii) Owners of buildings, crops, plants, or other objects attached to the land; and
(iv) APs losing businesses, income, and salaries.

66. Compensation eligibility will be limited by a cut-off date to be set for the whole project on the day of signing the grant Agreement or within the 12 first months. MEW will use all possible communication methods (Decision on the cut-off-date, TV captions, local newspapers, meetings with village Elders, Community Information Boards, etc.) to inform communities and potentially APs on the cut-off-date and exclusion from compensation entitlements for all persons moved into the Project corridor after the cut-off-date. MEW will also determine the measures for the protection of the project corridor from influx of new settlers in anticipation of compensation and relocation to other places. APs who settle in the affected areas after the cut-off-date will not be eligible for compensation. However, they will be given sufficient advance notice, asked to vacate premises

and dismantle affected structures prior to the implementation of the project. The materials from dismantled structures will not be confiscated, and they will not pay any fines or suffer sanctions.

67. All APs in the Project are entitled to compensation and resettlement assistance, irrespective of their land ownership status, to help the restoration of their livelihoods to pre-project levels. The combination of compensation measures and resettlement assistance offered to them depends on the nature of the lost assets and the magnitude of the Project's impact as well as the social and economic vulnerability of the displaced persons. The compensation packages must reflect replacement costs for all losses such as, crops, trees, structures, businesses, incomes, etc.

68. Under the SPS (2009), the livelihood of APs should be enhanced or at least restored to the pre-project levels. To achieve this target, the APs are given entitlements to land replacement, wherever possible, compensation at replacement cost for all affected assets, as well as to other allowances which are aimed at minimization of adverse impacts. The following are the key elements of the entitlement policy:

(i) Paying replacement cost for affected assets;
(ii) Compensation for affected property (houses, commercial buildings, supporting buildings and structures, improvements on land, regardless of the legal status of affected property);
(iii) Compensation for loss of land use rights and compensation for standing crops and trees;
(iv) Allocation of replacement land plot(s) for relocation;
(v) Compensation for the loss of income;
(vi) Compensation for the loss of employment;
(vii) Assistance in moving to a new relocation site;
(viii) Assistance during the transition period (i.e. accommodation rental during the house construction);
(ix) Allowances for seriously affected and vulnerable persons;
(x) Provision of civic and other public amenities at the resettlement site;
(xi) Priority of employment for seriously affected and vulnerable persons;
(xii) Compensation of any temporary impact envisaged during the construction period.

69. Project tasks will be implemented according to a compensation eligibility and entitlements framework in line with both Afghanistan's laws and regulation and ADB SPS (2009). A summary entitlements matrix is included in the following table. ***Note: the Entitlement Matrix is currently being reviewed by MEW. The below matrix will be replaced by the latest matrix once made available.***

Table 5. Draft Entitlement Matrix6

Type of Loss	Application	Definition of AH/Aps	Compensation Entitlements7
Land			
Agricultural Land: permanent land loss, access or damage.	APs losing productive land regardless of impact severity	Registered owner/legal: Owners with fully registered land ownership.	Land (of equivalent productivity) for land is the preferred option, where possible. Otherwise, cash compensation at full replacement cost based on current market value. If the residual plot becomes

6 Additional changes may be introduced to the Entitlement Matrix based on the results of the Social Impact Assessment, to capture any unaccounted impacts.

7 All asset losses will be compensated at current market rates.

Type of Loss	Application	Definition of AH/Aps	Compensation Entitlements7
			unviable for cultivation, the project will acquire it if the owner so desires. Preference shall be given to land-based resettlement strategy Transitional allowance for livelihood losses for 12 months period.[8]
		<u>Legalizable owner:</u> APs with formal/ customary deeds, or traditional land rights.9	The ownership rights of these APs will be recognized, and the APs provided with cash compensation at full replacement cost or a replacement land plot (preferred). Transitional allowance for livelihood losses for 12 months. The amount will be determined when the project becomes effective.
		<u>Non-legal/informal settler:</u> APs that are not legitimate land users, or squatters.	Non-legalizable APs losing agricultural land plots will be compensated with one-time allowances in cash, equal to 12 months transitional allowance. Non-land assets will be compensated at replacement cost.
Traditional land (Documents needed: land grants, tax receipts, unofficial land deeds, declarations of village development councils, Jirgas, village elders)			The ownership rights of these APs will be recognized, and the APs provided with replacement land (preferred) or cash compensation at full replacement cost. Transitional allowance for livelihood losses for 12 months.
		Agricultural Tenant (formal/informal)	Full compensation of income of lost crops x the remaining years (up to 5 years) of lease. In case of tenancy no crop compensation will be given to the land owner.
		Agricultural Landlord	Compensation of lost income for the remaining term of the lease.

[8] The amount for all time-based allowances will be based on minimum subsistence income. The latest poverty line determined under Afghans Living Conditions Survey (ALCS) 2016/2017, has been determined as 2,064 AFN per capita per month".

9 In case the users/possessors of lands do not have any valid paper evidence of ownership of the affected lands (traditional users), the AFG land management law requires that in such circumstance these lands of up to 0.2 hectares (5 Jeribs, 2,000sqm) of quantity will be considered the possessor's property and official deeds shall be issued to him/her provided that it meets the conditions such as: (i) the land is not registered as government land in the government records, (ii) there is no valid documents of ownership with any other person of that land (iii) there are visible agricultural and residential construction signs of the possessor and, (iv) neighbouring plot owners confirm possession by the person for at least 15 years prior to 30 April 1978,

Type of Loss	Application	Definition of AH/Aps	Compensation Entitlements7
Non-agricultural land	AP losing their commercial/ residential land	Registered owner/legal: (Owner with full registration) Legalizable owner: APs with formal/ customary deed, or traditional land rights as vouched for by local Jirga, elders or Community Development Council.	Replacement land (preferred) or cash compensation at full replacement cost. Transitional allowance for livelihood losses for 12 months The ownership rights of these APs will be recognized, and the APs provided with cash compensation at full replacement cost, or an equivalent replacement land plot (preferred). Transitional allowance for livelihood losses for 12 months.
		Non-legal/Informal Settler (Without registration/ valid documents using land permanently.)	Non-legalizable APs losing a land plot, which is the only land plot used for residence, will be offered a government land and one-time allowance in cash, equal to 12 months transitional allowance.
Temporary Impact on land plot	N/A	N/A	Temporary loss of land plots will be compensated for the loss of produce for the duration of the impact.
Buildings and Structures			
Residential and non-residential structures/assets		All AHs regardless of their legal ownership/ registration status (including legalizable and informal settlers) Renters	Cash compensation for loss of building/structures at full replacement costs free of taxes, depreciation and transaction costs. Renters shall be provided with cash compensation of 6 months rental, or the remainder of their paid-up lease, whichever is greater.
Loss of Community Infrastructure/Common Property Resources			
Loss of common property resources	Community/ Public assets	Community/ Government	Reconstruction of the loss of resource/asset in consultation with community and restoration of their functions. Provision of basic infrastructure services at relocation sites.10
Loss of Income and Livelihood			
Livelihoods	Households subject to livelihood impacts	All households	In addition to cash compensation as specified below, AHs are eligible to receive non-cash compensation by way of participation in livelihood rehabilitation programs to be developed as part of each LARP.

10 Where host communities are impacted, compensation will be determined in accordance with this framework and with the provisions of SPS 2009

Type of Loss	Application	Definition of AH/Aps	Compensation Entitlements7
Crops	Affected standing crops or agricultural land, used permanently for crop cultivation.	All APs (owners or sharecroppers) regardless of legal status (including legalizable and informal settlers)	Cash compensation equal to market value of crop lost, plus cost of replacement of seeds for the next season. Advance notice to harvest crops.
Trees	Trees affected	All APs regardless of legal status (including legalizable and Informal settlers)	(i) Wood trees: market value based on the value of wood. (ii) Fruit trees (productive): Cash compensation at market rate on the basis of type, age and productive value of the trees. (based on the expected yield of the tree, multiplied by the number of years required to grow a tree of equivalent productivity).The cost of a seedling shall be added to the total compensation. (iii) Seedlings: Replacement cost The owner keeps the cut tree.
Business/ Employment	Permanent or temporary business/ employment loss	All APs regardless of legal status (including legalizable and Informal settlers)	Owner: (i) (permanent impact) cash indemnity of 1-year's net income based on paid taxes or in the absence of income proof, one-time cash compensation equal to 12 months subsistence allowance. (ii) (Temporary impact) cash indemnity of net income for months of business stoppage (up to three months). Assessment to be based on tax declaration or, in its absence, a fixed sum equal to 3 months minimum subsistence allowance. Permanent worker/employees: Indemnity for lost wages equal to actual wage for 3 months or in case of absence of tax declaration, a fixed sum equal to 3 months subsistence allowance.
Allowances			
Severe Impacts	>10% income loss	All severely affected AHs including informal settlers	Agricultural income: Additional crop compensation for 1 year's yield of the affected land and/or, for other non-agricultural incomes: an allowance covering 12 months of the national minimum subsistence.
Relocation/ Shifting	Transport/	All AHs to be relocated	An allowance covering transport and livelihood expenses for the transitional period. (sum to be determined for vehicle hire charge)
Vulnerable People Allowances		AHs below poverty line, AHs headed by women, AHs headed by disabled	One-time lump sum of 6 months minimum subsistence allowance as a vulnerability allowance and

Type of Loss	Application	Definition of AH/Aps	Compensation Entitlements7
		person. Internally displaced persons, Kuchis/nomads	employment priority in project-related jobs where feasible.
Unforeseen impacts during construction	Impacts during construction to properties or assets out of the corridor of impact or ROW.	All APs	Due compensation to be assessed and paid when the impacts are identified based on the above provisions and on the requirements of ADB SPS 2009.

C. Valuation and Compensation Rates

70. The valuation methodology of compensation rates for the different affected assets is detailed in the next paragraphs.

1. Land

71. Afghanistan's Law on Land Acquisition (2017) envisages the forming of a committee tasked with producing a bill of valuation which is used to determine the value of acquired land, buildings and associated structures. The committee determines the minimum and maximum value of the land to be acquired based on the value of properties on the local market and neighboring areas three months prior to the preparation of the bill of valuation. According to the National Land Policy (2018), monetary compensation for expropriated land is based on the value of the land prior to the announcement of the development project being pursued in the public interest. Land-for-land compensation is preferred, and APs are entitled to receive equivalent land in terms of type, location, grade and business value. If equivalent land is unavailable, APs can be compensated partly in land and cash or alternatively, they can receive the total compensation in cash.

2. Structures

72. The replacement cost of houses/buildings will be determined based on construction type, cost of materials, transportation, types of construction, architectural and engineering standards, land preparation, labor, and other construction costs at current rates. No deduction for depreciation and transaction costs will be applied. Where there is a significant difference in value between one part of a property to be expropriated and another, the law allows for the separate evaluation of the parts.

73. Affected public and community buildings and structures will be restored during the project construction.

3. Annual Crops

74. Compensation for affected annual crops will be calculated using lost income method, which is derived from data on the productivity of each species and the current market price of 1kg of product. The market value of annual crops was determined as the net market rates at the farm gate for the first-year crop. Cash compensation at current market rates for the gross value of one year’s harvest is paid by default. The price of sowed seeds, fertilizers, and farming costs are also considered and compensated at market rate. Crop compensation will be paid both to landowners and tenants based on their specific sharecropping agreements. In the event that more than one year’s compensation is due to the APs, the crops after the first year will be compensated at gross market value.

4. **Trees**

75. Fruit-bearing trees will be compensated differently if they are productive, or yet to become productive. The Law on Land Acquisition (2017) indicates that productive fruit trees are compensated according to the price of firewood plus the value of fruit borne by the tree for a period of five years. If the tree has bloomed, the price of that year's yield is paid in addition to the value of fruit borne by the tree for a period of five years.

76. According to the Law on Land Acquisition (2017), non-productive/wood trees are compensated according to local tradition based on the price of firewood. Non-productive ornamental trees are compensated according to local tradition which is five times the value of firewood.

V. SOCIO-ECONOMIC INFORMATION

A. Overview

77. The affected area of C-1 is located in Shah Wali Kot district of Kandahar Province. The Shah Wali Kot District borders Khakrez District to the West, Oruzgan Province to the North, Zabul Province to the East and Daman and Arghandab districts to the South. The Socio-Economic Survey of the AHs of the reservoir (91 village estates/mantega) was not conducted due to security restrictions, these households are located in the upstream of Dahla Dam. The security in upstream of Dahla Dam is non-existent; as currently none of the affected villages are under the control of government. It has therefore not been possible to conduct a socio-economic survey within the reservoir area during the implementation of the TA. It will be necessary to conduct a comprehensive survey during implementation. The following information is indicative only.

78. A socio-economic scoping study of about 25% of the AHs (7 households, out of total 27 AHs) of realignment of the Kandahar to Bamiyan Route Bearer Highway (RBH) was conducted from 10 to 11 April 2019, through a randomly selected sample of 7 AHs using a short-structured questionnaire. The 27 AHs live in three villages named Sha Joy, Luwal Arab and Shorow (the shorow village is not part of the villages to be affected due to raising of the reservoir). The information collected through this survey has been presented below and has been taken as a sample to analyze the overall socio-economic conditions of the APs of Raising Dahla Dam. In addition, some limited primary data was however collected from field observations and discussions with the representatives of APs during the topographic survey, consultation meetings and workshops with the APs, the meetings with the officials of district Shah Wali Kot and implementing agencies. To support the findings and obtain an overview of the socio-economic characteristics of the affected population, secondary data was also used.

79. During the subsequent LARP preparation, the primary socio-economic data of each AH shall be gathered in parallel with detailed measurement and other resettlement surveys and studies.

B. Indicative Demographic Details

1. Population

80. According to the most recent population estimate of the Shah Wali Kot district, the total population is 45,732; of which 23,524 (51%) are men and 22,208 (49%) are women.[11]

2. Composition of Households

81. The total population of the sampled seven AHs is 56 persons. The household composition of these sample includes 21% children below 10 years of age, 67% are adults, and 11% are aged over 60 years. On average, there are eight persons in one household (around 60 % male and 40 % female).

Table 6. Age Composition

(Sample size: 7 AHs)

No. of Family Member	Male	Female	Total	%
Children (below 10 years)	7	5	12	20.8
Adult (10 to 60 years)	22	16	38	67.3
Aged (above 60 years)	4	2	6	11.9

[11] Central Statistics Organization, Afghanistan Population Estimates 2017-2018

No. of Family Member	Male	Female	Total	%
Total	**33**	**23**	**56**	**100.0**

3. Type of Family

82. Details of family types (whether joint/nuclear/extended) of 27 AHs is based on census data from the road realignment survey. Nearly 43% of the total AHs live in joint families, 47% in nuclear families, and 10% in extended families. A description of each family type in the context of project AH is explained below.

(i) Nuclear families: Nuclear family consists of a single family.
(ii) Joint families: Joint family consists of family of two or three generations. It usually consists of a grandfather, sons and their family, and grandsons and their family. The land is usually controlled by the grandfather or by his eldest son.
(iii) Extended families: Extended family consists of two or more families of three to four generations. It is typical to only Pashtun families and these families may consist of up to 40 members living under a same roof. These families usually consist of two or three grandfathers, sons and their families, unmarried daughters (in some cases daughters with their families), grandsons and families and unmarried granddaughters. The lands are usually controlled by the eldest grandfather or by his eldest son.

4. Ethnicity

83. There is only one ethnic group in the project area, the Pashtuns. There are no indigenous people as defined by ADB SPS (2009).

C. Indicative Socio-economic Details

1. Economic Profile

84. **Poverty Status**. The poverty status of the 27 AHs is given in Table 7. According to the Afghanistan Living Conditions Survey 2016-17, the national poverty line defined and valued at 2016-2017 survey prices is 2,064 AFN per person per month ($25.5/person/month). The same benchmark was considered in the present analysis. About 26% of AHs are considered as vulnerable, below the poverty line, while around 74% AHs are above the poverty line.

Table 7. Poverty Status

(Sample size: 27 AHs)

Poverty Status	Total AHs	% of AHs
Poor/vulnerable	7	26
Above poverty line	20	74
Total	**27**	**100**

85. **Income.** The main sources of income of sampled AHs is agriculture. The second source of income is business. The average monthly income of the sampled households amounts to AF 6,045 (AF 756 per person per month) which is much less than the national poverty line (AF 2,064 per person per month). The average annual income is AF 72,540 ($948).

86. Due to the unavailability of jobs throughout the year, people often migrate to other places for employment. 71% (5 households) of the sampled seven AHs reported some seasonal migration in winter. Out of these, 28% migrate to other provinces, 44% to other districts while 28% migrate to other countries in search of work. The majority work as unskilled laborers when they

migrate (68%). About 17% conduct business (establish micro businesses or open small a shop at the location of their migration).

87. **Expenditures**. Average annual expenditure of the sampled seven AHs on various types of items is shown in Table 8. Food is the major type of expenditure and contributes to 58% of the total expenditures. Transportations expenses amount to 8% of the household's income, health 15%, clothing 11%, while education and social functions are represented at 4% each.

Table 8. Average Annual Expenditure

(Sample size: 7 AHs)

Type of expenditure	Average Annual Expenditure (AF)	% of Expenditure
Food	42,942	57.6
Transportation	6,195	8.3
Clothing	11,502	15.4
Health	7,942	10.6
Education	2,432	3.4
Communication	500	0.5
Social functions	2,950	4.2
Total	**74,463**	**100**

88. **Debts.** Indebtedness is quite prevalent in the sampled seven AHs. Around 86% AHs (six households) reported that they had taken loans from different sources for various households needs. Only 14% of the households (one household) reported that they did not take any loan. The loans are counted as small loans and ranges between AF 5,000 to 10,000. There are very limited households that have loans up to AF 50,000, which are often taken by the groom families for the purpose of a wedding.

89. **Assets**. Details of various types of common household assets possessed by the sampled AHs show radios and motorcycles as the most common households' assets. Other assets are bicycles, cars, televisions and air conditioners. No washing machine and computers were found in the sampled households.

Table 9. Possession of Durable Goods

(Sample size: 7 AHs)

Item	Number of AHs
Radio	5
Bicycle	2
Television	2
Computer	0
Washing machine	0
Motorcycle/scooter	5
Car	4
Air conditioner	2

2. Gender

90. Women work mainly in the house doing all household chores, caring for children and other family members and tend the livestock within the household compound where they spend all their time. They usually do not participate in any decision-making related to the family affairs.

91. Across all income levels, male members of the household make all the decisions about household expenditure. In only around 4% of the households do women decide where the money would be spent, and in around 9% of the households do men and women jointly make these

decisions. Women's participation in community development activities is extremely low (less than 5%), and women's participation in public sector services is also less than 5%.

92. Women face a number of constraints due to gender gaps on access to resources that restrict their participation in the agriculture sector, these constraints include:

(i) Access to assets: the absence of official identification (*tazkera*) limits women's access to government and assistance under development projects and lack of assets (land) to offer as collateral limit their access to agriculture credit.
(ii) Balance of power and decision-making: women traditionally have had little decision-making authority on land use (e.g., what crops to grow and when), farm labor allocation, input purchasing (including access to irrigation water), or crop marketing. There are no female agriculture extension workers.
(iii) Knowledge, beliefs, perceptions: rural women have low literacy and numeracy rates, and they face cultural norms that limit their mobility outside of their residential compounds to engage in economic and other activities.
(iv) Practices and participation: most of the women are involved in small-scale, subsistence (not commercially-oriented), unpaid activities that take place within their residential compounds, such as kitchen gardens, post-harvest processing, and the raising of livestock and poultry production.

3. Other Indicators

93. **Education and Literacy**. Currently, there are no operational schools in the affected villages. There are some educational centers (madrassahs) for male and female children to study the Islamic education. There are no public health centers available in the affected villages. Out of the sample population, only 16% is literate. [12] Literacy rate among men is higher as compared to women (18% vs 14%).

94. **Health**. Responses of sampled AHs to the question of whether any of their family members were affected by any major illness in last year shows that 71% reported some illness. The illnesses included fever, heart disease, malaria, tuberculosis, kidney problems, diabetes, hepatitis, etc. In addition, four recent cases of polio in male and female children have been reported in Shah Wali Kot District in December 2018.[13]

95. **Water**. The major source of drinking water in the Project area is from open wells fitted with hand pumps. Out of the surveyed AHs, 29% reported well water as the source of drinking water, about 29% use stream water, 14% of AHs drink natural spring water and 29% use other sources.

96. **Sanitation**. Most of the sampled AHs (62%) use traditional dry pit latrines while 11% have flush toilets. Nearly 28% of the sampled AHs reported having no toilet and both men and women use open spaces for defecation, far from the residential area.

97. **Source of fuel**. Wood is the main source of fuel being used by surveyed households for cooking. 86% of the households use wood as the source of fuel for cooking, 14% AHs use gas and none of the AHs use electricity for cooking.

98. **Housing**. Mostly, APs have built mud structures for housing, some of the structures are semi concrete; the foundations are constructed with concrete and stones while most of the

[12] Person who has passed primary school and/or can read and write.
[13] UNOCHA report, USAID OFDA Factsheet: https://www.usaid.gov/sites/default/files/documents/1866/afghanistan_ce_fs01_12-27-2017.pdf

structures is made of mud. On average, there are three rooms per living compound and only one is lighted with solar lights.

4. Roads and Transportation

99. **Road access**. 28.5% of AHs have access to village roads, 28.5% to district roads, 43% to provincial roads and none have no road access at all.

100. **Condition of roads**. 71.5% of sampled AHs stated that access roads were good, while 14% thought that they were poor and 14% very poor.

101. **Expenditure and willingness to pay**. The average monthly expenditure of sampled AHs on transportation is AF650. The majority of AHs (86%) expressed their willingness to pay for better road services. Only around 14% expressed their unwillingness.

D. Livelihood

1. Use the Reservoir

102. Currently, the AHs use the affected area of reservoir for following purposes:

(i) Irrigation: Mostly APs use Dam water to irrigate their agriculture fields and orchards through deep wells and the use of solar water pumps to extract water;
(ii) Water for Drinking and Household Chores: APs use deep wells that are fed from Dahla reservoir to get water for their purpose of drinking and household chores;
(iii) Agriculture: APs get the reservoir area on lease from the government to use it for agriculture purposes, when there is less water in the Dam. Mostly, they cultivate crops such as black turtle bean and watermelon.

2. Sources of Livelihood

103. The main source of livelihood in Kandahar Province is rain-fed agriculture. However, with protracted reduction in rainfall, farmers are extracting more groundwater to irrigate crops.[14] Kandahar is a market for sheep, wool, cotton, food grains, fresh and dried fruit and tobacco. Woolen products, felt and silk are major products. The surrounding irrigated region produces fine fruits, especially grapes, and Kandahar City has plants for canning, drying and packing fruit.[15]

104. Based on the consultations and field observations, it was determined that the main source of livelihood in the project area is also agriculture. Fishing and hunting is forbidden in Dahla reservoir and is not a source of livelihood in the area.[16]

105. According to consultation with APs, generally livestock is used for household consumption and not as a source of income, as follows: (i) cattle for milk; (ii) sheep and goat for meat; and (iii) poultry for eggs.

The socio-economic survey of seven AHs confirmed that agriculture is their main source of livelihood. The 71% of AHs specify agriculture and seasonal labor as their main economic activity.

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[14] Currently, about 22,000 ha (18.5% of agricultural area) is under groundwater irrigation.
[15] Asad Sarwar Qureshi and Mujeeb Akhtar, A survey of drought impacts and coping measures in Helmand and Kandahar provinces of Afghanistan, December 2004
[16] Based on consultation meetings with ASBA, it was confirmed that fishing is not allowed in Dahla reservoir for its protection and due to security reasons. As per consultation with APs, it was confirmed that security police of Dahla Dam is not allowing fishing and hunting.

The 14% state business/sales as their major economic activity and another 14% are work for government and social sector organizations.

Table 10. Occupational Patterns

(Sample size: 7 AHs)

	No of Ahs	%
Agriculture	5	72
Working for other farmers	0	0
Small enterprise	0	0
Government and NGO	1	14
Business and trading	1	14
Hunting or gathering	0	0
Daily wage	0	0
Other	0	0
Total	**7**	**100**

106. The AHs can be grouped in the following categories from a livelihood perspective:

(i) **Non-Resident/Farmers**: The 70% of residents of Dahla Dam do not reside in the affected villages due to insecurity, weak rule of law and drought. Most of them live in Kandahar and Kabul cities, and some of them live in foreign countries. Their main source of income is agriculture particularly the dry figs, which they sell in Kandahar city and all over Afghanistan, and some of them export to India, Pakistan. Most of these APs do not fall under the category of poor.

(ii) **Tenants/Sharecroppers**: The families of tenants and sharecroppers have been living in the affected area for last 20 to 50 years. The do not own lands, they cultivate the lands of owners and live in their houses. The number of tenant and sharecropper households are more as compared to the titleholder households. Most of the tenant and sharecropper households are poor and cannot afford internal displacement due to their socio-economic conditions despite of insecurity and on-going war. They have verbal agreements with the owners on cost sharing of cultivation and sharing of agriculture produce. The landowners bear the cost of all agriculture inputs while the sharecroppers are responsible for cultivation/ production.

(iii) **Leaseholders**: The local farming households take affected agriculture lands of reservoir on lease from the government for cultivation, when there is low level of water in the Dam. They deposit a share of their income in Kandahar Ministry of Finance. Mostly they grow crops such as black turtle bean and Watermelon.

(iv) **Kuchis**: Mostly, the kuchis are the seasonal migrants and have been living in the project area for last 5 to 10 years. They do not own agriculture or residential lands in the affected villages and live in informal settlements on government owned land. Mostly they work as agriculture labor during their stay in the villages. Some of the Kuchis come to the affected villages in spring season and go back in winter season. Their main sources of income are livestock rearing and agriculture labor. The rate of daily wages in the villages is AF 350 per day. On average they find 10 day work in a month, their average income from labor is AF 3,500 per month. Most of kuchis fall under the category of marginalized and extreme Poor. They do not have economic means to internally displace from the project affected area despite of insecurity and on-going war, due to their socio-economic conditions. The Kuchi households are smaller from both the land owners and tenants/sharecroppers.

(v) **Neighbors**: Neighbors are the Anti-Government people who are from Kandahar or Loy Kandahar (Kandahar, Helmand, Uruzgan, Nimroz and Zabul). They are also involve in agriculture and small businesses.

(vi) **Agriculture Value Chain**: Women and children are involved in drying and packing of figs, on average, they earn AF 200 to 300 per day.

(vii) **Micro Business Enterprises**: During the peace time, there were workshops, shops and small business opportunities available in the affected area, mostly along both sides of Kandahar Bamiyan Highway. But now due to the security condition, there are no such business opportunities along the Kandahar Bamiyan Highway. Some of AHs run micro enterprises on village level.

3. Crops and Orchards Production

107. In the Dahla Dam affected area, the main types of agriculture are field crops and orchards, including:

(i) Dry fig: Affected villages are well-known for dry fig. According to LAR impact assessment survey, 95% of APs' orchards are fig orchards. In addition, based on consultation meetings with APs, 95% sales are coming from dry fig. Fig orchards are major source of livelihoods.

(ii) Pomegranate: According to LAR impact assessment survey, 5% of APs' orchards are pomegranate orchards. In addition, based on consultation meetings with APs, 5% sales are coming from pomegranate. After dry fig, pomegranate products are one of the main source of livelihoods.

(iii) Black cumin: Based on consultation meetings with APs, some farmers are producing black cumin as a source of income for their livelihoods.

(iv) Apricot, walnut, apple, grapes: These trees/orchards are available in the area but are mostly being used for own consumption and not for sales.

(v) Cereals (wheat and other): APs are using only for their households.

(vi) Field vegetables, watermelons, potatoes, onions, and other: APs are using only for their households.

4. Irrigation Systems

108. The major source of irrigation water is *Kariz* (underground irrigation channe)l. Each *Kariz* has different local name and mostly there is one *Kariz* for each village. Based on the survey and consultation meetings with APs, most of the *Karizes* are dried, and due to the unavailability of water, the APs are planting less agriculture lands.

109. The second major source of irrigation water is from Arghandab, Shah Joy and Wayan rivers. When there is water available in rivers, the APs are diverting water for their agriculture lands and orchards. Due to the climate change, the heavy floods destroyed their intakes. In addition, the river surface is down from their land and it is difficult for local people to construct standard intakes.

110. The third source is deep wells. APs use deep wells water to irrigate orchards and agriculture lands. They extract water from pumps, operated through solar panels.

111. The severe drought has strongly affected the agriculture system as lack of sufficient surface water and has resulted in drying up of the orchards and reduction in crop cultivation. Based on the survey and consultations with APs, currently all farmers are using deep wells for their irrigation and are now using only 50% of their agriculture lands.

VI. CONSULTATION, PARTICIPATION AND DISCLOSURE

112. According to ADB SPS (2009), APs must be meaningfully consulted and provided with opportunities to participate in the planning and implementation of the LARP. Under the same principles, APs must be informed in an appropriate and timely manner of the planning process outcomes, as well as the schedules and procedures for the preparation and implementation of the LARP, including entitlements, payment procedures, and relocation.

113. The flow of information is a two-way communication process between the borrower/client and APs, and a platform where all relevant information is taken into consideration in the project planning and implementation phases. Meaningful and continuous consultations create a platform for the stakeholders' participation/inclusion in the project processes.

114. Given the difficulties likely to be encountered in LARP preparation in insecure areas, project communities will need to be consulted and informed in an ongoing, continuous process involving meetings with heads of villages, affected people's representatives, other stakeholders, and discussions with individual persons.

A. Consultations and Workshop Undertaken

1. Output 1. Sub-component 1a and 1b

115. At this stage of the LARF preparation, substantive village level consultations were not possible due to insecurity. Instead, consultation meetings were conducted individually with village elders. The main issues discussed were the main component of the project, acquisition of agricultural lands, residential lands, orchards and pastures, and feedback on the project. The main message received during the consultations with elders is that people support the project and agree with the project implementation; however, people request to be compensated before any work begins. In addition, during consultations, elders were informed that the DMS will be conducted by the resettlement team and government officials.

116. Due to security reasons, individuals who participated at consultation meetings at the village level, did not agree to sign their names or have their photos taken.

117. The resettlement team conducted two workshops which were held with 335 AP's representatives, government representatives, ADB, and the TRTA consultants. These workshops provided an opportunity for stakeholders to consider resettlement options and to state their opinions. The two consultative workshops on land acquisition and resettlement were conducted in Kandahar City.

Table 11. Summary of Workshops Held

Workshop	Date	Location	Number of participants	Type of participants
Workshop with representatives of APs	9 December 2018	Kandahar City	54	Affected People's Representatives, TRTA resettlement team, Government representatives
Consultative workshop on resettlement	6-9 April 2019	Kandahar City	281	Affected People's Representatives, Government representatives, ADB and TRTA representatives

118. During the second workshop a series of consultative sessions were held over two days in collaboration with the Government Implementing Agencies (IAs) in order to inform the representatives of APs, on (i) key potential land acquisition and resettlement impacts compiled as a result of topographic survey in collaboration with ASBA and Project APs; (ii) agree on the

key facts and figures compiled on land acquisition and the direct, indirect and gradual impacts;(iii) and discuss the way forward for collecting necessary information and consultations with APs' representatives and affected communities on certain aspects of land acquisition and resettlement. The workshop proceedings are detailed in Appendix 2.

119. The first day of the workshop presentations were delivered and APs Committee members were invited to present their demands and concerns regarding the project. All of them mentioned that they support the project and there is no objection regarding resettlement.

120. During both workshops, the participants requested from the Kandahar Governor H.E Hayatullah Hayat, to find the Presidential Decree and previous agreements between APs Committee and the Government during the period of 2013-2014 when the Dam Raise project was previously being considered. In addition, workshop participants requested the Kandahar Governor to arrange their meeting with the President to discuss these previous agreements and get the Presidential approval.

121. During the second day of the consultative workshop, consultations were carried out with 60 APs Committee members. The following table details the concerns raised by the APs during the workshops and consultations and possible mitigation measures.

Table 12. Summary of Concerns Raised During Consultations

Issues/Concerns Raised	Possible Mitigation Measures
ADB and the Afghan Government should pay compensation before actual implementation of the project. AP representatives are lacking trust because the road which was previously realigned by USACE for an 8m raise was carried out without anyone receiving compensation.	Initiation of civil works should be conditional upon the full implementation of LARP(s) connected with the works, including full delivery of compensation and rehabilitation. Such a condition should be clearly spelled out in the text of the civil works contract.
APs Committee members requested from the Kandahar Governor, ASBA director and ADB representative to find the original copy of Presidential Decree and previous agreements between APs committee and Government from 2013-14. They requested to arrange a meeting with the Afghan President to discuss the previous agreement with them. The previous agreement was developed over the course of six months and covered all of their demands.	APs are requesting to meet with the President to implement the previous agreement and get compensation accordingly. Without further consultations or a meeting with the President, the project will face difficulties during implementation. Ongoing consultations and meetings will be held to ensure that APs will not disturb project implementation or limit access to AH during surveys.
APs Committee members mentioned that in previous agreements, they agreed with government to construct a township for them in Kandahar.	Relocation needs and implications will be assessed through active and extensive community consultations to be continued with APs. Relocation will be based on a community demand driven approach. AHs will be consulted to ascertain their relocation choices
APs confirmed that after their meeting with the President and approving the previous agreement, they will support the DMS with the presence of Government Resettlement Committee and ADB representative.	While the workshop paved the way for access to some AHs, ongoing consultations and broad stakeholder workshops should be held to ensure that there is access to AH during surveys.
The contour line should be marked in areas affected by the Dam raise before the start of the DMS survey for implementation ready LARPs.	

Issues/Concerns Raised	Possible Mitigation Measures
Some APs which are benefiting from this water and will be affected by the dam are showing opposition without considering the national importance of the Project. Personal-benefit consideration of APs could be used by external interferences resist and stop the project.	During LARP preparation process the Project should conduct public awareness raising campaigns on project scope, benefits and implementation.

2. Sub-component 1b. Road realignment

122. One meaningful consultation meeting was held on 30 March 2019 in the main affected village: Mohammad Shahjuy village in Sha Wali Kot District with 15 men, including the chiefs of the villages. The meeting focused on the road realignment sub-component. Information about the project, the SPS 2009, methodology for valuation, allowances and the GRM were explained to the participants. Participants asked clarification about the compensation for the land and for trees, job opportunities, and about the road construction standards. Most participants were satisfied with the explanation provided by the resettlement specialist and were satisfied that they will be compensated for their losses. Some participants expressed their concerns on the risk of improper implementation of the project. The participants were satisfied to hear that the road will be built to engineering standards and mentioned that transportation problems should as such be solved. They are looking forward to the implementation of the project and promised their support for the maintenance and security of the road. The details of the consultation are provided in Appendix.

B. Continuation of Consultation

1. Sub-component 1a. Main Dam and Six Saddle Dams Raised

123. The community consultation process will be interwoven into all stages of the project and last for the duration of the project. The consultations will encompass involvement of the primary stakeholders as well as other stakeholder groups. Consultation and participation are closely linked with information disclosure.

124. The approaches to consultations, information sharing and engagement with stakeholders that will be adopted in the preparation and implementation of multiple LARPs are:

(i) **Wide community consultations** include a broad representation of the communities;
(ii) **Targeted stakeholders consultations** include specific groups of APs such as affected business owners, APs losing agricultural land, etc.
(iii) **Workshops** include representatives of local authorities and representatives of the project communities;
(iv) **Focus group discussions** include representatives of local authorities, communities, women's groups, youth groups, and any other third parties to discuss specific project-related issues and gather participants' opinions, suggestions and concerns.
(v) **Key informant interviews** are conducted mostly during the project preparation phase to generate information and ideas about the Project.
(vi) **Face-to-face meetings** with the APs are held to clarify confidential information on the compensation amount, particular entitlements related to the APs' affected assets, complaints or concerns related to the project, as needed.
(vii) **Questionnaires/interviews** may include socioeconomic questionnaires, census questionnaires, poverty assessments, gender-related interviews, etc.

125. Consultation proceedings will be properly documented. The essential documents will include:

(xii) Summary,
(xiii) List of the key issues raised by the participants,
(xiv) Agreed actions,
(xv) Photographic records, and
(xvi) List(s) of participants.

126. The minutes of the consultations, together with scanned signatures of the participants will be included in regular reports and in the LARPs. The data will be disaggregated by gender, with the key information recorded at the top of the minutes, stating the number of participants, the number of men, and the number of female participants.

2. Sub-component 1b. Road realignment

127. The consultations will continue throughout the project cycle. The effectiveness of resettlement implementation is directly related to the degree of continuing involvement of those affected by the Project. Several additional rounds of consultations with the APs will be required during the detailed engineering design and subsequently during the LARP implementation. Consultations during the detailed engineering design and LARP implementation will involve agreements on compensation, assistance options, and entitlement package and income restoration. The other round of consultations will occur when compensation and assistance are provided. Information disclosure is pursued for effective implementation and timely execution of the LARP.

128. For the benefit of the community in general and APs in particular, the LARP shall be made available at the concerned offices of MRRD. The PMU will provide information on resettlement policies and features of the LARP.

C. Information Disclosure

129. ADB SPS (2009) requires the provision of relevant project information in a timely manner, at an accessible place and in a form and language(s) understandable to the APs and other stakeholders. Information disclosure involves delivering information about a proposed project to the affected people and other stakeholders. The purpose of the information disclosure requirements specified under ADB SPS (2009) is to facilitate engagement of people so that a constructive relationship between the parties is established at the outset and maintained over the life of the project. Special efforts will be made to reach vulnerable groups and illiterate people lacking access to public media and information exchange.

130. For transparency in planning and for further active involvement of APs and other stakeholders, the project information will be disseminated through disclosure of resettlement planning documents. A resettlement information pamphlet containing information on compensation, entitlement and resettlement management adopted for the Project will be made available in Pashto and distributed to all APs. Each AP will be provided information regarding specific entitlements.

131. Modes of information methods will be:

(i) Informing village elders;
(ii) Information campaigns, the media;
(iii) Public meetings;
(iv) Focus group discussions;

(v) Household/individual interviews;
(vi) Workshops/seminars;
(vii) Project websites; and
(viii) Local information boards.

132. Project communities have already been consulted and informed in an ongoing, continuous process involving meetings with heads of villages, consultative workshops, and discussions with individual persons. The consultation process will continue throughout the project implementation phases.

133. The April 2019 consultative workshop result and request for community feedback was announced by ASBA (Appendix 2) following the April 2019 workshop through the following:

(i) Kandahar Governor's Office;
(ii) National Radio and TV of Kandahar;
(iii) APs Committee;
(iv) Helmand River Basin Authority (HRBA);
(v) Tolo Afghan News Channel;
(vi) MEW (MEW Webpage);
(vii) Benawa News Channel Webpage;
(viii) Lar aw Bar News Channel Webpage.

134. During the detailed design, consultations should be held to verbally brief the APs who are illiterate regarding their entitlements, the compensation methods and means of recourse to GRMs established for the Project. A copy of the final LARF and the LARPs (when prepared) in English will be disclosed on ADB's website, while a copy of the final LARF and LARPs in Pashto will be disclosed on the MEW website and at the local authorities' offices. The LARP in Pashto will also be disclosed to the APs at the relevant local elders' offices in the project communities. Moreover, as required by the new ADB Public Communications Policy (2012-2018), monitoring reports on the LARP implementation will also be posted on the ADB website.

VII. GRIEVANCE REDRESS MECHANISM

135. Article 34 of Afghanistan's Law on Land Acquisition 2017 details the grievance redress mechanism (GRM) as follows:

(i) Whenever the owner or his/her legal representative is dissatisfied with the compensation of the expropriated property, he/she may present his/her reasoned objections statement to the Expropriating Authority within 60 days of the date on which they received information about their compensation.
(ii) The Expropriating Authority shall assess the objection stated in Paragraph 1 of this article within 30 days and make an appropriate decision.
(iii) Whenever the claimant is not satisfied with the decision of the Expropriating Authority, the issue shall be referred to a jury. The jury consists of a representative of the relevant Union of Engineers; a representative of the Afghanistan Chamber of Commerce and Industries; and a representative of the people of the expropriated area.

136. The decision of the jury is final if the parties agree; otherwise the issue is referred to a competent court.

137. The existing grievance redress system may be used in conjunction with the project-related GRM. A project-specific GRM will be established to receive, evaluate, and facilitate the resolution of affected parties' concerns, complaints, and grievances about the issues related to the project. The GRM will function during all phases of the project implementation. It will provide a time-bound and transparent mechanism to address and resolve grievances arising from the implementation of the project.

138. The GRM is a formalized way for the PMU to identify and resolve concerns and people's grievances. It offers APs a forum to voice their concerns, seek clarifications to their queries, or register complaints related to the project's performance. The scope of the GRM addresses issues related to involuntary resettlement, social and environmental performance, and information disclosure.

139. The APs will have the right to file complaints and/or queries on any aspect of the project, including land acquisition and resettlement. Under the adopted grievance mechanism, the APs may appeal any decision, practice or activity related to the project. All possible avenues will be made available to APs to voice their grievances. The PMU will ensure that grievances and complaints on any aspect of the project are addressed in a timely and effective manner.

140. The fundamental objectives of the GRM are to:

(i) reach mutually agreed solutions satisfactory to both the Project and the APs, and to resolve any grievances locally, in consultation with the aggrieved party;
(ii) facilitate the smooth implementation of the LARP (if required), particularly to cut down on lengthy litigation processes and prevent delays in project implementation; and
(iii) facilitate the development process at the local level, while maintaining transparency as well as to establish accountability to the APs.

141. The GRM will cover issues related to social, environmental and other safeguard issues under the ADB safeguard covenants and Afghan law. The APs will be fully informed of their rights and the procedures for addressing complaints, orally and in writing during the consultations and surveys, and will be informed again when the compensation is disbursed. Care will be taken to prevent grievances rather than relying solely on the redress process. This will be achieved through careful LAR design and implementation, by ensuring full participation and consultation

with the APs, and by establishing extensive communication and coordination between the affected communities, the EA, and local governments in general.

142. The Grievance Redress Committee (GRC) will be formed by MEW and local authorities as a permanent and functional structure, engaging personnel of MEW from all departments to work on LAR issues and complaint resolution. The MEW will specify that representatives of local/community authorities, elders, auditors, APs and any other persons or entities can be included in the Committee as members.

143. The MEW follows ADB's Grievance Redress Procedure (GRP) to address any dissatisfaction and complaints by residents regarding its activities. This is set out in the ADB Resettlement Policy Framework (ADB Safeguard Policy Statement (2009)). This procedure will be applied to address any complaints or grievances during the implementation of Output 1.

144. The GRM will be established at two levels: (i) the GRC at the Project level and (ii) the GRC at the MEW (district) level. If the complaint cannot be resolved at these first two levels, a complainant will have the choice to lodge his/her complaint at the related (district) court. The Project GRC is oriented towards resolving complaints at the project level through negotiations with community leaders and representatives of AP. These discussions will involve the affected groups and members of the project-level GRC, as well as the site manager and chief engineer of the construction contractor, if necessary. If a case cannot be resolved in this way it will be submitted to the second level - the MEW GRC, led by the PMU Director. If the case still cannot be resolved, the aggrieved party will have the right to refer their grievance to a court. The aggrieved party will have the right to refer their grievance to a court at any point.

145. The first, fastest and most accessible avenue to address grievances is the PMU, chiefly through the PMU social officer and project director. The contact phone number of the PMU will be posted in the project area, the construction sites and on the MEW website. These focal points will attempt to resolve grievances informally through continuous interactions with AP. The PMU will answer queries and resolve grievances regarding various issues, including contractor performance, environmental impacts of the project (noise, air, traffic, etc.), land acquisition, structures acquisition, livelihood impacts, entitlements, and assistance. If a grievance cannot be resolved informally, the project coordinator convenes a meeting of the project-level GRC in the project area and conducts proceedings to reach an amicable settlement between the parties. The report of the committee is recorded in writing, and copies are provided to the parties involved. The GRC will be required to meet and reach a decision within 14 days of receiving a complaint (verbally or in writing) from an AP or his representative. There will also be an appeals procedure where, if a person is dissatisfied with the ruling of the GRC, he or his representative may attend their next meeting to present the case. The committee will then reconsider the case, after which their decision is final.

146. If an unresolved grievance from the first level is forwarded to the second level, the MEW GRC, will review and address the grievance in consultation with the PMU resettlement officer, project director, AP; representatives of community districts, elders and Mirabs; and representatives of government offices in Kandahar (ASBA Kandahar, MEW, site manager, social officer, environmental officer, complaint officer). The MEW level GRC (second level) will consist of the following persons: (i) project Director or project manager of MEW (GRC chair); (ii) AP or representative of the AP; (iii) representative of the local district commissioner's office; (iv) resettlement/social specialist (national). The functions of the GRC are as follows: (i) provide support to AP on problems arising from land acquisition (temporary or permanent), asset acquisition, and eligibility for entitlements, compensation, and assistance; (ii) record grievances of AP, categorize and prioritize them, and provide solutions within 14 days; and (iii) report to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

147. The PMU social/resettlement officer will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued, and decisions carried out. A hearing will be held by the GRC, if necessary, and the AP will be given an opportunity to present his/her concerns or issues. The process will promote conflict resolution through mediation. The GRC shall convene as necessary when there are grievances to address and it will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 14 days. The following table summarizes the envisaged GRP.

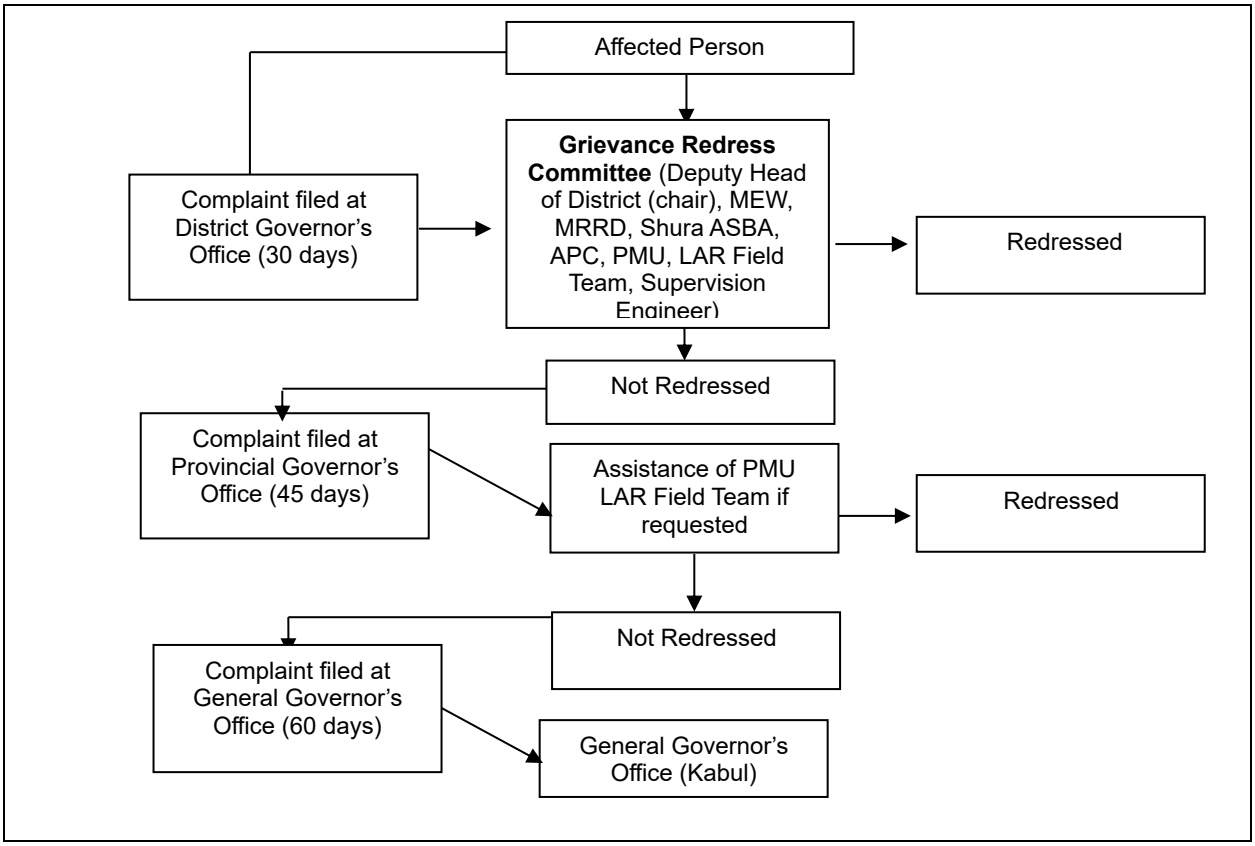
Table 13. Grievance Resolution Process

Steps	Process
Step 1	The complaint is informally reviewed by the PMU focal point at the project level, which takes all necessary measures to resolve the dispute amicably.
Step 2	• If the grievance is not solved at the previous step, the aggrieved party will be assisted to formally lodge their grievances with the project GRC (level 1). The aggrieved person will lodge the complaint if there is failure of the informal negotiation process and produce documents supporting his/her claim. • The GRC member secretary will review the complaint and prepare a Case File for a GRC hearing and resolution. A formal hearing will be held with the GRC on a date fixed by the GRC member secretary in consultation with the conveyor and the aggrieved person. • On the date of the hearing, the aggrieved person will appear before the GRC at the district office and produce evidence in support of his/her claim. The member secretary will note down the statements of the complainant and document all procedures. • The decisions will be issued by the conveyor and signed by other members of the GRC. The case record will be communicated to the complainant by the LAR Team. The grievance redress at this stage shall be completed within 14 days
Step 3	If the aggrieved person is dissatisfied with the GRC decision at the project level, the next option will be to lodge their grievances with the GRC at the MEW level within two weeks after receiving the decision from the project level GRC. The complainants must produce documents supporting his/her claim. The MEW GRC will review the GRC hearing records and convey its decisions to the aggrieved person within 14 days of receiving the complaint.
Step 4	If the MEW GRC decision fails to satisfy the aggrieved person/s, they can pursue further action by submitting their case to the appropriate court of law (local courts) without reprisal. The aggrieved person can take legal action over the amount of compensation or any other issues, e.g. occupation of their land by the contractor without their consent, damage or loss of their property, restrictions on the use of land/assets, environmental concerns such as dust caused by the contractor's machinery, etc.

148. In addition, the complainant can appeal a GRM decision and bring the case to the ADB Accountability Mechanism. The project level GRM does not in any way impede the access of the complainants to the ADB Accountability Mechanism (AM)[17] or the country's judicial or administrative remedies. Should the complainant wish to register a complaint with the ADB AM, the focal person should provide the complainants the ADB AM contact information. The Grievance Redress Process is shown in Figure 8.

[17] Asian Development Bank. 2019. *Accountability Mechanism,* Manila. www.adb.org/site/accountability-mechanism/main

Figure 8. Grievance Redress Process



Source: TRTA Consultants, 2019

VIII. INSTITUTIONAL ARRANGEMENTS

A. General

149. This section deals with roles and responsibilities of various institutions for the successful implementation of the LARP. The primary institutions to be involved in the process are as follows:

(i) Ministry of Finance (MOF);
(ii) Provincial Governor's Office;
(iii) District Governor's Office;
(iv) MUDL/ARAZI;
(v) Ministry of Energy and Water (MEW);
(vi) Ministry of Rehabilitation and Rural Reconstruction (MRRD);
(vii) Project Management Unit (PMU);
(viii) Due Diligence Team (DDT) at PMU Level;
(ix) Construction Supervision Consultant (CSC);
(x) Grievance Redress Committee (GRC).

150. The Ministry of Finance (MOF) will be the Executing Agency (EA). MOF has the overall responsibility of design, land acquisition and resettlement, construction, construction monitoring and supervision of the Project. This also includes financing and executing land acquisition and resettlement tasks and cross-agency coordination.

151. The Governor's office assigns verification and valuation committees as per the IAs requests. The Governor's office approves the verified ownership package and the valuation report in the weekly administrative meeting prior sending them to the central MUDL for final approval prior submission to the cabinet. In both cases of land for land and/or cash for land, the cabinet is the ultimate approver of both the land prices and LAR budget and allocation of public and government lands for resettlement of the APs.

152. MUDL/ARAZI has the role in the settlement process to identify eligible owners as per the eligibility criteria in the land acquisition law. Provincial and district governors' offices do the valuation of the affected assets.

153. MEW will be the IA of sub-component 2a. and MRRD will be the IA of sub-component 2b. Both agencies will establish their respective Project Management Unit (PMU) which will be responsible for the general management of the planning and implementation of all project-related activities, including social safeguards tasks.

154. MEW has the overall responsibility for preparation, implementation and financing of all LAR tasks and cross-agency coordination. MEW, on behalf of MRRD, will implement and complete the resettlement of affected people for sub-component 2b. The regional MEW offices will assist the activities by facilitating communication between the offices, the local governments and the APs, and assist in implementing LAR tasks related to the local administration.

155. MEW is responsible for LAR planning, implementation and financing of all project components. For the dam raising component of Output 1, special and focused arrangements are required to be in place physically covering the entire reservoir area. All project activities and resources in the initial 12 to 24 months of project implementation will be solely dedicated and directed to resettlement of residents of the reservoir, which is conditional to initiating the civil works.

156. Overall responsibility for project safeguard activities, including resettlement, lies with the MEW/PMU Head/ designated Chief Safeguards Compliance Officer and the Social and

Environment Safeguard Unit (SESU) Coordinator, both of whom will be based at the PMU in Kabul.

B. Main Institutions and Responsibilities

1. MEW Project Management Unit

157. PMU will be established for the implementation of the Project. The PMU is headed by a Director. It has separate teams to oversee different aspects of the Project and liaise with stakeholders. These teams will oversee technical and engineering functions under each contract, legal matters, due diligence on new projects, safeguards, finance and administration, evaluation, monitoring and reporting, and results measurement and capacity development (training, policy advisory, management information systems and procedures).

158. The functions of the PMU in regard to resettlement management are:

(i) Overall planning, implementation and monitoring of resettlement and rehabilitation (R&R activities) in the Project;
(ii) Ensure availability of budget resettlement activities;
(iii) Liaison with line agencies related to the implementation of the LARP;
(iv) Coordinate with line departments and Construction Supervision Consultant (CSC),
(v) Provide training and mentoring on LAR matters.

2. Due Diligence Team

159. The DDT will be formulated as part of the PMU. The DDT will work closely with other staff of the PMU and will be specifically looking after the safeguards issues. The DDT will assist the PMU in getting all the necessary clearances and implementation of the resettlement activities prior to start of any civil works. The DDT will be supported by an International Resettlement Specialist (IRS) and one National Resettlement Specialist (NRS). Both the international and national resettlement specialists will work closely with the PMU.

3. Resettlement Specialist (International)

160. The candidate to be selected as international resettlement specialist is desired to have similar prior experience in resettlement and social development planning and implementation and LAR capacity building. The IRS will be assisted by PMU staff, and the implementing NGO, for planning and implementation of resettlement activities in the project.

4. Construction Supervision Consultant

161. The CSC will closely work with the PMU to support in monitoring, supervision and coordination of all activities related to resettlement implementation. The CSC will deploy sufficient local and international expertise on resettlement. The CSC will:

(i) Supervise the project implementation;
(ii) Ensure that project-specific social mitigating measures are incorporated into the contract documents;
(iii) Work in close coordination with the PMU and the engineering team;
(iv) Verify implementation and assess impacts of the LARP through the conduct of necessary surveys and investigations.

5. Other Organizations and Agencies

162. **Civil Works Contractors**. Civil work contracts will be awarded after the final LARPs acceptance by ADB and disclosure. The Civil Works Contractors to be appointed by MEW/MRRD to undertake the construction will be responsible for mitigating impacts resulting from the construction activities. Based on the LARPs and the technical design, the construction activities shall be monitored closely to ensure compliance with the temporary mitigating measures in case of unforeseen adverse impact on private land and other assets.

163. **ADB**. Besides supervising the Project periodically, ADB will review the External and Internal Monitors' compliance reports and provide clearance for the award of contracts and the signing and initiation of civil works.

164. **Monitoring Agency**. MEW will appoint an independent EMA for external monitoring. In case of involuntary land acquisition, External monitoring covers all aspects of LARP implementation, starting from legalization and finishing with payment of all compensation and rehabilitation allowances before starting civil works. The external monitoring will be executed by the hired company or person.

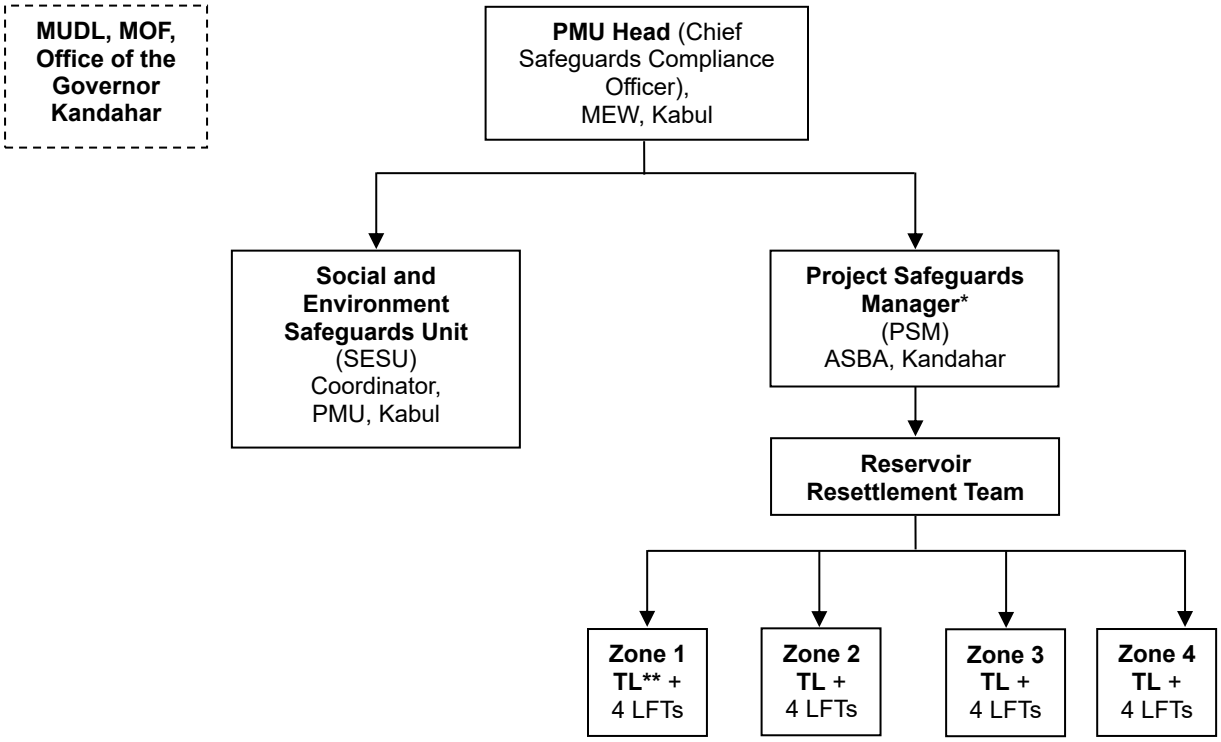
C. Organizational Arrangement

165. The Dahla Dam area will be divided into four zones to expedite the resettlement process. A Reservoir Resettlement Team will be stationed at ASBA in Kandahar, headed by a Project Safeguards Manager (PSM).[18] The Reservoir Resettlement Team will comprise of four zonal team leaders. Each zonal team leader will manage four LFTs, comprising of three social analysts (2 male, 1 female preferably).

166. The SESU Coordinator will support the PMU Head and the LFTs in the respective project area with their work through liaising with relevant officials of MUDL, MOF and the Office of the Governor of Kandahar.

[18] The PMU Project Safeguards Manager stationed at ASBA in Kandahar will be responsible for field level safeguards across all project outputs.

Figure 9. Organizational Arrangement for LAR Safeguards



* The PSM will be responsible for all 4 project components and could have other teams under them, the Reservoir Resettlement Team will be established under the PSM specifically for Output 1

** All four zonal Team Leaders will coordinate, manage, document and consolidate field consultations of each of their four LAR Field Teams (LFTs)

IX. COMMUNITIES LARP PREPARATION AND IMPLEMENTATION

A. Overview

167. LAR activity, surveys and assessments will be focused around individual villages/ communities in the Dahla Dam inundation area. There could be one LARP prepared for each affected village/community, or a few LARPs prepared for a cluster of villages/communities which prefer to be relocated together. LARPs preparation, approval and implementation will be an integral part of the initiation of project implementation.

168. **Land Acquisition and Resettlement Field Teams (LFTs)**, mobilized by ASBA/MEW will mentor physically and economically APs, to register themselves and their families in Socioeconomic and Census Surveys of AHs as the first step in formulating the LARPs.

169. The consultations with affected villages population will be conducted at the beginning of the LAR processes and continue throughout the Project and LARP preparation and implementation phases. The villagers will be fully informed about the LAR preparation, approval and implementation stages procedure, the DMS, socioeconomic study, and relocation options which will be based and developed on APs' preferences voiced during the consultations at the community Elders' level and face-to-face consultations with AHs the head/representative of the AHs.

170. To ensure that people are fully and meaningfully informed, MEW may consider individual or in small groups consultations with the AHs which may be held in Kandahar and in Kabul MEW will explore and use all culturally appropriate methods to inform communities. These may include the Project-related TV interview with MEW representatives, articles in the local newspapers, community information boards, meetings with the community Elders, and any other method appropriate for the local context which will ensure that all segments of the communities, including illiterate and vulnerable groups, are informed.

171. The methods of information sharing with affected village's populations will be agreed with village elders. The affected population will need to agree with relocation options and the records of their agreement will be included in the LARPs. The consultations with affected communities is a continuous process. However, to establish the compensation, relocation site options and livelihood rehabilitation preferences in consultations with communities, may take 12 or 18 months.

172. The valuation procedure and the compensation amount will be disclosed to the APs prior to the signed agreement for relocation. The full amount calculated as compensation including applicable allowances, must be paid before the acquisition of land and relocation.

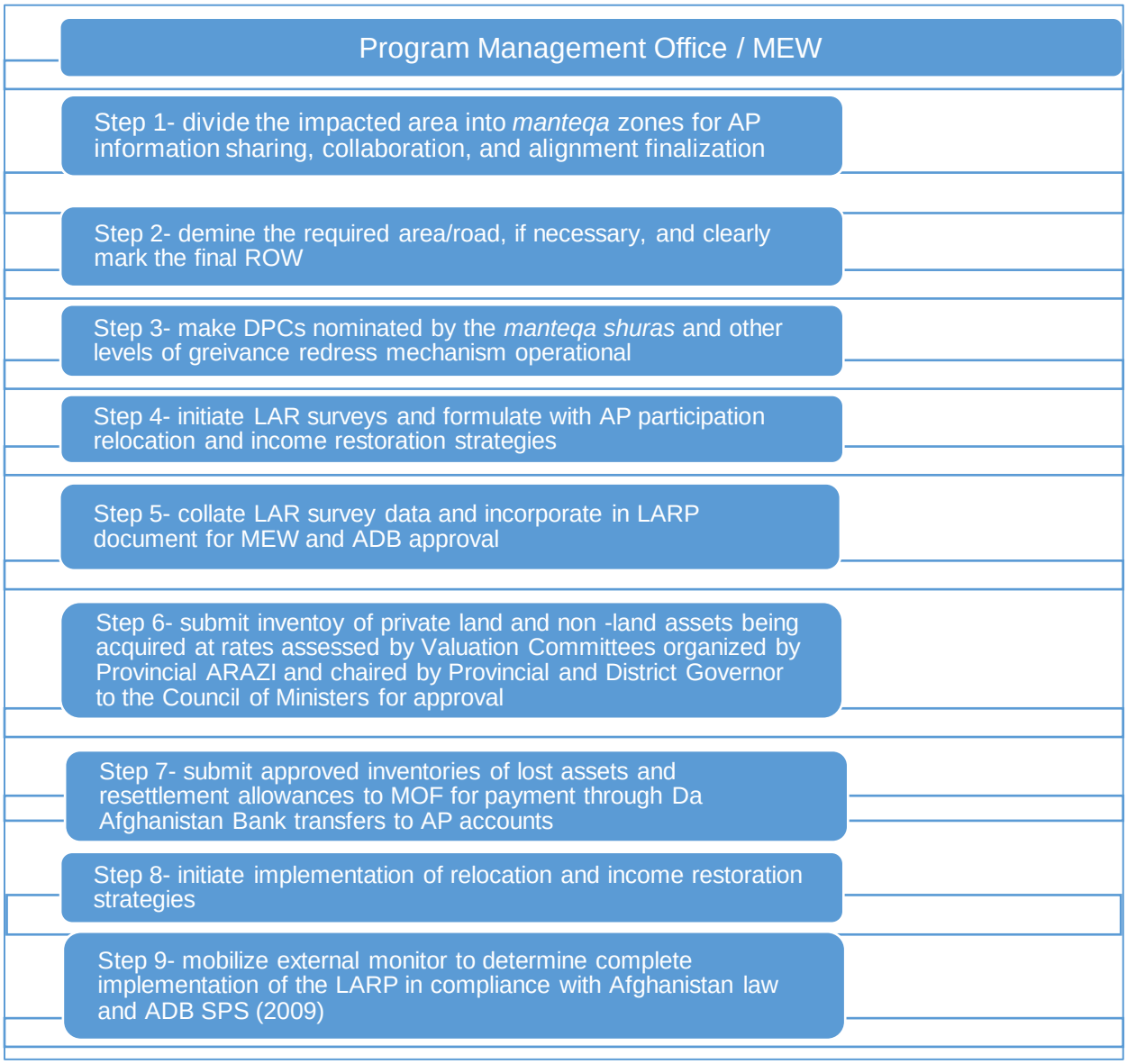
173. The LARP preparation and implementation will not only pertain to impact and compensation of impact, but equally to restoration of AH's livelihoods. The LFT, comprising of two male social analysts and preferably one female social analyst supported by appropriate consultation arrangements, will carry out assessments for compensation, develop an impacted asset list and establish the value of the impacted assets, as well as brief AHs on the options available for restoration beyond cash. This work will be done in the first 18 to 24 months of project implementation to ensure safe relocation and resettlement of the AHs and timely initiation of civil works. Compensation eligibility and restoration planning of the dam raising component (Project Output 1) are shown below.

Table 14. Compensation Eligibility and Restoration Planning

Tasks	Target Groups	Methods and Approaches	Goal	Anticipated Duration
Establishment of the cut-off-date	All project communities and APs.	1. Letter or Decree as per the Government procedure; 2. Dissemination of Information about the cut-off-date and eligibility for compensation;	1. Inform the Project communities and APs about the cut-off-date and eligibility to compensation for all residing in the Project area before the cut-off-date. 2. Protect the Project area from encroachers and new settlers in anticipation for compensation.	1 month, within the first 12 months
Continuous consultations with stakeholders	1. Government Departments related to the Project; 2. Villages Elders; 3. People directly affected by the Project.	1. Meetings; 2. Workshops where applicable; 3. Meetings with the heads of AHs in Kandahar or Kabul (individually or smaller groups);	1. Inform APs/ communities about the Project stages; 2. Ensure timely cooperation of the relevant regional and government Departments; 3. Discuss communities' preferences for compensation and relocation; 4. Discuss with APs the extent and nature of the Project effect on their land and other assets and their preferences for compensation, relocation and livelihood restoration.	Throughout the Project preparation and implementation stages
Communities mapping;	Clusters of communities which prefer to be relocated together.		1. Determine groups of communities to be relocated together; 2. Make action plans for number of LARPs to be prepared; 3. Prepare a tentative LARP implementations schedule;	4 months, as early as possible
LARPs preparation and disclosure	APs and displaced communities	1. SES and Census studies' 2. DMS based on the satellite imagery and verified during individual consultations with APs and/or by the field team. 3. Valuation of affected land and	1. Ensure that APs are fully informed; 2. Ensure APs' agreements with relocation options and livelihood restoration are included in the LARP; 3. Ensure that all affected assets are correctly calculated and	Continuous process until the last LARP is prepared and disclosed

Tasks	Target Groups	Methods and Approaches	Goal	Anticipated Duration
		assets or negotiation of the resettlement packages; 4. Preparation of the LARP; 5. Approval of the LARP by IA/EA and ADB; Disclosure of the LARP at MEW and ADB websites.	included for compensation; 4. Ensure that a grievance redress mechanism is established and available to the APs; 5. Ensure that a proper monitoring is in place;	
Relocation and resettlement planning	AHs/communities	Payment and/or replacement allotment and relocation	1. Payment of compensation and relocating of communities	18-24 months throughout the project duration

Figure 10. Steps for Post-final Design LARP Preparation and Implementation



174. In the LARP development stage, the LFT will be responsible for assessing impact, enabling compensation, and soliciting relocation preferences and livelihood restoration (based on current skills and livelihoods) of AHs. LFTs will hold consultations and spend three days with each AH cluster, which will constitute of 3 AHs each.

175. LARP preparation and implementation, by the LFTs will be overseen by the construction supervision / management consultants who will be adequately resourced to guide consultation and resettlement tasks. The table below outlines the necessary steps during the LARP preparation and implementation.

176. A critical early process will determine the scope of the reservoir resettlement by identifying the affected households via census and determining the assets that will be eligible for compensation. The following are early next steps in the process of establishing a cut-off date and conducting a detailed measurement survey of affected assets:

Table 14a. Early steps in establishment of cut-off-date (conclusion of DMS)

	Active Stakeholders	Tasks involved
Preliminaries	MEW, Govt. all project communities and APs.	1. Letter or Decree as per the Government procedure; 2. Dissemination of Information about the cut-off-date and eligibility for compensation;
Consultations	Government Departments related to the Project; Villages Elders; People directly affected by the Project. PMC	1. Meetings; 2. Workshops where applicable; 3. Meetings with the heads of AHs in Kandahar or Kabul (individually or smaller groups);
Conduct DMS	MEW PMO LFT APs PMC	Physical surveys (if possible) Analysis of imagery Analysis of interview/meeting/survey results Synthesis of data to determine final DMS

177. Together with determining scope of resettlement, cut-off date and detailed measurement survey, the identification of viable and acceptable relocation options is of paramount importance in the LARP development process. The agreement on relocation sites will drive the appropriate selection of livelihood restoration programs. Ownership of the process by APs is essential, and the agreement must be reached through detailed and iterative consultations with communities. The following table outlines the critical milestones in the development and implementation of LARPs for reservoir affected communities.

Table 14b: Milestones in Resettlement Implementation.

Milestone	Comments
1. Census and interviews of APs conducted	This will determine the numbers of APs to be included in the LARPs
2. DMS completed and cut-off date reached	Cut-off date should coincide with completion of DMS
3. Relocation options identified	These options should be identified and analyzed as early as possible. The presentation of options to communities, consultation with communities and agreement on relocation sites shall begin at this stage.
4. Relocation options consulted and agreed	Draft LARP could be expected at this point. It is expected that this will not be less than 2 years after project commencement.
5. Livelihood restoration measures agreed	Final LARP to ne approved and disclosed at this point.
6. Compensation and allowances paid	
7. APs relocated	**Award of spillway raising contract is linked to this milestone.**
8. Livelihood restoration measures under implementation	

Table 15. LARP Process

Task	Responsibility	Timeframe	Comments
Project Approval/Grant Effectiveness	ADB/ GoirA	30 August 2019 / 1 October 2019	ADB Board meeting and grant effectiveness
PMO/MEW Social and Environmental Safeguards Unit takes responsibility for project implementation according to ADB SPS 2009 and Afghanistan Law	MEW/ADB	15 September 2019	Head PMO at MEW in Kabul will be designated Chief Compliance Officer for the project. The Social and Environmental Safeguards Unit (SESU) at the PMO will be functional through a qualified SESU Coordinator assisted by 1 resettlement and 1 environmental officer.
Establishment of Project Safeguards Manager's Office (PSMO) @ ASBA/Kandahar	MEW PMO/ ASBA	15 October 2019	A Project Safeguards Manager (PSM) reporting to Director ASBA will be responsible for implementing the compensation, relocation and livelihood/income restoration activities in the area impacted by the raising of the dam. The PSM will be a senior national resettlement specialist, central to the implementation strategy and resettlement and livelihood restoration outcomes. The PSM will be supported by a full-time national and the intermittent input of an international resettlement specialist.
Mobilization of Reservoir Resettlement Team (RRT) / Project Implementation Consultants (PIC)	PMU/ ASBA	15 November 2019	The Reservoir Resettlement Team (RRT) will report to the PSM, and comprise of 4 zonal team leaders and their respective LAR Field Teams (LFTs). The 4 zonal team leaders will have social science backgrounds. The RRT will be further supported within the framework of a Scout LFT (a specialized unit for identifying feasible relocation sites and enhancing restoration of livelihoods) staffed by specialists in agricultural engineering, horticulture, livelihood development, livestock and animal husbandry resourced through the Project Implementation Consultants (PIC).
Mobilization of LFT in 4 impacted zones	PSMO	15 December 2019	The LFTs will be the main interface with the impacted communities. In order to keep the confidence and retain trust of the APs, the same LFTs will mentor and facilitate the APs, both while ensuring their compensation and during relocation. Based on a training needs assessment, the LFTs will receive training on various aspects of resettlement, relocation and livelihood restoration processes, and on consultation methods, namely key informant interviews, focus group discussions, and rapid participatory assessments. The PSM and 4 zonal team leaders will mobilize their respective LFTs with special consideration for safety and security, provided under the main civil works contract. Culturally appropriate approaches supporting the effectiveness of female members of the team will be determined by the PSM in consultation with the zonal team leaders and the LFTs.

Task	Responsibility	Timeframe	Comments
Mobilization of Scout LFT for the preliminary identification of feasible relocation sites in the vicinity of the reservoir and evaluation of alternative sites.	ASBA / PSMO / MUDL (ARAZI)	15 December 2019	The Scout LFT comprising of relevant specialists, and field staff of MUDL/ARAZI on deputation to the Project, will identify tracts of arable **state land** and sources of irrigation that can be developed and consolidated into packages of irrigated and rainfed land and pasture.
Reservoir Resettlement Team does groundwork for LARPs for village estates/communities and presents compensation and relocation options to Village Clusters.	PSMO	15 October 2020	LFTs will prepare draft LARPs and submit these to the PSMO where the plans will be verified for adequate consultation with all stakeholders and amended for authenticity, if necessary, by national resettlement specialists. Zonal LFTs will lead the community consultations to agree on relocation sites and on various options for allotments to communities. Communities will be consulted to ascertain their relocation choices: (i) cash in lieu of other assets; (ii) land in lieu of land; (iii) combination of cash and land in lieu of assets; (iv) residential land in the city and agricultural land as a rural foothold; and (v) hybrid combinations that may be proposed by communities and developed during consultations. Where land in lieu of land will be the case, one village may consist of more than one community for relocation and likewise, more than one village may combine as a community for relocation. Similarly, the restoration of lost agriculture can be based on allotting the same quantities and types of land as lost or where the relocation site has less land than the land lost, proportionatly for each category of land on the basis of the size of the lost irrigated land. This will be done in coordination with the Scout LFT, district and provincial governor's offices and the local MUDL/ARAZI.
Draw up a compensation-for- lost -assets- and -relocation docket for each AP/AH, confirmed but subject to Land acquisition proceedings	LFTs	15 October 2020	Respective zonal LFTs in close coordination with APs and APs Committees (APC) will determine the extent of lost assets through a detailed measurement survey of land being acquired, and of non-land assets such as building structures being demolished, or trees and crops being cut. Eligibility for receiving allowances according to the LARF for relocation, transition, loss of business, severity of agricultural loss, transition and vulnerability will also be determined by the zonal LFT in close coordination of the APs. While possession of non- land assets is normally a sufficient indicator of eligibility, ownership of land assets may pose challenges in certain cases. Afghanistan land law recognizes village community through the neighbors of the land and the elders' council (jirgah) to verify ownership.
Project Safeguards Manager (PSM) prepares and finalizes LARP for each village estate/community group	PSMO	15 June 2021	LARPs for each village estate / community will be finalized by the PSM, with the support of its national and international resettlement specialists.

Task	Responsibility	Timeframe	Comments
Approval of LARP by PMO/MEW, ADB and MUDL and disclosure	PMU/ ADB/ MUDL	15 September 2021	Once PSM finalizes LARPs for each village estate / community, the LARPs will be approved by PMO and ADB and MUDL. Disclosure of approved LARPs in English and Dari/Pashto translations will be in accordance with the procedures outlined in the LARF.
Preparation of relocation sites (Civil Works Contractor)	PSMO/ PIC	15 November 2020	Following a due diligence report confirming that there are no informal users of state owned land, the Scout LFTs will work closely with the Civil Works Contractor to ensure timely and adequate preparation of relocation sites, which will comprise of preliminary land leveling / retainer walls and field formation.
Payment of Compensation and/or relocation land rights	MEW/ MOF/ MUDL/ ADB, 15 March 2021	15 February 2022 *(MOF typically suspends payments between October – February)	Compensation is in practice defined for losses of land, infrastructure and other tangible non-land assets. This compensation for land may be made through replacement land which will require the provision of ownership documentation for the replacement land in the name of the eligible person. With regards to tangible non-land assets, compensation is only payable in cash. The total sum of payments for tangible non-land assets is based on the quantity and type of loss, determined through detailed measurement surveys and are paid in cash. Commensurate resettlement allowances will also be paid in cash. The obligation to affected communities according to law ceases once payment is made. Actual relocation and income restoration programs are not a compensation for loss, but an endeavor to maintain and enhance the standard of living of APs. Cash transfers to individual accounts of APs will be made by MOF through Da Afghanistan Bank. Livelihood and rehabilitation programs will not be contingent upon civil works and will continue beyond the reservoir impoundment.
Establishment of reception centers and evacuation to relocation sites	ASBA/ PSMO/ RRT/ APC 15 May 2021	15 February 2022 onwards *(based on compensation and commensurate allowance payments)	RRT will establish reception centers at relocation sites through the provision of temporary accommodation for APs and their livestock under the supervision of zonal LFTs, while the Scout LFTs will provide specialized advisory services on house building, sanitation, animal husbandry, livestock management, farming, irrigation systems and livelihoods. The zonal LFTs will mobilize the community resettling in contiguous land on irrigation, cropping patterns and livelihood development. Basic health care and transitional schooling will be provided to APs. This will signal the initiation of area development activity for which resources will be solicited from district and provincial governors' offices.
Monitoring and Evaluation of Relocated APs	RRT	December 2021	RRT submits regular monitoring reports to Project Safeguards Manager who will forward them to MEW/PMO and ADB

B. Impact Documentation

178. The LFT will carry out the following three activities which will serve as a baseline of impacted assets that AHs will need to be compensated for:

(i) Census of all AHs and APs;
(ii) DMS[19] of all land and non-land impacts;
(iii) A valuation of all affected assets and a LAR budget, and;
(iv) Socio-economic survey (SES) of the AHs based on a 25% statistical sample.

179. While the first three relate to compensation, the fourth provides a baseline of the socioeconomic conditions of AHs against which their socioeconomic wellbeing can be assessed post physical / economic displacement and rehabilitation. To accomplish these tasks, the LAR team will: (i) conduct consultations with APs; (ii) conduct field visits to determine the number and socio-economic status of the APs and to assess the potential land acquisition and resettlement impacts at each site, APs should be interviewed using a standard questionnaire and (iii) assess land and assets market to determine compensation based on a replacement cost .

180. An analysis of the expected numbers of APs and assets that would be affected by the raising of Dahla Dam was conducted based on satellite images, consultations with Affected People and AP representatives during workshops and village visits. Appendix 1 shows the list of identified villages to be reviewed and surveyed during the LARP preparation stage in order to get a comprehensive list of impacts. The APs committee also suggested the inclusion of some additional villages which were known to be outside the area affected by inundation in the list of affected villages to be surveyed, in order to properly assess whether there will be any indirect impacts in these villages. All village estates that are close to the dam will be mobilized by the LFT to take part in their respective participatory LARP preparation and implementation process. These areas were accepted by AP committee members, ASBA, and the Kandahar Governor's office at the consultative workshop on resettlement held in April 2019.

181. Initial best estimates on the anticipated impact by the 13.6m raising of Dahla Dam show that there are approximately 5,800 people who will be directly affected by the inundation. Approximately 83% of irrigated land in the directly affected area will be inundated. In excess of 200 jeribs of orchards, 50,000 fruit trees, and over 14 mosques and cultural areas will be affected by the dam raise. More accurate figures will be available following the LARP preparation and the census survey and detailed measurements survey to be carried out during the LARP development stage. Villages/agricultural units which are close to the area of direct impact and may be indirectly or gradually impacted will need technical field assessment during the DMS.

182. Due to the high risks associated with sending surveyors for field surveys, the DMS may not strictly follow the traditional home-to-home data collection approach. To minimize the field-work associated risks, ensure the process and data transparency as much as feasible, a combination of two or more data sources and methods for data collection and verifications, will be adopted. This is a more flexible approach which will enable lower risk collection of reliable data in different time and different contexts. The DMS approaches to be used during the LARPs preparations are as follows:

(i) The impact information collected by the satellite images during the preparation of the Project LARF, will be further validated during the LARP preparation by procuring of high

[19] DMS and census include: i.) a full inventory/measurement of all land/other items losses including buildings, crops, trees, and income; ii.) an assessment of unit replacement values for each affected item/loss; iii.) identification of each AH/AP by gender, age and ethnic affiliation.

resolution satellite images as close to the cut-off-date as possible in order to triangulate and confirm impact information. The satellite imagery will be used as the main method of data collection for the whole Project Area.

(ii) The satellite imagery impact data will be verified and updated during the face-to-face consultations with an individual AP or small groups of APs gathered in Kandahar or Kabul. Each AP will identify their lands and other affected properties. The list of affected assets will be made and signed by the AP.

(iii) The field team will collect the Project impact data on the ground where access to communities is possible and from the APs who chose not to come to the individual consultations with the Resettlement Specialists in Kandahar or Kabul. The data will be verified by comparison with the satellite imagery related to these APs.

C. Soliciting Relocation Preferences

183. Relocation needs and implications will be assessed through active and extensive community consultations with APs. Relocation will be based on a community demand driven approach. AHs will be consulted to ascertain their compensation choices: (i) cash in lieu of other assets; (ii) land in lieu of land; (iii) combination of cash and land in lieu of assets; (iv) residential land in the city and agricultural land as a rural foothold; and (v) combinations that may be proposed by AHs and developed during consultations.

184. So far there is limited understanding of APs preferences of relocation. However, there is availability of land in the vicinity for agriculture so there is a possibility of developing new village estates of similar topography and habitat as those impacted by the reservoir. Similarly, there is the possibility of the Government allocating land in urban housing colonies to AHs. Previous agreements with affected people during 2013-2014 mentioned the possibility of a township in Kandahar as a possible relocation option.

185. The LFT will consult with AHs and document their requirements and preferences for relocation as stated in the options above, as well as their preference to relocate with present neighbors and kin or independently.

D. Communication and Representation

186. The traditional way of representation in these communities has been the *mantaqa shura* (the council of the village estate); although still widely applicable, other forces relating to issues going beyond the local issues of the area have disturbed the dominant pattern of this consensus. This became evident during the consultative workshops held in the Governor's office with APs where some representatives withheld their names from the attendance list given security concerns related to the broader ongoing conflict in the region.

187. To ensure transparency and accurate reporting, representatives of two other neighboring AHs will need to be present when the LFT gathers information about individual households to determine impact and inventory of lost assets and notes preferences for relocation and restoration. Wherever APs have to compete for or line up for limited project facilities in resettlement sites, the traditional draw system of the Pashtun, the "*pacha*" should be instituted.

E. Civil Works Implementation

188. Civil works will start only after the LARPs relevant to the respective civil works contracts are implemented and all AHs fully compensated, safely relocated and settled in their new locations. Such a condition will be clearly spelled out in the text of the civil works contract. A LARP

implementation compliance report will be prepared by the external monitoring and evaluation agency (EMA) prior to initiation of civil works. For communities subject to reservoir inundation, reservoir impoundment shall not commence until all AHs are fully compensated, safely relocated and settled in their new locations, with livelihood restoration measures established.

X. BUDGET AND FINANCING

189. The total estimated cost of resettlement for Output 1 is AF 1,445,930,287 ($19,274,872): AF 1,414,131,487 ($18,855,086) for sub-component 1a and AF 31,798,800 ($419,786) for sub-component 2b.

A. Sub-component 1a. Main Dam and Six Saddle Dams Raised

190. All LARP preparation and implementation costs, including the cost of compensation and resettlement administration, project internal and external monitoring, and contingencies will be part of the overall project budget. The Ministry of Energy and Water is responsible for securing the project-related funding. Cost for land compensation will be borne by MEW/the Government. Project implementation costs will be covered by the grant as will costs for the compensation of non-land assets and payment of commensurate resettlement, vulnerability and relocation allowances.

191. Land compensation value will be provided as per law by MUDL through the Provincial Valuation Committee. Acquired land, other affected assets and applicable allowances will be paid as per ADB SPS (2009) and the Project-specific Entitlement Matrix to be approved by the IA.

192. The full LARPs will contain information about the budget, including:

(i) Unit compensation rates for all affected items and allowances by indicating methodologies.
(ii) A cost table for all compensation expenses;
(iii) LARP implementation costs;
(iv) Resettlement assistance to severely AH, vulnerable families and assistance for relocation/shifting; and
(v) LARP budget with administrative cost and contingencies.

193. Given the extreme safety circumstances and the large extent of impact where many villages are going to be relocated, it is impossible to give the exact budget at this time. The next steps may have one or many LARPs. People's resettlement preferences need to be taken into account, including what possible relocation options are, and what are the needs to rebuild livelihoods. The local authorities and the Kabul government need to first agree before finalizing budget figures.

194. An estimated budget based on initial analysis of potential impacts is listed in the table below.

Table 16. Illustrative Budget Figures

Cost		Amount (AF)
Structures		67,218,000
Crop losses		19,396,000
Tree losses		971,519,000
Business losses		5,356,530
Special allowances (transitional or relocation allowance, HHs below poverty line, women headed HHs)		61,815,660
External Monitoring		6,000,000
	Sub-total	1,131,305,190
Contingency (25%)		282,826,297
	Total (AF)	**1,414,131,487**
	Total ($)	**18,855,086**

B. Sub-component 1b. Road realignment

195. The resettlement cost estimate for this Project includes eligible compensation based on the census survey. The unit cost for land and other assets in this budget has been derived through rapid field appraisal, consultation with affected families, relevant local authorities and reference from old practices. Contingency provisions have been made to take into account variations from this estimate. The Government will bear the cost of land, and ADB will provide funding for resettlement assistance. Some of the features of this cost estimate are outlined below.

1. Compensation Valuation

196. **Land valuation** has been done based on TRTA consultation meetings with the APs. For land compensation only legally owned land holders AHs with (i) titles, (ii) official deeds, (iii) unofficial written deeds, or (iv) declaration from Shura, Jirgas or elders of the village estate *(manteqa)* were considered. In Afghanistan, there are no open markets for sale or purchase of land. Generally, very negligible land registration takes place officially in respect of sale/purchase of land. Moreover, there are no established official rates for various types of lands. As such, determining the optimum rate payable to the AH losing lands will be an important task. The location and type of land will influence the actual price per square meter. As per the site survey, the nearer the land to a build-up area (e.g. village proper), the higher the valuation and perception of the AH. The costs of land, if no replacement land is found, will be borne by the Government.

Table 17. Land Classification

Type of Land / Classification of Land	Location
(i) Agricultural Land Irrigated Land	Luwal Arab and Shahjuy villages
(ii) Garden Land	Shajuy village

197. **Tree** compensation for fruit trees is calculated for each main tree type at annual average production multiplied with value/kg at market prices and number of years needed to re-grow the tree to the same productive level. Preliminary assessment shows that all AHs losing trees have sufficient remaining land to replant trees. The calculations are given in Table 18.

Table 18. Calculation by Type of Fruit Trees

Tree	Average Annual Yield (kg)	Market price (AF/kg)	Years to regrow to productive level	Rate per tree (AF)
Pomegranate	40	46	5	9200
Apricot	90	20	5	9000
Berry	65	30	6	9750

198. Based on these calculations it was found that the rates of fruit trees vary from AF 9,000 to AF 9,750. A uniform rate of AF 9,500 was considered for all fruit trees in consultation with the APs. In the affected area only pomegranate trees will be lost. Most of the pomegranate trees in this area are fruitful and are between four and seven years age, with the average age counted to be five years.

2. Income Restoration / Other Allowances

199. The realignment of the Route Bearer Highway will not require the preparation of a relocation plan. The project's resettlement strategy is to provide compensation for all lost assets at replacement cost in order that APs incomes and livelihoods are not adversely affected and where possible improved. All APs whose livelihoods are affected will be supported for income losses and those whose livelihoods are affected adversely provide them with livelihood restoration

measures (including allowances and interventions for severely affected, poor and vulnerable APs).

(i) **Income Restoration Allowance for Business Losses**. compensation for permanent business losses will be in cash for the period deemed necessary to re-establish the business (6 months). Business losers will receive AF 10,000 a month based on the average monthly business income of shops that are more or less similar and obtained during the LARP census survey. The sum of this allowance will be adjusted if necessary in light of information collected and if payments are delayed beyond a year. No business losses are anticipated due to the road realignment.

(ii) **Vulnerable Group Allowance**. Vulnerable people (APs below the poverty line, women headed households, disabled person headed households, etc.) will be given assistance in the form of a one-time allowance for vulnerability. Vulnerable AHs will be entitled to receive AF 45,000 and receive priority in employment in project-related jobs.

(iii) **Transitional Allowance**. AH, renters, or sharecroppers forced to relocate will receive a transitional allowance for livelihood losses for three months at AF 7,500 per month.

(iv) **Relocation Allowance**. AH forced to relocate will receive a relocation allowance for transportation of AF 7,500.

(v) **Severe Agricultural Land Impacts**. When greater than 10% of an AP's agricultural land is affected, the AP will get an additional allowance for severe impacts equal to the market value of a year's net income crop yield of the land lost.

200. A 10% contingency has been added and costs for an external monitoring agency. Costs will be updated during implementation based on consultations and feedback received.

Table 19. Resettlement Budget Road Realignment

Purpose		**Amount (AF)**
Structure		0
Crops		323,000
Tree (productive, pomegranate)		23,180,000
Temporary Business loss		0
Permanent Business loss		0
Women Headed Households		0
Transitional Allowance		135,000
Relocation Allowance		0
Household below poverty line		270,000
External Monitoring		5,000,000
	Sub-total	**28,908,000**
Contingency (10%)		**2,890,800**
	Total in AF	**31,798,800**
	Total in USD	**419,786.60**

Source: TRTA resettlement survey, April 2019

XI. MONITORING AND REPORTING

201. LAR tasks under the Project will be monitored internally. External monitoring will be assigned to a Social Safeguard Consultant (SSC), a qualified individual or an agency, to be hired by MEW and approved by ADB.

A. Internal Monitoring

202. Internal monitoring will be carried out routinely with the support of a consultant and assisted by the local authorities. The results will be communicated by MEW/PMU to ADB through the quarterly project implementation reports. Indicators for the internal monitoring are related to processes and immediate outputs and results. The monthly reports will be consolidated quarterly in the standard supervision reports to ADB. Specific monitoring benchmarks (where applicable) will include:

(i) Timeliness, adequacy of the information campaign, and quality of information and consultations with APs;
(ii) Status of land acquisition and payments of land compensation;
(iii) Compensation for affected structures and other assets;
(iv) Payments for losses (if adverse impacts occur during the project implementation);
(v) Income/livelihood restoration activities (if affected); and
(vi) Results of income restoration activities, where necessary.

B. External Monitoring

203. ADB SPS (2009), requires monitoring activities to correspond with the Project's risks and impact. The Project is classified as category 'A' for involuntary resettlement. Therefore, external monitoring will be carried out by an External Monitoring Agency (EMA) for the Project activities. The monitoring results will be included in the PMU monthly reports and in the semi-annual reports for the project. In addition, the PMU will monitor and measure the progress of implementation of the project. If unanticipated involuntary resettlement impacts are found during the project implementation, the PMU will follow ADB SPS (2009) requirements for monitoring and reporting of the implementation of safeguards plans; ensure compliance with safeguards measures; document and disclose monitoring results; and identify necessary corrective and preventive actions if needed.

APPENDIXES

Appendix 1.
List of Villages Affected as per TRTA Impacts Survey, April 2019

1. Output 1 LAR Impact Assessment have been conducted in April 2019 by a few groups of professional surveyors including engineering team, resettlement team, social team, local coordinators and APs representatives.

2. Surveyors have conducted site visits for all villages to identify type of impact, type of land, and other LAR impacts. During the survey, consultation meetings have been conducted individually with all village elders about their Agriculture Land, Residential Land, Orchards Lands and Pasture. The satellite imagery has been used for Land measurements with consideration on the slope of lands.

3. It was discussed with APs that field measurement will be conducted during detail measurement survey (DMS) by resettlement team and government officials.

4. APs Committee members mentioned that in the previous assessment by Afghan Government and APs Representatives it was identified that there will be the following three types of impacts due to Dahla Dam Raise:

(i) Direct impacts: those lands, villages and orchards which will be fully inundated;
(ii) Indirect Impacts: those lands, villages and orchards which will not be fully submerged but will be partially affected. Indirect impact properties may also face impacts such as damage of water resources (Kariz, water wells), land erosion, loss of land productivity, etc.
(iii) Gradual impacts: APs have previous experience from existing Dahla Dam, when it was constructed, after several years their water resources disappeared, and their agriculture lands were destroyed and washed out by sedimentation and flooding. These villages are not going to be inundated.

Direct impacts

5. Based on current LAR impact assessment the following 26 villages and agriculture units will be directly impacted.

No	Name of village	Location
1	Karmullah	Shah Joe Valley
2	Khakata Arab	Shah Joe Valley
3	Khakata Shah Joe	Shah Joe Valley
4	Hajani Kalay	Shah Joe Valley
5	Haji Asif Kalay	Shah Joe Valley
6	Tahseldar Kareez	Shah Joe Valley
7	Gulana Kareez	Shah Joe Valley
8	Tamba Kareez	Wayan Valley
9	Batta Zaarah	Wayan Valley
10	Loye Khawaja Zai Kareez	Wayan Valley
11	Kochnai Khowaja Zai	Wayan Valley
12	Lowara Laghar Joe	Wayan Valley
13	Kshata Laghar Joe	Wayan Valley

No	Name of village	Location
14	Kala	Wayan Valley
15	Tambah Cheeni	Wayan Valley
16	Payawo	Arghandab River Valley
17	Siasang	Arghandab River Valley
18	Alam Ghah	Arghandab River Valley
19	Bayena	Arghandab River Valley
20	Sher Jan Kalay	Arghandab River Valley
21	Ghasheen	Arghandab River Valley
22	Ghulam Walah	Arghandab River Valley
23	Shah Zameena Rood	Arghandab River Valley
24	Khair Parah	Arghandab River Valley
25	Lowarah Andarlah	Arghandab River Valley
26	Abdulqadoos Walah or Mayaqool	Arghandab River Valley

Indirect impacts

6. Based on current LAR impact assessment the following nine villages and agriculture units will be indirectly impacted.

No	Name of village	Location	Extent of impact
1	Lowara Shah Joe	Shah Joe Valley	Significant (30% of Agri & pasture land)
2	Shaho Khel	Shah Joe Valley	Partial (10% of pasture land)
3	Lowaar Arab	Shah Joe Valley	Partial (15% of Agriculture land & Pasture)
4	Kshata Shadah	Wayan Valley	Significant (30% of Agri & Houses land)
5	Gogai	Wayan Valley	Significant (50% of Agri, Orchard & Houses land)
6	Mazdooraka	Wayan Valley	Significant (50% of Agri, Orchard & Houses land)
7	Tarmo Choey	Arghandab River Valley	Partial (20% of Agri & Houses land)
8	Najmuddin Kalay	Arghandab River Valley	Partial (20% of Agri & Orchard land)
9	Garmawoo Kareez	Arghandab River Valley	Significant (50% of Agri, Orchard & Houses land)

Gradual impacts

7. These villages are not going to be inundated. Based on current LAR impact assessment following 29 villages and agriculture units will be gradually impacted.

No	Name of village	Location
1	Landi, Mian Horaw	Shah Joe Valley
2	Hindo Joe	Shah Joe Valley
3	Shah Zameena Kareez	Wayan Valley
4	Abdulhanan Kalay	Wayan Valley
5	Lowara Shadah	Wayan Valley
6	Lowar Barlass	Wayan Valley

No	Name of village	Location
7	Amir Mohammad KAreez	Wayan Valley
8	Khakata Alizai	Wayan Valley
9	Sultan Kalay	Wayan Valley
10	Lowar Alizai	Wayan Valley
11	Zhar Jarr	Wayan Valley
12	Khernai	Wayan Valley
13	Chaman	Wayan Valley
14	Dewal Joe	Wayan Valley
15	Yar Daad	Wayan Valley
16	Kshata Barlass	Wayan Valley
17	Neley	Wayan Valley
18	Kareezgay	Arghandab River Valley
19	Abdulhai Rood Walah	Arghandab River Valley
20	Abdulhai Kareez	Arghandab River Valley
21	Shamaly Baital	Arghandab River Valley
22	Sohaily Baital	Arghandab River Valley
23	Lal Khan Kass	Arghandab River Valley
24	Aass Walah	Arghandab River Valley
25	Mula Qadoos Neeka Kareez	Arghandab River Valley
26	Lowarah Khair Parah	
27	Gorwan Kareez	
28	Sheen Dam	
29	Shamalzai	

8. After the end of the first round of impact assessment survey, the APs committee suggested the inclusion of these following 27 villages in the list of villages to be surveyed. It is expected that these villages will not be affected.

No	Name of village
1	Paye Khorwa
2	Delak (Spena Ghondai)
3	Khadarzai
4	Saidan Walah
5	Sherjan Kareez
6	Saadullah Walah
7	Haji Hasamuddin Walah
8	Nary Walah
9	Pacha Walah
10	Mardojee Kareez
11	Haji Halem Kareez
12	Dastgeer Kareez
13	Khawas Kareez
14	Toor Ghondai Kareez
15	Rasheed Kareez
16	Potai Dagah Kareez
17	Kharwarai Kareez
18	Wach Kareez
19	Nawe Walah
20	Laghar Kareez

No	Name of village
21	Zandah Kareez
22	Naghmo Walah
23	Speen Lash
24	Hadiri Walah
25	Cheni Kariz
26	Sarkozi Kas
27	Takhta Kali

Appendix 2. Consultative Workshop Report

1. Consultative Workshop on Key Land Acquisition and Resettlement Impacts of Output-1 (Raising of Dahla Dam Project) in Kandahar.

9 – 10 April 2019, Kandahar Afghanistan

AIM AND OBJECTIVES OF THE WORKSHOP

2. The aim of the consultative workshop was:

(i) To raise awareness of APs of the process of land acquisition and resettlement;
(ii) To discuss key activities and processes during the preparation and implementation of LARPs and lessons learned by the participants;
(iii) To enhance participant's knowledge and understanding on the project LAR impacts, consultation, valuation, Grievance redress mechanisms and compensation;
(iv) Enable participants to share their thoughts, experiences and best practices in terms of the project.
(v) Increase participants awareness on the likely availability of water from Dahla Dam after the dam's storage expansion.

MAIN STAKEHOLDERS AND PARTICIPANTS

3. The target group for this consultative workshop was almost 79% affected people from 86 villages, resettlement consultants, DABS, MAIL, DRRD, NEPA, DUDI, Municipality, AUWSSC, ASBA along with TRTA team members.

4. The participants attended both days of the two day consultative workshop. The detail of participants is presented in the table below.

Detail of the Workshop Participants

Agency/Institution	No. of Participants
Affected Peoples and their Representatives	221
Provincial Governor's Office	10
District Governors	6
Municipality	2
DPH (Department of Public Health)	2
DAIL (Department of Agriculture, Irrigation and Livestock)	2
ASBA (Arghandab Sub Basin Authority)	20
AUWSSC (Afghanistan Urban Water Supply and Sewerage Corporation)	1
HRBA (Helmand River Basin Authority)	2
DABS (Da Afghanistan Breshna Sherkat)	1
DRRD (Department of Rural Rehabilitation and Development)	2
NEPA (National Environmental Protection Agency) Kandahar	1
DUDL (Directorate of the Urban Development and Land)	2
TRTA Technical Staff	8
ADB (Asian Development Bank)	1
Total	**281**

METHODOLOGY ADOPTED FOR THE WORKSHOP IMPLEMENTATION

5. The workshop objectives were met through a two-day event, which included presentations, discussion, questions and a case study.

6. The two-day workshop was organized in the format of lectures with the help of structured presentations by the main speakers representing TRTA staff and government officials. Each presentation was followed by a 10 minutes question and answer session and discussion along with the case study presentation.

7. The program agenda was shared with all participants two days prior to the workshop and a hard copy of the workshop materials were provided to all participants during the workshop. Presentations and handouts were translated into local language (Pashto) and were shared with participants.

8. All the presentations were presented in the local language. A note taker was assigned to draft minutes of the event in detail.

PARTICIPATION AND EXECUTIVE SUMMARY OF ISSUES DISCUSSED

9. The two-day Consultative Workshop on Key LAR Impacts of Output 1 Raising of Dahla Dam was conducted successfully. This report aims to document the workshop purpose, methodology, implementation, issues raised and discussed, and results of evaluation by participants. The workshop was conducted by the TA 9273: Preparing the Arghandab Integrated Water Resources Development Project and 7 presentations were delivered by the following key speakers.

10. The workshop was attended by 221 affected people representatives with the participation of the Provincial Governor and Deputy Governor, District governors of Shah Wali Kot, Dand, Nish, Zheray, Daman, and Arghandab, TRTA technical team members, and the heads of other provincial line departments.

11. The consultative workshop was organized in a participatory manner. All participants were provided an opportunity to ask questions and lead discussions. Additionally, they had an opportunity to present their thoughts; lessons learned and discussed proposed solutions during the workshop. Two presentations were delivered by Ghulam Farooq Nasery introducing the social safeguards requirements of ADB SPS 2009 and a combined presentation on conducting meaningful consultation and grievance redress mechanism GRM and disclosure. Mr. Zainuddin Sahibi from the TRTA delivered a presentation on the overall project and components. Mr. Habib Khan from the TRTA presented the identified land acquisition and resettlement impacts during the collaborative topographic survey and discussed regarding the directly, indirectly and gradual impacts on the villages. Mr. Masih Ullah from TRTA delivered a case study presentation on the land acquisition and resettlement process in the ADB projects. Mr. Rooz Khan Majrooh presented the environmental impact assessment and mitigation measures developed for the project.

12. **Mr. Zainuddin Sahibi, TRTA Deputy Team Leader:** The deputy team leader of the TRTA expressed his gratitude for the assistance in conducting the consultation workshop for the component-1 Dahla Dam project. He mentioned that for technical support ADB assigned ATES (Afghan Tarin Engineering Services) and shared with the participants that the project has four components. Mr. Sahibi stated that the 1st component is the raising of Dahla Dam that can increase the age of the dam, the 2nd component is climate-smart productive use of water for agriculture and through implementation of the project it will conserve the water loss and will increase agriculture productivity as the present condition of the Canal are investigated and various surveys are conducted, the 3rd component is water supply for Kandahar City and its surrounds that will facilitate treated water to the community within the project area, the 4th component is the Dahla Dam hydropower development and through implementation of this project it will decrease the load shedding. Mr. Sahibi mentioned that different surveys are accomplished for the project (such as Concept Report, Hydrologic Study, Feasibility Study of the Hydro Power, Multi water Sector Report, Water Resource Management Plan, Environmental Report, Social Survey and Impact Assessment Survey of the C2, C3 and C4, Study of the 6 saddles dams. The Project will develop a guideline for Dahla Dam and will submit it to ASBA for Dahla Dam management. The reports are finalized most of them are submitted to the concerned section and the rest will be submitted soon after completion.

13. **Mr. Najeeb Ahmad, TRTA Kandahar Coordinator:** Mr. Najeeb Ahmad is the responsible person for the workshop arrangements. He familiarized the participants with the workshop Agenda and introduced the workshop key participants and presenters. He also assisted Eng. Habib Khan during the presentation on component-1 Topographic Survey Results on Key Land Acquisition and Resettlement Impacts.

14. **Eng. Habib Khan, TRTA Dam Specialist:** The Dam Specialist briefed the participants regarding component-1 Topographic Survey Result on Key Land Acquisition and Resettlement Impacts and other LAR Aspects. He informed the participants regarding the mode of the impacts (direct, indirect and gradual impacts), the type of impacted lands, vulnerable or impacted villages, range of the possible direct, indirect and gradual impacts, detail of the possible impacts on public places, religious centers, etc. Mr. Habib informed the participants that it's now the general information regarding Component-1 (Dahla Dam Raising) and after the detailed design of the project, the Land Acquisition and Resettlement Team will collect and register the actual data and information of each individual APs assets through conducting of the detailed measurement survey. Meanwhile, they are notifying the related administration, affected committee members and AHs to share their opinions and concerns regarding the project for smooth implementation of the project.

15. **Mr. Ghulam Farooq Nasery, ADB Representative**: Two presentations were delivered by Ghulam Farooq Nasery on the introduction to social safeguards requirements of ADB SPS 2009 and a combined presentation on conducting meaningful consultations and grievance redress mechanism GRM and disclosure.

16. **Mr. Masih Ullah, TRTA National Resettlement Specialist:** Mr. Masih Ullah delivered a case study presentation on land acquisition and resettlement process in ADB projects. He shared with participants regarding LAR implementation process, Documentation, APs registration, Grievance Redress Mechanism, detailed measurement survey and socioeconomic survey, asset valuation, responsibilities of APS during LARP preparation and problems / issues in implementation.

17. **Mr. Rooz Khan Majrooh, TRTA National Environmental Specialist:** Mr. Majrooh briefed the workshop participants on environmental impact assessment and mitigation measures and methodology for environmental management developed for the project.

18. Workshop participants appreciated for theme selection of the workshop and articulated that the agenda topics were most relevant to their needs and clearly addressed their concerns regarding the project and the LARP process.

19. **Mr. Hayatullah Hayat, Provincial Governor of Kandahar Province;** appreciated the proposed affected people representatives for their participation and briefed them regarding the importance of the project. He also thanked the Asian Development Bank for consideration of the project and allocation of funds for the said project. The Governor highlighted the key impacts and importance of this mega project which entails land acquisition and resettlement impacts where the Government of Afghanistan is fully committed for smooth implementation of the project being as first priority of, HE the President himself. He also requested the participants/affected people to assist the survey teams in collection of the data from the field in order to prepare reports to ADB for review and approval. He promised the APs for facilitation of the land acquisition process, resettlement, valuation and provision of compensation of land prior to acquiring their land for the project. The Governor also asked ADB, Ministry of Energy and Water for proper consultation to the APs in regard to design, valuation and the level of impacts. He stated that we know and appreciate your sacrifices for the project, the government will provide the compensation, but the Allah will give you rewards and stated that providing drinking water and facilitation of the electricity that will use for the benefit of the community it's a charity. Meanwhile he will make sure the APs that according to the policy we will compensate you prior to the project implementation.

20. **Mr. Haji Abdul Mubin (Haji Malim Sahib) APs Representative:** Mr. Haji Malim briefed

the participants on behalf of the APs committee, thanked and appreciated ADB, Ministry of Energy and Water (MEW), ASBA director for his hard work in regard to coordination, facilitation and joint efforts with the TRTA team. He especially appreciated ADB for consideration of this project and allocation of funds for the said project. He stated the satisfaction of the participants in terms of arrangement; accommodation provided to them and relevant topics of the presentations that really addressed the needs of affected people to be understood. Mr. Haji Malim briefed the participant that Shah Wali Kot district is the place of the famous stars of the contemporary history such as Minister Shah Wali Khan, Kareem Dad Khan, Abdul Salam Khan and their followers but their graves and houses are now under the water and their families suffered a lot and shifted to other parts because of the dam construction/establishment. This time due to the dam raising it will impact their rest livelihood facilities. He mentioned that they have suffered directly during dam establishment, gradually after the dam establishment, and will suffer again due the dam rising as we have previous experience from the dam that due to the gradually impact of the dam, we lost a lot of our properties, and nobody compensated us properly. That's why people lost their trust on government and had concerns regarding compensation. He thanked the engineers for considering the gradual impacts in the assessment survey.

21. During his speech, he informed the participants about a guideline (methodology or concept note) that was developed for the C1 affected people of Shah Wali Kot district during the year of 2013-2014. Based on the request of Shah Wali Kot district residence, HE the President Hamid Karzai assigned a committee consisting of seven-line ministries to look over all aspects of the project along with the impacts to the villagers. A number of field visits were conducted by Deputy Ministers of the line ministries and a report was drafted and shared with the President's Office for further consideration and process. At that time the project activities have been stopped for a period, and when it resumed the APs requested to follow the same policy that were developed for the LAR of Shah Wali Kot District. He mentioned that we got information that the developed guidelines are no longer available in the Ministry of Energy and Water and other relevant administration. He frequently requested the Governor of Kandahar, Ministry of Energy and Water, ASBA provincial office and ADB to look for the report as a reference and requested to use it as a guideline.

22. In addition to this, they also requested Ministry of Energy and Water as the owner of the project, ADB as financing agency, the Provincial Governor and ASBA Director to look and find the report and arrange a high-level meeting with HE President. In light of the report and further assurances to the affected people is required.

23. The consultative workshop was organized in a manner that answers most of their questions and concerns, all participants were provided an opportunity to ask questions and lead discussions. The participants asked the following question during the second day's consultation sessions.

Questions discussed with affected person's representatives	**Answers by TRTA, ADB and Government Representatives**
Do you support this project?	Yes, this is an essential Project and we all support the project.
Will there be job opportunities for us?	Yes, the priority will be given to those who are living in the project site.
Will ADB facilitate a chance for a meeting with the President to share our concerns regarding the previous	It will be considered

Questions discussed with affected person's representatives	Answers by TRTA, ADB and Government Representatives
prepared guideline?	
Can the Provincial Governor or ASBA director facilitate a chance for a meeting with president to share our concerns regarding the previous prepared guideline?	It will be considered
Are there any assistance/allowances for the poor people?	Yes, The ADB has special allowances for vulnerable households.
Will the Government want to deal with us in the light of the previous guidelines prepared for this project?	It will be considered
How much amount is estimated for Dahla dam and in this estimated amount how much ADB commitment to finance?	Component 1: $231 Million, sponsored by ADB Component 2: $136 Million, sponsored by ADB C1 and C2 ADF grant $332 million; IFAD $55 million co-financing Component 3: $200 Million (Urban water component will be funded and implemented by World Bank) Component 4: $75 Million (Hydropower component will be a PPP (public-private partnership) transaction Total project costs: $667 Million
What are the general responsibilities, conditions and obligation of the ADB in Dahla Dam rising project?	
Is the ADB responsible just for the finance of the whole project or they have role in practical construction activities too.	The ADB have role in financing of the project and will be involve in practical activities.
What is the form of financing? Is it Loan or Grant or something else? What is the procedure, the amount will transfer to government budget or the ADB will directly expense this amount?	It is in form of cash and will be grant; the amount will be transfer to the contractor through MOF.
Are there any special conditions for the cash amount in the project, such as accomplishment of Land Acquisition and Resettlement prior to sponsor the project?	The ADB will not launch the project until all the APs are compensated properly.
What are the policies and conditions of ADB for the project sponsoring or financing? What facilitation does ADB want from Afghan Government and Conditions of ADB for Afghan government for contribution in the project?	The Government of Afghanistan will acquire the land and will deliver the land compensation to APs then the ADB will facilitate the other assistance and compensation.
Does the ADB have any specific procedure and policy for the	All the participants were aware that there is no specific policy developed for the Dahla Dam project

Questions discussed with affected person's representatives	Answers by TRTA, ADB and Government Representatives
compensation of the Dahla Dam APs?	but the ADB have a Comprehensive policy for compensation of the APs.
What is the procedure of ADB regarding the compensation of Dahla Dam APs, will ADB consider the compensation as a part of the project or the ADB will treat the APs compensation separately?	All the participants were informed that there is no specific policy developed for the Dahla Dam project, and it's not necessary because the ADB have a comprehensive policy for compensation of the APs, the ADB will consider the compensation as a part of the project.
What is the share of ADB in compensation? How much the ADB will contribute in compensation? Whole amount, one portion if yes, which part, or it is not the responsibility of ADB.	It was clear that except land compensation the ADB will be responsible for the compensation of all other losses such as structures, trees, business loss etc.
Is the allocated amount for LAR compensation included in the project amount? Or will the ADB have separate fund for the APs compensation?	All the participants were notified that the compensation amount is included in the project and will be considered as a part of the project.
What are the questions and demands of ADB from APs?	It will be considered.
Do you have a title of the Land?	Yes, we have titles of the lands but mostly we have customary deeds.
Do you think this project is beneficial for the people?	All the people agreed on one common idea, that by the implementation of the project, if our crops get year-round water our agriculture will flourish, and the lives of the villagers will become better
How will local people participate in construction works?	Local people will participate in construction works as labour, supervisors and administrative service according to their qualifications and level of skills.
Will the owners of land and houses surrender their properties for the development of this project?	If they are paid compensation and resettlement assistance the owner will surrender their properties for the interest of the project development
How will local people and representatives support for planning, implementation and monitoring of resettlement program?	Local people will help in correctly identifying the APs and their properties, in valuation of affected properties, grievance redressing issues and payment of compensations and resettlement assistance.

CONCLUSION

24. The Consultative workshop was organized in Kandahar City, with the first day of the workshop conducted in the Provincial Governor House Conference Hall, and the second day workshop w arranged in ASBA directorate in a very well secured environment. Both venues were easily accessible for the participants.

25. The participants were satisfied with the contents and the time allocated for the workshop which enabled the participants to share their thoughts, experiences and best practices in the project and enhance participant's knowledge and understanding on the project LAR impacts, consultation, valuation, Grievance redress mechanisms and increase participant's awareness on

the likely availability of water from Dahla Dam after the dam's storage expansion.

26. The APs representatives requested from Ministry of Energy and Water as the owner of the project, ADB as financing agency, Provincial Governor and ASBA Director to look and find out the report and arrange a high-level meeting with HE President in light of the report (LAR guideline prepared for C1) and further assurance to affected people.

WORKSHOP AGENDA

S. N	Theme, Key Speaker, Responsible Person (Governor House Conference Hall, Kandahar – Afghanistan)	Time	
1st day of the Workshop, April 9, 2019			
1	Registration of the participants. Eng. Noor Ahmad and Eng. Shaukat Khan	08:00	09:00
2	Opening Session with Recitation of Holy Quran. Qari Sahib Haji Mula	09:00	09:05
3	Introduction of the agenda to the workshop participants. Eng. Najeeb Ahmad, TRTA Kandahar Coordinator	09:05	09:15
4	Welcoming Statements and Opening of the Workshop. H.E Hayat Ullah Hayat, Governor of Kandahar Province	09:15	09:30
5	Brief Overview of the Entire Project and Components. Eng. Zainuddin Sahibi, TRTA Deputy Team Leader	09:30	09:45
6	Presentation regarding Identified land acquisition and resettlement impacts during collaborative topographic survey and discussion regarding directly, indirectly and gradually affected villages. Eng. Habib Khan, TRTA Dam Specialist Eng. Najeeb Ahmad, TRTA Kandahar Coordinator and Eng. Toryallai Mahboobi, ASBA Director	09:45	10:15
7	**Tea Break**	10:15	10:30
8	Aps representatives Demands and their concerns regarding Land Acquisition, Resettlement and Environment. Aps Representative, Haji Malim Sahib	10:30	10:45
9	Land Acquisition and Resettlement Policy Statement (SPS 2009) of ADB during Project Implementation. Mr. Ghulam Farooq Nasery, ADB Representative	10:45	11:15
10	Case study Presentation on Land Acquisition and Resettlement Process of the implemented ADB projects. Masih Ullah, TRTA Resettlement Specialist	11:15	11:45
11	Presentation of environmental impact assessment and mitigation measures and methodology for environmental management. Eng. Rooz Khan Majrooh, Environmental Specialist	11:45	12:15
12	**Lunch, Prayer and Tea Break**	12:15	01:30
13	Procedure for consultation meetings and information regarding GRM Mr. Ghulam Farooq Nasery, ADB Representative	01:30	02:00
14	Project Importance and request from Aps for smooth project implementation Mr. Hafizullah Sayeedi, DAIL Director	02:00	03:00

S. N	Theme, Key Speaker, Responsible Person (Governor House Conference Hall, Kandahar – Afghanistan)	Time	
2nd day of the Workshop, April 10, 2019			
1	Registration Eng. Noor Ahmad	08:00	09:00
2	Recitation of the Holy Quran Qari Sahib Abdullah	09:00	09:05
3	Consultation Meetings with Aps representatives. Resettlement Team	09:05	10:05
4	**Tea Break**	10:05	10:20
5	Group Presentations Aps Individual Group	10:20	11:20
6	Questions and Answers Aps and Presenters	11:20	12:00
7	**Launch and Prayer Break**	12:00	01:30
8	Recap of the agreements and output of the Workshop ASBA Director, Resettlement Team	01:30	02:00
9	Thanks to participants and closing of the Workshop. Najeeb Ahmad, ASBA Director	02:00	02:15

WORKSHOP BANNER

WORKSHOP ANNOUNCEMENT FROM ASBA

د افغانستان اسلامی جمهوریت
د اوبو او انرژی وزارت

جمهوری اسلامی افغانستان
وزارت انرژی و آب

Ministry of Energy and Water
ریاست عمومی حوزه دریائی هلمند
Helmand River Basin Agency
ریاست حوزه فرعی دریائی ارغنداب ولایت کندهار
آمریت برنامه ها و خدمات انجنیری

شماره: ۸۳۶ / ۶۹۳
نیته : ۰۲ / ثور / ۱۳۹۸

S.NO: _____
DATE: / /

د اطلاعات او کلتور ریاست محترم مقام ته!

هیله ده لاندی متن او ټول ارقام د ۱۵ ورځو لپاره د خبرتیا او اعلان په شکل مسلسل نشر کړی.

د کندهار ولایت د ارغنداب فرعی حوزی ریاست او داسیابي برمختیابي بانک (ADB) کډه خبرتیا !

دشاولیکوټ د دهلي دم دشاوخوا ولسي وګړو د زیانمنیدونکو ټولني،اونورو ټولو شخصي ملکیت لرونکو دیاملرني ور !!

دافغانستان اسلامي جمهوری دولت په پلان کی لری چی د دهلی بند ستره او ملی پروژه چی خلور لویی برخی لری عملا د اسیایی انکشافی او جهانی بانکونو په مالی ملاتر شروع کړی، چی د دغه پروژی اروند ټول ابتدائی مطالعات ترسره شوی، او د نومورې بند د دیوال لورولو په سبب د اغیزمنیدوکو ولسی ملکیتونو د زیان معلومولو او ارزونی لمړنی سروی په نژدی وخو کی د کندهار ولایت د ابیاری د ریاست او اسیایی بانک اله لوری ترسره شوی. په داسی حال کی چې د افغانستان اسلامی جمهوری دولت د اسیایی برمختیایی بانک په مرسته، ددغه پروژې څخه زیانمنیدونکو اولسونو ته د دوی دملکیتو د عادلانه او قانوني عوض ورکولو په باب پوره ډاډ ورکوی.

څکه نو د زیان ارزوني د دغه سروې ابتدائي معلومات ستاسو د خبرتیا او نظر غوښتنې دپاره نشر او اعلان ته سپارو.که کومه نیوکه یا وراندیز موجود وي هیله ده چې د دهلي دم د شاوخوا ولسي وګړو د ټولني د لاري يې د اعلان څخه د(۳۴) کاري ورځو په دننه یعنی د ثور میاشتی تر آخری نیټې پورې د کندهار ولایت د ارغنداب رود حوزوی ریاست ته راوړسوئ.

د سروې په اړه عمومي معلومات

لمړی برخه : په راټولونکي کې د دهلي بند ارتفاع د (13.6) متره لورولو یا د بحر د سطحي څخه د 1154 متر لور د زیان تخنیکی دقیق خط (کنتور) له املې تر درې ګونو (مستقیم ،غیرمستقیم او تدریجي) زیانو لاندي رسېدونکي عمومي زیانونو ارقام عبارت دی له :

۱-کرهنیزه مځکي او باغونه (15631) جریبه .
۲- میوه لرونکي درختي (304882) درختي .
۳- د اوسېدو کورونه (2504) ودانی .
۴- زیانمنیدونکي کلي او کاریزونه (64) واحده .
۵- ټوله میشت زیانمنیدونکي نفوس (20032) تنه .

دوهمه برخه : پخوانی زیانونه : د دهلي دلمړنی دم تر ټولو او د زیانمنیدونکو ملکیتو تر لمړني استملاک وروسته په دې ټیرو ۶۷ کلیو کي (2141) جریبه نوره مځکه هم په تدریجي او کرار کرار دول د اوسني موجود بند د جانبي زیانونو له املې خرابه سوېده . دغه برخی نه په تجربه او د ولسونو د غوښتنی سره سم مو دا ځلی په دغه سروی کښی د یوی تکراری لویی خلا مخه هم نیولی.

دریمه برخه : د اوسنی پروژې د تطبیق له امله د زیانمنیدونکو کلیو نومونه عبارت دی له.

الف : هغه کلي او کاریزونه چې زیانمنیدنه یې په ابتدائي سروې کې هم تثبیت سوېده :

شمېره	دکلی نوم	شمېره	دکلی نوم	شمېره	دکلی نوم
۱	لوړه شاه جوی	۱۰	حاجي آصف کلي	۱۹	کښته لغرجوی
۲	کرم الله	۱۱	تحصیلدار	۲۰	کښته شاده
۳	ښاهوخیل	۱۲	ګلانه	۲۱	عبدالحنان کلي
۴	لور عرب	۱۳	ټمبه کاریز	۲۲	کوګی
۵	لنډۍ ، میان ښوراو	۱۴	شاه زمینه کاریز	۲۳	لوړه شاده
۶	هندوجوی	۱۵	بته زاره	۲۴	لور برلاس
۷	کښته عرب	۱۶	لوی خواجه زی	۲۵	آمیرمحمد کاریز
۸	کښته شاه جوی	۱۷	کوچني خواجه زي	۲۶	کښته علیزي
۹	حجاني کلي	۱۸	لوړه لغرجوی	۲۷	سلطان کلي

د همدغو کلو په دوام :

شمېره	دکلی نوم	شمېره	دکلی نوم	شمېره	دکلی نوم
۲۸	لور علیزي	۴۱	ترموچوی	۵۴	شاه زمینه رود
۲۹	کلا	۴۲	الم غه	۵۵	خیرپاره
۳۰	مزدورکه	۴۳	بوینه	۵۶	آس واله
۳۱	ژر جر	۴۴	نجم الدین کلي	۵۷	ګرماو کاریز
۳۲	خیرنی	۴۵	کاریزګي	۵۸	لوړه اندرله
۳۳	چمن	۴۶	عبدالحی رود	۵۹	عبدالقدوس
۳۴	دیوال جوی	۴۷	عبدالحي کاریز	۶۰	ملاګدونیکه کاریز
۳۵	یارداد	۴۸	شمالي بیتل	۶۱	ګوروان کاریز
۳۶	کښته برلاس	۴۹	سهیلي بیتل	۶۲	شملزی
۳۷	نیلی	۵۰	لعل خان کځ	۶۳	شین دم
۳۸	ټمبه چینی	۵۱	شیرجان کلي	۶۴	لوړه خیرپاره
۳۹	پایاو کاریز	۵۲	غاشین		
۴۰	سیاسنګ	۵۳	غلام واله		

بادونه :

دغه (64) کرهنیزه واحدونه (کلي او والي) د دهلي بند د 13.6 مترو لوړلو پروژې د درې ګونې زیانو (1154 مترو ارتفاع) تر خطرلاندې سیمه کې واقع او د زیانو په لومړني لیست کې شامل سوېدي،خو که بیا هم هر کرهنیزه واحد د دهلي بند د استملاک د طرزالعمل شرایط پوره نه کړي،د زیانو په وروستي لیست کې نه شمیرل کیږی .

ب: هغه کلي او کاریزونه چې زیانمنېدنه یې د سروې د تخنیکي ګروپ تر څېړنې لاندې ده :

شمیره	دکلی نوم	شمیره	دکلی نوم	شمیره	دکلی نوم
۱	پای ښوراو (نورمحمدخان)	۱۰	مردوجي کاریز	۱۹	نوی واله
۲	ډیلک (سپینه غونډي)	۱۱	حاجي حلیم	۲۰	لغر کاریز
۳	خدرزي	۱۲	دستګیر کاریز	۲۱	زنده کاریز
۴	سیدان واله	۱۳	خواص کاریز	۲۲	نغمو واله
۵	شیرجان کاریز	۱۴	تورغونډي کاریز	۲۳	سپین لاښ
۶	سعدالله واله	۱۵	رشید کاریز	۲۴	دهدیري واله
۷	حاجي حسام الدین واله	۱۶	پوتي درګه کاریز	۲۵	چینې کاریز
۸	نري واله	۱۷	خرواري کاریز	۲۶	سرکوزی کڅ
۹	پاچاه واله	۱۸	وچ کاریز	۲۷	تخته کلی

مهم ټکی :

خرنګه چې د دهلې ډم شاوخوا ولسي وګرو د تولني له خوا د زیان ارزوني د سروې د لومړی پړاو په پای کې د زیان ارزونې په لیست کې دېورته (27) نورو کرهنیزه واحدونو دشاملولو وراندیز سوی دی.نو څکه دغه کلي د سروې د مسلکي ګروپ تر څېړنې لاندې دي .هغه کرهنیزه واحدونه چې د دري ګونو زیانو تر خطر لاندې وي او د دهلې ډم داستملاک د طرزالعمل شرایط پوره کولای سي دزیانو په لیست کې شامل،او د پاته نورو څخه صرف نظر کیږي.

باحترام

انجنیر تورپالی "محبوبی"

رئیس حوزه فرعی رود ارغنداب

کاپی: د کندهار ولایت مقام
کاپی: د کندهار ملی راډیو تلویزیون
کاپی: د دهلی اروند زیانمنېدونکو ولسي ټولنه
کاپي: د هلمند عمومي سېبندیزی حوزی ریاست
کاپی: طلوع افغان ورځپاڼه،
کاپی: د اوبو او برېښنا وزارت وېب پاڼه،
کاپی: (ADB) آسیایی پرمختیایی بانک او د هغوی وېب پاڼه،
کاپی: بېنوا وېب پاڼه
کاپی: لرو بر وېب پاڼه

Office Address/
Infront of UNAMA , Aino Mina
District , Kandahar , Afghanstan.
contact No: +93(0)744304537
Email: RMD. KDR@gmil.com
Web : WWW.MEW.gov.af

د دفتر پته :
د یوناما پر مخامخ، عینو مینه ، (۵) ناحیه کندهار،
افغانستان
د اړیکي شمیره : +93(0)744304537
د اړیکي شمیره : +93(0)700671576
برېښنا لیک: RMD.KDR@gamil.com

English translation:

"The department of information and culture:
Please broadcast and publish the following text and data in the form of notice for 15 days.

Joint awareness of the ASBA and ADB, Kandahar province!

Consideration for private property owners and vulnerable community around the Dahla Dam
The Islamic Republic of Afghanistan is planning to launch the massive national project of the Dahla dam consisting of four components through the financial support of the ADB and World bank.
The ADB and the ASBA conducted the impact assessment survey and gather the information of those private properties and assets that's going to be impacted due to the dam rising.
While the Islamic Republic of Afghanistan, with the help of ADB fully assure the APs about fair and legal compensation of their properties and assets.
So, the basic information is broadcasted for your awareness, objections or suggestions. If civilians have objection or have suggestions for improvement can convey their massage to ASBA through the APs committee within 24 working days or at the end of Sawar month of the Afghan Calendar.

General Information regarding the Survey Assessment:

First Part:
Due to the Dam rising up to 13.6 m or 1154 m from the sea level the possible general impact data of Directly, Indirectly and Gradually impacted areas are listed below.

- Total Agriculture Land and Orchard Land 15631 Jerib
- Total Fruit Trees 304882
- Total Residential Houses 2504
- Total impacting Villages and Kareez 64
- Total Population that's going to be impacted due to the project implementation 20032

Second Part:
Previous Losses: During Dam construction and Land Acquisition for the 1st time, with the passage of time in 67 years the dam gradually impacted almost 2141 Jerib private land,
In consideration of the previous experience of gradually impact and APs recommendation this time to prevent the same practice we account the gradually losses.

Third Part:
Due to the project implementation the names of impacted villages, Kareezes and agricultures units are listed below:

A: Those Villages that their names are also included and recorded in the primary survey:

#	Name Of the village, Karezes and Agricultures Units	#	Name Of the village, Karezes and Agricultures Units	#	Name Of the village, Karezes and Agricultures Units
1	Karmullah	23	Shah Zameena Rood	45	Lowar Alizai
2	Khakata Arab	24	Khair Parah	46	Zhar Jarr
3	Khakata Shah Joe	25	Lowarah Andarlah	47	Khernai
4	Hajani Kalay	26	Abdulqadoos Walah or Mayaqool	48	Chaman

#	Name Of the village, Karezes and Agricultures Units	#	Name Of the village, Karezes and Agricultures Units	#	Name Of the village, Karezes and Agricultures Units
5	Haji Asif Kalay	27	Lowara Shah Joe	49	Dewal Joe
6	Tahseldar Kareez	28	Shaho Khel	50	Yar Daad
7	Gulana Kareez	29	Lowaar Arab	51	Kshata Barlass
8	Tamba Kareez	30	Kshata Shadah	52	Neley
9	Batta Zaarah	31	Gogai	53	Kareezgay
10	Loye Khawaja Zai Kareez	32	Mazdooraka	54	Abdulhai Rood Walah
11	Kochnai Khowaja Zai	33	Tarmo Choey	55	Abdulhai Kareez
12	Lowara Laghar Joe	34	Najmuddin Kalay	56	Shamaly Baital
13	Kshata Laghar Joe	35	Garmawoo Kareez	57	Sohaily Baital
14	Kala	36	Landi, Mian Horaw	58	Lal Khan Kass
15	Tambah Cheeni	37	Hindo Joe	59	Aass Walah
16	Payawo	38	Shah Zameena Kareez	60	Mula Qadoos Neeka Kareez
17	Siasang	39	Abdulhanan Kalay	61	Lowarah Khair Parah
18	Alam Ghah	40	Lowara Shadah	62	Gorwan Kareez
19	Bayena	41	Lowar Barlass	63	Sheen Dam
20	Sher Jan Kalay	42	Amir Mohammad KAreez	64	Shamalzai
21	Ghasheen	43	Khakata Alizai		
22	Ghulam Walah	44	Sultan Kalay		

Notice: Due to the Dahla Dam rising up to 13.6 m or 1154 m from the sea level these 64 villages are coming in the first category and are located in the impacted area. If any of them cannot meet the land acquisition criteria will be excluded from the list.

B: Those Villages which are under investigation of the technical team.

No	Name of the Village	No	Name of the Village
1	Paye Khorwa	15	Rasheed Kareez
2	Delak (Spena Ghondai)	16	Potai Dagah Kareez
3	Khadarzai	17	Kharwarai Kareez
4	Saidan Walah	18	Wach Kareez
5	Sherjan Kareez	19	Nawe Walah
6	Saadullah Walah	20	Laghar Kareez
7	Haji Hasamuddin Walah	21	Zandah Kareez
8	Nary Walah	22	Naghmo Walah
9	Pacha Walah	23	Speen Lash
10	Mardojee Kareez	24	Hadiri Walah
11	Haji Halem Kareez	25	Cheni Kariz
12	Dastgeer Kareez	26	Sarkozi Kas
13	Khawas Kareez	27	Takhta Kali
14	Toor Ghondai Kareez		

Important Notice:
As the APs committee recommend these 27 villages and had concerns regarding that it will be affected due to the dam raising therefore these villages are under investigation of the technical team if any of them fulfill the criteria of land acquisition will be consider otherwise will be exclude from the list.

The survey result announcement letter will be shared with:

- Copy: Kandahar Governor Office.
- Copy: National Radio TV of Kandahar (TV Announced);
- Copy: APs Committee.
- Helmand River Basin Authority (HRBA).
- Tolo Afghan News Channel.
- MEW (MEW Webpage).
- ADB (ADB Webpage).
- Benawa News Channel Webpage.
- Lar aw Bar News Channel Webpage.**"**

Appendix 3. Outline of a Resettlement Plan

1. This outline is part of the Safeguard Requirements. A resettlement plan is required for all commensurate with the significance of potential involuntary resettlement impacts and projects with involuntary resettlement impacts. The level of detail and comprehensiveness is risks. The substantive aspects of the outline will guide the preparation of the resettlement plans, although not necessarily in the order shown. If indigenous people are affected, the plan will identify the risks and include special provisions to mitigate these risks.

2. The comprehensiveness of a resettlement plan would correspond to the potential involuntary resettlement impacts/risks and size of the project. The resettlement plan must adequately address all involuntary resettlement issues related to the project, describe specific mitigation measures that will be taken to address the issues, and outline institutional requirement and resources required to implementation of the LARP. The following outline of LARP is suggested for the present project.

A. Executive Summary

3. This section provides a concise statement of project scope, key survey findings, entitlements and recommended actions.

B. Project Description

4. This section provides a general description of the project, discusses project components that result in land acquisition, involuntary resettlement and identify the project area. It also describes the alternatives considered to avoid or to minimize resettlement. It includes tables with quantified data and provide a rationale for the final decision.

C. Scope of Land Acquisition and Resettlement

5. This section:

- Discusses the project's potential impacts and includes maps of the areas or zone of impact of project components or activities;
- Describes the scope of land acquisition and explains why it is necessary for the main investment project;
- Summarizes the key effects in terms of assets acquired and displaced persons; and
- Provides details of any community/government property resources that will be acquired.

D. Socioeconomic Information and Profile

6. This section outlines the results of the social impact assessment, the census survey, and other studies, with information and data disaggregated by gender, vulnerability, and other social groupings, including:

- Number and description of people and communities to be affected;
- likely impacts on land and asset acquisition on the people and communities affected;
- Description of the project's impacts on poor, indigenous and/or ethnic minorities, women, disabled and other vulnerable groups;

- Description and analysis of the socioeconomic situation, impacts, needs, and priorities for women.

E. Information Disclosure, Consultation, and Participation

7. This section:

- Identifies project stakeholders, especially key stakeholders;
- Describes the consultation and participation mechanisms to be used during the different stages of the project cycle;
- Describes the activities undertaken to disseminate project and resettlement information during the project design and preparation for engaging stakeholders;
- Summarizes the results of consultations with affected and displaced persons (including host communities if applicable), and discusses concerns raised and recommendations made for inclusion in the LARP;
- Confirms disclosure of the draft LARP to displaced persons and includes arrangements to disclose any subsequent plans; and
- Describes the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for consultation with displaced and affected persons during the project implementation.

F. Grievance Redress Mechanisms

8. This section describes mechanisms to receive and facilitate the resolution of affected persons concerns and grievances. It explains how the procedures are accessible to affected persons and gender sensitive.

G. Legal Framework

9. This section:

- Describes national and local laws and regulations that apply to the project and identifies gaps between local laws and ADB's policy requirements; and, discuss how the gaps will be addressed;
- Describes the legal and policy commitments from the Executing Agency for all types of displaced persons;
- Outlines the principles and methodologies used for determining valuations and compensation rates at replacement cost for assets, incomes, livelihoods; and sets out the compensation and assistance eligibility criteria and procedure ant the timeframe for disbursement of compensation and assistance;
- Describes the land acquisition process and prepares a schedule for meeting with the key procedural requirements.

H. Entitlements, Assistance and Benefits

10. This section:

- Defines displaced persons entitlements and eligibility, and describes all resettlement assistance measures (includes an entitlement matrix);
- Specifies all applicable assistance to vulnerable groups, including women, and other

special groups.

I. Relocation of Housing and Settlements

11. This section:

- Describes options for relocating housing and other structures, including replacement housing, replacement cost cash compensation, and/or self-selection (ensure that gender concerns and support to vulnerable groups are identified);
- Describes alternative relocation sites considered; community consultations conducted; and justification for selected sites, including details about locations, environmental assessment of sites, and development needs;
- Provides timetables for site preparation and transfer;
- Describes the legal arrangements to regularizes tenure and transfer titles to resettled persons;
- Outlines measures to assist displaced persons with their transfer and establishment at new sites;
- Describes plans to provide civic infrastructure.

J. Income Restoration and Rehabilitation

12. This section:

- Identifies livelihood risks and prepare disaggregated tables based on demographic data and livelihood sources;
- Describes income restoration programs, including multiple options for restoring all types of livelihoods;
- Describes special measures to support vulnerable groups;
- Explains gender considerations; and
- Describes training programs where applicable.

K. Resettlement Budget and Financing Plan

13. This section:

- Details costs for each type of affected assets including applicable allowances;
- Provides an itemized budget for all resettlement activities;
- Includes a justification for all calculated compensation at a replacement cost, rates and other cost estimates (considering applicable contingencies), plus replacement costs;
- Includes information about the source of funding for the resettlement plan budget.

L. Institutional Arrangements

14. This section:

- Describes institutional arrangement responsibilities and mechanisms for carrying out the measures of the LARP;
- Includes institutional capacity building program, including technical assistance, if required.

M. Implementation Schedule

15. This section includes a detailed, time bound, implementation schedule for all key resettlement and rehabilitation activities. The implementation schedule should cover all aspects of resettlement activities synchronized with the project schedule of civil works and provide timing for the land acquisition processes.

N. Monitoring and Reporting

16. This section describes the mechanisms and benchmarks appropriate to the project for monitoring and evaluating the implementation of the LARP. It specifies arrangements for participation of affected persons in the monitoring process. This section will also describe reporting procedures.

Appendix 4. Road Realignment Impact Survey Photos

Chainage: [1+000]
GPS: [31.8751017 N, 65.8656017 E]
Date/Time: 2019-03-30 12:47
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [1+200]
GPS: [31.8791867 N, 65.8682367 E]
Date/Time: 2019-03-30 12:45
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [1+250]
GPS: [31.8759217 N, 65.8655283 E]
Date/Time: 2019-03-30 12:45
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [1+300]
GPS: [31.8761800 N, 65.8655433 E]
Date/Time: 2019-03-30 12:46
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [1+350]
GPS: [31.8767833 N, 65.8656850 E]
Date/Time: 2019-03-30 12:46
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [1+400]
GPS: [31.8772517 N, 65.8658217 E]
Date/Time: 2019-03-30 12:46
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [1+600]
GPS: [31.8820800 N, 65.8698750 E]
Date/Time: 2019-03-30 12:38
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [1+600]
GPS: [31.8820800 N, 65.8698750 E]
Date/Time: 2019-03-30 12:40
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [1+600]
GPS: [31.8820800 N, 65.8698750 E]
Date/Time: 2019-03-30 12:42
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [1+800]
GPS: [31.8859717 N, 65.8808033 E]
Date/Time: 2019-03-30 12:32
Location: [Landai Showraw village, Dahla Dam, Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [4+600]
GPS: [31.9002317 N, 65.8916033 E]
Date/Time: 2019-03-30 11:59
Location: [Shah Joy village, Dahla Dam Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [4+600]
GPS: [31.9002317 N, 65.8916033 E]
Date/Time: 2019-03-30 11:59
Location: [Shah Joy village, Dahla Dam Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [5+000]
GPS: [31.9031633 N, 65.8936183 E]
Date/Time: 2019-03-30 11:40
Location: [Shah Joy village, Dahla Dam Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [5+000]
GPS: [31.9031633 N, 65.8936183 E]
Date/Time: 2019-03-30 11:41
Location: [Shah Joy village, Dahla Dam Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [5+000]
GPS: [31.9031633 N, 65.8936183 E]
Date/Time: 2019-03-30 11:43
Location: [Shah Joy village, Dahla Dam Upstream village, Shah Wali Kot district, Kandahar]

Chainage: [5+000]
GPS: [31.9031633 N, 65.8936183 E]
Date/Time: 2019-03-30 11:49
Location: [Shah Joy village, Dahla Dam Upstream village, Shah Wali Kot district, Kandahar]

Consultation with affected persons
Chainage: [5+000]
GPS: [31.9031633 N, 65.8936183 E]
Date/Time: 2019-03-30 11:46
Location: [Shah Joy village, Dahla Dam Upstream village, Shah Wali Kot district, Kandahar]

Chainage: 9+300]
GPS: [31.9128167 N, 65.9342750 E]
Date/Time: 2019-03-30 12:15
Location: [Lowar Arab village, Dahla Dam Upstream village, Shah Wali Kot district, Kandahar]

Appendix 5. Road Realignment Focus Group Discussion Minutes

Shah Walikot District: Kandahar Province
Villages: Mohammad Shajuy

Date and time: 30 March 2019, 11-12AM
Participants: 15 men, Chiefs of the village from two places of Sha Joy villages in two meetings of the Sha Wali Kot district
Information shared: Information about the Route Bearer Highway Project, ADB and Afghan Government policy about Land Acquisition and Resettlement Plan, GRM information.

The focus group discussion (FGD) with men was conducted in the ShaJuy village. During the consultations with men, the project, the SPS 2009, methodology for valuation, allowances and the GRM were explained to the participants. The questions asked were related to compensation, the timing for the land, trees and compensation for unexpected damages during the road construction time.

The main information shared with the participants

(i) Information about the Route Bearer Highway to members of the consultation meeting;
(ii) Project, related activities and socioeconomic and other studies required;
(iii) Process of preparation and implementation of the Land Acquisition and Resettlement Plan;
(iv) ADB SPS 2009 and Afghan law compensation requirements;
(v) Entitlements for land, buildings, structures; business owners and renters, and workers;
(vi) Allowances for severely affected and vulnerable groups;
(vii) GRM mechanism;
(viii) Information about the cut-off date.

The main questions and suggestions at these consultations were as follows:

No	Questions/ Discussions	Answers
1	Will the affected people be compensated for this project?	Yes, all the affected people will be compensated by ADB and Afghan Government.
2	Can we create enough job opportunities for people who live in the Project area?	Yes, this is a huge public benefit project and a lot of people of this area would be hired in this project for a long time.
3	How will be the land and trees compensation paid?	Resettlement specialists answered and explained all the stage and process of the implementation.
4	Will this road be constructed as a standard?	Yes, this road will be constructed as a standard.

People's opinions

Besides questions being asked from APs, they also added the following opinions:

(i) Since the road is built in standard form, the transportation of the people be solved;
(ii) The road plays a great role in the beauty and cleanliness of the road perimeters;
(iii) People have promised to support for the maintenance and security of the road;
(iv) People are eagerly waiting for implementation of the road;
(v) Some the people had concerns for the risk of improper implementation of the Project;
(vi) A great number of people are satisfied because they will be compensated for their loses.

ADB

د ارغنداب د اوبو منابعو د هر اړخیز مدیریت د پانګونی پروژه (TA-9273 AFG)

TA-9273 AFG: Preparing the Arghandab Integrated Water Resources Development Investment Project

Component C-1 (Route Bearer Highway)

FCG ANZDEC Ltd.

Participant List of Consultation Meeting with Local People for LARP Development of Component C-1 (Route Bearer Highway)

د مشورتی غونډی د ګډونوالو لست د ظاهرشاهی کانال د بیارغونی پروژی دمتأثره کیدونکو خلکود زیان دعوض دمعلوماتو دپاره

Meeting Place:

Date: 30/3/2019

دغونډی ځای: ش جوی

تاریخ : 30/3/2019

شماره No	Name نوم	Father Name ولد	Village کلی	District ولسوالی	Province ولایت	Position وظیفه	Mobil No نمبرتیلفون	Signature امضا	Date تاریخ	Remarks ملاحظات
	رحمن الله	محمد علی	ش جوی	شاولی کوت	کندهار	زمین دار	ندارد		30/3/2019	
	ش خان	خان آغا	ش جوی	شاولی کوت	کندهار	زمین دار	〃		〃	
	حفیظ الله	خان آغا	ش جوی	شاولی کوت	کندهار	زمین دار	〃		〃	
	قدرت الله	محمد علی	ش جوی	شاولی کوت	کندهار	زمین دار	〃		〃	
	سلطان	ملا جانان	ش جوی	شاولی کوت	کندهار	زمین دار	〃		〃	
	ابو نور الحمد	فیض محمد	کابل ناحیه ۱۷ قفلی	سیاگرد غوربند	پروان	سروییر	0795696307		〃	
	ابو شوکت	حاجی زرګل	محله خوګیانی	کجه	ننګرهار	سرویر	077441091		〃	

ADB

د ارغنداب د اوبو منابعو د هر اړخیز مدیریت د پانګونې پروژه (TA-9273 AFG)

TA-9273 AFG: Preparing the Arghandab Integrated Water Resources Development Investment Project

Component C-1 (Route Bearer Highway)

FCG
FCG ANZDEC Ltd.

Participant List of Consultation Meeting with Local People for LARP Development of Component C-1 (Route Bearer Highway)

د مشورتي غونډې د ګډونوالو لست د ظاهرشاهي کانال د بیارغونې پروژې دمتأثره کیدونکو خلکود زیان دعوض دمعلوماتو دپاره

Meeting Place:

Date: 30,3,2019

دغونډې ځای: ش جوی

تاریخ: 30, 3, 2019

شماره No	Name نوم	Father Name ولد	Village کلی	District ولسوالی	Province ولایت	Position وظیفه	Mobil No نمبرتیلفون	Signature امضا	Date تاریخ	Remarks ملاحظات
1	جانان	مراشیراحمد	ش جوی	ش ولی کوټ	کندهار	دهاره کار	ندارد		30,3,2019	
2	هاشم خان	عبدالکلیم خان	ش جوی	ش ولی کوټ	"	دهقان	"		"	
3	شاه خان	هاشم خان	ش جوی	ش ولی کوټ	"	زمین دار	"		"	
4	لعل محمد	جانان	ش جوی	"	"	زمین دار	"		"	
5	عزت الله	هاشم خان	ش جوی	"	"	زمین دار	"		"	
6	جمعه گل	محمد علی	ش جوی	"	"	دهقان	"		"	
	انجنیر نورالحق	حفیظ محمد	ناحیه ۱۷ فصلی کابل	شاکردعلابند	پروان	سرویر	0795696[illegible]		"	
	انجنیر شوکت	حاجی زمری	چمله جوګرنی	کلیجه	ننګرهار	سرویر			"	

IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Risk Assessment And Risk Management Plan

Document Date: 22/10/2019

Project No. 2000002332

Asia and the Pacific Division
Programme Management Department

RISK ASSESSMENT AND RISK MANAGEMENT PLAN

Risk Description	Rating	Mitigation Measures	Responsibility
A. Technical			
Dam safety compromised through incorrect design or construction	H	A panel of experts (including international and national experts of various technical fields) will be recruited to review detailed engineering and design and monitor construction.	MEW PMO ISC POE
Disruption to irrigation supply during construction	L	Potential disruption to irrigation will be minimized by the appropriate construction planning being coordinated during dry months from July to December. Temporary water release channels will be constructed.	MEW PMO ASBA ISC
Flood damage to structures during construction	M	Most construction should be conducted in July–November during low reservoir volume period with minimal risk of spillway flows. Contractor must design coffer dams to protect under construction spillways and structures and will be responsible for managing the flood risks.	MEW PMO ISC
Shortage of construction materials	L	Recent investigations confirmed adequacy of construction materials from the extended reservoir area and spillway area excavation. As these areas are outside of the existing reservoir, the contractor can start acquiring, processing and stockpiling materials upon the commencement of works to ensure adequate construction materials with quality assurance. Cement and gravels can be obtained from local quarries.	MEW PMO ISC
Poor coordination between civil works and hydropower works contractors causes construction delays	M	MEW PMO and the ISC will coordination with the contractors to ensure coordination among various contractors and timely construction of each contractor.	MEW PMO ISC
Severe climate change events may affect delivery of increased water supply and reliability	M	The findings of a climate risk assessment, conducted during the project preparation, were considered for the structure dimensions. The spillway sizes are determined to be resilient to potential climate change. Besides, the project will support farmers to introduce innovative and efficient irrigation technologies and on-farm practices that will contribute to improving climate resilience.	MAIL ISC

B. Economic and Financial			
Inadequate budget for O&M results in Dahla Dam and AIS asset deterioration	S	The government has committed to continuing the annual ASBA budget for staff and O&M for Dahla Dam and the AIS canal network services. The government is also committed to regulatory reform (supported by the project) to enable charges for water supply delivery, which allows for a sustainable revenue for O&M. Specific covenants are included in the Grant Agreement.	MEW, MAIL, MRRD MEW PMO
Delay in the project implementation may delay economic and financial benefits	M	Project implementation schedule is regarded as conservative and implementation is well supported by project implementation consultants.	MAIL, MRRD PMOs and ISCs, ADB
C. Governance and Capacity			
Government internal audit capacities are limited, and audit of projects financed through official development budgets are not part of the current scope of audit.	M	MOF retains controllers in MEW, MAIL, and MRRD for internal control of project payments. MEW, MAIL, MRRD will provide full support for the internal audit unit to conduct audits of development projects, including the proposed project.	MEW, MAIL, MRRD management
Capacity to manage ADB-financed project funds still developing.	M	PMO personnel will provide support in project financial management to PMU staff. The project will ensure staff e-training on ADB's disbursement policies and procedures, supported by the ISCs.	MEW, MAIL, MRD PMOs and/or PMU
Delays in procurement	M	The ISC will assist PMOs with procurement.	MEW, MAIL, MRRD PMOs, ISCs
Availability of local contractors for dam works	M	The dam design is simplified to allow use of the local contractors, whose capability was confirmed by ASBA and MEW. Works packaging was designed to have 3–4 lots under one package, so that both large and medium size contractors can be attracted.	MEW
Availability of skilled and capable Afghan nationals limits progress in key agriculture activities	M	The project will recruit local staff and will upskill these in a train the trainer approach. International consultants will support local staff.	MAIL PMO, ISC

D. Safeguards			
Lack of security for contractors and field staff does not allow freedom of movement	H	Multiple security risk mitigation measures have been considered during the project preparation and are built into the project design. Critical is the integrated approach to water resource development design which allows most communities in the project area to be beneficiaries of the project. The FCAS Risk Management Toolkit was deployed during project design. For inclusiveness of and strategic communication with local communities to increase local residents' ownership of the project, project's objectives and design have been well-informed to local residents and authorities during project processing. The consultation will be continued during project implementation. The resettlement planning has been carefully worked through with the relevant agencies. The project and contractors will employ and upskill locals. Contractors will be responsible for their own security arrangements, a measure that has proved successful in other projects. Community contracting works will also be applied to minor civil works. A 7-year implementation period was planned to accommodate possible LARP implementation delays. Finally, project risk managers and security teams will work closely with local police and security senior personnel and community leaders.	MEW, MAIL, MRRD PMOs
Conflict over land ownership and water rights	M	Communities will be involved in the project for community contracting works of irrigation facilities and as labor of contractor's works. Such community engagement will increase ownership of beneficiaries and will help resolve these issues. Intensive public consultation and awareness campaign is built into the project design. Policy reforms to be supported by the project are expected to strengthen water conflict resolution options and mechanisms, including traditional approaches.	MEW, MAIL, MRRD PMO

ADB = Asian Development Bank; AIS = Arghandab Irrigation System; ASBA = Arghandab Sub-Basin Authority; FCAS = fragile and conflict-affected situations; H = high; ISC = implementation support consultant; L = low; M = moderate; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MOF = Ministry of Finance; MRRD = Ministry of Rural Rehabilitation and Development; O&M = operation and maintenance; POE = panel of experts; PMO = project management office; PMU = project management unit; TA = technical assistance.
Source: Asian Development Bank.

IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Sd 18 Aiwrdip Fcas Action Plan.Final 12 Jul2019

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Asia and the Pacific Division
Programme Management Department

FCAS Action Plan

AFG: Arghandab Integrated Water Resources Development Project

March 2019

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Acronyms

ADB	Asian Development Bank
AFRM	Afghanistan Resident Mission
ASAGs	Anti-State Armed Groups
ASBA	Arghandab Sub-Basin Agency
AUWSSC	Afghanistan Urban Water Supply and Sewerage Corporation
CBOs	Community Based Organizations
CDC	Community Development Council
CDDC	Community Driven Development Component
CSOs	Civil Society Organizations
DDA	District Development Assembly
FCAS	Fragility and Conflict Affected Situation
IDPs	Internally Displace Peoples
MFF	Multi-Tranche Financing Facility
NGO	Non-Government Organization
PCA	Project-Community Agreement
PCAC	Project-Community Agreement Committee
PCIA	Peace and Conflict Impact Assessment
PRTs	Provincial Rehabilitation Teams
SBC	Sub-Basin Council
TAPI	Turkmenistan, Afghanistan, Pakistan, India Gas Pipeline Project
TRTA	Transaction Technical Assistance

1 Introduction

A. Project Background

1. This plan forms part of the transaction technical assistance (TRTA) for the AIWRDIP and will be critical for the development of a project FCAS approach. The TRTA is currently underway and will assist the Government of the Islamic Republic of Afghanistan (GoIRA) and Asian Development Bank (ADB) make an informed decision on investment in the Arghandab water resources development and associated water supply and electrification investment for Kandahar city, and irrigation modernization investment in the Arghandab river basin.

2. The project is located in the Arghandab river sub-basin in Kandahar Province, and aims to improve the availability of water resources for urban water supply and power generation for Kandahar city, and irrigated agriculture in the basin. Availability of water in the sub-basin, as with the rest of the country, is highly seasonal and erratic, with frequent severe droughts affecting agriculture, economy and people's living standard. The project will address this water problem by enhancing the storage capacity of the existing Dahla dam reservoir by raising the dam height by 8.0 meters increasing the existing reservoir volume estimated at 314 million m^3 by 264 million m^3. This project would also provide targeted multi-sectoral interventions to ensure effective utilisation of the water resources.

3. Kandahar City, the country's second largest city, and the surrounding area is severely constrained by acute shortage of water for household and irrigation purposes. The economy of the local population heavily relies on agriculture. The Dahla dam reservoir, once irrigating about 60,000 ha of land, has lost one third of its capacity to sediment, greatly reducing the reservoirs storage ability. About 20 percent of the residents in Kandahar city are accessing municipality provided water distribution services, which has no proper water treatment facilities and is not well maintained. Despite water shortage, the city is also in acute shortage of power, as the city is not connected with the national power grid, forcing the city to experience frequent power outages.

4. The investment program will provide long-term sustainable solutions to the above problems by providing additional, reliable water resources – thereby providing the city and surrounds an access to dependable irrigation water to agriculture, safe drinking water and increased and low generation cost power.

B. Purpose and Objectives of the Action Plan

5. The FCAS Action Plan sets out a number of strategies and actions that can be implemented to mitigate against conflict risk that may emerge during the project. The purpose of the action plan is to act as a bridge between understanding – the FCAS Assessment and subsequent monitoring of the context – and action – the design and implementation of the project that is responsive to the context it is operating in and actively works to reduce negative impacts and maximise positive one, even if not the main aim of the project.

6. To do this, it guides project processing teams in turning information from the FCAS Assessment into project activities/strategies to meet the emerging challenges and opportunities that the project may face during implementation through a Peace and Conflict Impact Assessment (PCIA). It is a living document that should be regularly reviewed and revised during

implementation, as appropriate, based on ongoing project conflict sensitivity monitoring, to take account of unanticipated positive and negative impacts that are identified.

7. This is a preliminary FCAS Action Plan that will require regular updating by project FCAS staff throughout the project as FCAS monitoring provides new information. As the context and conflict undergo regular change and transformation, project related FCAS documents/plans require routine updating and appraisal to ensure the project is responsive to emerging trends in the context. Component specific FCAS Action Plans, informed by their own component-specific FCAS Assessments, should also be developed moving forward.

2 Impact Assessment

8. The development of an FCAS action plan requires an understanding of the likely conflict-related impacts that may merge during the period of the project in order that mitigation strategies and actions can be put into place. This understanding is drawn from the FCAS Assessment (see AIWRDIP FCAS Assessment) and then developed further through an impact assessment.

9. The impact assessment helps the project team identify and understand the plausible effects of the project on its context by considering potential negative and positive impacts that it may create, with a specific focus on how it may impact on conflict in the project context. This analysis should be revised periodically throughout the project to update based on the actual, unintended negative and positive impacts that are occurring during implementation.

10. The impact assessment also considers how conflict in the context may positively and negatively impacts on the project. This is necessary as it may affect the implementation of the project, which could further drive conflict, while the project, through its implementation choices, can help to address some of these conflicts. Moreover, positive elements in the context may assist the project in overcoming disputes and tensions that arise.

11. A summary narrative of the main potential impact trends derived from the AIWRDIP FCAS Assessment is developed below. This a considers the key ways in which the project can impact on the context and vice versa. A deeper analysis is developed in the adapted AIWRDIP Peace and Conflict Impact Assessment (PCIA) which can be found in Annex 1. The AIWRDIP PCIA considers the impacts the project could encounter in terms of political, economic, cultural, social, and security aspects. In doing this, it aligns closely with Afghanistan's membership of the g7+ and commitment to the Peacebuilding and State-building Goals (PSGs).

2.1 Project Impacts on Context

12. The project is primarily aimed to increasing water supply and enhancing water governance to ensure effective allocations. In addition, it will provide potable water to Kandahar City. This has significant potential to reduce existing and future water-related conflicts, as well as reducing the pressure on water demand. The provision of electricity will support small-scale industries and enterprises to create more job opportunities for the local people. The project will also help in provision of employment and business opportunities, reducing vulnerability to migration, unemployment and poverty and supporting the security and stability in the region.

13. The wide range of benefit of the project offers great potential for local communities, tribes and districts to work together, increasing social cohesion and solidarity among the people. The project also enjoys a high level of public support which can be harnessed to undermine ASAGs support and increase the legitimacy of the Government in the eyes of the population

14. However, the project has already raised significant expectation which, if unmet, will likely result in significant tension and ill-feeling toward the project which could manifest into obstruction and threat to personnel and property. This is especially this case in the districts of Kandahar Province that are not targeted by the project. These districts represent roughly 65% of the Kandahar Provide population and enjoy 95% of its economy. This may result in significant resentment in districts not targeted, both towards Government and other districts.

15. The project can act as a catalyst for improved local government coordination, enhancing good governance, service delivery and strengthening government legitimacy in the eyes of people. The rehabilitation and extension of the irrigation system should increase the efficiency of water management systems which could decrease water related conflicts leading to greater social cohesion. Moreover, the project has the potential to create opportunities for collaboration between farming communities to better manage the water distribution system. This opportunity could be used for peacebuilding and government legitimacy.

16. While this is possible, it must be noted that significant efforts must be made to ensure this eventuality. With a total investment of $460m, the AIWRDIP represents a significant resource transfer. It should be expected that attempts to corrupt, extort and steal will take place. This would increase the risk of tension and conflict, especially if it results in delivery problems. In addition, exclusionary decision-making processes and the accrual of project benefits to only some groups is likely to drive division, especially if constructed along identity lines.

17. Land acquisition in upstream areas may result in land-related conflict causing wider grievances and increasing insecurity if not managed appropriately and speedily. Little is currently known about resettlement options or intentions. Resettlement onto proposed government-owned rural land may result in issues around access to services and livelihoods, as well as conflict with other rural communities. While resettlement in government-owned urban land brings demands for high-value land and increasing pressure on scarce resources. Both of these could cause conflict between the displaced people and communities of absorption

18. Large-scale construction, and the secondary services and industries to support it, will can create direct and indirect employment opportunities in the targeted districts, and will stimulate local economies and support local business, reducing vulnerability to migration, unemployment and poverty, strengthening social cohesion, security and stability in the region and increasing government legitimacy.

19. At the same time, construction phases may disrupt the flow of irrigation water, possibly causing creating tension and anger among farming communities

2.2 Context Impact on the Project

20. While there is great expectation attached to the AIWRDIP, this also translates into significant public support. If properly managed this could be a significant asset, facilitating a secure working environment for project teams, strengthening Government legitimacy in the eyes

of the people, and reinforcing local peacebuilding capacities. Local leaders (particularly tribal elders, the Shura and DDA members, etc.) will play an important role in realising this potential and facilitating the project through bringing groups together and managing conflict.

21. However, it must be recognised that public trust in the Government is low and while there may be significant support for the AIWRDIP there is also significant concern the Government cannot implement the project effectively and in a transparent and an accountable way. Undesirable interventions in the project (corruption, extortion, political interference, etc.) can result in significant pressure on contractors and supervision consultants to comply with demands to ensure the project progresses ore that they derive additional benefits (e.g. longer contracts). This can create local tensions, drive up social exclusion and decrease transparency and accountability, all contributing to conflict.

22. Effective management of the project will require not only technical capacity but also governance capacity to ensure transparency, effective engagement of communities and more inclusive decision-making – all necessary to ensure current public support is maintained. Existing governance structures provide some key functions necessary for the successful implementation of the project and can be engaged to further strengthen water governance in the Arghandab Sub-Basin. This will be critical given the capacity gaps identified.

23. Insecurity represents a significant contextual challenge for the project and can affect it in many ways. ASAGs are heavily active in upstream areas many access problematic and the recent assassination of the provincial security commander has created a security vacuum. Ongoing negotiations with the Taliban, and accompanying security operations in the area, mean the situation is fluid and not easily predictable which can present further complications for the project.

24. Vulnerability represents a further challenge for the project as it can drive insecurity (e.g. push people into insurgency groups) and resentment toward the project (e.g. where those vulnerable are impacted disproportionately by any project-related shock).

25. The ongoing water crisis affecting the whole country plays its role in driving conflict in Kandahar Province as water (and land) resources are increasingly affected. If the water crisis continues it is likely this will have negative implications for the project as there is an expectation that the project will resolve issue surrounding water availability.

25. Current and historical conflicts/grievance over a number of issues (political marginalisation, water distribution, land ownership etc.) further have the potential to affect the project meaning those existing capacities to manage conflict will be critical and must be reinforced by the project.

26. However, Kandahar Province has various examples of existing social capital that can be utilised and supported to help overcome negative implications of the project. In addition, civil society in Kandahar Province, while limited in capacity, is eager to engage in the project. Civil society engagement could further assist in improving government legitimacy in the eyes of the people.

3 Options Development & Prioritisation

27. A key function of the AIWRDIP FCAS Action Plan is the development of options to address the potential impacts based on the analysis completed (through the AIWRDIP FCAS Assessment and the Impact Assessment). These options are there to guide the project team and are aimed at minimising potential (and actual) negative impacts where identified (both in terms of negative impacts of the project on the context and of the context on the project), and maximising those positive impacts identified.

28. The development of options will be influenced by the stage a project is at. Project processing affords the opportunity to identify potential impacts, and the subsequent development of approaches to address these, while implementation monitoring enables the tracking of actual impacts and the opportunity to adapt projects accordingly (see FCAS Action Plan Guideline).

29. During processing it is easier to develop options for potential impacts, but more difficult to predict the probability they may occur. It does, however, provide the opportunity to develop strategies that can prevent potential negative impacts from occurring in the first place, and mitigate against them if they do occur. Likewise, measures can be established to increase the prospect of positive impacts occurring and maximise their effects when they do occur.

30. As the project is now in the processing stage, options are developed for a number of potential impacts that have been identified. Actual impacts will be identified during implementation through FCAS monitoring (see AIWRDIP FCAS Monitoring Framework).

31. Annex 2 – FCAS Conflict Sensitivity Options – provides a range of clear options that can be taken to pre-emptively and retrospectively to address the potential impacts identified in Annex 1. These options should be followed by project staff throughout the various phases of the project and should be adapted as necessary according to findings from FCAS monitoring. FCAS staff should be central to ensuring the continued applicability of the options identified and developed.

32. Possible options developed in Annex 2 are divided into four tables by impact direction and type. Within each table they are then grouped by conflict/peace impact issue. This comprises of 6 key conflict/peace impact issues under the ‘Potential positive impact project activities could have on the context’ category with 21 possible actions, 7 key conflict/peace impact issues under the ‘Potential negative impact project activities could have on the context’ category with 30 possible actions, 5 key conflict/peace impact issues under the ‘Potential positive impact the context could have on the project’ category with 23 possible actions, and 6 key conflict/peace impact issues under the ‘Potential negative impact the context could have on the project’ category with 27 possible actions.

33. The following table summarises the key options/responses that can be taken to ensure the AIWRDIP is compliant with the conflict sensitive approach and best situated to address concerns and opportunities identified in the AIWRDIP FCAS Assessment.

Priority	Response/Option	Support	Constraint
1	Governance strengthening and sound project management	• Necessary for effective implementation • Some existing capacity • Opportunities within the project	• Institutional capacity • Risk of project interference
2	Awareness raising and consultation with communities	• Interest of communities • Need for access to information • Increase the level of support • Decrease negative attitudes	• Difficulty in access to insecure areas
3	Inclusive and proactive community engagement	• Interest of communities • No need for extra budgetary allocations	• Obstruction from power-holders
4	Effective LARP with support for integration	• Major obstacle for the project • Interest of communities (upstream and downstream)	• Lack of information on resettlement plans • Requires adequate staffing
5	Community-driven development	• Interest of communities • Need of communities • Increase community buy-in	• Budgetary limitations
6	Active engagement of government entities	• Local government entities interest in the project • Importance of government support and ownership	• Lack of capacity within local governance
7	Compliance with ADB/GIRoA policies	• Necessary for smooth implementation • Transparency and accountability	• Current challenges within government
8	Transparency in procurement, recruitment and overall project implementation	• Necessary for smooth implementation • Necessary for attaining support and positive attitude	• Current challenges within government • Interference from powerbrokers

4 Key Actions

34. In order to address the concerns and opportunities identified a number of key actions need to be taken. These include mitigation strategies to address potential or actual negative impacts and scale-up strategies to realise unanticipated peacebuilding opportunities.

35. **Government strengthening and sound project management**

- Establish effective coordination mechanisms among local government departments that are directly and indirectly engaged in the project. Engage with departments not involved where conflict sensitivity benefit may be evident.
- Provide appropriate capacity development to enable local government departments to effectively work together to address coordination problems (e.g. conflict management) and to engage more effectively with communities (e.g. community engagement).
- Orient all project staff on the AIWRDIP FCAS Approach to ensure they are aware of the risks of raising expectations and equipped with the tools to manage them.
- Implement recommendations made in the Integrated Water Resource Management (IWRM) Plan in order to further strengthen water governance structures and process, and to ensure all water related conflicts are resolved peacefully, water governance recommendations made should be followed.
- Establish district level Water Users Association in each of the targeted seven districts and the sub-basin committee (SBC) (see IWRM Plan) to strengthen water governance.

36. **Awareness raising and consultation with communities**

- Engage in a public information campaign to ensure accurate information is delivered across Kandahar province explaining the project, its aims and objectives, schedules and activities. Provide the public with regular updates in terms of progress and any mitigation strategies employed to address delays.
- Involve local leaders in the project monitoring and oversight committee to ensure strong community voices, reinforce their role as mediators and conflict management bodies to ensure the project activities are implemented as planned and to publicly demonstrate the important role they are playing in the project.
- Develop Project-Community Agreements in collaboration with local leaders to articulate the role they will play in supporting the project and what support they can expect in return. This should include support in terms of ensuring safe access to communities and project sites, project security arrangements engaging local communities, conflict management procedures to be followed in the event of disputes between the project and communities and community oversight of project implementation.
- Engage in regular and sustained communication and information-sharing with farming communities to appraise them of progress against construction schedules and any necessary adjustments, as well as adjusted mitigation strategies, if delays are likely. This must be done in good time to enable farming communities to adjust.

37. **Inclusive and proactive community engagement**

- The establishment of a project monitoring and oversight committee comprising of local government department representation, tribal elders and youth-led civil society organisations would help ensure transparency and increase both community engagement in the project, and collaboration between the Government and communities.
- Develop Project-Community Agreements in collaboration with local leaders to articulate the role they will play in supporting the project and what support they can expect in return. This should include support in terms of ensuring safe access to communities and project sites, project security arrangements engaging local communities, conflict

management procedures to be followed in the event of disputes between the project and communities and community oversight of project implementation.

- Engage on a regular and sustained basis with communities to ensure their active participation and to and restore the damaged relationship between the State and local communities, resulting in increased government legitimacy and more trust from the public. Involve communities in decision-making processes where possible making specific efforts to ensure a wider range of voices beyond existing and traditional powerbrokers
- Monitor community engagement effectiveness through the (adapted) FCAS Public Perception Survey to track satisfaction levels and enable adjustments in the community engagement strategy if required.

38. **Effective LARP with support for integration**

- Consult with communities to be displaced on their resettlement options and preferences to gain a comprehensive understanding of likely areas of absorption and map those areas for socioeconomic opportunities/challenges and conflict dynamics.
- Develop the LARP in close consultation with upstream communities, including site visits arranged with representatives of these communities, to ensure land and crop mapping is accurate.
- Orient on government ministry (local and national) staff on ADB policies regarding the LARP to ensure there are no delays due to coordination problems.
- Create a resettlement advisory group comprised of representatives of those to be displaced and communities of absorption, along with local government departments and local stakeholders (tradition leaders, youth leaders, security actors, business community, etc.) to support the resettlement process including sustainable integration and conflict management.
- Consult with those to be displaced, local government departments, local stakeholders and communities of absorption through the resettlement advisory group to develop interventions to support resettlement and integration.
- Allocate resources for Community-Driven Development Components (CDDCs) to be implemented in communities of absorption to reduce resource pressures, enhance conflict management and promote social cohesion, thus supporting the resettlement and integration process (see Community-Driven Development Component Guideline)
- The implementation of the LARP should be actively and closely monitored in collaboration with the monitoring and oversight committee in order avoid any mismanagement in the acquisition phase.

39. **Community-Driven Development Components**

- Utilise the CDDC to provide opportunities for intra- and inter- group collaboration to resolve common problem and address common goals. This will reinforce mutual cooperation and strengthen social cohesion, as well as providing practical ways to offset challenges that emerge in terms of conflict.
- Support existing and emerging small-scale enterprises and provide micro-finance facilities in order to prepare a better platform for the post-implementation impacts of the AIWRDP. This initiative could be supported through projects under the Community Driven Development Component (CDDC) and should focus on agricultural supply chain investments to indirectly engage communities in non-targeted districts.

- Allocate resources for Community-Driven Development Components (CDDCs) to be implemented in communities of absorption to reduce resource pressures, enhance conflict management and promote social cohesion, thus supporting the resettlement and integration process (see Community-Driven Development Component Guideline)
- Ensure CDDC design provides opportunities for greater inclusion while at the same time demonstrating the role local leaders have had in the development of their communities.
- Prioritize the most vulnerable communities through CDDCs including women, disabled people, the martyrs families, Kochis and IDPs/returning refugees in coordination with local government departments, and in close consultation with local communities.
- Closely monitor CDDCs through the AIWRDIP FCAS monitoring framework in collaboration with the project monitoring and oversight committee.

40. **Active engagement of government entities**

- Regular engagement with key water stakeholders – ASBA, SBC, WUAs – and the project monitoring and oversight committee, will provide the opportunity to: update key stakeholders on predicted water flows; share water distribution-related concerns; and, find mutually acceptable solutions for equitable water allocations. This will decrease the chance for grievances and conflict even when water shortages occur.

- Include local government departments focused on social issues in decision-making processes to ensure government policy regarding social groups is integrated where possible (e.g. Directorates of Tribal Affairs, Women's Affairs, Culture and Youth, etc.).
- Engage with local governmental security actors on a regular basis to identify any emerging security considerations and devise appropriate responses.

41. **Compliance with ADB/GIRoA policies**

- The project should always adhere to the existing ADB and GIRoA policies;
- Expectations with politicians and other powerbrokers at provincial level regarding investments into certain areas, or the awarding of contracts, etc, must be managed from the start to ensure the risk of corruption or extortion is minimised.
- Staff recruitment and goods/services procurement should follow ADB guidelines and be transparently conducted to ensure local stakeholders and communities are appropriately informed. Community-based procurement should be promoted where possible as a project policy to provide a safeguard against extortion (recognising the limits of this).
- The Project-Community Agreement could be developed (in consultation with the PCA committee) to include a mechanism to negate undue interference in the project. This should centre on maximising transparency to ensure all parties are aware of all demands placed on the project (those anticipated as part of the project and those that are unwarranted). Engage in regular consultation with local powerbrokers and communities to ensure all parties are appraised of project progress, upcoming schedules and any emerging challenges.

42. **Transparency in procurement, recruitment and overall project implementation**

- The project should comply with ADB and GIRoA policies through procurement and recruitment;

- Make public ADB and GoIRA procurement policies and procedures and ensure all stakeholders are aware of these to ensure they recognise full transparency will be adhered to during procurement processes.
- Develop the capacity of local government departments in areas of transparency and accountability and reinforce their role in providing timely information and to be accountable to the public. FCAS Perception Surveys may help with this (see FCAS M & E Guideline).
- In order to maintain transparency and accountability; project information should be disclosed to the public preferably according to the CoST standard
- Link public support for the project to security measures. Maximise the potential for ongoing strong public support by ensuring inclusive decision-making processes where possible, full transparency during procurement and implementation, adherence to project safeguard protocols, and regular access to the project monitoring and oversight committee (see above).
- Include suitable representation from civil society in the project monitoring and oversight committee and ensure they are engaged throughout to ensure they play an active role in promoting transparency.

42. An action plan has been prepared and is presented in the succeeding table.

43. Activities		Performance Targets/ Indicators		Responsibility	Timeframe
Output 1: Dahla Dam capacity increased					
1.1	Ensure local government awareness and coordination of conflict management	1.1	At least two workshops per year with local government departments to establish effective coordination mechanisms for direct and indirect engagement in the project, and for conflict management.	CPMO, MEW, MRRD, MAIL (ASBA, DAIL, DRRD)	Q2 of Year 1 to Q4 of Year 4
1.2	Effective LARP implementation	1.2	LARP implemented and monitored in full accordance with the plan. Grievances and mitigation responses recorded in LARP reports	MEW, CPMO Resettlement Officer	Starting from Q1 of Year 1
1.3	Ensure consultation with local communities on recreation areas	1.3	Ensure public safety risks are addressed in viewing points and swimming and recreational areas developed for families at Dahla Dam and Tarnak Main Canal in Kandahar City.	CPMO, MEW, MRRD, EPCS, ASBA, and FCAS Specialist	Starting from Q1 of Year 1 at design stage and construction phase
1.4	Prioritize opportunities for local contractors and workers	1.4	Conduct an awareness campaign amongst local contractors and communities providing information on potential opportunities and general requirements prior to issue of tenders. At least 50% of contractors' workforce are residents of the surrounding districts.	CPMO, MEW, ASBA, FCAS Specialist	Starting from Q1 of Year 1 at design stage and construction phase
Output 2: Reliability of Irrigation Water Supply Increased					
2.1	Improved community irrigation services	2.1a 2.1b	Design of rehabilitation of community irrigation systems uses CDD approach and may include non-irrigation water access points, foot bridges and other facilities that may be requested by local communities. At least 2 awareness sessions in each village issues related to water conservation, safe water practices, water pollution and water borne diseases.	CPMO, MRRD, EPCS, CDC, *Mirabs*, and FCAS Specialist, Gender Specialist, Environment Specialist	2.1a Starting from Q3 of Year 1 at the design and construction phase 2.1b Starting from Q2 of Year 1
Output 3: Agriculture Water Productivity Improved					
3.1	Use local participation to select local farmers and train young men (who may otherwise take up arms) as resource persons for capacity-building of farmer groups in production of high value crops and extension services.	3.1a 3.1b 3.1c	Extension Services Action Plan developed for high value agriculture and horticulture, including at least 30% activities aiming to give youth worthwhile employment and livelihood options. Organize cross farm and knowledge sharing events to enhance mutual learning among farmers, of which 25% are young men. At least 20 men farmers trained as paraprofessionals (three from each district) in extension services of high value crop production.	CPMO, MAIL, DAIL PIUs, MRRD, and FCAS Specialist	3.1a–c Starting from Q3 of Year 1
3.2	Increase young men farmers' access to agriculture and horticulture inputs and services.	3.2a 3.2b	At least 40% of farmer group membership is under 30 years of age. At least 75% of matching grant recipients are under 30 years of age or employ 3 or more men under 25 years of age.	CPMO, MAIL, DAIL PIUs, MRRD, and FCAS Specialist	By the end of the project
Output 4: Capacity in water resource management and use strengthened					
4.1	Ensure increased young men's participation in capacity building programs in water resource management and use	4.1a 4.1b	Minimum 30% representation of young men in consultation and decision-making forums related to training and capacity building programs. Men under 30 years comprise at least 30% of sponsored M.Sc. in integrated water resources management by 2025 (baseline 2019: 0).	MEW, MAIL, MRRD, NEPA,	Starting from Q3 of Year 1–Q4 2025

43. Activities	Performance Targets/ Indicators	Responsibility	Timeframe
Institutional Strengthening, Project Management, and Monitoring and Evaluation			
5.1 Enhance capacity of executing agency, project management unit and implementing agencies in FCAS risks and mitigation approaches and implementation of projects and programs	5.1 One training and two refresher courses for implementing agencies on FCAS project design and implementation conducted.	CPMO MEW, MAIL, DAIL, DRRD, MRRD, Social Safeguard Specialist	5.1 Starting from Q2 of Year 1

ASBA = Arghandab Sub-Basin Agency; CDC = Community Development Council; CDD = community driven development; CPMO = central program management office; DAIL = Department of Agriculture Irrigation and Livestock; DRRD = Department of Rural Rehabilitation and Development; EPCS = Engineering, procurement, construction supervision support consultant; FCAS = Fragile and Conflict-Affected States; MAIL = Ministry of Agriculture, Irrigation and Livestock; MEW = Ministry of Energy and Water; MRRD = Ministry of Rural Rehabilitation and Development; M.Sc. = Master of Science; NEPA = National Environmental Protection Agency; PIU = project implementation unit; Q = quarter.

5 Action Plan Management

43. Effective implementation of the AIWRDIP FCAS approach is reliant on effective management of the AIWRDIP FCAS Action Plan. This requires appropriate staffing, capacity development, monitoring and resources.

5.1 Staffing

44. A detailed conflict sensitivity resources requirement has been developed for the ADB AFRM Conflict Sensitivity Handbook. This includes clear responsibilities for all staff in the delivery of an FCAS approach. All project-related staff (in AFRM, Government line ministries and supervision consultants/contractors) should be oriented in their obligations (by the AFRM FCAS Focal Point) and should follow their responsibilities as outlined in the Handbook.

45. An appropriate FCAS staffing structure in place within AFRM, the GoIRA and supervision consultants (where contractors are engaged in related activities – community mobilization, monitoring etc. - they should also engage FCAS staff) will be required. This is defined below.

5.1.1 At the AFRM Level:

- *AFRM FCAS Focal Point* – Responsible for oversight of the AIWRDIP FCAS Approach.
- *AFRM Sector staff (Sector Heads, Project Officers, Analysts)* – Responsible to provide the link between the AFRM FCAS Focal Point and the project team.
- AFRM M&E Officer – Responsible for supporting in the application of the AIWRDIP FCAS Monitoring Framework.

5.1.2 At the Government Level:

- PMO FCAS Officer – Responsible to oversee the engagement of PIU FCAS Officers and to coordinate across Government and with AFRM.
- PIU FCAS Officers – Responsible to oversee the implementation of the AIWRDIP FCAS Approach and coordinate with the Supervision Consultant and Contractor(s).

5.1.3 At the Supervision Consultant/Contractor Level:

- Supervision Consultant FCAS Officer – Responsible for implementation of the AIWRDIP FCAS Approach, compliance and reporting, and coordination with Contractor.
- Contractor FCAS Officer/Social Development Staff – Responsible for planning and implementing community engagement and consulting with Supervision Consultant FCAS Officer.

5.2 Capacity Development

46. The AIWRDIP FCAS Conflict Sensitivity Capacity Development Plan sets out the various considerations to be made in terms of FCAS capacity development within the AIWRDIP. This should be monitored by the AFRM FCAS Focal Point.

5.3 Monitoring and Reporting on the FCAS Action Plan

47. In order to ensure the AIWRDIP FCAS Action Plan is implemented properly, regular monitoring and reflection on the (un-)intended negative and positive impacts of the project on the conflict and the effect of the conflict on the project's work is critical to adopt the activities to the changing context and local conflict dynamics. A project/program that appears conflict sensitive on paper is not guaranteed to be so in practice. Thus, continued monitoring of the conflict sensitivity of the project is necessary.

48. Such monitoring should include field visits and meetings with different project stakeholders including community members, CBOs/CSOs, local government departments and etc. The PMO field and M&E officers and the contractor are to regularly report on the implementation of the AIWRDIP FCAS Action Plan and to collect robust information about the intended and unintended positive and negative impacts of the project. Field officers are to regularly report to the FCAS staff if the project unintentionally contributes to conflict or furthering the tension in the region. Reporting should also focus on the emerging opportunities for peace if these are not properly exploited in the AIWRDIP FCAS Assessment and Action Plan.

49. Monitoring should be conducted in accordance with, and contribute to, the AIWRDIP FCAS Monitoring Framework.

5.4 Resources

50. Given the AIWRDIP is in the relatively early stages of processing and does not have procurement staff recruited it is too soon to provide accurate estimates of the budget required to operationalize the approach. An indicative budget is presented in Annex 3, however this will require further development by the AFRM FCAS Focal Point in collaboration with project leads and procurement staff.

Annex 1: AIWRDIP Adapted Peace and Conflict Impact Assessment (PCIA)

The PCIA is a comprehensive tool through which the potential peace and conflict impacts of a project can be identified at the political, economic, social, cultural and security levels. The PCIA is discussed in more detail in the FCAS Action Plan Guideline. What follows here is an adaptation of the PCIA for the AIWRDIP context

POLITICAL IMPACT
(adapted from the PCIA)

Possible Impact	**No**	**Partly**	**Yes**	**Explanation/Reasoning**	
1. POLITICAL POWER STRUCTURES				Positive	Negative
Might the project impact *political power structures* in terms of…				The project might…	
…initial project relationships with politicians and powerbrokers			X	…help establish professional working relationships and collaboration to ensure transparency and accountability	…raise expectations which could be difficult to manage later on increasing chances for corruption and interference from powerbrokers if their expectations are not met
…relationships between certain political groups or authority structures?			X	…promote coordination and harmony among different stakeholders including government, private sector, civil society and local communities because of the national status and importance of the project. E.g., the processing stage of the project has already initiated coordination among ASBA and DAIL. …tie shared interests. E.g. the relations between MAIL and MEW as both ministries share interests in the project.	…enhance the role of certain political groups or authorities, leaving behind a large number of stakeholders that will limit buy-in and shared cooperation, and may result in obstruction …pave the way for unhealthy competition among certain political groups in order to gain licit/illicit interests.
…traditional administrative authority?		X		…help the authorities and entities in capacity development to step forward towards modernized administration.	
… (formal or informal political structures) and processes - either in the formal arena of institutionalised state politics, or in the informal arena of civil society?			X	…provide opportunity for cooperation among formal and informal political bodies as well as central and provincial entities …strengthen the attention and interest of informal bodies to seek their interests; hence, provide support to formal bodies for the success of the project.	…cause discontent among informal political structures if they are excluded.
2. POLITICAL PROCESSES					
Might the project impact *political processes* in terms of…				The project might…	

…people's identity, protection, freedom, or political participation?			X	…enhance participation of people to ensure the smooth implementation of the project. This will enrich interaction and understanding among surrounding communities and develop mutual acceptability, helping the resettlement process …decrease the amount of displacement as a result of increase in the water availability in the post-implementation (operation) stage. …facilitate the management and resolution of current conflicts among up and downstream communities and tribes that have roots in the lack of adequate water.	…create imbalanced biases towards certain group of people leaving some people unsatisfied which may negatively impact on political participation of people not only for this project but also for future development opportunities. …pressurize and coerce those communities in the upstream whose land will be acquired during the implementation stage if the already recommended sound resettlement strategies and approaches are not pursued in the right form and timing.
…involvement in political or decision-making processes?			X	…enable increased involvement around water allocations, resettlement strategies and community development planning (through CDDCs) which could reduce the distance between the State and citizens as well as enhance the wider project …strengthen decision-making processes at local level through the use of Project-Community Agreements which open up space for political engagement	…reduce opportunities for wider engagement in decision-making processes if the project bypasses communities …entrench existing asymmetric power dynamics if only local powerholders are included as local representatives, thus further marginalising the more vulnerable
…people's ability to gather together, around issues, or participate in social or political institutions, organisations or associations?			X	…open up space for joint working between communities to develop and support solutions to problems emerging due to the project (e.g. through CDDCs, PCAs, etc.) …create new opportunities for social interaction through the above as well as project-based employment	…close down opportunities for communities to collaborate and work together if there is a perception that the project does not benefit all communities equally.
…levels of participation by women in political processes?		X		…positively affect the socio-economic status of women. This could be further nurtured if women leaders and representatives support the project through their involvements in political processes.	
…the consolidation of constructive relationships between state and civil society?		X		…narrow the current gap between government and civil society by providing an opportunity for the civil society to work together with government institutions for the success of the project.	…increase chances for grievances over land or resettlement related conflicts if the process is not managed properly which could widen the gap
…transparency and accountability of public decision-making?			X	…become an example of transparency and accountability if the project pursues an inclusive stakeholder and social engagement strategy throughout all stages especially decision-making. …raise awareness and participation of marginalised groups in the community. …maintain transparency and accountability if the project complies with ADB and GIRoA policies. …improve governance through effectively responding to the local demands and provision of timely solution to the arising grievances to land and resettlement related issues	…decrease public trust in the ability of local government to implement such a mega project at a transparent and accountable way …increase public grievances if local government fails to effectively implement the project. …face pressure by political/tribal entities in power regarding their engagement in the project that will lead to increased local tensions, social exclusion and decreased transparency and accountability. …increase land related conflicts in the upstream area during land acquisition especially if the

					process is lacking transparency and awareness raising
…inter-group tensions?			X	…provide opportunities to manage and resolve inter-group tensions through the use of CDDCs …reduce tensions over water allocations through inter-group coordination during water allocation decisions	… exacerbate current inter-group tensions due to lack of water if the project does not benefit all the communities and different groups equally during processing and implementation. …increase the existing tribal division, if it fails to equally benefit all tribes or their balanced involvement in project related decision-making process.

ECONOMIC, SOCIAL & CULTURAL IMPACT
(adapted from the PCIA)

Possible Impact	**No**	**Partly**	**Yes**	**Explanation/Reasoning**	
1. Economic Strengths & Weaknesses				Positive	Negative
Might the project impact *the present economic situation* in terms of…				The project might…	
Livelihoods and employment?			X	…recruit competent staff through open competition increasing chances for transparency and social inclusion …provide opportunities for employment to those resettled and local communities in project activities strengthening social cohesion and co-existence	…limit the possibilities for effective project recruitment if the process influenced by the patronage networks, government officials and powerbrokers
Food & nutrition, education?			X	…directly impact in increase of agricultural and livestock products. …create more alternative livelihood opportunities for the local population i.e. the newly introduces cash crops such as pistachio and saffron.	
Shelter or clean water?			X	…improve physical living conditions of displaced people through provision of well-planned housing schemes that maintain the social network of those displaced	…worsen the physical and social conditions of the displaced households with inadequate cash compensation for their losses
Reliance on an economy related to violence (e.g. small arms)?			X	…enhance livelihoods of farming communities with increased water availability reducing the need to engage in the illicit economy (e.g. poppy production).	…result in economic pressures for those who are resettled that increase the risk of engagement in illicit economies
Capacities for individuals and communities to define problems, formulate solutions, or			X	…open up space for collaborative problem solving through the CDDCs and PCAs …provide capacity development in conflict management and collaborative working to a variety of stakeholders that will	…limit the potential development of community capacity by only focusing on existing powerholders as representatives of communities and bypassing marginalised community members

resolve problems?				benefit across communities	
The status of indigenous or vulnerable groups?			X	…increased participation of the underrepresented tribes supports the principles of social inclusion and equity	…increase deprivation and sense of vulnerability and social exclusion if underrepresented tribes are not properly engaged under the project … exacerbate the risk of conflict between displaced people and their host communities over the available resources in the resettlement sites.
2. Social Attitudes or Coping Mechanisms					
Might the project impact group social attitudes or coping mechanisms *unintentionally* in terms of…				The project might…	
Shared values, cooperation or mutual respect and trust between groups?			X	…enhance social relations between farming communities if water allocation decisions are made in a more inclusive way. …. strengthen urban social cohesion with the implementation of CDDCs to facilitate the integration of those resettling. …further enrich social cohesion and mutual co-existence communities as currently farmers help Kochi's by allowing their cattle to feed into their orchards and crops after harvesting season.	…negatively affect the relation between groups if the project benefits certain groups while excluding others.
Particular attitudes?			X	…enhance government legitimacy in the eyes of people if social inclusion is promoted through this project.	…increase negative attitudes and rumour-mongering, especially in the upstream areas, if effective community engagement is not employed (e.g., the belief that the project was a strategy to flood out the Taliban). …result in the perception that the Government is not interested in those poor districts not directly targeted by the project if they do not receive some form of indirect benefit.
Inclusion of members from the various communities in decision-making?			X	…enable the tribal elders who play key role as connector in bringing various tribes to work together and to jointly decide for the wellbeing of the province. …provide greater space for community's engagement in decision-making through the CDDCs and PCAs.	…broaden social dislocation if certain diversity attitudes are not maintained. …strengthen existing discriminatory power imbalances if decision-making processes are not inclusive.
The ability of individuals & groups to work together for mutual benefit?			X	…provide the chance for surrounding communities to become active in working together for the success of the project through CDDCs and PCAs. …strengthen the role of local government (ASBA, DAIL, etc.) in bringing together communities for their mutual benefit through comprehensive community engagement.	…create obstacles to effective community collaboration if there is a perception of unfair resources allocations. …reduce opportunities for productive collaboration if resettlement planning is not appropriate and implementation weak.
Those promoting tolerance or inclusion?			X	… strengthen the position of those promoting tolerance or inclusion (e.g., through the CDDC and PCA) …provide opportunities to engage those promoting tolerance or inclusion through the ASBA conflict management facility and the CDCs	…. weaken the position of those promoting tolerance or inclusion by strengthening the position of powerbrokers and bypassing marginalised or vulnerable community members …undermine work conducted by those promoting

					tolerance or inclusion through an inappropriate resettlement programme
3. ROOT CAUSES OF ECONOMIC, SOCIAL OR CULTURAL VIOLATIONS					
Might the project impact the *tribal and social conflict* in terms of….				The project might…	
The root causes in conflict profile?			X	…be considered as connector between various tribes and communities if the huge potential of the project to bring together local communities, tribes and districts, increasing social cohesion and solidarity among the people, is realised	…cause deeper community conflict if tribal elders try to benefit their patronage networks through the project at the expense of others …increase pressure on already scarce resources if resettlement is not adequately planned for and resourced in terms of community engagement and CDDCs.
Underlying attitudes or behaviours?			X	…strengthen support for productive collaboration between communities and between the Government and citizens for the development of the country …increase inter-group engagement that benefits wider society	…strengthen negative attitudes held towards Government, weakening their position in a volatile area, if groups perceive they are 'losing out' in the project.
Inclusion and participation of citizens?			X	…significantly improve inclusion in decision-making processes through the CDDCs, PCAs and engagement with ASBA, as well as the implementation of effective community engagement.	…undermine efforts to improve inclusion and participation by working only with established powerbrokers and not seeking to engage representatives from marginalised and vulnerable groups

SECURITY IMPACT TOOL (adapted from the PCIA)					
Possible Impact	**No**	**Partly**	**Yes**	**Explanation/Reasoning**	
1. CONFLICT BETWEEN COMMUNITIES				Positive	Negative
Might the project impact on the potential for conflict *between the community and others* in terms of…				The project might…	
Tensions or the relationships between the communities in targeted districts and those not targeted?			X	… diminish existing, or reduce potential for new, perceptions of exclusion of citizens in those districts of Kandahar Province not targeted by the project if they receive some form of indirect benefit from the project (e.g. through CDDCs or improved agricultural supply chains)	…create significant resentment towards communities in targeted districts, as well as ill-feeling toward Government for perceived neglect.
Disputes and conflict between those communities resettling and those communities absorbing the			X	…increase social cohesion if local stakeholders and decision-makers utilise effective community engagement strategies and ensure additional pressure on resources is effectively addressed and equal access to government services	…increase division if local stakeholders and decision-makers do not effectively engage communities or ensure additional pressure on resources is effectively addressed and equal

resettled?					access to government services
Conflict between remaining upstream communities and downstream communities?			X	…reduce support for insurgent groups in upstream areas through enhancement of service delivery and therefore government legitimacy …create opportunities for collaboration between farmers of different communities/districts through water allocation decisions and maintenance of the irrigation system. This opportunity could be used for peacebuilding and government legitimacy.	…increase the vulnerability of upstream areas to insecurity as insurgents push back against the project. This could impact on conflict between upstream and downstream communities throughout and after the resettlement process …exacerbate disputes over access to water, increasing insecurity in the project context and vulnerability to insurgents' attacks. …cause grievances and increase insecurity if the land acquisition and resettlement process of upstream communities are not properly handled.
2. CONFLICT IN THE COMMUNITY					
Might the project significantly change the potential for violence *between people within the community* in terms of*…*				The project might…	
Capacities to pursue non-violent options?			X	…enhance conflict management capacities to the ASBA, CDCs and through the CDDC and PCAs. …. provide opportunities for dialogue-based resolution of disputes through the PCAs.	…push community members toward insurgency groups by discriminating during selection …increase the burden for conflict management interventions of local stakeholders by giving preference to existing powerholders at the expense of marginalised and vulnerable groups
Impacting on existing power dynamics within communities?			X	…help to rebalance power dynamics in peaceful ways if local stakeholders and powerbrokers are persuaded of the benefits of greater inclusion in decision-making and are supported in doing this. …provide opportunities for greater citizen participation bringing greater benefit to the community thus reinforcing the need for inclusive participation.	…increase the chances for deprivation and reinforcing division and polarization if local stakeholders/powerbrokers are empowered to promote patronage interests rather than common interests. …result in violent pushback from local stakeholders/powerbrokers if they perceive their power to be threatened.
Water allocations?			X	• …receive support from ASAGs as majority of them are local people and their families are also involved in agriculture who are also suffering water crisis.	…disturb the flow of irrigation water during construction of dam and rehabilitation of canals which will cause in creating tensions and anger among farming communities.
Making potential victims into a more or less attractive target?		X			• …face anger and tension among local communities if operations by security forces in the upstream areas and project neighbouring districts cause in assassination of innocent people.
3. UNDERLYING CAUSES OF SECURITY RIGHTS DENIAL					
Might the project impact the root causes of				The project might…	

***security rights violations* in terms of…**					
Addressing existing water disputes and reducing the risk of future disputes			X	… improve the ability of local stakeholders to address water conflict through increased water supply and more efficient water allocation systems.	…create additional demand for water through resettlement into downstream areas which may lead to conflict. …be unable to meet additional water demand (for irrigation and urban drinking) if the current water shortage continues.
Enhanced provision of basic needs			X	…enhance basic service delivery through the resettlement process and CDDCs which reduce tensions and addresses some of the root causes of conflict, thus enhancing government legitimacy and further reduce the risk of conflict.	…neglect to develop and implement an appropriate resettlement plan that addresses concerns over service delivery of those displaced and those in areas of absorption.
Affecting support for insurgency movements			X	…. reduce support for insurgency movements (local and national) if inclusive practices are followed and service delivery is improved in terms of quality and equity as this will increase government legitimacy.	… turn people towards insurgency movements if: project implementation is exclusionary; service delivery does not improve or worsens; there is a perception that some groups benefit at the expense of others; or, the resettlement process is significantly problematic.
4. CONFLICT RESOLUTION & COMMUNITY-BASED PROTECTION					
Might the project impact *local forms of conflict resolution or community-based protection* such as *…*				The project might…	
the local Shura?			X	…promote the engagement of the Shura in the project, particularly in terms of managing local conflicts, through the PCAs and CDDCs. …. reinforce the community engagement capacity of the Shura through engagement in trainings. …. facilitate the strengthening of relationships between local government and local Shuras, particularly in upstream areas, through regular and sustained consultation.	…undermine the Shura by excluding it from community consultation processes. …increase security risks for the Shura by not appropriately consider the risks they face as a result of their engagement in the project and implementing mechanisms to reduce these risks (e.g. being targeted by insurgent groups).
the Community Development Council (CDC)?			X	…promote the engagement of the CDC in the project, particularly in terms of managing local conflicts, through the PCAs and CDDCs. …. reinforce the community engagement capacity of the CDC through engagement in trainings. …. facilitate the strengthening of relationships between the CDCs and other local stakeholders, particularly in upstream areas, through regular and sustained consultation.	…undermine the CDC by excluding it from community consultation processes. …increase security risks for the CDC by not appropriately consider the risks they face as a result of their engagement in the project and implementing mechanisms to reduce these risks (e.g. being targeted by insurgent groups).
the conflict management facility in the ASBA?			X	…promote the role of the conflict management facility in the ASBA as the key actor in managing water-related conflict throughout the project area. …. reinforce the conflict management and community engagement capacity of the ASBA through engagement in trainings. …. facilitate the strengthening of relationships between the	…increase security risks for the ASBA by not appropriately consider the risks they face as a result of their engagement in the project and implementing mechanisms to reduce these risks (e.g. being targeted by insurgent groups).

				ASBA with other local stakeholders, and communities particularly in upstream areas, through regular and sustained consultation.	
Local government departments?			X	…support more effective cross governmental coordination through bringing different departments together …. reinforce the community engagement and conflict sensitivity capacity of local government departments through engagement in trainings. …. facilitate the access to and strengthening of relationships between local government departments and other local stakeholders, particularly in upstream areas, through regular and sustained consultation.	…undermine the perceived legitimacy of local government by not effectively engaging communities, failing to be transparent in decision-making and delivering for some groups at the expense of others.

Annex 2: FCAS Conflict Sensitivity Options

	Category	**Potential positive impact project activities could have on the context**	
	Link to Conflict Sensitivity (Primary Impact; Secondary Impact)	Strengthening of CONNECTORS and/or weakening of DIVIDERS; Increased trust of community, Improved operational space, Effective implementation	
	Potential Conflict/Peace Issue	**Required Approach**	**Possible Actions**
1	The wide range of benefit of the project offers great potential for local communities, tribes and districts to work together, increasing social cohesion and solidarity among the people.	Ensure good governance is a key focus of project implementation	Involve communities in decision-making processes where possible making specific efforts to ensure a wider range of voices beyond existing and traditional powerbrokers Ensure full transparency in decision-making processes and articulate these decisions clearly through community engagement. Engage on a regular and sustained basis with communities to ensure their active participation and to and restore the damaged relationship between the State and local communities, resulting in increased government legitimacy and more trust from the public. Ensure all communities benefit equitably and their opinions and reasonable demands are considered in the decision-making processes.
2	The project can act as a catalyst for improved local government coordination, enhancing good governance, service delivery and strengthening government legitimacy in the eyes of people.	Promote effective local government coordination	Establish effective coordination mechanisms among local government departments that are directly and indirectly engaged in the project. Engage with departments not involved where conflict sensitivity benefit may be evident. Provide appropriate capacity development to enable local government departments to effectively work together to address coordination problems (e.g. conflict management) and to engage more effectively with communities (e.g. community engagement). Promote the (adapted) use of the FCAS Perception Survey (see FCAS M & E Guideline) to promote greater accountability of local government to their communities
3	The rehabilitation and extension of the irrigation system should increase the efficiency of water management systems which could decrease water related conflicts leading to greater social cohesion.	Plan processes/activities to support effective water governance	In order to strengthen water governance structures and process, and to ensure all water related conflicts are resolved peacefully, water governance recommendations made in the Integrated Water Resource Management (IWRM) Plan should be followed. Follow recommendation made under Sub-Component 2 of the TRTA The establishment of a district level Water Users Association in each of the targeted seven districts and the sub-basin committee (SBC) (see IWRM Plan) could also be instrumental in strengthening water governance. ASBA and DAIL, in coordination with Mirabs and lead farmers, should establish a committee in order to review the current water distribution system (Haqaba) and make any necessary recommendations for change Ensure the delivery of a strong community engagement strategy to effectively bring communities together

4	The project has the potential to create opportunities for collaboration between farming communities to better manage the water distribution system. This opportunity could be used for peacebuilding and government legitimacy.	Strengthen the role of the SBC and WUAs in delivering the AIWRDIP FCAS approach	Provide full orientation on the AIWRDIP FCAS approach to the SBC and all district WUAs. Provide capacity building in community engagement and conflict management to the SBC and all district WUAs working closely with the ASBA. Utilise the CDDC function to engage in interventions that bring farming communities together over common problems/goals to build problem-solving capacity and social cohesion.
5	The project can create direct and indirect employment opportunities in the targeted districts reducing vulnerability to migration, unemployment and poverty, strengthening social cohesion, security and stability in the region and increasing government legitimacy in the eyes of people.	Promotion of labour-intensive implementation of the project.	Recruit un-skilled labour (and skilled labour where possible) directly from the project surrounding communities into labour-intensive engagement through community procurement guidelines, taking into account importance of ensuring tribal balance in recruitment and transparency in selection. The project-community agreement (PCA) could include a quota system for targeting the inclusion of vulnerable people in recruitment. This would require proper consulted with the local population to ensure they are appropriately sensitized on issues the vulnerability and agree with the allocated quota (refer to FCAS Project-Community Agreement Guideline). Ensure the protection of labour rights for local labour and facilitate social interaction and engagement through employment to strengthen social cohesion.
6	The project will stimulate local economies and support local business reducing vulnerability to migration, unemployment and poverty, strengthening security and stability in the region and increasing government legitimacy in the eyes of people.	Community-based procurement Widen business engagement beyond project requirements	Work with local stakeholders and the business community to identify what can be sourced locally in terms of materials and machinery. Support existing and emerging small-scale enterprises and provide micro-finance facilities in order to prepare a better platform for the post-implementation impacts of the AIWRDP. This initiative could be supported through projects under the Community Driven Development Component (CDDC) and should focus on agricultural supply chain investments to indirectly engage communities in non-targeted districts. Ensure procurement is conducted through a transparent and accountable process

	Category	**Potential negative impact project activities could have on the context**	
	Link to Conflict Sensitivity (Primary Impact; Secondary Impact)	Weakening of CONNECTORS and/or strengthening of DIVIDERS; Decreased trust of community, Reduced operational space, Ineffective implementation	
	Potential Conflict/Peace Issue	**Required Approach**	**Possible Actions**
1	The project has already raised significant expectation which, if unmet, will likely result in significant tension and ill-feeling toward the project which could manifest into obstruction and threat to personnel and property.	Adherence to good governance principles Effective community engagement	Orient all project staff on the AIWRDIP FCAS Approach to ensure they are aware of the risks of raising expectations and equipped with the tools to manage them. Make public ADB and GoIRA procurement policies and procedures and ensure all stakeholders are aware of these to ensure they recognise full transparency will be adhered to during procurement processes. Employ a fully transparent approach through all engagement with local stakeholders and communities to ensure they are fully aware of the project and any benefits that may accrue to them, as well as those that will not, and the process they must engage in to obtain those benefits. Ensure

			the projects delivers what it promises. Engage with the ASBA, SBC, WUAs, CDCs and Project Community Agreement Committees (PCACs) to ensure effective consultation on water allocations to help avoiding raise in expectation of famers who are in high demand for irrigation water (see FCAS Community Engagement Guideline & FCAS Project-Community Agreement Guideline). Ensure effective community outreach in upstream areas to address information gaps regarding the land acquisition and resettlement process to manage expectations. This must go beyond working only through community representatives to actively being present in communities to ensure accurate information is provided. Work with communities of absorption to sensitise them on what they can expect in terms of support to facilitate the integration of those experiencing project-based displacement.
2	The project targets 7 of the 14 districts in Kandahar Province. These districts represent roughly 65% of the Kandahar Provide population and enjoy 95% of its economy. This may result in significant resentment in districts not targeted, both towards Government and other districts.	Effective stakeholder and community engagement in non-targeted districts. Investments in non-targeted districts	Engage in a public information campaign to ensure accurate information is delivered to non-targeted districts explaining the project and how any indirect benefits may accrue to them despite not being a direct beneficiary Examine opportunities to connect with other infrastructure projects to provide benefit to non-targeted districts. For example, the community-driven development components (CDDCs) under TAPI (Turkmenistan-Afghanistan-Pakistan-India Gas Pipeline Project) could provide some benefit these districts Consider the allocation of some CDDC funds under the AIWRDIP to be utilised in non-targeted districts to promote agricultural supply chains that would link to farming communities in downstream areas. This would widen the benefit of the project and strengthen social and economic interacts between districts, reducing resentment.
3	With a total investment of $460m, the AIWRDIP represents a significant resource transfer. It should be expected that attempts to corrupt, extort and steal will take place. This would increase the risk of tension and conflict, especially if it results in delivery problems	Compliance with ADB/GIRoA Procurement and Recruitment Policies Full transparency over procurement processes and project decisions Effective community engagement	Expectations with politicians and other powerbrokers at provincial level regarding investments into certain areas, or the awarding of contracts, etc, must be managed from the start to ensure the risk of corruption or extortion is minimised. Staff recruitment and goods/services procurement should follow ADB guidelines and be transparently conducted to ensure local stakeholders and communities are appropriately informed. Community-based procurement should be promoted where possible as a project policy to provide a safeguard against extortion (recognising the limits of this). The Project-Community Agreement could be developed (in consultation with the PCA committee) to include a specific criterion that ensure procurement of local labour and construction materials is done in a way that is socially inclusive. This would reinforce the principle of introducing the most vulnerable people to work under the project or provide services as well as including communities in procurement processes to help offset risk. The establishment of a project monitoring and oversight committee comprising of local government department representation, tribal elders and youth-led civil society organisations would help ensure transparency and increase both community engagement in the project, and collaboration between the Government and communities.
4	Land acquisition in upstream areas may	Development and	The LARP process should take into account historical issues around land registration and, in

	result in land-related conflict causing wider grievances and increasing insecurity if not managed appropriately and speedily.	implementation of context-responsible LARP	conjunction with the ARAZI, put in place appropriate measures to address irregularities in order to minimise the risk of conflict (see the AIWRDIP FCAS Assessment). The LARP should be developed in close consultation with upstream communities, including site visits arranged with representatives of these communities, to ensure land and crop mapping is accurate. Orientation on ADB policies regarding the LARP should take place with all relevant government ministry (local and national) staff to ensure there are no delays due to coordination problems. The implementation of the LARP should be actively and closely monitored in collaboration with the monitoring and oversight committee in order avoid any mismanagement in the acquisition phase. The establishment of an effective Grievance Redress Mechanism (GRM) and its widespread publicity and awareness raising of the local population to utilize this mechanism can provide opportunity for the local population to submit their complaint effectively and avoid chances for exacerbating grievances and concerns. This should be connected to the Project-Community Agreement.
5	Little is currently known about resettlement options or intentions. Resettlement onto proposed government-owned rural land may result in issues around access to services and livelihoods, as well as conflict with other rural communities. While resettlement in government-owned urban land brings demands for high-value land and increasing pressure on scarce resources. Both of these could cause conflict between the displaced people and communities of absorption	Development of post-resettlement support and follow-up through project lifetime	Consult with communities to be displaced on their resettlement options and preferences to gain a comprehensive understanding of likely areas of absorption and map those areas for socioeconomic opportunities/challenges and conflict dynamics. Create a resettlement advisory group comprised of representatives of those to be displaced and communities of absorption, along with local government departments and local stakeholders (tradition leaders, youth leaders, security actors, business community, etc.) to support the resettlement process including sustainable integration and conflict management. Consult with those to be displaced, local government departments, local stakeholders and communities of absorption through the resettlement advisory group to develop interventions to support resettlement and integration. Allocate resources for Community-Driven Development Components (CDDCs) to be implemented in communities of absorption to reduce resource pressures, enhance conflict management and promote social cohesion, thus supporting the resettlement and integration process (see Community-Driven Development Component Guideline) Coordinate with governmental departments to ensure appropriate service provision and to minimise negative impacts of increased population levels on service demand
6	Exclusionary decision-making processes and accrual of project benefits is likely to drive division, especially if constructed along identity lines.	Enforcement of inclusion policy in regard to decision-making and benefit accrual.	The project, in all phases, should follow an inclusive community engagement strategy, ensuring the involvement of all concerned tribal/identity groups and communities in order to reduce/prevent further tribal/identity-based division. Specifically target those traditionally marginalised from decision-making (women, youth, minorities, the (relative) poor) to empower their voice. Sensitise other community members to build consensus on the value of inclusion for community and societal development and wider peace. Include local government departments focused on social issues in decision-making processes to ensure government policy regarding social groups is integrated where possible (e.g. Directorates of

			Tribal Affairs, Women's Affairs, Culture and Youth, etc.).
7	Construction phases may disrupt the flow of irrigation water, possibly causing creating tension and anger among farming communities	Implementation of mitigation mechanisms Effective community engagement	Consult with the ASBA, SBC and WUAs to determine likely impacts of construction, most appropriate mitigation mechanisms and necessary community engagement strategies to effectively inform farming communities of the various phases of construction. Phase construction during least impactful periods to minimise potential negative impacts. Consider area phases of construction to minimise scope of impact. Consult with the ASBA, SBC and WUAs to determine construction schedules. The project construction scope of work should include construction of any necessary temporary infrastructure (e.g. temporary canals,) or other mechanisms to avoid interruption of water flow during construction where impact is determined. Engage in regular and sustained communication and information-sharing with farming communities to appraise them of progress against construction schedules and any necessary adjustments, as well as adjusted mitigation strategies, if delays are likely. This must be done in good time to enable farming communities to adjust.

	Category	**Potential positive impact the context could have on the project**	
	Link to Conflict Sensitivity (Primary Impact; Secondary Impact)	Improved operational space, Effective implementation, (possible) Increased trust of community; Strengthening of CONNECTORS and/or weakening of DIVIDERS	
	Potential Conflict/Peace Issue	**Required Approach**	**Possible Actions**
1	While there is great expectation attached to the AIWRDIP, this also translates into significant public support. If properly managed this could be a significant asset, facilitating a secure working environment for project teams, strengthening Government legitimacy in the eyes of the people, and reinforcing local peacebuilding capacities	Adherence to good governance principles Effective community engagement	Engage in a public information campaign to ensure accurate information is delivered across Kandahar province explaining the project, its aims and objectives, schedules and activities. Provide the public with regular updates in terms of progress and any mitigation strategies employed to address delays. Follow up on public information campaign with targeted community engagement events in areas affected by the project to provide more detailed information on how the project will impact that area (positively and negatively) and consult communities on their concerns etc. Ensure full transparency in decision-making processes and articulate these decisions clearly through community engagement. Engage on a regular and sustained basis with communities to ensure their active participation and to and restore the damaged relationship between the State and local communities, resulting in increased government legitimacy and more trust from the public. Involve communities in decision-making processes where possible making specific efforts to ensure a wider range of voices beyond existing and traditional powerbrokers Utilise the established project monitoring and oversight committee (see above) to help ensure transparency and increase both community engagement in the project, and collaboration between the Government and communities, countering negative perceptions of the Government. Public support for the project should be regularly monitored through the (adapted) FCAS Public

			Perception Survey to track satisfaction levels and enable adjustments in the community engagement strategy if required. Coordinate between local security actors, project security and communities to maximise the potential of public support in terms of ensuring a secure working environment for project and government staff.
2	Local leaders (particularly tribal elders, the Shura and DDA members, etc.) will play an important role in facilitating the project and are instrumental in bringing groups together and managing conflict.	Facilitate key roles for local leaders in engaging with the project Utilise the opportunity to gain local leader commitment to more inclusive practices	The project should engage local leaders from the very first stage until handover and operation. In order to keep these groups involved, their views and opinions should be respected and considered in decision and policy making processes, so that they realize their role counts in the project success and will maintain motivated. Involve local leaders in the project monitoring and oversight committee to ensure strong community voices, reinforce their role as mediators and conflict management bodies to ensure the project activities are implemented as planned and to publicly demonstrate the important role they are playing in the project. Develop Project-Community Agreements in collaboration with local leaders to articulate the role they will play in supporting the project and what support they can expect in return. This should include support in terms of ensuring safe access to communities and project sites, project security arrangements engaging local communities, conflict management procedures to be followed in the event of disputes between the project and communities and community oversight of project implementation. Work with local leaders to develop their appreciation for more inclusive practices for the benefit of communities and society. Generate a consensus on how to ensure the inclusion of those more marginalised and vulnerable in decision-making. Utilise the CDDCs to provide opportunities for greater inclusion and demonstrate the role local leaders have had in the development of their communities.
3	Existing governance structures provide some key functions necessary for the successful implementation of the project and can be engaged to further strengthen water governance in the Arghandab Sub-Basin	Support the strengthening of governance structures	Provide appropriate capacity development to enable local government departments to effectively work together to address coordination problems (e.g. conflict management) and to engage more effectively with communities (e.g. community engagement). Implement recommendations made in the Integrated Water Resource Management (IWRM) Plan in order to further strengthen water governance structures and process, and to ensure all water related conflicts are resolved peacefully, water governance recommendations made should be followed. The establishment of a district level Water Users Association in each of the targeted seven districts and the sub-basin committee (SBC) (see IWRM Plan) could also be instrumental in strengthening water governance. Provide capacity support to the ASBA's conflict resolution department to strengthen its ability to manage water-related conflict.

4	Kandahar Province has various examples of existing social capital that can be utilised and supported to help overcome negative implications of the project	Develop and implement strategies that support the further development of social capital	Build on existing patterns of sharing resources to cope with the water crisis by revising the existing water distribution (Haqaba) system to ensure an equitable water distribution reducing the current inequalities and improving water distribution. Utilise the CDDC to provide opportunities for intra- and inter- group collaboration to resolve common problem and address common goals. This will reinforce mutual cooperation and strengthen social cohesion, as well as providing practical ways to offset challenges associated with the resettlement process. Ensure effective community engagement that sensitises communities of the needs of the most vulnerable and builds consensus over addressing these needs as a priority. Work with tribal and religious leaders to support these messages. Push for the insertion in Project-Community Agreements for direct measures that will support inclusion (social, economic and political) and work to minimise the risks of conflict. These agreements should clearly articulate the responsibilities for both the community and project to ensure this.
5	Civil society in Kandahar Province, while limited in capacity, is eager to engage in the project. Civil society engagement could further assist in improving government legitimacy in the eyes of the people.	Engage with local civil society	Consult with local civil society, local government and community representation to identify appropriate areas for civil society engagement, necessary mechanisms for such engagement and likely contenders within local civil society who could engage. Include suitable representation from civil society in the project monitoring and oversight committee and ensure they are actively engaged throughout. Provide capacity building support for civil society members in areas of advocacy, governance, transparency and accountability, and monitoring and oversight to enable them to more effectively engage with the project and to strengthen their sustainability.

	Category	**Potential negative impact the context could have on the project**	
	Link to Conflict Sensitivity (Primary Impact; Secondary Impact)	Reduced operational space, Ineffective implementation, (possible) decreased trust of community; Weakening of CONNECTORS and/or strengthening of DIVIDERS	
	Potential Conflict/Peace Issue	**Required Approach**	**Possible Actions**
1	Public trust in the Government is low and while there may be significant support for the AIWRDIP there is also significant concern the Government cannot implement the project effectively and in a transparent and an accountable way.	Adherence to good governance principles	The establishment of a project monitoring and oversight committee comprising of local government department representation, tribal elders and youth-led civil society organisations would help ensure transparency and increase both community engagement in the project, and collaboration between the Government and communities, countering negative perceptions of the Government. Develop the capacity of local government departments in areas of transparency and accountability, and reinforce their role in providing timely information and to be accountable to the public. FCAS Perception Surveys may help with this (see FCAS M & E Guideline). Engage on a regular and sustained basis with communities to ensure their active participation and to and restore the damaged relationship between the State and local communities, resulting in increased government legitimacy and more trust from the public.

2	Undesirable interventions in the project (corruption, extortion, political interference, etc.) can result in significant pressure on contractors and supervision consultants to comply with demands to ensure the project progresses ore that they derive additional benefits (e.g. longer contracts). This can create local tensions, drive up social exclusion and decrease transparency and accountability, all contributing to conflict	Compliance with ADB/GIRoA Procurement and Recruitment Policies Full transparency over procurement processes and project decisions Effective community engagement	Expectations with politicians and other powerbrokers at provincial level regarding investments into certain areas, or the awarding of contracts, etc, must be managed from the start to ensure the risk of corruption or extortion is minimised. Staff recruitment and goods/services procurement should follow ADB guidelines and be transparently conducted to ensure local stakeholders and communities are appropriately informed. Community-based procurement should be promoted where possible as a project policy to provide a safeguard against extortion (recognising the limits of this). The Project-Community Agreement could be developed (in consultation with the PCA committee) to include a mechanism to negate undue interference in the project. This should centre on maximising transparency to ensure all parties are aware of all demands placed on the project (those anticipated as part of the project and those that are unwarranted). Engage in regular consultation with local powerbrokers and communities to ensure all parties are appraised of project progress, upcoming schedules and any emerging challenges. The establishment of a project monitoring and oversight committee comprising of local government department representation, tribal elders and youth-led civil society organisations would help ensure transparency and increase both community engagement in the project, and collaboration between the Government and communities. Engage in regular appraisal of the AIWRDIP FCAS Assessment with specific attention to how powerbroker-related challenges to the project. Adapt this action plan as appropriate on an ongoing basis.
3	Insecurity represents a significant contextual challenge for the project and can affect it in many ways. ASAGs are heavily active in upstream areas many access problematic and the recent assassination of the provincial security commander has created a security vacuum. Ongoing negotiations with the Taliban, and accompanying security operations in the area, mean the situation is fluid and not easily predictable which can present further complications for the project.	Comprehensive security planning Local leader and community engagement to augment security measures	Develop robust security risk assessments, plans and budget. Appraise on a regular basis to ensure continuing 'fit for purpose' status and collaboration closely with local security actors and local leaders to identify any emerging security considerations and devise appropriate responses. Embed security into Project-Community Agreements to reinforce the role local leaders and communities can play in supporting the security of the project and to ensure the project does not take any actions that may unnecessarily increase its exposure to the risk of insecurity. Link public support for the project to security measures. Maximise the potential for ongoing strong public support by ensuring inclusive decision-making processes where possible, full transparency during procurement and implementation, adherence to project safeguard protocols, and regular access to the project monitoring and oversight committee (see above). Efforts should be made to involve other communities in security-related cooperation with the project through the sharing of information from communities currently doing this, and/or the development of joint community CDDC projects with a security focus (see FCAS CDDC guideline). Hiring local security guards, especially from upstream areas which are more insecure, benefits the project through assisting in context and project-context interaction monitoring (see AIWRDIP FCAS Monitoring Framework) and could increase community buy-in to the project further helping improve its resilience to insecurity in the area. Target vulnerable populations and locations for available project support to reduce possible belligerence towards the project.

4	The ongoing water crisis affecting the whole country plays its role in driving conflict in Kandahar Province as water (and land) resources are increasingly affected. If the water crisis continues it is likely this will have negative implications for the project as there is an expectation that the project will resolve issue surrounding water availability.	Effective stakeholder consultant and community engagement	Public awareness is necessary to manage the expectations of farming communities regarding the limitations of the project. When there is an inability to meet water allocations community engagement will be critical in ensuring tensions are managed and communities work productively with the ASBA to revise allocations as necessary. Mitigation strategies should be developed by ASBA (this could include community engagement strategies and community driven development components (CDDCs) that strengthen community resilience) to minimize the potential negative impacts in times of water shortage that may contribute to increased tension and conflict. Regular engagement with key water stakeholders – ASBA, SBC, WUAs – and the project monitoring and oversight committee, will provide the opportunity to: update key stakeholders on predicted water flows; share water distribution-related concerns; and, find mutually acceptable solutions for equitable water allocations. This will decrease the chance for grievances and conflict even when water shortages occur.
5	Current and historical conflicts/grievance over a number of issues (political marginalisation, water distribution, land ownership etc.) have the potential to affect the project		Strengthen existing conflict resolution/management capacities at local government and community levels. Regularly analyse existing and emerging conflicts and, in coordination with local leaders, work closely with the concerned communities to involve all conflicting parties in the project where possible to provide opportunities for cooperation and strengthened social cohesion. Engage the ASBA conflict resolution department in this Involve communities in decision-making processes where possible making specific efforts to ensure a wider range of voices beyond existing and traditional powerbrokers. Ensure full transparency in decision-making processes and articulate these decisions clearly through community engagement. Develop the project-community agreement (in consultation with the project-community agreement committee) to include a specific quota of employment opportunities and CDDC projects for more vulnerable and deprived communities to ensure they are also benefitting of the project and decrease vulnerability and social exclusion. Work with the ASBA, SBC and WUAs to consider the establishment of a fine mechanism to reduce water stealing cases. This would require effective community engagement to develop a model that could be adopted and enforced.
6	Vulnerability represents a potential challenge for the project as it can drive insecurity (e.g. push people into insurgency groups) and resentment toward the project (e.g. where those vulnerable are impacted disproportionately by any project-related shock).		Specifically target those traditionally marginalised from decision-making (women, youth, minorities, the (relative) poor) to empower their voice. Sensitise other community members to build consensus on the value of inclusion for community and societal development and wider peace. In coordination with local government departments, and in close consultation with the local communities, prioritize the most vulnerable communities through CDDCs including women, disabled people, the martyrs families, Kochis and IDPs/returning refugees. Develop the project-community agreement (in consultation with the project-community agreement committee) to include a specific quota of employment opportunities and CDDC projects for more vulnerable and deprived communities to ensure they are also benefitting of the project and decrease vulnerability and social exclusion.

			Recruit un-skilled labour (and skilled labour where possible) directly from the project surrounding communities into labour-intensive engagement through community procurement guidelines, with a specific targeting of vulnerable households/communities. The establishment of an effective Grievance Redress Mechanism (GRM), see above, and its widespread publicity and awareness raising of the local population to utilize this mechanism can provide opportunity for the local population to submit their complaint effectively and avoid chances for exacerbating grievances and concerns. This should be connected to the Project-Community Agreement.

Annex 3: Indicative Budget

Category		Unit	# of units	Unit Cost ($)	Total Cost ($)	Comment
Staff	PMO FCAS Officer	Month	96	$4,000	$384,000	Based on one PMO with FT FCAS Officer for 8 years. To be adjusted as necessary (inc. unit cost)
	PIU FCAS Officers	Month	384	$3,000	$1,152,000	Based on one PIU per project component with FT FCAS Officer for 8 years. To be adjusted as necessary (inc. unit cost)
	Consultants	Month	15	$20,000	$300,000	Provides option if required. Mix of national and international. Cost may be put onto Supervision Consultant/Contractor. Can be removed if not felt necessary
Capacity Development	Orientation	Workshop	10	$5,000	$50,000	Based on initial orientation and refreshers. In Kabul and in Districts. To be adjusted as necessary
	Training	Workshop	10	$20,000	$200,000	Trainings in conflict management, governance, etc, TBC. Costs adjustable
	Capacity Tracking	Lump sum	7	$5,000	$35,000	Cost per year, tracking to follow FCAS Capacity Tracking Guideline. To be adjusted as necessary
Community Engagement	Community Consultations	Lump sum	192	$3,000	$576,000	Allows for two per month. May need to be adjusted according to component and actual cost. Consultations conducted by ADB/GoIRA. Consultations conducted by Supervision Consultant/Contractor to be included in their budgets
	Project-Community Agreements	Lump sum	50	$10,000	$500,000	One PCA per community identified. To be adjusted according to # identified and cost required. Cost to cover establishment of PCAC, member expenses and anyhting else. May be included in the Supervision Consultant/Contractor budget
Community-Driven Development Component (CDDC)	Upstream CDDCs	Lump sum	4	$1,000,000	$4,000,000	To be adapted as per need based on assessments by FCAS staff. Costs may vary depending on type of intervention.
	Downstream CDDCs	Lump sum	8	$1,000,000	$8,000,000	
	Resettlement CDDCs	Lump sum	10	$1,000,000	$10,000,000	
Monitoring, Evaluation & Reporting	FCAS Monitoring	Month	96	$2,000	$192,000	To cover logistical costs of monitoring. To be adapted as necessary
	FCAS Evaluation	Lump sum	3	$50,000	$150,000	One final evaluation of Component 1, one mid-term evaluation of components 2, 3 & 4, final evaluation of completed project
TOTAL					$25,539,000	

* Nb: All costs identified in the indicative budget are those in addition to resourcing needs of the Supervision Consultant and Contractor. Supervision Consultant and Contractor costs must be identified by bidding companies in accordance with the bidding documentation requirements set out by the AFRM Focal Point in collaboration with procurement staff. Bidding documentation should

clearly set out the AIWRDIP FCAS Approach requirements for bidding companies (for both Supervision Consultants and Contractors) (see FCAS Procurement Guideline).

** Nb: The indicative budget should be expanded and updated at the earliest opportunity by the AFRM FCAS Focal Point and procurement staff when finalise decisions on the AIWRDIP FCAS approach are taken.

IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Cost Estimates Arghandab 7 Aug

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

Total Grants	Total Grant	ADB Administrative fees	Actual Grants	To be added		ADB Administrative Charges	Spreadsheet Check	
ADB	$ 343 780 000	0	$ 343 780 000	$ 2			Base costs	
IFAD (grant)	$ 40 000 000	$ 784 314	$ 39 215 686	$ -		2%	Contingencies	CHECK
IFAD (loan)	$ -	$ -	-	$ -		2%		
DRR financing	$ 5 000 000	0	$ 5 000 000	$ (2)		$ 784 314	Total project costs	CHECK
Government			$ -				ADB grant	
Beneficiaries			$ -			IFAD Service Charges	IFAD grant	
Total:	***$ 388 780 000***	***$ 784 314***	***$ 387 995 686***	***$ -***		$ -	DRR grant	CHECK
ADF/DRR								

Implementation 7 Years

Ministries 3

	Base costs	Physical Contingency	Price Contingency	Security (contractors)	Total Contingencies	Total	ADB Administrative Charg	Total
MEW	$ 235 210 177	$ 20 575 805	$ 9 281 233	$ 14 357 729	$ 44 214 767	$ 279 424 944	$ 32 000	$ 279 456 944
MRRD	$ 49 150 597	$ 5 738 621	$ 2 152 274	$ 1 272 889	$ 9 163 784	$ 58 314 381	$ 602 314	$ 58 916 695
MAIL	$ 60 910 486	$ 2 306 369	$ 715 099	$ 584 405	$ 3 605 873	$ 64 516 359	$ 150 000	$ 64 666 359
Total:	***$ 345 271 260***	***$ 28 620 795***	***$ 12 148 606***	***$ 16 215 023***	***$ 56 984 424***	***$ 402 255 684***	***$ 784 314***	***$ 403 039 998***

CONTINGENCIES

		2019	2020	2021	2022	2023	2024	2025	2026	
		Year 0	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Average**
Exchange rate	AFG		80.72	80.72	80.72	80.72	80.72	80.72	80.72	80.72
	USD									
Physical Contingency										
Annual	Foreign		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
	Domestic		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Price Contingency										
Annual	Foreign	1.50%	1.50%	1.60%	1.60%	1.60%	1.60%	1.60%	1.60%	
	Domestic	0.60%	3.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	
Cumulative:	Foreign	1.5%	3.0%	4.6%	6.3%	8.0%	9.7%	11.5%	13.3%	7.2%
	Domestic	0.6%	2.4%	6.0%	10.2%	14.6%	19.2%	24.0%	29.0%	13.3%
Implementation Schedule:										
Annual	*Implementation*	*0%*	*10%*	*15%*	*22%*	*23%*	*15%*	*10%*	*5%*	*100%*
	Contract award	*0%*	*5%*	*15%*	*25%*	*23%*	*15%*	*12%*	*5%*	*100%*
	Disbursement	*0%*	*5%*	*5%*	*20%*	*25%*	*20%*	*15%*	*10%*	*100%*
Cumulative:	*Implementation*		*10%*	*25%*	*47%*	*70%*	*85%*	*95%*	*100%*	
	Contract award		*5%*	*20%*	*45%*	*68%*	*83%*	*95%*	*100%*	
	Disbursement		*5%*	*10%*	*30%*	*55%*	*75%*	*90%*	*100%*	

Year		***ADB Implementation***	***ADB Contract award***	***Q1 10%***	***Q2 20%***	***Q3 30%***	***Q4 40%***	***Total 100%***
0	*2019*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
1	*2020*	*10%*	*5%*	*1%*	*1%*	*2%*	*2%*	*5%*
2	*2021*	*15%*	*15%*	*2%*	*3%*	*5%*	*6%*	*15%*
3	*2022*	*22%*	*25%*	*3%*	*5%*	*8%*	*10%*	*25%*
4	*2023*	*23%*	*23%*	*2%*	*5%*	*7%*	*9%*	*23%*
5	*2024*	*15%*	*15%*	*2%*	*3%*	*5%*	*6%*	*15%*
6	*2025*	*10%*	*12%*	*1%*	*2%*	*4%*	*5%*	*12%*
7	*2026*	*5%*	*5%*	*1%*	*1%*	*2%*	*2%*	*5%*
Total:		*100%*	*100%*	*10%*	*20%*	*30%*	*40%*	*100%*

Year		***ADB Disbursement***					
0	*2019*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
1	*2020*	*5%*	*1%*	*1%*	*2%*	*2%*	*5%*
2	*2021*	*5%*	*1%*	*1%*	*2%*	*2%*	*5%*
3	*2022*	*20%*	*2%*	*4%*	*6%*	*8%*	*20%*
4	*2023*	*25%*	*3%*	*5%*	*8%*	*10%*	*25%*
5	*2024*	*20%*	*2%*	*4%*	*6%*	*8%*	*20%*
6	*2025*	*15%*	*2%*	*3%*	*5%*	*6%*	*15%*
7	*2026*	*10%*	*1%*	*2%*	*3%*	*4%*	*10%*
Total:		*100%*	*10%*	*20%*	*30%*	*40%*	*100%*

Year		***IFAD (grant) Contract award***	***10%***	***20%***	***30%***	***40%***	***100%***
0	*2019*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
1	*2020*	*8%*	*1%*	*2%*	*2%*	*3%*	*8%*
2	*2021*	*22%*	*2%*	*4%*	*7%*	*9%*	*22%*
3	*2022*	*25%*	*3%*	*5%*	*8%*	*10%*	*25%*
4	*2023*	*20%*	*2%*	*4%*	*6%*	*8%*	*20%*
5	*2024*	*10%*	*1%*	*2%*	*3%*	*4%*	*10%*
6	*2025*	*10%*	*1%*	*2%*	*3%*	*4%*	*10%*
7	*2026*	*5%*	*1%*	*1%*	*2%*	*2%*	*5%*
Total:		*100%*	*10%*	*20%*	*30%*	*40%*	*100%*

Year		IFAD (grant)	Disbursement					
0	2019		0%	0%	0%	0%	0%	0%
1	2020		3%	0%	1%	1%	1%	3%
2	2021		15%	2%	3%	5%	6%	15%
3	2022		20%	2%	4%	6%	8%	20%
4	2023		20%	2%	4%	6%	8%	20%
5	2024		17%	2%	3%	5%	7%	17%
6	2025		15%	2%	3%	5%	6%	15%
7	2026		10%	1%	2%	3%	4%	10%
Total:			100%	10%	20%	30%	40%	100%

Year		IFAD (loan)	Contract award	10%	20%	30%	40%	100%
0	2019		0%	0%	0%	0%	0%	0%
1	2020		8%	1%	2%	2%	3%	8%
2	2021		22%	2%	4%	7%	9%	22%
3	2022		25%	3%	5%	8%	10%	25%
4	2023		20%	2%	4%	6%	8%	20%
5	2024		10%	1%	2%	3%	4%	10%
6	2025		10%	1%	2%	3%	4%	10%
7	2026		5%	1%	1%	2%	2%	5%
Total:			100%	10%	20%	30%	40%	100%

Year		IFAD (loan)	Disbursement					
0	2019		0%	0%	0%	0%	0%	0%
1	2020		3%	0%	1%	1%	1%	3%
2	2021		15%	2%	3%	5%	6%	15%
3	2022		20%	2%	4%	6%	8%	20%
4	2023		20%	2%	4%	6%	8%	20%
5	2024		17%	2%	3%	5%	7%	17%
6	2025		15%	2%	3%	5%	6%	15%
7	2026		10%	1%	2%	3%	4%	10%
Total:			100%	10%	20%	30%	40%	100%

TAXES $ 16 090 227

Taxes	Percentages		Project amounts			Project amounts				Taxes	
	Foreign	Domestic	Total			Foreign	Domestic	Foreign	Domestic	Total	Percentage
A. INVESTMENT COSTS											
Civil Works	4.00%	4.00%	$ 190 708 941	$ 231 270 000	$	185 016 000	$ 46 254 000	$ 7 400 640	$ 1 850 160	$ 9 250 800	57.5%
Goods and Equipment	4.00%	4.00%	$ 7 664 893	$ 8 950 000	$	7 160 000	$ 1 790 000	$ 286 400	$ 71 600	$ 358 000	2.2%
Community Contracting	4.00%	4.00%	$ 70 480 924	$ 75 115 687	$	60 092 550	$ 15 023 137	$ 2 403 702	$ 600 925	$ 3 004 627	18.7%
Consulting Services	4.00%	4.00%	$ 27 823 356	$ 34 765 000	$	27 812 000	$ 6 953 000	$ 1 112 480	$ 278 120	$ 1 390 600	8.6%
Training and Workshops	4.00%	4.00%	$ 3 645 922	$ 4 300 000	$	3 440 000	$ 860 000	$ 137 600	$ 34 400	$ 172 000	1.1%
Safeguards	4.00%	4.00%	$ 27 796 940	$ 27 796 940	$	-	$ 27 796 940	$ -	$ 1 111 878	$ 1 111 878	6.9%
B. RECURRENT COSTS											
Salaries	4.00%	4.00%	$ 8 729 556	$ 10 261 522	$	-	$ 10 261 522	$ -	$ 410 461	$ 410 461	2.6%
Running costs	4.00%	4.00%	$ 6 808 365	$ 7 894 913	$	192 000	$ 7 702 913	$ 7 680	$ 308 117	$ 315 797	2.0%
Office equipment	4.00%	4.00%	$ 420 553	$ 496 000	$	396 800	$ 99 200	$ 15 872	$ 3 968	$ 19 840	0.1%
Office security and renovation	4.00%	4.00%	$ 1 191 810	$ 1 405 620	$	240 000	$ 1 165 620	$ 9 600	$ 46 625	$ 56 225	0.3%
Total			**$ 345 271 260**	**$ 402 255 682**	**$**	**284 349 350**	**$ 117 906 333**	**$ 11 373 974**	**$ 4 716 253**	**$ 16 090 227**	**100%**

C. CONTINGENCIES AND CHARGES

FINANCING

Financing	Project base cost	Physical Contingency	Price Contingency	Security (contractors)	IFAD Service Charges	B Administrative Char	Total Amount	Grant Amount	Amounts still to be added	Allocation table amount	CHECK FOR Allocation tables	Grant fund Check
ADB	$ 293 623 480	$ 23 419 299	$ 10 522 196	$ 16 215 023		$ -	$ 343 779 998	$ 343 780 000	$ 2	$ 348 780 000	$ -	CHECK
IFAD (grant)	$ 33 706 873	$ 4 127 004	$ 1 381 809	$ -		$ 784 314	$ 40 000 000	$ 40 000 000	$ -	$ 40 000 000	$ -	
IFAD (loan)	$ -	$ -	$ -	$ -		$ -	$ -	$ -	$ -	$ -	$ -	
DRR financing	$ 4 239 445	$ 569 782	$ 190 775	$ -		$ -	$ 5 000 002	$ 5 000 000	$ (2)			CHECK
Government	$ 3 755 290	$ 504 710	$ -	$ -	$ -	$ -	$ 4 260 000					
Beneficiaries	$ 9 946 172	$ -	$ 53 828	$ -		$ -	$ 10 000 000					
	$ 345 271 260	***$ 28 620 795***	***$ 12 148 608***	***$ 16 215 023***		***$ 784 314***	***$ 403 040 000***	***$ 388 780 000***	***$ -***	***$ 388 780 000***	***$ -***	

OUTPUTS

	Outputs	Ministry	Base costs	Physical	Price	Security (contractors)	Contingencies	ADB Charges	Total
1	**Dahla Dam capacity increased**		**$ 219 614 858**	**$ 18 697 449**	**$ 8 941 217**	**$ 15 630 619**	**$ 43 269 285**	**$ -**	**$ 262 884 143**
1a	Raise the main dam and six saddle dams	MEW	$ 199 874 557	$ 16 821 485	$ 8 076 569	$ 14 103 641	$ 39 001 695	$ -	$ 238 876 252
1b	Road realignment	MEW	$ 18 152 243	$ 1 662 528	$ 793 186	$ 1 399 934	$ 3 855 648	$ -	$ 22 007 891
1c	Capacity in dam operation and flow management improved	MRRD	$ 1 588 058	$ 213 435	$ 71 463	$ 127 045	$ 411 942	$ -	$ 2 000 000
2	**Reliability of irrigation water supply increased**		**$ 47 912 303**	**$ 5 354 541**	**$ 1 846 643**	**$ -**	**$ 7 201 183**	**$ 602 314**	**$ 55 715 800**
2a	Modernization of AIS	MAIL	$ 14 220 791	$ 1 911 274	$ 639 936	$ -	$ 2 551 210	$ -	$ 16 772 001
2b	Improvement of community irrigation services	MRRD	$ 33 691 512	$ 3 443 266	$ 1 206 707	$ -	$ 4 649 973	$ 602 314	$ 38 943 799
3	**Agricultural water productivity improved**		**$ 55 082 537**	**$ 1 523 093**	**$ 509 964**	**$ 584 405**	**$ 2 617 462**	**$ 150 000**	**$ 57 849 999**
3a	Demonstration of innovative agricultural on-farm practices and investment opti	MAIL	$ 55 082 537	$ 1 523 093	$ 509 964	$ 584 405	$ 2 617 462	$ 150 000	$ 57 849 999
3b			$ -	$ -	$ -	$ -	$ -	$ -	$ -
4	**Capacity in water resource management and use strengthened**		**$ 5 511 278**	**$ 740 716**	**$ 248 008**	**$ -**	**$ 988 723**	**$ 32 000**	**$ 6 532 001**
4a	Water regulations reform	MEW	$ 1 526 200	$ 205 121	$ 68 679	$ -	$ 273 800	$ 32 000	$ 1 832 000
4b	Strategic water resources management training	MEW	$ 2 967 611	$ 398 847	$ 133 542	$ -	$ 532 389	$ -	$ 3 500 000
4c	Establishment of a National Hydrological Modelling Platform	MEW	$ 1 017 467	$ 136 748	$ 45 786	$ -	$ 182 534	$ -	$ 1 200 001
5	**Project management**		**$ 17 150 284**	**$ 2 304 998**	**$ 602 775**	$ -	**$ 2 907 773**		**$ 20 058 057**
			$ 345 271 260	***$ 28 620 796***	***$ 12 148 606***	***$ 16 215 024***	***$ 56 984 426***	***$ 784 314***	***$ 403 040 000***

Base costs			Contingencies plus charges			Totals Check		
$	345 271 260	#NAME?	$ 57 768 740	#NAME?	$	403 040 000	#NAME?	
		#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?	$ 57 768 740	#NAME?	$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?	$ 57 768 740	#NAME?	$	403 039 998	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 039 998	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 039 998	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?	$ 57 768 740	#NAME?	$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?			$	403 040 000	#NAME?	
$	345 271 260	#NAME?	$ 57 768 738	#NAME?	$	403 039 998	#NAME?	
$	345 271 260	#NAME?	$ 57 768 738	#NAME?	$	403 039 998	#NAME?	

Output	Sub Component	Description	Ministry	Packages	Base costs	Physical	Price	Security	ADB Charges	ADB Fees	Total costs excl ADB fees	PP Method	PP Expenditure	Sub-Category	INT pm	Financing	Account	Foreign	Remarks
2	2a	AIS Gate Repairs, modernization, and signage	MEW	MEW-CW-07	$ 211 972	13.44%	4.50%	0.00%		$ -	$ 250 000	RFQ	Civil Works	Civil Works		ADB	ADF/DRR	80%	Request for Quotations - Works
2	2a	AIS Water level gauges – construction and installation	MEW	MEW-CW-08	$ 84 789	13.44%	4.50%	0.00%		$ -	$ 100 000	RFQ	Civil Works	Civil Works		ADB	ADF/DRR	80%	Request for Quotations - Works
2	2a	AIS Vehicles – 3 pickups & 1 water tanker truck	MEW	MEW-GE-03	$ 169 578	13.44%	4.50%	0.00%		$ -	$ 200 000	RFQ	Goods and Equipment	Goods and Equipment		ADB	ADF/DRR	80%	Goods contract, national advertising
3	3a	Agriculture demonstration implementation (goods and equipment, services)	MAIL	MAIL-GE-01	$ 3 815 499	13.44%	4.50%	0.00%	2.00%	$ 90 000	$ 4 500 000	RFQ	Goods and Equipment	Goods and Equipment		IFAD (grant)	IFAD (grant)	80%	Small contracts
5	5	Office Equipment MEW	MEW	MEW-GE-04	$ 148 381	13.44%	4.50%	0.00%		$ -	$ 175 000	RFQ	Office Equipment	Project Management		ADB	ADF/DRR	80%	
5	5	Security MEW	MEW		$ 305 240	13.44%	4.50%	0.00%		$ -	$ 360 000	RFQ	Office security and renovati	Project Management		ADB	ADF/DRR	0%	
5	5	Office Equipment MRRD	MRRD	MRRD-GE-01	$ 225 538	13.44%	4.50%	0.00%		$ -	$ 266 000	RFQ	Office Equipment	Project Management		ADB	ADF/DRR	80%	
5	5	Security MRRD	MRRD		$ 225 216	13.44%	4.50%	0.00%		$ -	$ 265 620	RFQ	Office security and renovati	Project Management		ADB	ADF/DRR	0%	
5	5	Office Equipment MAIL	MAIL	MAIL-GE-02	$ 46 634	13.44%	4.50%	0.00%		$ -	$ 55 000	RFQ	Office Equipment	Project Management		ADB	ADF/DRR	80%	
5	5	Security MAIL	MAIL		$ 406 987	13.44%	4.50%	0.00%		$ -	$ 480 000	RFQ	Office security and renovati	Project Management		ADB	ADF/DRR	0%	

		ADB		IFAD (grant)		IFAD (loan)		DRR financing		Government		Beneficiaries		
		Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	***Total Costs***
A	**Base Costs**	***293.623***	85%	***33.707***	10%	***.***	0%	***4.239***	1%	***3.755***	1%	***9.946***	3%	***345.271***
	Foreign	*202.648*	*84%*	*26.965*	*11%*	*.*	*0%*	*3.392*	*1%*	*.*	*0%*	*7.957*	*3%*	*240.962*
	Domestic	*90.976*	*87%*	*6.741*	*6%*	*.*	*0%*	*.848*	*1%*	*3.755*	*4%*	*1.989*	*2%*	*104.309*
	Resettlement													
	Adjusted Domestic	90.976	87%	6.741	6%	.	0%	.848	1%	3.755	4%	1.989	2%	104.309
B	**Contingencies**													
	1 Physical Contingency	23.419	82%	4.127	14%	.	0%	.57	2%	.505	2%	.	0%	28.621
	Foreign	*18.238*	*84%*	*2.427*	*11%*	*.*	*0%*	*.305*	*1%*	*.*	*0%*	*.716*	*3%*	*21.687*
	Domestic	*8.188*	*87%*	*.607*	*6%*	*.*	*0%*	*.076*	*1%*	*.338*	*4%*	*.179*	*2%*	*9.388*
	2 Price Contingency	10.522	87%	1.382	11%	.	0%	.191	2%	.	0%	.054	0%	*12.149*
	Foreign	*16.539*	*84%*	*2.201*	*11%*	*.*	*0%*	*.277*	*1%*	*.*	*0%*	*.649*	*3%*	*19.665*
	Domestic	*13.38*	*87%*	*.991*	*6%*	*.*	*0%*	*.125*	*1%*	*.552*	*4%*	*.293*	*2%*	*15.341*
	Security (contractors)	16.215	100%	.	0%	.	0%	.	0%	.	0%	.	0%	*16.215*
	IFAD Service Charges													.
	ADB Administrative Charges	.		*.784314*	100%	.	0%	.	0%	.	0%	.	0%	*.784*
	Subtotal C	***50.157***	87%	***6.293***	11%	***.***	0%	***.761***	1%	***.505***	1%	***.054***	0%	***57.769***
	Total Project Costs	**343.78**	**85%**	**40.**	**10%**	**.**	**0%**	**5.**	**1%**	**4.26**	**1%**	**10.**	**2%**	**403.04**

	Outputs: 1			2		3	4			5		
	Subcomponents:	***1a***	***1b***	***1c***	***2a***	***2b***	***3a***	***4a***	***4b***	***4c***	***5***		***Total Costs***
A	**Base Costs**	**199.875**	**18.152**	**1.588**	**14.221**	**33.692**	**55.083**	**1.526**	**2.968**	**1.017**	**17.15**		***345.271***
	Foreign	*143.583*	*14.101*	*1.27*	*11.377*	*21.453*	*44.066*	*1.221*	*2.374*	*.814*	*.703*		*240.962*
	Percentage	.	.	.	.	.	.	.	.	.	.		
	Domestic	*56.291*	*4.051*	*.318*	*2.844*	*12.239*	*11.017*	*.305*	*.594*	*.203*	*16.448*		*104.309*
	Resettlement costs												
	Adjusted Domestic	56.291	4.051	.318	2.844	12.239	11.017	.305	.594	.203	16.448		*104.309*
	Percentage	.	.	.	.	.	.	.	.	.	.		
B	**Contingencies**												
	1 Physical Contingency	16.821	1.663	.213	1.911	3.443	1.523	.205	.399	.137	2.305		*26.316*
	Foreign	*12.923*	*1.269*	*.114*	*1.024*	*1.931*	*3.966*	*.11*	*.214*	*.073*	*.063*		*21.687*
	Domestic	*5.066*	*.365*	*.029*	*.256*	*1.102*	*.991*	*.027*	*.053*	*.018*	*1.48*		*9.388*
	2 Price Contingency	8.077	.793	.071	.64	1.207	.51	.069	.134	.046	.603		*11.546*
	Foreign	*11.718*	*1.151*	*.104*	*.928*	*1.751*	*3.596*	*.1*	*.194*	*.066*	*.057*		*19.665*
	Domestic	*8.279*	*.596*	*.047*	*.418*	*1.8*	*1.62*	*.045*	*.087*	*.03*	*2.419*		*15.341*
	Security (contractors)	*14.104*	*1.4*	*.127*	*.*	*.*	*.584*	*.*	*.*	*.*	*.*		*16.215*
	IFAD Service Charges					*.*							*.*
	ADB Administrative Charges	*.*	*.*	*.*	*.*	*.602*	*.15*	*.032*	*.*	*.*	*.*		*.784*
	Subtotal (B)	***39.002***	***3.856***	***.412***	***2.551***	***5.252***	***2.767***	***.306***	***.532***	***.183***	***2.908***		***57.769***
	Total:	**238.876**	**22.008**	**2.**	**16.772**	**38.944**	**57.85**	**1.832**	**3.5**	**1.2**	**20.058**		**403.04**

		Outputs:												
		Subcomponents:	***Civil Works***	***Goods and Equi***	***Community Con***	***Consulting Servi***	***Training and Wo***	***Safeguards***	***Salaries***	***Running costs***	***Office equipme***	***Office security***	***Total Costs***
A	**Base Costs**		**$ 190 708 941**	**$ 7 664 893**	**$ 70 480 924**	**$ 27 823 356**	**$ 3 645 922**	**$ 27 796 940**	**$ 8 729 556**	**$ 6 808 365**	**$ 420 553**	**$ 1 191 810**	***$ 345 271 260***
	Foreign		*$ 152 567 153*	*$ 6 131 914*	*$ 56 384 739*	*$ 22 258 685*	*$ 2 916 738*	*$ -*	*$ -*	*$ 162 794*	*$ 336 442*	*$ 203 494*	*$ 240 961 959*
		Percentage	63%	3%	23%	9%	1%	0%	0%	0%	0%	0%	
	Domestic		*$ 38 141 788*	*$ 1 532 979*	*$ 14 096 185*	*$ 5 564 671*	*$ 729 184*	*$ 27 796 940*	*$ 8 729 556*	*$ 6 645 571*	*$ 84 111*	*$ 988 316*	*$ 104 309 301*
		Resettlement costs											
	Adjusted Domestic		$ 38 141 788	$ 1 532 979	$ 14 096 185	$ 5 564 671	$ 729 184	$ 27 796 940	$ 8 729 556	$ 6 645 571	$ 84 111	$ 988 316	*$ 104 309 301*
		Percentage	37%	1%	14%	5%	1%	27%	8%	6%	0%	1%	
B	**Contingencies**												
	1 Physical Contingency		$ 17 714 268	$ 940 188	$ 3 431 871	$ 3 739 459	$ 490 012	$ -	$ 1 173 252	$ 915 044	$ 56 522	$ 160 179	*$ 28 620 796*
	2 Price Contingency		$ 8 581 902	$ 344 920	$ 1 202 892	$ 1 252 051	$ 164 066	$ -	$ 358 715	$ 171 503	$ 18 925	$ 53 631	*$ 12 148 606*
	Security (contractors)		*$ 14 264 889*	*$ -*	*$ -*	*$ 1 950 135*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ 16 215 024*
	ADB Administrative Charges		*$ -*	*$ 90 000*	*$ 662 314*	*$ 32 000*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ 784 314*
		Subtotal (B)	***$ 40 561 060***	***$ 1 375 108***	***$ 5 297 076***	***$ 6 973 645***	***$ 654 078***	***$ -***	***$ 1 531 967***	***$ 1 086 548***	***$ 75 447***	***$ 213 811***	***$ 57 768 740***
	Total:		**$ 231 270 001**	**$ 9 040 001**	**$ 75 778 000**	**$ 34 797 001**	**$ 4 300 000**	**$ 27 796 940**	**$ 10 261 523**	**$ 7 894 913**	**$ 496 000**	**$ 1 405 621**	**$ 403 040 000**

Table 1: Summary Cost Estimates
($ million)

Item		Amount[a]
A. Base Cost[b]		
1. Output 1	Dahla Dam capacity increased	219.61
2. Output 2	Reliability of irrigation water supply increased	47.91
3. Output 3	Agricultural water productivity improved	55.08
4. Output 4	Capacity in water resource management and use strengthened	5.51
5. Project Management		17.15
Subtotal (A)		**345.27**
B. Contingencies[c]		56.98
ADB Administrative Charges		.78
	Total (A+B)	**403.04**

c Includes provisions for security (contractors)

Table 2: Summary Financing Plan

Source	Amount ($ million)	Share of Total (%)
Asian Development Bank		
Special Funds resources (ADF grant)	348.78	86.5%
International Fund for Agricultural Development (grant)[a]	40.00	9.9%
Government	4.26	1.1%
Beneficiaries	10.00	2.5%
Total	**403.04**	**100.0%**

ADF = Asian Development Fund, Beneficiaries = farmers and post-farm enterprises

istered cofinancing in two tranches including administration fees and other charges as may be deducted pursuant to the cofinancing

Source: Asian Development Bank estimates.

PROJECT AT A GLANCE	Base costs	Project Manager	Contingencies	Total
	Output 1	219.61		
	Output 4	4.15		
PAG 1		223.77	$ 10 536 834 $ 40 052 631	**$ 274 358 979**
PAG 2	Output 2	21.18	$ 997 386 $ 3 791 267	**$ 25 970 032**
PAG 3	Outputb 3	39.52	$ 1 860 774 $ 7 073 177	**$ 48 450 989**
	Total	$ 284 467 931	$ 13 394 994 $ 50 917 075	**$ 348 780 000**

IMPLEMENTATION ARRANGEMEMTS

Procurement packages		Count	Code	Base costs	Contingencies	Total
Open Competitive Bidding	17 contracts (including lots)	17	OCB	$ 194 346 363	$ 41 123 637	$ 235 470 000
Request for Quotation (community contracting)	Multiple Community contracts	4	RFQ/CPP	$ 60 534 752	$ 4 580 935	$ 65 115 687
Request for Quotation (others)	Multiple contracts	10	RFQ	$ 5 639 834	$ 1 011 786	$ 6 651 620
QCBS 90:10	3 contracts (398 international person-months; 1084 national person months)	5	QCBS	$ 25 733 310	$ 6 566 690	$ 32 300 000
CQS	1 contract (auditor)	3	CQS	$ 203 493	$ 36 507	$ 240 000
SSS	2 contracts	2	SSS	$ 1 441 411	$ 258 589	$ 1 700 000
ICS	2 contracts (22 person months)	2	ICS	$ 648 635	$ 116 365	$ 765 000

Outputs / Key activities	MEW					MRRD					MAIL					Total by Financier				Total costs
	ADF/ DRR	IFAD (grant)	Govern- ment	Benefi- ciaries	Total MEW	ADF/ DRR	IFAD (grant)	Govern- ment	Benefi- ciaries	Total MRRD	ADF/ DRR	IFAD (grant)	Govern- ment	Benefi- ciaries	Total MAIL	ADF/ DRR	IFAD (grant)	Govern- ment	Benefi- ciaries	
A. INVESTMENT COSTS																				
1 Dahla Dam capacity increased	**203.58**	**.00**	**.00**	**.00**	**203.58**	**16.04**	**.00**	**.00**	**.00**	**16.04**	**.00**	**.00**	**.00**	**.00**	**.00**	**219.61**	**.00**	**.00**	**.00**	**219.61**
1a *Raise the main dam and six saddle dams*	*199.87*	*.00*	*.00*	*.00*	*199.87*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*199.87*	*.00*	*.00*	*.00*	*199.87*
1b *Road realignment*	*2.11*	*.00*	*.00*	*.00*	*2.11*	*16.04*	*.00*	*.00*	*.00*	*16.04*	*.00*	*.00*	*.00*	*.00*	*.00*	*18.15*	*.00*	*.00*	*.00*	*18.15*
1c *Capacity in dam operation and flow management improved*	*1.59*	*.00*	*.00*	*.00*	*1.59*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*1.59*	*.00*	*.00*	*.00*	*1.59*
2 Reliability of irrigation water supply increased	**21.10**	**.00**	**.00**	**.00**	**21.10**	**.08**	**25.53**	**.00**	**1.20**	**26.82**	**.00**	**.00**	**.00**	**.00**	**.00**	**21.18**	**25.53**	**.00**	**1.20**	**47.91**
2a *Modernization of AIS*	*14.22*	*.00*	*.00*	*.00*	*14.22*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*14.22*	*.00*	*.00*	*.00*	*14.22*
2b *Improvement of community irrigation services*	*6.88*	*.00*	*.00*	*.00*	*6.88*	*.08*	*25.53*	*.00*	*1.20*	*26.82*	*.00*	*.00*	*.00*	*.00*	*.00*	*6.96*	*25.53*	*.00*	*1.20*	*33.69*
3 Agricultural water productivity improved	**.00**	**.00**	**.00**	**.00**	*.00*	**.00**	**.00**	**.00**	**.00**	*.00*	**39.52**	**6.82**	**.00**	**8.75**	*55.08*	**39.52**	**6.82**	**.00**	**8.75**	**55.08**
3a *Demonstration of innovative agricultural on-farm practices and investment options*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*39.52*	*6.82*	*.00*	*8.75*	*55.08*	*39.52*	*6.82*	*.00*	*8.75*	*55.08*
4 Capacity in water resource management and use strengthened	**4.15**	**1.36**	**.00**	**.00**	**5.51**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**4.15**	**1.36**	**.00**	**.00**	**5.51**
4a *Water regulations reform*	*.17*	*1.36*	*.00*	*.00*	*1.53*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.17*	*1.36*	*.00*	*.00*	*1.53*
4b *Strategic water resources management training*	*2.97*	*.00*	*.00*	*.00*	*2.97*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*2.97*	*.00*	*.00*	*.00*	*2.97*
4c *Establishment of a National Hydrological Modelling Platform*	*1.02*	*.00*	*.00*	*.00*	*1.02*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*.00*	*1.02*	*.00*	*.00*	*.00*	*1.02*
Sub-total (A):	**228.83**	**1.36**	**.00**	**.00**	**230.18**	**16.12**	**25.53**	**.00**	**1.20**	**42.85**	**39.52**	**6.82**	**.00**	**8.75**	**55.08**	**284.47**	**33.71**	**.00**	**9.95**	**328.12**
B. RECURRENT COSTS																				
5 Project management	**3.86**	**.00**	**1.16**	**.00**	**5.03**	**4.97**	**.00**	**1.32**	**.00**	**6.30**	**4.56**	**.00**	**1.27**	**.00**	**5.83**	**13.39**	**.00**	**3.76**	**.00**	**17.15**
Total Base Costs:	**232.69**	**1.36**	**1.16**	**.00**	**235.21**	**21.10**	**25.53**	**1.32**	**1.20**	**49.15**	**44.08**	**6.82**	**1.27**	**8.75**	**60.91**	**297.86**	**33.71**	**3.76**	**9.95**	**345.27**
C. CONTINGENCIES AND CHAR	**43.82**	**.28**	**.16**	**.00**	**44.25**	**4.35**	**5.18**	**.18**	**.05**	**9.77**	**2.75**	**.83**	**.17**	**.00**	**3.76**	**50.92**	**6.29**	**.50**	**.05**	**57.77**
1 Physical Contingency	20.24	.18	.16	.00	*20.58*	2.13	3.43	.18	.00	*5.74*	1.62	.51	.17	.00	*2.31*	23.99	4.13	.50	.00	28.62
2 Price Contingency	9.22	.06	.00	.00	*9.28*	.95	1.15	.00	.05	*2.15*	.54	.17	.00	.00	*.72*	10.71	1.38	.00	.05	12.15
Security (contractors)	14.36	.00	.00	.00	*14.36*	1.27	.00	.00	.00	*1.27*	.58	.00	.00	.00	*.58*	16.22	.00	.00	.00	16.22
ADB Administrative Charges	.00	.03	.00	.00	*.03*	.00	.60	.00	.00	*.60*	.00	.15	.00	.00	*.15*	.00	.78	.00	.00	.78
Total project costs:	**276.50**	**1.63**	**1.32**	**.00**	**279.46**	**25.45**	**30.72**	**1.50**	**1.25**	**58.92**	**46.83**	**7.65**	**1.44**	**8.75**	**64.67**	**348.78**	**40.00**	**4.26**	**10.00**	**403.04**

	ADF/DRR Financing		IFAD (grant) Financing		Government Contribution		Beneficiaries Contributions		Total Costs
	Amount	%	Amount	%	Amount	%		%	Amount
Civil Works	***190.709***		***.***		***.***		***.***		**190.709**
MEW (Activities 1a, 2a: dam raising, AIS rehabilitations)	*174.798*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	174.798
MRRD (Activity 1b: road re-alignment)	*15.911*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	15.911
Goods and Equipment	***3.849***		***3.815***		***.***		***.***		**7.665**
MEW (Activities 1a, 2a: dam raising, AIS rehabilitations)	*3.849*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	3.849
MAIL (Activity 3a: onfarm demonstrations)	*.*	*0%*	*3.815*	*100%*	*.*	*0%*	*.*	*0%*	3.815
Community Contracting	***32.***		***28.535***		***.***		***9.946***		**70.481**
MAIL (Activity 3a: onfarm matching grants)	*32.*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	32.
MRRD (Activity 2b: canal and bridge rehabiliations)	*.*	*0%*	*25.535*	*100%*	*.*	*0%*	*.*	*0%*	25.535
MAIL (Activity 3a: onfarm matching grants)	*.*	*0%*	*3.*	*100%*	*.*	*0%*	*.*	*0%*	3.
MRRD (Activity 2b: in-kind support)	*.*	*0%*	*.*	*0%*	*.*	*0%*	*1.196*	*100%*	1.196
MAIL (Activity 3a: matching grant contributions)	*.*	*0%*	*.*	*0%*	*.*	*0%*	*8.75*	*100%*	8.75
Consulting Services	***26.467***		***1.357***		***.***		***.***		**27.823**
MEW (Activities 1a, 1b, 1c, 4c EPCS, POE, EWTR, Environment and social safeguards)	*19.162*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	19.162
MAIL (Activity 3a: AISC)	*7.305*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	7.305
MEW (Activity 4a: WREG)	*.*	*0%*	*1.357*	*100%*	*.*	*0%*	*.*	*0%*	1.357
Training and Workshops	***3.646***		***.***		***.***		***.***		**3.646**
MEW (Activities 1a, 4a, 4b)	*3.222*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	3.222
MRRD (Activities 1b, 2b)	*.212*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	.212
MAIL (Activities 3a)	*.212*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	.212
Safeguards	***27.797***		***.***		***.***		***.***		**27.797**
MEW (Resettlement costs under 1a, 1b, 2b, 3a)	*27.797*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	27.797
Subtotal (A)	***284.468***	*86.7%*	***33.707***	*10.3%*	***.***	*0.0%*	***9.946***	*3.0%*	***328.121***
Project Management	***13.395***		***.***		***3.755***		***.***		**17.15**
MEW (Salaries, running costs, office equipment, office security and renovation)	*3.862*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	3.862
MRRD (Salaries, running costs, office equipment, office security and renovation)	*4.974*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	4.974
MAIL (Salaries, running costs, office equipment, office security and renovation)	*4.559*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	4.559
MEW (Government staff, meeting rooms, utilities, others)	*.*	*0%*	*.*	*0%*	*1.164*	*100%*	*.*	*0%*	1.164
MRRD (Government staff, meeting rooms, utilities, others)	*.*	*0%*	*.*	*0%*	*1.322*	*100%*	*.*	*0%*	1.322
MAIL (Government staff, meeting rooms, utilities, others)	*.*	*0%*	*.*	*0%*	*1.269*	*100%*	*.*	*0%*	1.269
Subtotal (B)	***13.395***	*78.1%*	***.***	*0.0%*	***3.755***	*22%*	***.***	*0.0%*	17.15
Subtotal (A+B)	***297.863***	*86.3%*	***33.707***	*9.8%*	***3.755***	*1.1%*	***9.946***	*2.9%*	**345.271**
Physical Contingency	*23.989*	*83.8%*	*4.127*	*14.4%*	*.505*	*1.8%*	*.*	*0.0%*	28.621
Price Contingency	*10.713*	*88.2%*	*1.382*	*11.4%*	*.*	*0.0%*	*.054*	*0.4%*	12.149
Security (contractors)	*16.215*	*100%*	*.*	*0.0%*	*.*	*0.0%*	*.*	*0.0%*	16.215
ADB Administrative Charges	*.*	*0.0%*	*.784*	*100%*	*.*	*0.0%*	*.*	*0.0%*	.784
Subtotal (C)	***50.917***	***88.1%***	***6.293***	***10.9%***	***.505***	***0.9%***	***.054***	***0.1%***	***57.769***
Total Project Costs (A+B+C)	**348.78**	86.5%	**40.00**	9.9%	**4.26**	1.1%	**10.**	2.5%	**403.04**

	Total Costs						% Total
	AFG			US$			Base costs
	Local	Foreign	Total	Local	Foreign	Total	
A. INVESTMENT COSTS							
1 Civil Works						.	
1 Dahla Dam capacity increased	2878.54	11514.162	14392.702	35.662	142.649	178.311	51.6%
2 Reliability of irrigation water supply increased	200.143	800.57	1000.713	2.48	9.918	12.398	3.6%
3 Agricultural water productivity improved	.	.	.	.	.	.	0.0%
4 Capacity in water resource management and use strengthened	.	.	.	.	.	.	
Sub-total:	***3078.683***	***12314.732***	***15393.415***	***38.142***	***152.567***	***190.709***	***55.2%***
2 Goods and Equipment							
1 Dahla Dam capacity increased	32.713	130.854	163.567	.405	1.621	2.026	0.6%
2 Reliability of irrigation water supply increased	29.429	117.715	147.144	.365	1.458	1.823	0.5%
3 Agricultural water productivity improved	61.595	246.38	307.975	.763	3.052	3.815	1.1%
5 Capacity in water resource management and use strengthened	.	.	.	.	.	.	0.0%
Sub-total:	***123.737***	***494.949***	***618.686***	***1.533***	***6.132***	***7.665***	***2.2%***
3 Community Contracting							
1 Dahla Dam capacity increased	.	.	.	.	.	.	0.0%
2 Reliability of irrigation water supply increased	431.527	1726.108	2157.635	5.346	21.385	26.731	7.7%
3 Agricultural water productivity improved	706.272	2825.088	3531.36	8.75	35.	43.75	12.7%
4 Capacity in water resource management and use strengthened	.	.	.	.	.	.	0.0%
Sub-total:	***1137.799***	***4551.196***	***5688.995***	***14.096***	***56.385***	***70.481***	***20.4%***
4 Consulting Services							
1 Dahla Dam capacity increased	292.908	1171.633	1464.542	3.629	14.515	18.144	5.3%
2 Reliability of irrigation water supply increased	.	.	.	.	.	.	0.0%
3 Agricultural water productivity improved	117.928	471.713	589.642	1.461	5.844	7.305	2.1%
4 Capacity in water resource management and use strengthened	38.326	153.303	191.629	.475	1.899	2.374	0.7%
Sub-total:	***449.162***	***1796.65***	***2245.812***	***5.565***	***22.259***	***27.823***	***8.1%***
5 Training and Workshops							
1 Dahla Dam capacity increased	3.422	13.688	17.11	.042	.17	.212	0.1%
2 Reliability of irrigation water supply increased	1.369	5.475	6.844	.017	.068	.085	0.0%
3 Agricultural water productivity improved	3.422	13.688	17.11	.042	.17	.212	0.1%
4 Capacity in water resource management and use strengthened	50.645	202.579	253.224	.627	2.51	3.137	0.9%
Sub-total:	***58.857***	***235.43***	***294.287***	***.729***	***2.917***	***3.646***	***1.1%***
6 Safeguards							
1 Dahla Dam capacity increased	1688.688	.	1688.688	20.921	.	20.921	6.1%
2 Reliability of irrigation water supply increased	554.992	.	554.992	6.876	.	6.876	2.0%
3 Agricultural water productivity improved	.	.	.	.	.	.	0.0%
4 Capacity in water resource management and use strengthened	.	.	.	.	.	.	0.0%
Sub-total:	***2243.68***	***.***	***2243.68***	***27.797***	***.***	***27.797***	***8.1%***
Subtotal (A)	***7091.919***	***19392.956***	***26484.875***	***87.862***	***240.259***	***328.121***	***95.0%***
B. RECURRENT COSTS							
Salaries	704.622	.	704.622	8.73	.	8.73	2.5%
Running costs	549.549	.	549.549	6.808	.	6.808	2.0%
Office equipment	33.946	.	33.946	.421	.	.421	0.1%
Office security and renovation	96.199	.	96.199	1.192	.	1.192	0.3%
Subtotal (B)	***1384.316***	***.***	***1384.316***	***17.15***	***.***	***17.15***	***5.0%***
			.				
Subtotal (A+B)	***8476.235***	***19392.956***	***27869.191***	***105.012***	***240.259***	***345.271***	***100.0%***
C. CONTINGENCIES AND CHARGES							
1 Physical Contingency	.	.	2310.179			28.621	***8.3%***
2 Price Contingency	.	.	980.597			12.149	***3.5%***
Security (contractors)	.	.	1308.825			16.215	***4.7%***
ADB Administrative Charges	.	.	63.307			.784	***0.2%***
Subtotal (C)	***.***	***.***	***4662.908***			***57.769***	***16.7%***
	.	.	.				
Total Project Costs	***.***	***.***	***32532.099***			***403.04***	***116.7%***

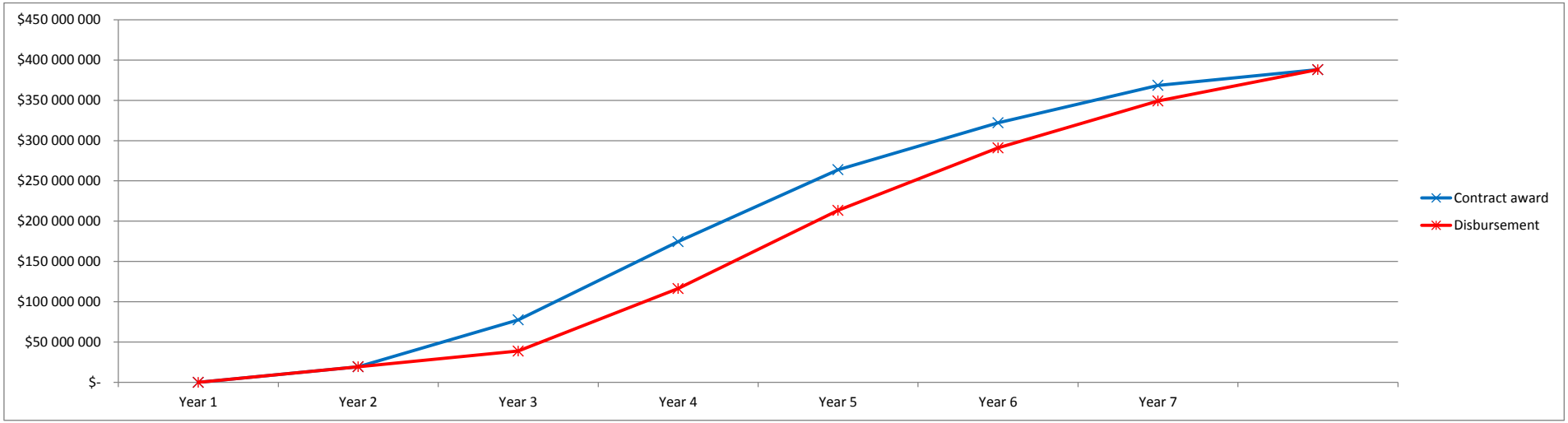
ADF/DRR **Financing**

	Item	Total Amount Allocated for ADB Financing USD		Percentage and Basis for Withdrawal from the Grant Account
		Category	Subcategory	
A. INVESTMENT COSTS				
1	**Civil Works**	**190 708 941**		
	MEW (Activities 1a, 2a: dam raising, AIS rehabilitations)		*174 797 830*	*100% of total expenditure claimed*
	MRRD (Activity 1b: road re-alignment)		*15 911 111*	*100% of total expenditure claimed*
2	**Goods and Equipment**	**3 849 394**		
	MEW (Activities 1a, 2a: dam raising, AIS rehabilitations)		*3 849 394*	*100% of total expenditure claimed*
3	**Community Contracting**	**32 000 000**		
	MAIL (Activity 3a: onfarm matching grants)		*32 000 000*	*100% of total expenditure claimed*
4	**Consulting Services**	**26 466 734**		
	MEW (Activities 1a, 1b, 1c, 4c EPCS, POE, EWTR, Environment and social safeguards)		*19 161 668*	*100% of total expenditure claimed*
	MAIL (Activity 3a: AISC)		*7 305 066*	*100% of total expenditure claimed*
5	**Training and Workshops**	**3 645 922**		
	MEW (Activities 1a, 4a, 4b)		3 221 978	*100% of total expenditure claimed*
	MRRD (Activities 1b, 2b)		211 972	*100% of total expenditure claimed*
	MAIL (Activities 3a)		211 972	*100% of total expenditure claimed*
6	**Safeguards**	**27 796 940**		
	MEW (Resettlement costs under 1a, 1b, 2b, 3a)		*27 796 940*	*100% of total expenditure claimed*
7	**Project Management**	**13 394 994**		
	MEW (Salaries, running costs, office equipment, office security and renovation)		*3 862 134*	*100% of total expenditure claimed*
	MRRD (Salaries, running costs, office equipment, office security and renovation)		*4 974 305*	*100% of total expenditure claimed*
	MAIL (Salaries, running costs, office equipment, office security and renovation)		*4 558 555*	*100% of total expenditure claimed*
B. UNALLOCATED		**50 917 075**		
	Physical and price contingencies, Security (contractors)		*50 917 075*	*100% of total expenditure claimed*
	Total	**348 780 000**		

IFAD (grant) Financing

Item		Total Amount Allocated for IFAD Financing USD		Percentage and Basis for Withdrawal from the Grant Account
		Category	Subcategory	
A. INVESTMENT COSTS				
2	**Goods and Equipment**	**3 815 499**		
	MAIL (Activity 3a: onfarm demonstrations)		*3 815 499*	*100% of total expenditure claimed*
3	**Community Contracting**	**28 534 752**		
	MRRD (Activity 2b: canal and bridge rehabiliations)		*25 534 752*	*100% of total expenditure claimed*
	MAIL (Activity 3a: onfarm matching grants)		*3 000 000*	*100% of total expenditure claimed*
4	**Consulting Services**	**1 356 622**		
	MEW (Activity 4a: WREG)		*1 356 622*	*100% of total expenditure claimed*
B. UNALLOCATED		**5 508 813**		
	Physical and price contingencies		*5 508 813*	*100% of total expenditure claimed*
C. ADB Administrative Charges		**784 314**		
	Total	**40 000 000**		

		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Closing Year
A	**Base Costs**		***34.527***	***86.318***	***162.277***	***241.69***	***293.481***	***328.008***	***345.271***	
	Foreign		*24.096*	*60.24*	*113.252*	*168.673*	*204.818*	*228.914*	*240.962*	
	Domestic		*10.431*	*26.077*	*49.025*	*73.017*	*88.663*	*99.094*	*104.309*	
	Resettlement									
	Adjusted Domestic		10.431	26.077	49.025	73.017	88.663	99.094	104.309	
B	**Contingencies**									
	1 Physical Contingency		2.862	7.155	13.452	20.035	24.328	27.19	28.621	
	2 Price Contingency		1.215	3.037	5.71	8.504	10.326	11.541	12.149	
	Security (contractors)		1.622	4.054	7.621	11.351	13.783	15.404	16.215	
	ADB Administrative Charges		.078	.196	.369	.549	.667	.745	.784	
	Subtotal (B)		***5.777***	***14.442***	***27.151***	***40.438***	***49.103***	***54.88***	***57.769***	
C	**Implementation**		***Year 1***	***Year 2***	***Year 3***	***Year 4***	***Year 5***	***Year 6***	***Year 7***	
	Contract award	.	19.4	77.599	174.598	263.837	322.036	368.596	387.996	
	Disbursement	.	19.4	38.8	116.399	213.398	290.997	349.196	387.996	
	Annual Drawdown		*19.4*	*19.4*	*77.599*	*96.999*	*77.599*	*58.199*	*38.8*	
	Opening Balance		*.*	*19.4*	*38.8*	*116.399*	*213.398*	*290.997*	*349.196*	
	Closing Balance		*19.4*	*38.8*	*116.399*	*213.398*	*290.997*	*349.196*	*387.996*	
	Average Balance		9.7	29.1	77.599	164.898	252.197	320.096	368.596	
	Average Undisbursed		378.296	358.896	310.397	223.098	135.798	67.899	19.4	
	Total Project Costs		***40.304***	***100.76***	***189.429***	***282.128***	***342.584***	***382.888***	***403.04***	



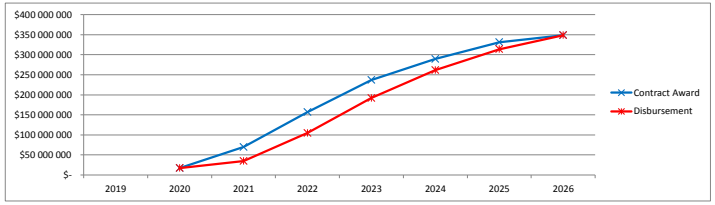
IFAD (loan) Financing

Item		Total Amount Allocated for IFAD Financing (USD)		Percentage and Basis for Withdrawal from the Grant Account
		Category	Subcategory	
A. INVESTMENT COSTS				
3	**Community Contracting**	**-**		
	MAIL ()		-	*100% of total expenditure claimed including taxes and duties*
UNALLOCATED		**-**		
	Physical and price contingencies		-	*100% of total expenditure claimed including taxes and duties*
	ADB Administrative Charges		-	
	Total	**-**		

Output / Subcomponent	Total Costs	Year 0 (2019)	Year 1 (2020)	Year 2 (2021)	Year 3 (2022)	Year 4 (2023)	Year 5 (2024)	Year 6 (2025)	Year 7 (2026)
A. INVESTMENT COSTS									
1 Dahla Dam capacity increased									
1a Raise the main dam and six saddle dams	199.875		19.987	29.981	43.972	45.971	29.981	19.987	9.994
1b Road realignment	18.152		1.815	2.723	3.993	4.175	2.723	1.815	.908
1c Capacity in dam operation and flow management improved	1.588		.159	.238	.349	.365	.238	.159	.079
Sub-total:	***219.615***		***21.961***	***32.942***	***48.315***	***50.511***	***32.942***	***21.961***	***10.981***
2 Reliability of irrigation water supply increased									
2a Modernization of AIS	14.221		1.422	2.133	3.129	3.271	2.133	1.422	.711
2b Improvement of community irrigation services	33.692		3.369	5.054	7.412	7.749	5.054	3.369	1.685
Sub-total:	***47.912***		***4.791***	***7.187***	***10.541***	***11.02***	***7.187***	***4.791***	***2.396***
3 Agricultural water productivity improved									
3a Demonstration of innovative agricultural on-farm practices and in	55.083		5.508	8.262	12.118	12.669	8.262	5.508	2.754
Sub-total:	***55.083***		***5.508***	***8.262***	***12.118***	***12.669***	***8.262***	***5.508***	***2.754***
4 Capacity in water resource management and use strengthened									
4a Water regulations reform	1.526		.153	.229	.336	.351	.229	.153	.076
4b Strategic water resources management training	2.968		.297	.445	.653	.683	.445	.297	.148
4c Establishment of a National Hydrological Modelling Platform	1.017		.102	.153	.224	.234	.153	.102	.051
Sub-total:	***5.511***		***.551***	***.827***	***1.212***	***1.268***	***.827***	***.551***	***.276***
Sub-total (A):	***328.121***		***32.812***	***49.218***	***72.187***	***75.468***	***49.218***	***32.812***	***16.406***
B. RECURRENT COSTS									
5 Project management									
Sub-total (B):	***17.15***		***1.715***	***2.573***	***3.773***	***3.945***	***2.573***	***1.715***	***.858***
Total Base Costs (A+B):	**345.271**		**34.527**	**51.791**	**75.96**	**79.412**	**51.791**	**34.527**	**17.264**
C. CONTINGENCIES AND CHARGES									
1 Physical Contingency	28.621		2.862	4.293	6.297	6.583	4.293	2.862	1.431
2 Price Contingency	12.149		1.215	1.822	2.673	2.794	1.822	1.215	.607
Security (contractors)	16.215		1.622	2.432	3.567	3.729	2.432	1.622	.811
ADB Administrative Charges	.784	.	.078	.118	.173	.18	.118	.078	.039
Subtotal (C)	***57.769***		***5.777***	***8.665***	***12.709***	***13.287***	***8.665***	***5.777***	***2.888***
Total project costs:	**403.04**		**40.304**	**60.456**	**88.669**	**92.699**	**60.456**	**40.304**	**20.152**

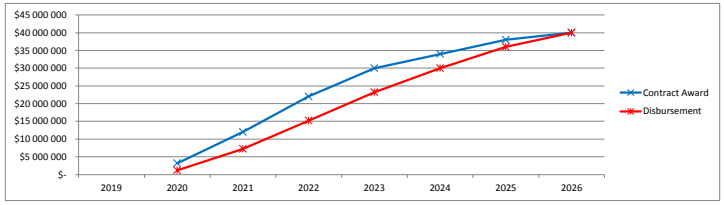
ADF/DRR (grant)

Cumulative	Cumulative	Contract Award						Disbursement				
		Year	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
		2019	.	.	.	.	.	.	.	.	.	.
17.439	17.439	2020	1.74	3.49	5.23	6.98	17.44	1.74	3.49	5.23	6.98	17.44
69.756	34.878	2021	5.23	10.46	15.70	20.93	52.32	1.74	3.49	5.23	6.98	17.44
156.951	104.634	2022	8.72	17.44	26.16	34.88	87.19	6.98	13.95	20.93	27.90	69.76
237.17	191.829	2023	8.02	16.04	24.07	32.09	80.22	8.72	17.44	26.16	34.88	87.19
289.487	261.585	2024	5.23	10.46	15.70	20.93	52.32	6.98	13.95	20.93	27.90	69.76
331.341	313.902	2025	4.19	8.37	12.56	16.74	41.85	5.23	10.46	15.70	20.93	52.32
348.78	348.78	2026	1.74	3.49	5.23	6.98	17.44	3.49	6.98	10.46	13.95	34.88
		Total					**348.78**					**348.78**



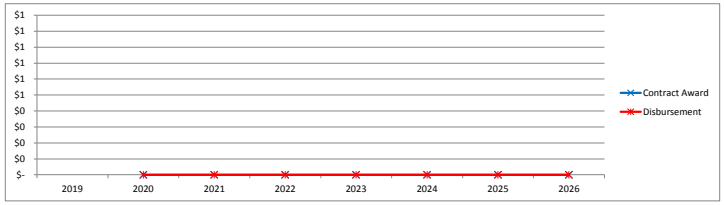
IFAD (grant)

Cumulative	Cumulative	Contract Award						Disbursement				
		Year	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
		2019	.	.	.	.	.	.	.	.	.	.
3.2	1.2	2020	.32	.64	.96	1.28	3.20	.12	.24	.36	.48	1.20
12.	7.2	2021	.88	1.76	2.64	3.52	8.80	.60	1.20	1.80	2.40	6.00
22.	15.2	2022	1.00	2.00	3.00	4.00	10.00	.80	1.60	2.40	3.20	8.00
30.	23.2	2023	.80	1.60	2.40	3.20	8.00	.80	1.60	2.40	3.20	8.00
34.	30.	2024	.40	.80	1.20	1.60	4.00	.68	1.36	2.04	2.72	6.80
38.	36.	2025	.40	.80	1.20	1.60	4.00	.60	1.20	1.80	2.40	6.00
40.	40.	2026	.20	.40	.60	.80	2.00	.40	.80	1.20	1.60	4.00
		Total					**40.00**					**40.00**



IFAD (loan)

Cumulative	Cumulative	Contract Award						Disbursement				
		Year	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
		Year	.	.	.	.	.	.	.	.	.	.
.	.	2019	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.	.	2020	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.	.	2021	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.	.	2022	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.	.	2023	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.	.	2024	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.	.	2025	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
		Total					**.00**					**.00**



Outputs:	Dahla Dam capacity increased	Reliability of irrigation water supply increased	Agricultural water productivity improved	Capacity in water resource management and use	Project management	*Total Costs*
A. INVESTMENT COSTS						
1 Civil Works	178.31	12.40	.00	.00	.00	*190.71*
2 Goods and Equipment	2.03	1.82	3.82	.00	.00	*7.66*
3 Community Contracting	.00	26.73	43.75	.00	.00	*70.48*
4 Consulting Services	18.14	.00	7.31	2.37	.00	*27.82*
5 Training and Workshops	.21	.08	.21	3.14	.00	*3.65*
6 Safeguards	20.92	6.88	.00	.00	.00	*27.80*
Subtotal (A)	***219.61***	***47.91***	***55.08***	***5.51***	.00	***328.12***
B. RECURRENT COSTS						
Salaries	.00	.00	.00	.00	8.73	*8.73*
Running costs	.00	.00	.00	.00	6.81	*6.81*
Office equipment	.00	.00	.00	.00	.42	*.42*
Office security and renovation	.00	.00	.00	.00	1.19	*1.19*
Subtotal (B)	***.00***	***.00***	***.00***	***.00***	***17.15***	***17.15***
Subtotal (A+B)	***219.61***	***47.91***	***55.08***	***5.51***	***17.15***	***345.27***
C. CONTINGENCIES AND CHARGES						
1 Physical Contingency	18.70	5.35	1.52	.74	2.30	*28.62*
2 Price Contingency	8.94	1.85	.51	.25	.60	*12.15*
Security (contractor)	15.63	.00	.58	.00	.00	*16.22*
ADB Administrative Charges	.00	.60	.15	.03	.00	*.78*
Subtotal (C)	***43.27***	***7.80***	***2.77***	***1.02***	***2.91***	***57.77***
Total Project Costs	***262.88***	***55.72***	***57.85***	***6.53***	***20.06***	***403.04***

	ADB		IFAD (grant)		IFAD (loan)		DRR financing		Government		Beneficiaries		*Total Costs*
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	
A. INVESTMENT COSTS													
Civil Works	***190.709***	***100%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***190.709***
### Dahla Dam capacity increased	*178.311*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*178.311*
### Reliability of irrigation water supply increased	*12.398*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*12.398*
### Agricultural water productivity improved	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*
### Capacity in water resource management and use strengthened	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*
Goods and Equipment	**3.849**	***50%***	**3.815**	***50%***	**.**	***0%***	**.**	***0%***	**.**	***0%***	**.**	***0%***	***7.665***
### *Dahla Dam capacity increased*	*2.026*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*2.026*
### *Reliability of irrigation water supply increased*	*1.823*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*1.823*
### *Agricultural water productivity improved*	*.*	*0%*	*3.815*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*3.815*
### *Capacity in water resource management and use strengthened*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*
Community Contracting	***32.***	***45%***	***28.535***	***40%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***9.946***	***14%***	***70.481***
Consulting Services	***25.449***	***91%***	***1.357***	***5%***	***.***	***0%***	***1.017***	***4%***	***.***	***0%***	***.***	***0%***	***27.823***
Training and Workshops	***.424***	***12%***	***.***	***0%***	***.***	***0%***	***3.222***	***88%***	***.***	***0%***	***.***	***0%***	***3.646***
Safeguards	***27.797***	***100%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***27.797***
Subtotal (A)	***280.228***	***85%***	***33.707***	***10%***	***.***	***0%***	***4.239***	***1%***	***.***	***0%***	***9.946***	***3%***	***328.121***
B. RECURRENT COSTS													
1 Salaries	*7.971*	*91%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.758*	*9%*	*.*	*0%*	*8.73*
2 Running costs	*3.811*	*56%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*2.997*	*44%*	*.*	*0%*	*6.808*
3 Office equipment	*.421*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.421*
4 Office security and renovation	*1.192*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*1.192*
Subtotal (B)	***13.395***	***78%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***3.755***	***22%***	***.***	***0%***	***17.15***
Subtotal (A+B)	***293.623***		***33.707***		***.***		***4.239***		***3.755***		***9.946***		***345.271***
C Contingencies													
1 Physical Contingency	*23.419*	*82%*	*4.127*	*14%*	*.*	*0%*	*.57*	*2%*	*.505*	*2%*	*.*	*0%*	*28.621*
2 Price Contingency	*10.522*	*87%*	*1.382*	*11%*	*.*	*0%*	*.191*	*2%*	*.*	*0%*	*.054*	*0%*	*12.149*
Security (contractors)	*16.215*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*16.215*
ADB Administrative Charges	*.*	*0%*	*.784*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.784*
Subtotal C	***50.157***	***87%***	***6.293***	***11%***	***.***	***0%***	***.761***	***1%***	***.505***	***1%***	***.054***	***0%***	***57.769***
Total Project Costs	**343.78**	**85%**	**40.**	**10%**	**.**	**0%**	**5.**	**1%**	**4.26**	**1%**	**10.**	**2%**	**403.04**

		MEW		MRRD		MAIL		
		Amount	%	Amount	%	Amount	%	***Total Costs***
A	**DETAILED CPMO TABLES**	**4.555**	***29%***	**5.867**	***37%***	**5.376**	***34%***	**15.798**
	Salaries	*3.6*		*2.451*		*3.351*		*9.402*
	Running costs	*.42*		*2.584*		*1.49*		*4.495*
	Office equipment	*.175*		*.266*		*.055*		*.496*
	Office security and renovation	*.36*		*.566*		*.48*		*1.406*
	Subtotal A							
B.	***RECURRENT COSTS***							
1	**ADF/DRR**	***4.555***	***29%***	***5.867***	***37%***	***5.376***	***34%***	***15.798***
	Salaries	3.6		2.451		3.351		9.402
	Running costs	.42		2.584		1.49		4.495
	Office equipment	.175		.266		.055		.496
	Office security and renovation	.36		.566		.48		1.406
C	**Difference**	**$**	**-**	**$**	**-**	**$**	**-**	**$**	**-**
	Salaries	$	-	$	-	$	-	$	-
	Running costs	$	-	$	-	$	-	$	-
	Office equipment	$	-	$	-	$	-	$	-
	Office security and renovation	$	-	$	-	$	-	$	-

	MEW		MRRD		MAIL		
	Amount	%	Amount	%	Amount	%	***Total Costs***
A. INVESTMENT COSTS							
ADF/DRR	***228.828***		***16.123***		***39.517***		***284.468***
1 Dahla Dam capacity increased	203.577		16.038		.		219.615
2 Reliability of irrigation water supply increased	21.097		.085		.		21.181
3 Agricultural water productivity improved	.		.		39.517		39.517
4 Capacity in water resource management and use strengt	4.155		.		.		4.155
IFAD (grant)	***1.357***		***25.535***		***6.815***		***33.707***
1 Dahla Dam capacity increased	.		.		.		.
2 Reliability of irrigation water supply increased	.		25.535		.		25.535
3 Agricultural water productivity improved	.		.		6.815		6.815
4 Capacity in water resource management and use strengt	1.357		.		.		1.357
IFAD (loan)	**.**		**.**		**.**		**.**
1 Dahla Dam capacity increased	.		.		.		.
2 Reliability of irrigation water supply increased	.		.		.		.
3 Agricultural water productivity improved	.		.		.		.
4 Capacity in water resource management and use	.		.		.		.
Government	**.**		**.**		**.**		**.**
1 Dahla Dam capacity increased	.		.		.		.
2 Reliability of irrigation water supply increased	.		.		.		.
3 Agricultural water productivity improved	.		.		.		.
4 Capacity in water resource management and use strengt	.		.		.		.
Beneficiaries	**.**		***1.196***		***8.75***		***9.946***
1 Dahla Dam capacity increased	.		.		.		.
2 Reliability of irrigation water supply increased	.		1.196		.		1.196
3 Agricultural water productivity improved	.		.		8.75		8.75
4 Capacity in water resource management and use strengt	.		.		.		.
Subtotal (A)	***230.184***	***70%***	***42.854***	***13%***	***55.083***	***17%***	***328.121***
B. RECURRENT COSTS							
1 ADF/DRR	***3.862***		***4.974***		***4.559***		***13.395***
Salaries	3.052		2.078		2.841		7.971
Running costs	.356		2.191		1.264		3.811
Office equipment	.148		.226		.047		.421
Office security and renovation	.305		.48		.407		1.192
2 IFAD (grant)	**.**		**.**		**.**		**.**
Salaries	.		.		.		.
Running costs	.		.		.		.
Office equipment	.		.		.		.
Office security and renovation	.		.		.		.
3 IFAD (loan)	**.**		**.**		**.**		**.**
Salaries	.		.		.		.
Running costs	.		.		.		.
Office equipment	.		.		.		.
Office security and renovation	.		.		.		.
4 Government	***1.164***	***31%***	***1.322***	***35%***	***1.269***	***34%***	***3.755***
Salaries	.106		.441		.212		.758
Running costs	1.058		.882		1.058		2.997
Office equipment	.		.		.		.
Office security and renovation	.		.		.		.
Subtotal (B)	***5.026***	***29%***	***6.297***	***37%***	***5.828***	***34%***	***17.15***
Subtotal (A+B)	***235.21***		***49.151***		***60.91***		***345.271***
C Contingencies							
1 Physical Contingency	*20.576*	*82%*	*5.739*	*14%*	*2.306*	*2%*	*28.621*
2 Price Contingency	*9.281*	*87%*	*2.152*	*11%*	*.715*	*2%*	*12.149*
Security (contractors)	*14.358*	*100%*	*1.273*	*0%*	*.584*	*0%*	*16.215*
ADB Administrative Charges	*.032*	*0%*	*.602*	*100%*	*.15*	*0%*	*.784*
Subtotal C	***44.247***	***87%***	***9.766***	***11%***	***3.756***	***1%***	***57.769***
Total Project Costs	**279.457**	**69%**	**58.917**	**15%**	**64.666**	**16%**	**403.04**

	MEW		MRRD		MAIL		
	Amount	%	Amount	%	Amount	%	***Total Costs***
A. INVESTMENT COSTS							
1 ADF/DRR							
Civil Works	174.798		15.911		.		190.709
Goods and Equipment	3.849		.		.		3.849
Community Contracting	.		.		32.		32.
Consulting Services	19.162		.		7.305		26.467
Training and Workshops	3.222		.212		.212		3.646
Safeguards	27.797		.		.		27.797
Sub-total:	***228.828***		***16.123***		***39.517***		***284.468***
2 IFAD (grant)							
Civil Works	.		.		.		.
Goods and Equipment	.		.		3.815		3.815
Community Contracting	.		25.535		3.		28.535
Consulting Services	1.357		.		.		1.357
Training and Workshops	.		.		.		.
Safeguards	.		.		.		.
Sub-total:	***1.357***		***25.535***		***6.815***		***33.707***
3 **IFAD (loan)**							
Civil Works	.		.		.		.
Goods and Equipment	.		.		.		.
Community Contracting	.		.		.		.
Consulting Services	.		.		.		.
Training and Workshops	.		.		.		.
Safeguards	.		.		.		.
Sub-total:	***.***		***.***		***.***		***.***
4 ***Government***							
Civil Works	.		.		.		.
Goods and Equipment	.		.		.		.
Community Contracting	.		.		.		.
Consulting Services	.		.		.		.
Training and Workshops	.		.		.		.
Safeguards	.		.		.		.
Sub-total:	***.***		***.***		***.***		***.***
5 Beneficiaries							
Civil Works	.		.		.		.
Goods and Equipment	.		.		.		.
Community Contracting	.		1.196		8.75		9.946
Consulting Services	.		.		.		.
Training and Workshops	.		.		.		.
Safeguards	.		.		.		.
Sub-total:	***.***		***1.196***		***8.75***		***9.946***
Subtotal (A)	***230.184***	***70%***	***42.854***	***13%***	***55.083***	***17%***	***328.121***
B. RECURRENT COSTS							
1 ADF/DRR							
Salaries	3.052		2.078		2.841		7.971
Running costs	.356		2.191		1.264		3.811
Office equipment	.148		.226		.047		.421
Office security and renovation	.305		.48		.407		1.192
Sub-total:	***3.862***		***4.974***		***4.559***		***13.395***
3 Government							
Salaries	.106		.441		.212		.758
Running costs	1.058		.882		1.058		2.997
Office equipment	.		.		.		.
Office security and renovation	.		.		.		.
Sub-total:	***1.164***	***31%***	***1.322***	***35%***	***1.269***	***34%***	***3.755***
Subtotal (B)	***5.026***	***29%***	***6.297***	***37%***	***5.828***	***34%***	***17.15***
Subtotal (A+B)	***235.21***		***49.151***		***60.91***		***345.271***
C Contingencies							
1 Physical Contingency	*20.576*	*82%*	*5.739*	*14%*	*2.306*	*2%*	*28.621*
2 Price Contingency	*9.281*	*87%*	*2.152*	*11%*	*.715*	*2%*	*12.149*
Security (contractors)	*14.358*	*100%*	*1.273*	*0%*	*.584*	*0%*	*16.215*
ADB Administrative Charges	*.032*	*0%*	*.602*	*100%*	*.15*	*0%*	*.784*
Subtotal C	***44.247***	***87%***	***9.766***	***11%***	***3.756***	***1%***	***57.769***
Total Project Costs	**279.457**	**69%**	**58.917**	**15%**	**64.666**	**16%**	**403.04**

		MEW		MRRD		MAIL			
		Amount	%	Amount	%	Amount	%	***Total Costs***	%
A. INVESTMENT COSTS									
	Civil Works	***174.798***	***92%***	***15.911***	***8%***	***.***	***0%***	***190.709***	
###	Dahla Dam capacity increased	*162.4*	*91%*	*15.911*	*9%*	*.*	*0%*	*178.311*	
###	Reliability of irrigation water supply increased	*12.398*	*100%*	*.*	*0%*	*.*	*0%*	*12.398*	
###	Agricultural water productivity improved	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	
###	Capacity in water resource management and use strengthened	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	
	Goods and Equipment	***3.849***	***50%***	***.***	***0%***	***3.815***	***50%***	***7.665***	
###	*Dahla Dam capacity increased*	*2.026*	*100%*	*.*	*0%*	*.*	*0%*	*2.026*	
###	*Reliability of irrigation water supply increased*	*1.823*	*100%*	*.*	*0%*	*.*	*0%*	*1.823*	
###	*Agricultural water productivity improved*	*.*	*0%*	*.*	*0%*	*3.815*	*100%*	*3.815*	
###	*Capacity in water resource management and use strengthened*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	
	Community Contracting	***.***	***0%***	***26.731***	***38%***	***43.75***	***62%***	***70.481***	
1	*Dahla Dam capacity increased*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	
2	*Reliability of irrigation water supply increased*	*.*	*0%*	*26.731*	*100%*	*.*	*0%*	*26.731*	
3	*Agricultural water productivity improved*	*.*	*0%*	*.*	*0%*	*43.75*	*100%*	*43.75*	
4	*Capacity in water resource management and use strengthened*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	
	Consulting Services	***20.518***	***74%***	***.***	***0%***	***7.305***	***26%***	***27.823***	
1	*Dahla Dam capacity increased*	*18.144*	*100%*	*.*	*0%*	*.*	*0%*	*18.144*	
2	*Reliability of irrigation water supply increased*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	
3	*Agricultural water productivity improved*	*.*	*0%*	*.*	*0%*	*7.305*	*100%*	*7.305*	
4	*Capacity in water resource management and use strengthened*	*2.374*	*100%*	*.*	*0%*	*.*	*0%*	*2.374*	
	Training and Workshops	***3.222***	***88%***	***.212***	***6%***	***.212***	***6%***	***3.646***	
1	*Dahla Dam capacity increased*	*.085*	*40%*	*.127*	*60%*	*.*	*0%*	*.212*	
2	*Reliability of irrigation water supply increased*	*.*	*0%*	*.085*	*100%*	*.*	*0%*	*.085*	
3	*Agricultural water productivity improved*	*.*	*0%*	*.*	*0%*	*.212*	*100%*	*.212*	
4	*Capacity in water resource management and use strengthened*	*3.137*	*100%*	*.*	*0%*	*.*	*0%*	*3.137*	
	Safeguards	***27.797***	***100%***	***.***	***0%***	***.***	***0%***	***27.797***	
1	*Dahla Dam capacity increased*	*20.921*	*100%*	*.*	*0%*	*.*	*0%*	*20.921*	
2	*Reliability of irrigation water supply increased*	*6.876*	*100%*	*.*	*0%*	*.*	*0%*	*6.876*	
3	*Agricultural water productivity improved*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	
4	*Capacity in water resource management and use strengthened*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	
	Subtotal (A)	***230.184***	***70%***	***42.854***	***13%***	***55.083***	***17%***	***328.121***	
B. RECURRENT COSTS									
1	Salaries	*3.158*	*36%*	*2.519*	*29%*	*3.053*	*35%*	*8.73*	
2	Running costs	*1.414*	*21%*	*3.073*	*45%*	*2.322*	*34%*	*6.808*	
3	Office equipment	*.148*	*35%*	*.226*	*54%*	*.047*	*11%*	*.421*	
4	Office security and renovation	*.305*	*26%*	*.48*	*40%*	*.407*	*34%*	*1.192*	
	Subtotal (B)	***5.026***	***29%***	***6.297***	***37%***	***5.828***	***34%***	***17.15***	
	Subtotal (A+B)	***235.21***		***49.151***		***60.91***		***345.271***	
C	**Contingencies**								
1	Physical Contingency	*20.576*	*82%*	*5.739*	*14%*	*2.306*	*2%*	*28.621*	
2	Price Contingency	*9.281*	*87%*	*2.152*	*11%*	*.715*	*2%*	*12.149*	
	Security (contractors)	*14.358*	*100%*	*1.273*	*0%*	*.584*	*0%*	*16.215*	
	ADB Administrative Charges	*.032*	*0%*	*.602*	*100%*	*.15*	*0%*	*.784*	
	Subtotal C	***44.247***	***87%***	***9.766***	***11%***	***3.756***	***1%***	***57.769***	
	Total Project Costs	**279.457**	**69%**	**58.917**	**15%**	**64.666**	**16%**	**403.04**	

Output / Subcomponent	ADB	IFAD (grant)	IFAD (loan)	DRR financing	Government	Beneficiaries	Total costs
A. INVESTMENT COSTS							
1 Dahla Dam capacity increased							
1a Raise the main dam and six saddle dams	199.875	.	.	.	.	.	199.875
1b Road realignment	18.152	.	.	.	.	.	18.152
1c Capacity in dam operation and flow management improved	1.588	.	.	.	.	.	1.588
Sub-total:	***219.615***	***.***	***.***	***.***	***.***	***.***	***219.615***
2 Reliability of irrigation water supply increased							
2a Modernization of AIS	14.221	.	.	.	.	.	14.221
2b Improvement of community irrigation services	6.876	25.535	.	.085	.	1.196	33.692
Sub-total:	***21.097***	***25.535***	***.***	***.085***	***.***	***1.196***	***47.912***
3 Agricultural water productivity improved							
3a Demonstration of innovative agricultural on-farm practices and invest	39.517	6.815	.	.	.	8.75	55.083
Sub-total:	***39.517***	***6.815***	***.***	***.***	***.***	***8.75***	***55.083***
4 Capacity in water resource management and use strengthened							
4a Water regulations reform	.	1.357	.	.17	.	.	1.526
4b Strategic water resources management training	.	.	.	2.968	.	.	2.968
4c Establishment of a National Hydrological Modelling Platform	.	.	.	1.017	.	.	1.017
Sub-total:	***.***	***1.357***	***.***	***4.155***	***.***	***.***	***5.511***
Sub-total (A):	***280.228***	***33.707***	***.***	***4.239***	***.***	***9.946***	***328.121***
B. RECURRENT COSTS							
5 Project management							
Sub-total:	***13.395***	***.***	***.***	***.***	***3.755***	***.***	**17.15**
Total Base Costs (A+B):	***293.623***	***33.707***	***.***	***4.239***	***3.755***	***9.946***	***345.271***
C. CONTINGENCIES AND CHARGES							
1 Physical Contingency	23.419	4.127	.	.57	.505	.	28.621
2 Price Contingency	10.522	1.382	.	.191	.	.054	12.149
Security (contractors)	16.215	.	.	.	.	.	16.215
ADB Administrative Charges	.	.784	.	.	.	.	.784
Subtotal (B)	***50.157***	***6.293***	***.***	***.761***	***.505***	***.054***	***57.769***
Total project costs:	**343.78**	**40.00**	**.00**	**5.00**	**4.26**	**10.**	**403.04**

	Total Costs	
	AFG	US$
A. INVESTMENT COSTS		
1 Civil Works	15393.415	190.709
2 Goods and Equipment	618.686	7.665
3 Community Contracting	5688.995	70.481
4 Consulting Services	2245.812	27.823
5 Training and Workshops	294.287	3.646
6 Safeguards	2243.68	27.797
Subtotal (A)	***26484.875***	***328.121***
B. RECURRENT COSTS		
Salaries	704.622	8.73
Running costs	549.549	6.808
Office equipment	33.946	.421
Office security and renovation	96.199	1.192
Subtotal (B)	***1384.316***	***17.15***
Subtotal (A+B)	***27869.191***	***345.271***
C. Contingencies		
1 Physical Contingency	2310.179	28.621
2 Price Contingency	980.597	12.149
Security (contractors)	1308.825	16.215
IFAD Service Charges	.	.
ADB Administrative Charges	63.307	.784
Subtotal (C)	***4662.908***	***57.769***
Total Project Costs	**32532.099**	**403.04**

	Total Costs	
	AFG	US$
A. INVESTMENT COSTS		
1 MEW	18985.413	235.21
2 MRRD	3967.279	49.151
3 MAIL	4916.5	60.91
Subtotal (A)	***27869.191***	***345.271***
B. RECURRENT COSTS		
1 MEW	.	.
2 MRRD	.	.
3 MAIL	.	.
Subtotal (B)	***.***	***.***
Subtotal (A+B)	***27869.191***	***345.271***
C. Contingencies		
1 Physical Contingency	2310.179	28.621
2 Price Contingency	980.597	12.149
Security (contractors)	1308.825	16.215
IFAD Service Charges	.	.
ADB Administrative Charges	63.307	.784
Subtotal (C)	***4662.908***	***57.769***
Total Project Costs	**32532.099**	**403.04**

	ADB		IFAD (grant)		IFAD (loan)		DRR financing		Government		Beneficiaries		
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	***Total Costs***
A. INVESTMENT COSTS													
1 Civil Works	190.709	100%	.	0%	.	0%	.	0%	.	0%	.	0%	190.709
2 Goods and Equipment	3.849		3.815		.		.		.		.		7.665
3 Community Contracting	*32.*	*45%*	*28.535*	*40%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*9.946*	*14%*	70.481
4 Consulting Services	*25.449*	*91%*	*1.357*	*5%*	*.*	*0%*	*1.017*	*4%*	*.*	*0%*	*.*	*0%*	27.823
5 Training and Workshops	*.424*	*12%*	*.*	*0%*	*.*	*0%*	*3.222*	*88%*	*.*	*0%*	*.*	*0%*	3.646
6 Safeguards	*27.797*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	27.797
Subtotal (A)	***280.228***	***85%***	***33.707***	***10%***	***.***	***0%***	***4.239***	***1%***	***.***	***0%***	***9.946***	***3%***	***328.121***
B. RECURRENT COSTS													
1 Salaries	*7.971*	*91%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.758*	*9%*	*.*	*0%*	8.73
2 Running costs	*3.811*	*56%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*2.997*	*44%*	*.*	*0%*	6.808
3 Office equipment	*.421*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	.421
4 Office security and renovation	*1.192*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	1.192
Subtotal (B)	***13.395***	***78%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***3.755***	***22%***	***.***	***0%***	***17.15***
Subtotal (A+B)	***293.623***		***33.707***		***.***		***4.239***		***3.755***		***9.946***		***345.271***
C Contingencies													
1 Physical Contingency	*23.419*	*82%*	*4.127*	*14%*	*.*	*0%*	*.57*	*2%*	*.505*	*2%*	*.*	*0%*	28.621
2 Price Contingency	*10.522*	*87%*	*1.382*	*11%*	*.*	*0%*	*.191*	*2%*	*.*	*0%*	*.054*	*0%*	12.149
Security (contractors)	*16.215*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	16.215
ADB Administrative Charges	*.*		*.784*		*.*		*.*		*.*		*.*		.784
Subtotal C	***50.157***	***87%***	***6.293***	***11%***	***.***	***0%***	***.761***	***1%***	***.505***	***1%***	***.054***	***0%***	***57.769***
Total Project Costs	**343.78**	**85%**	**40.**	**10%**	**.**	**0%**	**5.**	**1%**	**4.26**	**1%**	**10.**	**2%**	**403.04**

	ADB		IFAD (grant)		IFAD (loan)		DRR financing		Government		Beneficiaries		
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	***Total Costs***
A. INVESTMENT COSTS													
1 MEW													
Civil Works	174.798		.		.		.		.		.		174.798
Goods and Equipment	3.849		.		.		.		.		.		3.849
Community Contracting	.		.		.		.		.		.		.
Consulting Services	18.144		1.357		.		1.017		.		.		20.518
Training and Workshops	.085		.		.		3.137		.		.		3.222
Safeguards	27.797		.		.		.		.		.		27.797
Sub-total:	***224.673***		***1.357***		***.***		***4.155***		***.***		***.***		**230.184**
2 MRRD													
Civil Works	15.911		.		.		.		.		.		15.911
Goods and Equipment	.		.		.		.		.		.		.
Community Contracting	.		25.535		.		.		.		1.196		26.731
Consulting Services	.		.		.		.		.		.		.
Training and Workshops	.127		.		.		.085		.		.		.212
Safeguards	.		.		.		.		.		.		.
Sub-total:	***16.038***		***25.535***		***.***		***.085***		***.***		***1.196***		**42.854**
3 MAIL													
Civil Works	.		.		.		.		.		.		.
Goods and Equipment	.		3.815		.		.		.		.		3.815
Community Contracting	32.		3.		.		.		.		8.75		43.75
Consulting Services	7.305		.		.		.		.		.		7.305
Training and Workshops	.212		.		.		.		.		.		.212
Safeguards	.		.		.		.		.		.		.
Sub-total:	***39.517***		***6.815***		***.***		***.***		***.***		***8.75***		**55.083**
													.
Subtotal (A)	***280.228***	***85%***	***33.707***	***10%***	***.***	***0%***	***4.239***	***1%***	***.***	***0%***	***9.946***	***3%***	***328.121***
B. RECURRENT COSTS													
1 MEW													
Salaries	3.052		.		.		.		.106		.		3.158
Running costs	.356		.		.		.		1.058		.		1.414
Office equipment	.148		.		.		.		.		.		.148
Office security and renovation	.305		.		.		.		.		.		.305
Sub-total:	***3.862***		***.***		***.***		***.***		***1.164***		***.***		**5.026**
													.
2 MRRD													.
Salaries	2.078		.		.		.		.441		.		2.519
Running costs	2.191		.		.		.		.882		.		3.073
Office equipment	.226		.		.		.		.		.		.226
Office security and renovation	.48		.		.		.		.		.		.48
Sub-total:	***4.974***		***.***		***.***		***.***		***1.322***		***.***		**6.297**
													.
3 MAIL													.
Salaries	2.841		.		.		.		.212		.		3.053
Running costs	1.264		.		.		.		1.058		.		2.322
Office equipment	.047		.		.		.		.		.		.047
Office security and renovation	.407		.		.		.		.		.		.407
Sub-total:	***4.559***	***78%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***1.269***	***22%***	***.***	***0%***	**5.828**
Subtotal (B)	***13.395***	***78%***	***.***	***0%***	***.***	***0%***	***.***	***0%***	***3.755***	***22%***	***.***	***0%***	***17.15***
Subtotal (A+B)	***293.623***		***33.707***		***.***		***4.239***		***3.755***		***9.946***		***345.271***
C Contingencies													
1 Physical Contingency	*23.419*	*82%*	*4.127*	*14%*	*.*	*0%*	*.57*	*2%*	*.505*	*2%*	*.*	*0%*	*28.621*
2 Price Contingency	*10.522*	*87%*	*1.382*	*11%*	*.*	*0%*	*.191*	*2%*	*.*	*0%*	*.054*	*0%*	*12.149*
Security (contractors)	*16.215*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*16.215*
ADB Administrative Charges	*.*	*0%*	*.784*	*100%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.*	*0%*	*.784*
Subtotal C	***50.157***	***87%***	***6.293***	***11%***	***.***	***0%***	***.761***	***1%***	***.505***	***1%***	***.054***	***0%***	***57.769***
Total Project Costs	**343.78**	**85%**	**40.**	**10%**	**.**	**0%**	**5.**	**1%**	**4.26**	**1%**	**10.**	**2%**	**403.04**

	Year 0 (2019)	Year 1 (2020)	Year 2 (2021)	Year 3 (2022)	Year 4 (2023)	Year 5 (2024)	Year 6 (2025)	Year 7 (2026)
A. INVESTMENT COSTS								
1 Civil Works		19.071	47.677	89.633	133.496	162.103	181.173	190.709
2 Goods and Equipment		.766	1.916	3.602	5.365	6.515	7.282	7.665
3 Community Contracting		7.048	17.62	33.126	49.337	59.909	66.957	70.481
4 Consulting Services		2.782	6.956	13.077	19.476	23.65	26.432	27.823
5 Training and Workshops		.365	.911	1.714	2.552	3.099	3.464	3.646
6 Safeguards		2.78	6.949	13.065	19.458	23.627	26.407	27.797
Subtotal (A)		***32.812***	***82.03***	***154.217***	***229.685***	***278.903***	***311.715***	***328.121***
B. RECURRENT COSTS								
1 Salaries		.873	2.182	4.103	6.111	7.42	8.293	8.73
2 Running costs		.681	1.702	3.2	4.766	5.787	6.468	6.808
3 Office equipment		.042	.105	.198	.294	.357	.4	.421
4 Office security and renovation		.119	.298	.56	.834	1.013	1.132	1.192
Subtotal (B)		***1.715***	***4.288***	***8.061***	***12.005***	***14.578***	***16.293***	***17.15***
Subtotal (A+B)		***34.527***	***86.318***	***162.277***	***241.69***	***293.481***	***328.008***	***345.271***
C. CONTINGENCIES AND CHARGES								
1 Physical Contingency		2.862	7.155	13.452	20.035	24.328	27.19	28.621
2 Price Contingency		1.215	3.037	5.71	8.504	10.326	11.541	12.149
Security (contractors)		1.622	4.054	7.621	11.351	13.783	15.404	16.215
ADB Administrative Charges		.078	.196	.369	.549	.667	.745	.784
Subtotal (C)		***5.777***	***14.442***	***27.151***	***40.438***	***49.103***	***54.88***	***57.769***
Total Project Costs		***40.304***	***100.76***	***189.429***	***282.128***	***342.584***	***382.888***	***403.04***

Outputs: .	Dahla Dam capacity increased			Reliability of irrigation water supply increased		Agricultural water productivity improved		Capacity in water resource management and use strengthened			Project management	
Subcomponents:	***1a***	***1b***	***1c***	***2a***	***2b***	***3a***	***3b***	***4a***	***4b***	***4c***	***.***	***Total Costs***
A. INVESTMENT COSTS												
1 Civil Works	162.4	15.911	.	12.398	.	.	.	.	.	.	.	*190.709*
2 Goods and Equipment	2.026	.	.	1.823	.	3.815	.	.	.	.	.	*7.665*
3 Community Contracting	.	.	.	.	26.731	43.75	.	.	.	.	.	*70.481*
4 Consulting Services	14.968	1.588	1.588	.	.	7.305	.	1.357	.	1.017	.	*27.823*
5 Training and Workshops	.085	.127	.	.	.085	.212	.	.17	2.968	.	.	*3.646*
6 Safeguards	20.395	.526	.	.	6.876	.	.	.	.	.	.	*27.797*
Subtotal (A)	***199.875***	***18.152***	***1.588***	***14.221***	***33.692***	***55.083***	***.***	***1.526***	***2.968***	***1.017***	.	***328.121***
B. RECURRENT COSTS												
Salaries	.	.	.	.	.	.	.	.	.	.	8.73	*8.73*
Running costs	.	.	.	.	.	.	.	.	.	.	6.808	*6.808*
Office equipment	.	.	.	.	.	.	.	.	.	.	.421	*.421*
Office security and renovation	.	.	.	.	.	.	.	.	.	.	1.192	*1.192*
Subtotal (B)	***.***	***.***	***.***	***.***	***.***	***.***	***.***	***.***	***.***	***.***	***17.15***	***17.15***
Subtotal (A+B)	***199.875***	***18.152***	***1.588***	***14.221***	***33.692***	***55.083***	***.***	***1.526***	***2.968***	***1.017***	***17.15***	***345.271***
C. CONTINGENCIES AND CHARGES												
1 Physical Contingency	16.821	1.663	.213	1.911	3.443	1.523	.	.205	.399	.137	2.305	*28.621*
2 Price Contingency	8.077	.793	.071	.64	1.207	.51	.	.069	.134	.046	.603	*12.149*
Security (contractors)	14.104	1.4	.127	.	.	.584	.	.	.	.	.	*16.215*
ADB Administrative Charges	.	.	.	.	.602	.15	.	.032	.	.	.	*.784*
Subtotal (C)	***39.002***	***3.856***	***.412***	***2.551***	***5.252***	***2.767***	***.***	***.306***	***.532***	***.183***	***2.908***	***57.769***
Total Project Costs	***238.876***	***22.008***	***2.***	***16.772***	***38.944***	***57.85***	***.***	***1.832***	***3.5***	***1.2***	***20.058***	***403.04***

		MEW		MRRD		MAIL		
		Amount	%	Amount	%	Amount	%	***Total Costs***
A	**Base Costs**	***234.047***	71%	***46.632***	14%	***50.891***	15%	***331.57***
	Foreign	*162.083*	*67%*	*34.721*	*14%*	*44.158*	*18%*	*240.962*
	Domestic	*71.964*	*79%*	*11.911*	*13%*	*6.733*	*7%*	*90.608*
	Resettlement							
	Adjusted Domestic	71.964	79%	11.911	13%	6.733	7%	90.608
B	**Contingencies**							
1	Physical Contingency	20.576	72%	5.739	20%	2.306	8%	28.621
	Foreign							
	Domestic							
2	Price Contingency	9.281	76%	2.152	18%	.715	6%	*12.149*
	Foreign							
	Domestic							
	Security (contractors)	*14.358*	89%	*1.273*	8%	*.584*	4%	*16.215*
	IFAD Service Charges					.		.
	ADB Administrative Charges	*.032*	4%	*.602*	77%	*.15*	19%	*.784*
	Subtotal C	***44.247***	77%	***9.766***	17%	***3.756***	7%	***57.769***
	Total Project Costs	**278.293**	**71%**	**56.398**	**14%**	**54.647**	**14%**	**389.339**
		.		.		.		.

Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Mgt Letter Arghandab To Adb

Document Date:	22/10/2019
Project No.	2000002332

Asia and the Pacific Division
Programme Management Department

IFAD | FIDA
Investing in rural people
Investir dans les populations rurales
Invertir en la población rural
الاستثمار في السكان الريفيين

Rome, 2 October 2019

Dear Ms Walton,

Re: Islamic Republic of Afghanistan – Arghandab Integrated Water Resources Development Project (AIWRDP)

I refer to the Arghandab Integrated Water Resources Development Project recently approved by the Executive Board of the Asian Development Bank (ADB), which the International Fund for Agricultural Development (IFAD) is expected to co-finance by means of a USD 40 million grant to be made available to the Islamic Republic of Afghanistan.

The AIWRDP represents a valuable opportunity for strengthening the partnership between IFAD and the ADB in Afghanistan, as our two institutions join forces to address the challenges affecting socio-economic development in the country.

Please be advised that the Programme design was reviewed earlier in August 2019 by IFAD's Quality Assurance Group (QAG) members, who raised the concern that the AIWRDP design does not adequately reflect the Fund's specific role in promoting sustainable and inclusive rural transformation.

In this regard, the design review meeting chaired by IFAD's Vice President considered a number of points that need to be dealt with in order to strengthen the Programme design and ensure that it is better aligned with IFAD's mandate and priorities, especially with regards to pro-poor targeting and women's empowerment. To this end, it was agreed that such points would be addressed in the early implementation stages of AIWRDP on the understanding that they would be adequately reflected in the Project Administration Manual (PAM) and related guidelines, such as those for the evaluation of subproject investment proposals for matching grants.

I acknowledge that within six months of the Project meeting all conditions precedent to its effectiveness, the Project Management Offices (PMOs) will develop a stakeholder communication, consultation and participation plan, for approval by ADB, which will outline the stakeholder outreach and engagement approach for implementation by relevant officers at each Project Implementation Unit (PIU).

./.

Ms Donneth Walton
Director
Environment, Natural Resources and Agriculture Division
The Asian Development Bank
Manila

For this purpose, IFAD will develop a detailed summary of how it expects targeting of the 36,000 small-scale farmers households to be conducted and of the priorities, that it wishes be pursued in relation to the activities it will finance, for integration in the Project design, the PAM and other relevant documents upon consultation with the ADB and the Government of Afghanistan.

If this proposal is acceptable to you, I would kindly request that you countersign and date the two copies of this letter and return one copy to the Fund.

Yours sincerely,

Nigel Brett
Director
Asia and the Pacific Division

Ms Donneth Walton
Director
Environment, Natural Resources and Agriculture Division
The Asian Development Bank

Signature: _____

Date: _____

Copy for information:

Mr Candra Samekto
Country Programme Manager (Afghanistan)
IFAD

Mr. Hans Woldring
Principal Natural Resources and Agriculture Specialist for Central and West Asia
ADB

IFAD
Investing in rural people

Afghanistan

Arghandab Integrated Water Resources Development Programme

Design Report

Annex: Arghandab Afg Management Letter For Adb

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Asia and the Pacific Division

Ms Donneth Walton
Director
Environment, Natural Resources and Agriculture Division
The Asian Development Bank

Signature: DWalton

Date: 9 October 2019

Copy for information:

Mr Candra Samekto
Country Programme Manager (Afghanistan)
IFAD

Mr. Hans Woldring
Principal Natural Resources and Agriculture Specialist for Central and West Asia
ADB