

Initial Environmental Examination

Project Number: 48042-001
April 2021

Afghanistan: Panj Amu River Basin Sector Project

(Sharawan and Momen Abad Irrigation Scheme – NCB005)

Prepared by the Ministry of Finance and the National Water Affairs Regulation Authority for the Asian Development Bank.

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ACRONYMS

ADB	Asian Development Bank	NEPA	National Environmental Protection Agency
AMP	Asset Management Plan	NWARA	National Water Affairs Regulation Authority
BC	Branch Canal	OFWM	On Farm Water Management Specialist
CBNRM	Community Based Natural Resource Management	OTJ	On-the-job Training
CPMO	Central Program Management Office	O&M	Operation and Maintenance
CBWRM	Community-based Water Resource Management	P-ARBP	Panj-Amu River Basin Projects (completed EU-supported project)
CEMMP	Construction Environmental Management and Monitoring Plan	PARB, P-ARBSP	Panj Amu River Basin, Panj Amu River Basin Sector Project
COP	Canal Operation Plan	PES	Payment for Ecosystem Services
CPMO	Central Project Management Office (MAIL)	PIO	Project Implementation Office
DAIL	Directorate of Agriculture, Irrigation, and Livestock	PMO	Project Management Office (NWARA)
DMF	Design and Monitoring Framework	PPTA	Project Preparatory Technical Assistance
EARF	Environmental Assessment Review Framework	R&U	Infrastructure Rehabilitation and Upgrading
EU	European Union	RBA	River Basin Agency
		RBC	River Basin Council
FMA	Forest Management Association	RES	Rapid Environmental Screening
FSDD	Feasibility Study and Detailed Design	RFP	Request for Proposal
GD-NRM	General Directorate – Natural Resource Management (MAIL)	SSEMP	Site Sepecific Environmental Management Plan
GIS	Geographic Information System	SBC	Sub-basin Councils
GoIRA	Government of the Islamic Republic of Afghanistan	SCLW	Supreme Council of Land and Water
HIS	Hydrology Information System	SE	Supervision Engineer
HR	Head Regulator	SRP	Site Revegetation Plan
HRBM	Hydrologist/River Basin Modeler		
IA	Irrigation Associations	TL	Team Leader
ISC	Implementation Support Consultancy	TOR	Terms of Reference
ISC IUCN	Implementation Support Consultancy International Union for Conservation of Nature	TMP	Tree Management Plan
IWRM	Integrated Water Resources Management	TBS	Trans boundary Specialist
MAIL	Ministry of Agriculture, Irrigation, and	WEAP	Water Evaluation and Planning (water

	Livestock		resources modelling software for IWRM)
MC	Main Canal	WG	Working Group (for the Pyanj River Basin Commission agreement)
MEW	Ministry of Energy and Water	WRD	Water Resources Department
MOF	Ministry of Finance	WMS	Watershed Management Specialist
MRRD	Ministry of Rural Rehabilitation and Development	WUA	Water User Association

EXECUTIVE SUMMERY

The proposed sub projects (Gul Tepa and Qala e Zal) of ADB funded Panj Amu River Basin Sector Project will increase agricultural productivity in the Panj-Amu River Basin through improving access and use of irrigated water at farm, scheme and river levels. These sub projects will improve yields, cropping intensities and irrigated areas on a command area of 12,571 ha (Momen Abad-1,449 ha and Sharawan-11,122 ha) resulting in increased farm incomes and reduced rural poverty, improved food security, import substitution, especially for wheat, and an increase in exports for high-value products such as fruit and nuts. Additional benefits include a reduction in conflict over water use, and an increase in sales of agricultural inputs such as fertilizers. These two sub projects are part of 21 priority schemes selected under the PARB project for new construction, rehabilitation and upgrading of irrigation and ancillary structures in the Panj-Amu basin. The PARB project also has following three outputs:

1. Water allocation and availability improved
2. On-farm water management enhanced
3. Watersheds properly managed and protected

The PARB Project is classified Category B for environment and had prepared the IEE report and approved by ADB and will be approved by NEPA. These two sub-projects of 12,571 ha irrigation capacity does not require IEE study as per ESIA regulation of Afghanistan. These sub-projects being categorized as Category B need to prepare IEE report with EMP as per ADB safeguard requirements.

Description of Environment:

River Basin and Hydrology: The waterways of the Sharawan and Momen Abad Canal subproject area are the main canal and its secondary branch and higher-order canals which is diverted from Talgon and Panj River. In an average year, there is water in the main and higher-order canals year-round. There are no natural or man-made lentic water bodies in the area.

The Takhar River is a good water source, feeding complex canal systems facilitating irrigation allowing for intensive double cropping agriculture in the project area. The smaller watersheds in the North of the Province carry water only periodically, though water is sufficiently available in rain-laden years (Regional Rural Economic Regeneration Strategies (RRERS) Provincial profile).

Land Use and Soil: The project site and surrounding valley includes highly cultivated agricultural farming systems which have been under settlement for millennia. The surrounding foothills are predominantly rangelands of minimal settlement although they are used extensively for grazing. The impact upon rangelands vegetation for fuel wood as well as brushwood to repair irrigation canals is recognized as a major burden upon biomass.

Climate, Climate Change and Natural Disasters: Afghanistan has a continental climate that is arid to semi-arid and is generally characterized by hot summers and cold winters. Average annual precipitation is very little over the whole country with large parts of the country receiving very little to no precipitation, with high unpredictability in the arid lowlands. Most precipitation occurs in the mountainous regions. In terms of the climate change, average annual temperature has increased in Afghanistan by 0.6° C between 1960 and 2008. The highest rate of increase occurred during the months of September-November, increasing at an average rate of 0.29° C

per decade. Based on the meteorological data recorded in Automatic Hydrometeorology Station in Nazdik-Taloqan, code 14-1. R00-5A obtained from WRD, the climate in Taloqan capital of Takhar province is warm and temperate. The climate here is considered to be a local steppe climate. There is little rainfall throughout the year. The climate here is classified as BSk by the Köppen-Geiger system. The average annual temperature is 16.1 °C in Taloqan. In a year, the average rainfall is 377 mm.

Water Quality: While the quality of water in the rivers is believed to be good, in order to understand the impact of construction work on water quality a water quality assessment is required before the construction work to provide qualitative data.

Air and Noise Quality: There are no permanent air quality monitoring facilities in other cities of Afghanistan, neither some campaign monitoring has been done outside Kabul. Therefore, no data on ambient air quality is available for the project area. There are no major industries emitting air pollutants in the project area. Vehicles, moving in the dusty roads are the sources of air pollution. In addition, majority of people use animal dung and fuel wood for cooking and heating purposes, and because of this the indoor air in the area must be very high. No major sources of noise pollution except the movement of vehicles, sometimes using pressure horns.

Proposed Protected Area: In the project influence area, there is no protected area but there are two previously proposed protected areas, namely Imam Sahib Wildlife Managed Reserve in Kunduz and Dargad Wildlife Managed Reserve in Takhar. Based on the field survey and google map the proposed protected areal located about 100-150 km away from the project area. This overlap area is reported to be difficult and risky to access, even by non-local Afghans, because it is in a remote location on the international border affected by insecurity and criminal activity.

Vegetation and Terrestrial Biodiversity: A remote sensing analysis undertaken in Kunar and Takhar provinces in 1977 and then again in 2002 revealed that the forest cover had shrunk by more than 50 percent in the interim. As mentioned above, Imam Sahib was one of the most important repositories of wetland biodiversity in tugai forest along the Panj-Amu River. Over the years there had been uncontrolled deforestation along the Panj-Amu River resulting in the destruction of the Tugai vegetation found in Imam Sahib District. Now, there is no forest land and around 2700 ha. of land in the Project Area (Zone 1 and II) is rangeland mainly grasses, forbs and small shrubs.

Vegetation along the Canal Banks: As per the field survey conducted in June-July 2020 along the canal lines, 99% species found are willow and only 1% is mulberry, and majority of famers said they use it for fuel wood and sometimes used as wooden truss.

Fish Species: Afghanistan Rivers and streams contain a mixture of Oriental and Palaearctic species, of northern and southern species and of high and low altitude-adapted species. The fauna is divided between Oriental and Palaearctic species. The fauna is dominated by Cyprinidae (56.9%), Cobitidae (24.5%) and to a lesser extent by Siluriformes (11.8%).

Socio-Economic Status of Project Influence Area: In 2017, the total basin population was estimated to be 4.211 million (1,029,473 in Kunduz province, 1,000,336 in Takhar province, 926,969 in Baghlan province, 186,300 in the Panj-Amu basin part of Bamyān province, 966,789 in Badakhshan province, 7,000 in the Panj-Amu basin part of Samangan, and 95,000 in the Shortepa watershed). The main ethnic groups in the North (the area of the Panj-Amu basin) are

the Tajik, Uzbek, Turcoman, Pashtun and some Kyrgyz. The Tajik are the second largest ethnic group in Afghanistan and in the majority in the Northern provinces.¹

Based on the field survey total population of Sharawan is 13,252 and Momenabad is 5,040. The total population in both the canals is 18,292.

Culturally and Socially Significant Sites and Indigenous Population: There is no any cultural and socially significant site in the project area except some mosques, graveyards, and shrines.

Summary of Adverse Environmental and Socio-Economic Impacts

Physical Environment:

Structure construction activities due to excavation works, vegetation clearing, dumping of spoils will result in soil. As the Momen Abad and Sharwan is the rehabilitation project, main construction activities include structure rehabilitation and canal lining in some area. Very less spoil will be generated as compared to new irrigation projects. Majority of the generated spoil will be used in the planned right of way roads and still there is the possibility of some of this to be dumped in the slopes that can trigger landslides during rainy season.

Construction activities in the river banks and possibilities of leakage of petroleum products and other chemicals from the construction machineries will pollute the river water quality. High turbidity will reduce the dissolved oxygen in water as well as there will be less sunlight for aquatic plants for photosynthesis. Poor storage of petroleum and chemicals during the construction can lead to ground water contamination which is the main source of drinking water in the area.

Construction activities and movement of equipment and trucks in the unpaved rural roads will generate significant amount of dust/ particulate emissions in the road side for short duration of time. Dusts/particulate emissions will also result in the construction site. Further, the winds on site could lead to dust / particulate emissions if the construction materials and spoils are not properly stored and contained.

During the construction period, waste is generated in the administration/residential buildings and labor camps, mostly the domestic type of waste, and construction activities in major infrastructure projects like big irrigation canals, there is some possibility of generation of small quantity of hazardous wastes. The impact can be adverse in case of haphazard dumping in the public area and river banks. The hazardous waste, if released to the environmental medium, the impact can be significantly adverse with long-term consequences.

Covid-19 is a respiratory illness caused by a virus called SARS-CoV-2. The virus is thought to spread mainly from person to person:

Biological Environment:

Momen Abad and Sharwan canal rehabilitation and improvement works will result in loss of 1199 trees (817 saplings, 281 pole size and 101 trees size). The number of affected trees determined based on the engineering design.

Takhar and Panj River has a limit types of fishes, also there is the possibility of illegal fishing like use of electric wires, use of gelatin with detonator, which can result in loss of small fishes as well. High turbidity water during construction at water bodies may also have impact on reduced oxygen and aquatic resources supportive to fishes for a short time.

Socio-Economic Environment:

¹<http://cso.gov.af/fa/page/demography-and-socile-statistics/demograph-statistics/3897111>

The project will be implemented in the existing ROW of canal and there is no need for land Acquisition and resettlement.

About 11 AHs are utilizing the services of the trees along the canals in the form of fruits, fodder and fuel wood and also as timber. Although the land with trees is public land and does not belong to these people but the services from these trees they are utilizing over the years will have direct impact on their livelihood.

During the construction period, there will be disturbances in the supply of water for irrigation which will result in the loss of agricultural productivity in the area.

Movement of heavy equipment's, trucks and construction activities along the canal lines and making of roads on the side of canal will have the possibility of damaging the private properties and crops in the fields directly having loss to people.

During the construction phase of major infrastructure projects, occupational health and safety as well as community health and safety are of great concerns due to increased pollution and chances of accidents in the sites.

Summary of Mitigation Measures:

Physical Environment

To minimize the risk of erosion during the construction period, it is recommended to minimize the extent and duration of the construction activities particularly in and around the water courses and progressively carryout the stabilization works; sub-divide the whole site into separate catchment areas including drainage path; keep loose soil material and stockpiles out of the drains, flow lines and water courses; install, complete and stabilize the cross drainage structures early; and manage water at non-erosive velocities.

In order to protect the river water quality, while constructing the intake, use coffer dams to ensure that no construction activities takes place on water bodies. Schedule the construction activities during the months when the flow in the river is low. Ensure that all the equipment's are properly maintained and no leakage of chemicals and petroleum products in the water bodies.

Regularly spray the water on the construction site and also on dusty village roads; limit the truck and other vehicle speed below 20 km/hour to minimize the re-suspension of dust in the unpaved road; keep all material storages (spoil, aggregates, sands, etc.) adequately covered and contained to prevent the emission of dusts due to winds on site; trucks carrying the spoils or other construction materials are covered properly; and ensure that the heavy machineries and construction equipment comply with the national standard and fully maintained as per the manufacturer's specifications. Make mandatory to use the ear muffs to workers working in high decibel equipment and nearby. Do not schedule the works during the night time that generates noise and disturb the people living in the area. Mark the sensitive areas (like school, health post, etc.) as no horn areas. Instrumental monitoring of water, air and noise will be conducted during the project implementation.

It is recommended to strictly follow the Good Practices for construction management with priority on waste reduction, easy collection, segregation, reuse/recycle and proper disposal of the remaining wastes. Ensure that the labor camps have proper facilities for waste segregation and even for composting of the biodegradable waste. Provide mobile toilets in the construction sites.

Biological Environment

Re-vegetation: As per the Regulation on Bed and Right of Way of Water Resources, 2014, and the discharges of the canals varying from 12 m³/s to 60 m³/s, there is the need to maintain right of way of minimum 8 m to maximum 20 m on both sides of canal. In order to compensate the

loss of vegetation cover of 6000 saplings will be re-planted with local species with participation of Water Users Association, Irrigation Associations, and Forestry Association.

Rehabilitation of the Degraded Land in the Area:

Panj-Amu River Basing Sector Project, another project funded by ADB and jointly under implementation by MEW and MAIL has plan to develop 21 different Natural Resources Management Plans and implement them for the restoration of degraded lands in the watersheds of the five north eastern provinces (Baglan, Kunduz, Takhar, Badaksan and Bamiyan) including the Kokcha and Panj-Amu rivers watersheds.

Rehabilitation of degraded lands will be carried out with the participation of local communities by providing technical support in the establishment of Forestry Association and their capacity enhancement.

In order to prevent the illegal fishing in the river bodies, all the persons employed during the construction phase must be made aware that the use of electricity and gelatin is illegal and can invite legal actions. Further use of coffer dams to avoid works in water bodies will reduce the problem of turbidity.

Socio Economic

LARP has prepared the Entitlement Matrix with rate of compensation which has been determined as per agreement between the representative of three impacted districts and the MEW.

A total of 11 affected household need to be compensated for the loss of their trees as per the agreed rate. As per the recent survey, these AHs will lose less than 10% of their livelihood and because of this, these AHs are not considered to be seriously affected.

LARP has the provisions of cash compensation at replacement rate for affected trees free of salvageable materials, depreciation and transaction costs.

Compliance to mitigation measures on air and noise quality will minimize the impacts on community health and safety as well as occupational health and safety. Further, ensure strict measures to prevent fires particularly in areas of storage of petroleum products and chemicals. OHS related guidelines of Afghanistan National Standards Authority need to be complied with for the safety and health of workers and communities. In addition to these, follow the IFC Guideline on Environment, Health and Safety for the best practices in construction activities.

Compliance to mitigation measures on Covid-19 will minimize the impacts on community health and safety as well as Covid-19. Further, ensure strict measures as notify your supervisor and stay home if you have symptoms, if you are sick. You should not return to work until the criteria to discontinue home isolation are met, in consultation with healthcare providers, your employer, and state and local health departments, Notify your supervisor if you are well but have a sick family member at home with COVID-19, Limit close contact with others by maintaining a distance of at least 6 feet, when possible, Limit the number of workers in small workspace areas such as job site elevators, trailers and vehicles, and spaces under construction if possible and Wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain, especially in areas where there is significant community-based transmission of COVID-19.

In order to minimize the impact on agricultural productivity due to disturbances in supply of water for irrigation, the civil work will be carry out in different stretches of the canals in parallels with the objective of completing the works as early as possible (15 months). There is the need to have good coordination between water users' associations, irrigation associations, DAIL, contractors, and the project management in scheduling the works and timing for supply of water for irrigation.

Beneficial Impacts:

Momen Abad and Sharawan Project despite having some adverse environmental and social impacts that can be avoided, minimized and compensated, it will not only provide benefits to the people living in the project area, but also will have significant contribution regionally and nationally. Momen Abad and Sharawan Project will have the following beneficial impacts:

Momen Abad and Sharawan Project, once in operation after rehabilitation and infrastructure improvement will supply uninterrupted water in the cultivable command area of 1,449 and 11,122 ha while currently the downstream is suffering from lack of water.

It will directly benefit about 71,910 people living in Taloqan districts in the project influence area by 2021, once the Momen Abad and Sharawan comes in full operation.

About 39.1% of population in Afghanistan are living below the national poverty line and people living below the national poverty line in Takhar is below the national average, and because of almost 71,910 people benefiting from this projects with increased agricultural productivity, added employment opportunities, and added income generation from cash crops the poverty in the area will be reduced with added sector contribution to the national GDP.

In addition to the water for irrigation, people will also have access to easily available water for drinking, cattle feeding and cleaning purposes thus directly improving the health and sanitation conditions in the area.

Draught is the major disaster in the area and the project aims to minimize the impacts on communities with increased supply of water as well as efficient use of water in the area. It will not only add the sources for water but also expected to enhance the ground water source which is the major source of water at present thus minimizing the impacts of draught in the area.

During the construction phase, local communities will have the opportunities of job and also small business opportunities to meet the demand of labor forces.

Environmental Management and Monitoring Plan

A detailed environmental management and monitoring plan is developed with institutional responsibility, monitoring and mitigation cost estimate. In order to address the problem of water and soil quality deterioration within the command area, the cost of monitoring of water and soil during the construction phase and within two years of operation phase is estimated about US\$ \$31,240.00. As majority of mitigation cost are part of good practices in the construction sites and only the cost for re-vegetation is additional and is about \$ 36,310.00.

Institutional Arrangement:

In order to ensure the fully compliance to the EMP and also national standards, institutional arrangement for monitoring and reporting as well as addressing complaints related the problem of the communities is proposed.

Grievance Redress Mechanism:

A grievance redress mechanism will be constituted to address the grievances of communities for both social and environmental complaints.

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1. INTRODUCTION

1.1. Background

1. The Panj-Amu River Basin Sector Project (P-ARBSP), will support improvement of water allocation and availability, enhancing on-farm water management, and protection of watersheds in the Panj-Amu River basin, through construction of water conveyance and irrigation infrastructure at 21 priority sub-projects (construction costs approximately \$50 million). The Project foresees establishment, strengthening, and support of sub-project water user associations (WUAs) and irrigator associations (IAs); training them on on-farm water management and improvement of agronomic techniques; implementation of watershed management plans at sites adjacent to the priority subprojects; and improvement of basin water resources planning and management.
2. Since 2004, the European Union (EU) has supported the Government of the Islamic Republic of Afghanistan (GoIRA) in its reconstruction efforts by funding integrated water management programmes in the Panj Amu River basin. The Project continues this EU support in partnership with ADB as co-financier and administrator. This approach aims to improve Government's ownership of fund management and conform to EU policy in Afghanistan of moving funding on-budget or into co-financing arrangements, and to increase sustainability.
3. The importance of the P-ARBS Project is in its impact on the well-being of rural communities in the basin, and in its support for Afghanistan's sector investment plan, the \$1.1 billion National Water and Natural Resources Development Program.

1.2. Project outputs

1.2.1. Output 1 – Water Allocation and Availability Improved

4. This output provides the capacity and resources for National Water Affairs Regulation Authorities- NWARA, and associated River Basin Agency (RBA) and Sub-Basin Agencies (SBAs) in the Panj-Amu river basin to:
 - a) **Sub-component 1: Water conveyance infrastructure rehabilitated and upgraded (R&U):** Improve water conveyance and allocation to irrigated farm systems through rehabilitation and upgrading of water conveyance infrastructure (head works and main canals) for which National Water Affairs Regulation Authorities- NWARA is responsible in 21 priority schemes. Climate proofing and environmental enhancements, specifically, water access points on canals, will also be provided in these schemes. R&U of these schemes aims to improve the availability of water, particularly in tail-end areas; increase irrigated area; increase yields; increase cropping intensity; and create an enabling environment for capacity building and reduced water conflict. Gated headworks will allow exclusion of river flood flows and reduce flood damage to command areas.
 - b) **Sub-component 2: WUAs established and strengthened:** Establish and strengthen capacity of 112 WUAs in respect of (i) WUA operation and maintenance (O&M) of conveyance infrastructure in their schemes (and others previously supported under the EU programme) to improve sustainability and increase equitability of within-scheme

head-tail water distribution; and (iii) WUA cooperation with the RBA, SBAs, and same sub-basin WUAs to facilitate water sharing among schemes in a sub-basin.

- c) **Sub-component 3: Water resources planning and management strengthened:** Improve capacity of NWARA, RBA, and SBAs to (i) plan, operate, and maintain their respective water resources infrastructure investment portfolios and (ii) address water sharing among schemes in a sub-basin, for increased total benefits and reduced sub-basin water conflicts.

1.2.2. Output 2 – On-farm Water Management Enhanced

- 5. This output provides resources and enhanced capacity to MAIL, and to Panj-Amu river basin DAILs to:
 - a) **Sub-component 1:** On-farm Irrigation infrastructure rehabilitated and upgraded: improve irrigation infrastructure at secondary and tertiary canal levels so as to have an integrated approach (including environmental enhancements to schemes i.e. water access points on canals).
 - b) **Sub-component 2:** IAs established and strengthened: establish and strengthen the capacity of at least 105 IAs to operate and manage irrigation infrastructure in these schemes thus improving sustainability, as well as ensuring more equitable distribution of water, increasing yields and cropping intensity, particularly in lower canal reaches, and thus reducing conflict over water use.
 - c) **Sub-component 3:** Efficiency of agricultural water use enhanced: improve water use efficiency at the farm level by improved on-farm water management and agronomic techniques and improving farmer knowledge from demonstration plots.

1.2.3. Output 3 – Watersheds properly managed and protected.

- 6. This output provides resources and enhanced capacity to MAIL, and Panj-Amu river basin DAILs to improve community-based watershed management, resulting in the restoration and protection of forestry and rangeland on 10,500 ha, through:
 - d) preparation of a community-based natural resources management technical manual and guidebook;
 - e) training of DAIL staff as master trainers to train communities;
 - f) identification and selection of approximately 21 watershed and rangeland sites for restoration and protection;
 - g) creation of community forestry and rangeland associations for each selected site;
 - h) Preparation and implementation of natural resource management plans for each selected site.

1.3. Purpose of Report

- 7. This Initial Environmental Examination (IEE) has been prepared for the Sharawan and Momen Abad Irrigation subproject as a part of Output 1 of the Panj-Amu River Basin Sector Project (P-ARBSP), Afghanistan. The IEE aims to identify, assess and provide suitable mitigation measures for potential environmental impacts if any in the subproject. Under the Asian Development Bank (ADB), the Project is classified as Environmental Category B. Category B projects require environmental assessment in the form of an initial environmental examination (IEE).

1.4. Identification of Project and Project Proponents

8. The P-ARBSP continues and expands the previous European Union (EU) support for irrigation development in the Panj-Amu basin. The Project will be financed through an ADB sector grant. It will have a seven-year implementation period and an estimated cost of \$76.75 million (\$50 million in EU funds and \$20 million in ADB funds and \$0.75 million in government in-kind contributions).
9. Project proponents are the GoIRA, ADB, and the EU. The Project Executing Agency (EA) is the Ministry of Finance. The Implementing Agencies (IAs) are the National Water Affair Regulation Authority (NWARA) and the Ministry of Agriculture, Irrigation, and Livestock (MAIL).
10. NWARA will be responsible for (i) construction of civil works on main (primary) canals; (ii) establishment and strengthening of water user associations (WUAs) in such schemes; and (iii) strengthened water resources planning and management.
11. MAIL will be responsible for (i) construction of civil works on secondary and higher-order canals; improved on-farm water management (OFWM) including establishment and strengthening of irrigation associations (IAs), agricultural extension, land levelling etc; and improved watershed management.

1.5. Scope of IEE

12. The scope of this IEE covers the environmental assessment of the Sharawan and Momen Abad canal proposed structures construction in Taloqan district of Takhar province.
13. 10. On the basis of the existing environmental baseline of the project area, the consultant determined the potential environmental impacts and mitigation measures of the proposed Sharawan and Momen Abad canal during Design, Construction and Operation phases. Alternate routings and options, as well as appropriate mitigation and monitoring measures, were considered to reduce possible adverse impacts.
14. Minimising environmental impact in any construction project falls into a category of activity which is commonly classed as a cross-cutting issue. That is to say, it is multi-disciplinary in that to be successful and it involves all players in the project.
15. The design of the P-ARBS project draws on the concept of integration by linking the importance of catchment management with the improved delivery of water management at the farm level. To achieve these ends requires participation in decision making and implementation by all players and stakeholders. This IEE aims to strengthen environmental management by recommending the involvement of a complete range of IA's, WUA's, Forest Management Association (FMA) and associated institutions to cultivate and promote that essential component of successful environmental management, one which is cross-cutting.
16. The boundaries of the Sharawan and Momen Abad subproject irrigation IEE study include;
 - a. The larger-scale longer-term environmental baseline description (climate, hydrology, history of human occupation etc.) and impacts (cumulative, environment-on- project);

- b. Provinces or districts within which Sharawan and Momen Abad subproject is located for baseline description relying on secondary census data;
- c. The irrigation schemes command area (within which selected civil works will be constructed, rehabilitated, and upgraded) for the remaining environmental baseline description and the IEE public consultation;
- d. The Sharawan and Momen Abad irrigation civil work command areas (of the specific irrigation infrastructure to be rehabilitated and upgraded) for assessment and management of irrigation and agriculture related impacts;
- e. Construction site and adjacent areas for assessment and management of construction impacts; and
- f. Potential quarry sites and adjacent areas for assessment and management of quarrying impacts.

1.6. Methodology

- 17. This IEE follows the methodology outlined in the ADB Guidelines; ADB Safeguard Policy Statement, June 2009 (SPS 2009) and environmental Laws of the Government of Afghanistan. The experiences of other studies in preparing IEE documentation for other similar projects have also been reviewed. This IEE is prepared based on review of preliminary design, collection of required data from project relevant area, review of secondary data and information, field visit and stakeholder consultations, (total of 8 public consultation meetings were held with men and women in head, mid-canal, and tail areas of each RSP, based on the numbers of beneficiaries for each canal three or two public consultations with male and female have conducted in up, middle and downstream area of each canal at the common places like village meeting/conference room, village Mosque and water user association office, for more details please see Annex 6: public consultation meeting record).
- 18. This IEE study was prepared in coordination with NWARA from April to November 2019, FSDD and Implementation Support Consultancy international and National experts. IEE team members visited the RSP. During the IEE visits, public consultation program was undertaken The field data was collected by environmental specialist and resettlement specialist by collaboration of Taloqan water manager, Water User Association (WUA) members, community representatives of the respective canal and Mirabs, the Taloqan water management department, CDC chairmen along the canal were contacted ,in the course of field visit(08-16 November, 2019) public consultation meetings were held and beneficiaries recommendations and feedback were reflected in the report (see Annex 6) as well as the needed information and data like number of beneficiaries , number of village along the scheme, income source of community and etc. were collected. All the proposed structures from intake (upstream) to end (tail) were screened by walk through and anticipated potential environmental impacts were recorded and reflected in the report.

1.7. IEE Study Team

- 19. This IEE prepared by international and national environmental experts working under Eptisa consultancy. A team from the project area are also part of the IEE updating team,

table 1. It is mentionable that the team is consist of environmentalist, agricultures and social expert, but as the position announce as surveyor therefore, there designation are surveyor.

Table 1: IEE team

SN	Name	Designation
1. 1	Dr. Gautam Kumar Basu	International Environmental Specialist
2	Mohammad Tawoos	National Environmental Specialist/ Echologist
3	Mohabatullah	National resettlement specialist
4	Morsal Satarzada	Gender Specialist
5	Najeeb Ziayee	Surveyor / Designer
7	Habibullah	Takhar Taloqan district water manager (Surveyor)

1.8. Data Collection / Compilation

20. Baseline data referring to the physical, biological, cultural and the socio-economic environment have been collected from previous studies, field visit, meeting with national and international experts and the following relevant authorities and agencies :
21. National Water Affair Regulation Authority (NWARA), Kabul;
22. Takhar, Taloqan Sub-Basin Agency
23. Panj Amu River Basin Authority;
24. Data gathering has been implemented during numerous meetings with international and national experts in Kabul and Takhar provinces.
25. A one-week site visit of the project area was conducted during the month of November, 2019.

1.9. IEE Information Sources and Limitations

26. A key limitation to the IEE study was the security situation in the Momen Abad area. International consultants were not permitted to visit the basin and national consultants were advised to limit their time in the field.
27. This IEE incorporates all information available at the time of writing.

1.10. Level of Detail and Comprehensiveness

28. 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 Sharawan and Momen Abad subproject that have relatively small command areas, without a broad range of potential significant impacts and risks. The command area of the project is as follow:
 - a) Momen Abad: 1,449-hectare command area
 - b) Sharawan: 11,122 -hectare command area

1.11. Screening and Categorization of subproject

29. The construction of water resources infrastructure has potentially significant environmental impacts requiring management to achieve acceptable levels of residual impact. Rapid environmental assessment conducted using standard checklist (Annex 1) to categorize the project. Based on the REA the project categorized as environmental category B.

1.12. Structure of Report

30. This IEE follows the ADB guidelines for content of an IEE.
- a) Executive Summary
 - b) Introduction
 - c) Policy, legal, and administrative framework
 - d) Description of the project
 - e) Construction activities
 - f) Analysis of alternatives
 - g) Description of the environment
 - h) Potential environmental impacts and mitigation measures
 - i) Public consultation and information disclosure
 - j) Grievance redress mechanism (GRM) Findings and recommendations
 - k) Findings and Recommendation
 - l) Conclusion

2. DESCRIPTION OF SAHAWAN & MOMEN ABAD SUB-PROJECTS

2.1. Irrigation History

32. According to various sources, the history of irrigated agriculture in Afghanistan goes back more than 4,500 years to ancient settlement, and archaeological research claims a very early date for some of the irrigation canals in the region². Based on the age of artefacts recovered from settlements along the canals, farmers have settled across the basin from 2500-1500 BCE.³ This history is significant to P-ARBSP as by default it flags the understanding and historical commitment of farmers to the importance of managing water. (Annex 8 detail regarding archaeology of irrigation).
33. In the 1960s and 1970s a French team of archaeologists conducted an in-depth survey of ancient irrigation works in what is now the project area of the P-ARBSP, known to the archaeologists as “eastern Bactria”. It was observed that “two factors that quickly became apparent to the personnel of the eastern Bactria survey were the considerable time-depth of settlement and agricultural activities in the region (as far back as the first part of the third millennium B.C.E.) and the remarkable continuity in the maintenance of irrigation systems, with canals tens of kilometres in length following the same courses through many centuries or, indeed, millennia.”⁴ This is important background information for the P-ARBS project in that the canals to be rehabilitated are modern versions of ancient canals, and as such care is needed in the rehabilitation construction works to be observant to possible unearthing objects of historical significance. Such objects need to be reported to and turned over to cultural authorities.
34. From a contemporary perspective, irrigation systems can be divided into two main categories: informal irrigation systems (surface water systems, karez, springs and wells) and formal irrigation systems. Informal systems are centuries-old and traditionally developed and managed by local communities within the constraints of local resources. They have undergone social and physical changes, and expand or contract based on water availability or challenges arising from years of conflict. Informal systems account for 88 percent of the country’s irrigated area (Rout, 2008). Their prevalence largely results from widespread availability of both water resources from rivers and streams as well as adjacent land suitable for development, usually along river terraces and alluvial plains. Although relatively larger than many systems, Momen Abad is considered a long-term informal system developed to achieve local needs.
35. Although Afghanistan is located in a semi-arid environment, it is still rich in water resources mainly because of the Hindu Kush mountain range covered for a large part of the year with snow supplying over 80 percent of the country’s surface water resources from altitudes of over 2000 m. The mountains function as natural water storage that

² “A short history of ancient canals for agriculture and industry”, by Pierre-Louis VIOLLET, Dr, Société Hydrotechnique de France, 25 rue des Favorites, 75015 Paris, France, Pierre-louis.viollet@wanadoo.fr

³ The Shorab and Qulbars canals are on the left bank of the Taloqan River, across the river from the site of the Rud-i-Sharawan canal that dates back to 1500-500 BCE, the current site of the main canal of Sharawan, one of the subprojects of the PARB. Ancient irrigation canals are found throughout the whole PARB project area.

⁴The Hellenistic Far East: Archaeology, Language, and Identity in Greek Central Asia, by Rachael Mairs, University of California Press, Oakland, CA, 2014, pp. 35-36

supports perennial flow in all the major rivers but a resource that is under threat from climate change⁵.

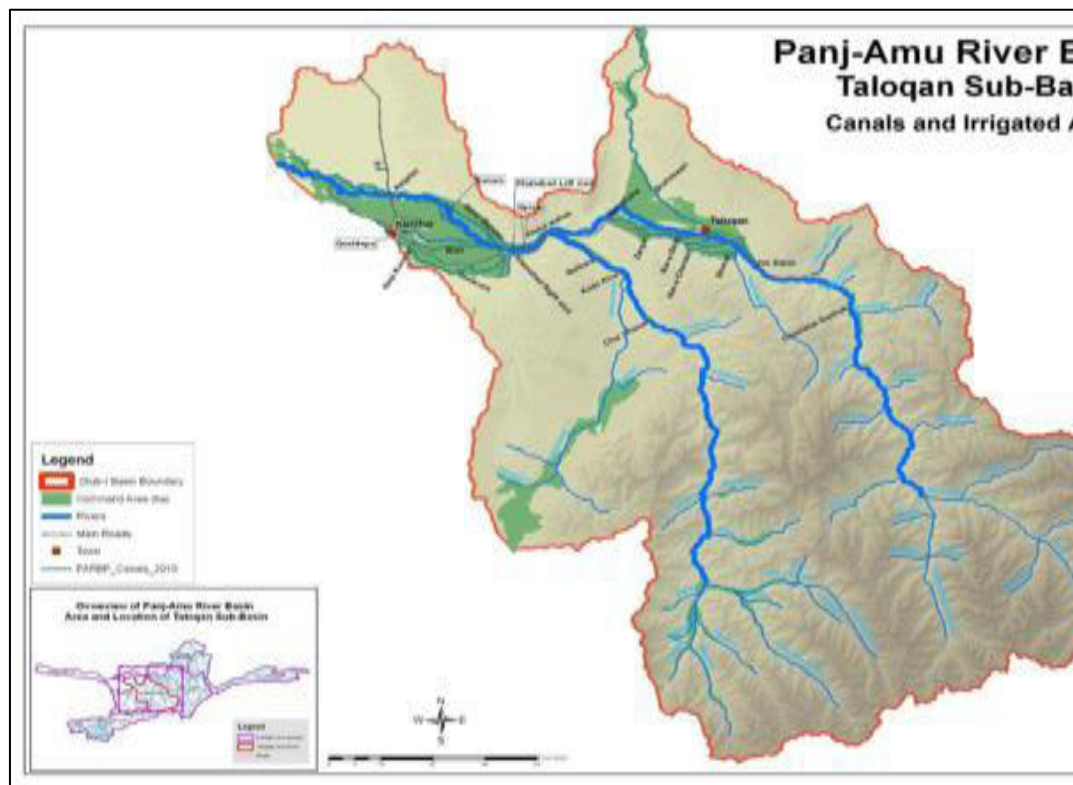
36. Under a 1946 treaty with the Former Soviet Union Afghanistan agreed to take an entitlement of 9 km³/year of water from the Panj River, however it is estimated that Afghanistan uses only about 2 km³/year of the that entitlement. As a result, it is recognized that Afghanistan's water resources are still largely underused.

2.2. DESCRIPTION OF SUBPROJECTS

2.3. Sharwan Irrigation Scheme

37. Sharwan canal project area lies in close proximity near the Taloqan, centre of Takhar province. Sharawan intake is immediately to the southeast of the Taloqan. The original age of the canal is unknown but according to local people, it is excavated in the era of Temor Empire near to emperor Timor Kora gani by the local people. After taking water from the Taloqan River the canal is aligned in the southwest direction passing through the Taloqan city and villages along the three districts. The headwork is constructed by the KRRP in 2011 it includes gated escape structure and automatic spillway to divert the water into the river during flood season. The main canal intake has 8 gates in Sharawan Headwork which regulates the flow to the main canal and 3 sluice gates which diverts the exceeding flow back to the river and the canal is unlined and irregular, the canal is about 97 km in length, irrigates about 11,122 ha of fertile land. The Sharawan canal has divided by eight zones with having 8 registered Water Users Associations (WUA).

Figure 1: Collage of Maps to Illustrate Project Locations for Sharawan canal



⁵http://www.afghanistan.no/english/sectors/afghanistan_and_climate_change/index.html, "Afghanistan and climate change in the Hindu Kush-Himalayan region", Norwegian Afghanistan Committee, by Farshad Tami, 2013.

The Table 2 below summarizes the beneficiary-requested structures for Sharawan irrigation schemes of Takhar province. Each structure will require onsite excavation and vegetation clearance for construction.

Table 1: Proposed Structures under Sharawan Irrigation Scheme

S/N	Proposed structure	Village
1	Construction of new intake (headwork)	Majar Qeshlaq (Eshan ha Ahandara)
2	Sedimentation of Basin	Majar Qeshlaq (Eshan ha Ahandara)
3	Sharawan Canal lining	Majar Qeshlaq (Eshan ha Ahandara)
4	Construction of spillway	Majar Qeshlaq (Eshan ha Ahandara)
5	Rehabilitation of existing headwork	Majar Qeshlaq (Eshan ha Ahandara)

2.3.1. Momen Abad irrigation scheme

38. Momen Abad irrigation scheme is located around 95.10 km from Takhar center. The GPS of the intake is N 37.435744098 E 69.56785566. The length of the main canal is approximately 12 km. It is located in Momen Abad Village, Khoja Bauddin district of Takhar province. The command area is located on left bank of Yatim Tepa main canal. It has a command area of around 1,449 ha. The names of the villages under this irrigation system are (1) Momen Abad (2) Naqil Bala (3) Qishlaq Arbab Jamal (4) Qishlaq Sangi Bay (5) Qaria Said Alam (6) Kohana Shakh (7) Qaria Allowddin The canal is the traditional one and has been running more than 50 years. The exact age of the canal is unknown; Momen Abad canal hasa weir which was constructed by KRBP. The canal is about 12 km in length, irrigates about 1,449 ha of fertile land. The canal has a registered Water Users Association (WUA).

Figure 2: Collage of Maps to Illustrate Project Locations for Momen Abad



39. The Table 3 below summarizes the beneficiary-requested structures under Momen Abad schemes of Takhar province. Each structure will require onsite excavation and vegetation clearance for construction.

Table 2: Proposed Structures under Momen Abad Irrigation Scheme

S/N	Proposed structure	Village
1	Qilirdi off-take & cross regulator	Momen Abad
2	Parchawa Haji Tawildar spillway	Momen Abad
3	Haji Gul Tash canal lining 200m	Momen Abad
4	Haji Hashim off-take	Naqil Bala
5	Parchawa Haji Janat Gul spillway	Qarildy

2.3.2. Approach canals

40. Sharawan canal headwork is located near Majar Qeshlaq village of Taloqan city. This canal gets water from the Taloqan River through an approach channel and intake constructed by KRBP. The Water Users Associations (WUAs), SBA and PIO have requested through an official letter that all the allocated budget should go to construction of new headwork. The command area of Sharawan canal suffers from flood inundation. The canal flows mostly west direction then passing through three districts and 327 villages, with a length of about 97 km and covering an irrigated area of about 11,122 hectares.
41. Momen Abad canal headwork is located near Momen Abad village. This canal gets water from Yatim Tapa main canal through an approach channel and intake constructed by PRBP. Onwards the canal passes through a regulating wall or flow guiding wall structure and ultimately reaches the canal headwork.

2.3.3. Head works

42. Sharawan canal headwork is located near Majar Qeshlaq village of Taloqan city. The condition of the head work has been deteriorated and for this the supply of water in the canal is interrupted. A new head works has been proposed to be constructed near this location.
43. Momen Abad canal gets its water through a constructed headwork from the Yatim Tapa main canal. Onwards the canal passes through 11 numbers of gated regulating structure and ultimately reaches the canal headwork. The high flood flow in the main canal caused damages in upstream and downstream of the headwork. This floodwater also destroys the public agriculture property. Some part of the upstream and downstream bank is washed away. To protect the canal headwork, upstream and downstream lands the community, WUA and SBA wants to provide protection walls in the u/s and d/s of the headwork. The main canal is about 12 Km length and it has capacity to carry up to 5.5 m³ /sec. It has silted up in many places and crosses a great number of torrents.

2.3.4. Main canals

44. The main canal for Sharawan is 97 km long and passing through 327 villages belong to three district: Taloqan, Baharak and Khwaja Ghar, as per length of canal and huge numbers of beneficiaries, the Taloqan sub basin agency has divided the canal beneficiaries in eight zones and established 8 water users associations.

45. The Momen Abad main canal is 12 km long and passing through 7 villages. The main canal is unlined, irregular in shape, and silted up in many places. In the irrigation season, the main canal water level is frequently too low to supply water to most of the secondary canal offtakes, but there are no cross-regulating structures in the main canal to raise the water level up to the offtakes.
46. **Distribution network.** The offtakes from the canal do not have modern water control structures. At these traditional offtakes, farmers emplace locally-available materials (sand, mud, brushwood) to raise water levels up to the offtakes and to control flow rates.
47. **Drainage.** The schemes have no drainage network as such. Any surplus water reaching the end of the canal drains back into the river.
48. **Water access points.** No water access points are present on the main nor on the secondary canals.
49. **Operation and maintenance arrangements.** There are registered WUAs within the schemes. The WUA members manage the canal in collaboration with their SBA. Mirabs are responsible for O&M of the main canal, and kokbashis for O&M of the secondary and tertiary canals. O&M activities are very basic and carried out without measuring the flow (no staff gauges).
50. **Current water management issues.** Current water management problems identified by beneficiaries in collaboration with the SBA, and potential civil works solutions considered during Project preparation.
51. **Vulnerability of Infrastructure requiring constant maintenance.** As is illustrated the existing primary, secondary and tertiary canals are defined and lined using rock, clay/sand and brushwood. Canal structures are weak, vulnerable to flooding, and require hours of local labour to remedy the frequent breaks in the canals due to the impact of aggressive flooding.
52. Because of long time sedimentation, Momen Abad canal beds are in general higher than the secondary canal beds. To make sufficient water available in the off-take canal, the farmers construct a local weir in the main canal every year using brushwood and sand bags.
53. A routine problem is that due to high sediment loads in water flows, sediments routinely build up in the canals, which requires manual cleaning. In some situations, the lack of available local labour is making impossible to maintain the flow of water and maintain the canals.
54. From the IEE perspective, the significance of the proposed Sharwan Thakkar and Momen Abad sub-project is the way in which both can improve upon the massive yearly impact upon the environment by the existing infrastructure and methods to maintain it. The demands upon local vegetation and the labour required to complete ongoing maintenance is a massive burden upon canal efficiency and environment.

55. The subproject offers a greatly improved system layout and design, the resources required to implement and the subsequent logistics to maintain the successful operation. Impact on surrounding vegetation and important biomass will be greatly reduced.

2.4. Construction Camp Setup

56. The selection of a camp site is dependent on many factors, including the size and conditions of the site and the availability of resources; the safety, security and protection it offers and cultural and social considerations. In addition, choosing a site involves consideration of access, coexistence with surrounding communities, the geology and topography, trees and vegetation, the potential impact on the environment, environmental causes of disease and other public health issues. Sites are allocated on the basis of being land or structures of low value and hence less suitable than elsewhere.
57. One construction camp will be set up by the contractor at a suitable location along the project corridor which in consultation with the PIO head and engineers.
58. The Contractor shall construct and maintain a camp /camps to provide living accommodation for his/her staff and operatives.
59. The Contractor shall be responsible for and provide all services to the living quarters and shall pay all charges in connection therewith and shall see to it that all sanitary laws and other laws and regulations in force in the area are complied with. The Contractor shall be responsible for and provide all necessary fencing and security to these areas.
60. The Contractor shall provide secure offices either by designed & constructed premises or rented & refurbished premises (site dependent & specific) and furnish said office premises inclusive of communication (internet services) facilities as per the Technical Specifications of the Contract, for the Project Manager, Engineers & Staff.
61. The office accommodation is to be inclusive of electricity, water and sewerage facilities and is to be properly serviced for the duration of the Contract, to include insurance, cleaning and maintenance of the buildings, sanitation and refuse collection, monthly communication fees, the provision of security implementation of the facility, with hot and cold water and power supply granted 24/7

2.5. Construction wastes

62. During construction stage, two types of wastes will be generated including debris and domestic refuse from construction camps. Any spoil generated by the construction activities will be disposed off at an approved location. Domestic waste will be collected and disposed of in an appropriate manner. No solid waste will be generated during the operation.
63. Collection and safe disposal of hazardous residues and dismantled material: large quantities of concrete will have to be removed. The disposal of dismantled material shall be co-ordinated with local administration. Agreement for disposal site(s) should also include the collection and disposal of any existing waste material.

2.6. Description of Construction Activities

2.6.1. Details for Structures and Construction

64. **Major construction.** Major on-site work proposed for the irrigation canals concerns the construction of protection wall, canal lining and masonry regulators to control the flow and direction of irrigation water. The regulators consist of a number of spans separated by piers and operated by steel gates which are routinely aligned at 90° to the weir to control silt entry into the canal. (Figures 3, 4 and 5 below illustrate these proposed cross and head regulators.)
65. Each regulator is constructed to manage (i) water levels in the upstream canal and (ii) the discharge passing downstream in order to:
- a) feed off-taking canals located upstream of the cross regulator;
 - b) help water escape from canals in conjunction with escapes;
 - c) control water surface slopes in conjunction with falls;
 - d) Control discharge of a canal into another canal or lake.

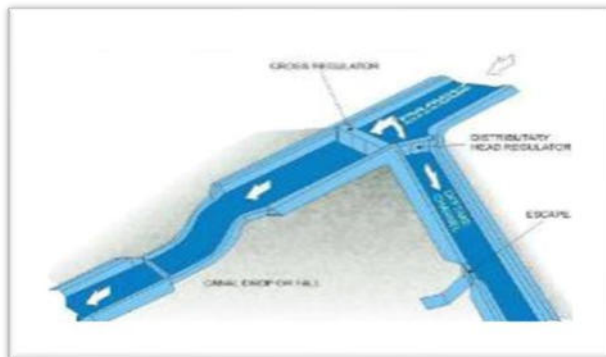


Figure 3: Schematic Lay-out of Typical Cross and Head Regulator



Figure 4: Typical Cross Regulator Front View



Figure 5: Typical Head Regulator Front View

2.6.2. Construction activities

66. Long-term Informal System Rehabilitated: The Sharawan and Momen Abad subproject aims to take an area which has been long-term informal irrigation area and install infrastructure to improve efficiency, productivity and thus livelihoods and food security. Proposed Sharawan and Momen Abad civil works for the both projects include:
67. Construction site clearance and preparation including tree removal;
- a) (Re)excavation of foundations, borrow pits and canals;
 - b) Management and disposal of excavation spoil;
 - c) Temporary closure of irrigation canals;
 - d) Temporary blockage of foot / vehicle paths / roads;
 - e) Excavation of temporary canals (diversions);
 - f) Sourcing construction materials from existing quarries or quarrying of such materials;
 - g) Creation and management of on-site stockpiles of construction materials;
 - h) Creation and disposal of solid and liquid waste;
 - i) Operation and maintenance of vehicles and equipment;
 - j) Creation of reinforced concrete structures;
 - k) Decommissioning and clean-up of construction sites, including infilling temporary canals and borrow pits.
 - l) Offtake – Construction of new intake about 1 to 1.5 KM up of the existing intake;
 - m) Canal lining- from new proposed intake to the existing intake of Sharawan canal;
 - n) Spillway- Construction of new spillway for spilling the sediments during flood season;
 - o) Basin sedimentation- Removal of sediments for new proposed intake to the existing intake of Sharawan canal;
 - p) Flow Measurement Infrastructure – Provide a calibrated staff gauge at each upgraded offtake to support water distribution proportional to offtake command areas;
 - q) Cross-regulators& Head regulators – Constructing of cross-regulators and head regulators in the main canal;
 - r) Canal Lining- Construction of canal lining to prevent water losses and seepage;
68. **Operation.** Activities will comprise water management and irrigation through the new and upgraded irrigation structures with resultant knock-on changes to agriculture.

2.6.3. Construction Methodology of Cross Regulator (CR) and Head Regulator (HR)

69. Construction of each regulator is based on specific site conditions. Works begin with the site clearance which includes clearing of shrubs/grass and removal of trees, making sure that trees removal is minimum.
70. **Approval of Construction Drawing:** The contractor will prepare construction drawings based on bidding drawings and actual site conditions. The construction drawings will clearly mark the earth excavation line and layout of structure.
71. **Temporary use of land:** Contractor will require access to land during construction. The community (WUA) will be requested to provide land during construction period:
- a) To allow for temporary diversion of canal water such that farmers can continue irrigation during construction
 - b) A suitable location near the construction site will be acquired to store the construction materials such as sand, gravel, stone, cement, reinforcement bars, and Geo-Textile filters.
 - c) Besides construction materials, contractor also require to have dump trucks/tippers, excavators, concrete mixtures, concrete vibrators, dozers/compactors etc. (If possible, the contractor will try to find government's barren land for the storage of materials and equipment.)
 - d) For access roads to construction sites making sure no settlement is disturbed
 - e) Site access, excavation, soil and vegetation removal and site rehabilitation will all be the responsibility of the contractor
 - f) The contractor will ensure that his activities create minimal impact on adjoining farmer land

2.6.4. Site Specific Construction Materials:

72. The most significant construction materials include stone, sand, gravel concrete, reinforcement and earth fill. The project implementation is assuming by contractor with experience in constructing reinforced concrete irrigation structures. In order to reduce the cost and impact of obtaining earth fill from borrow areas, the stockpiling and reuse of material excavated for the construction of hydraulic structures has been considered. However, material excavated from the canal, or stripped from embankment tops will not be suitable for construction and must therefore be disposed of.
73. Collection of some construction materials (e.g. sand, gravel and stone) will be carried out from the nearby river making sure that the quantity of materials taken from the river will not have adverse effect on the river regime (its longitudinal slope, size, flow etc). During different periods the river flow will have aggradations and degradation to maintain its regime. It is the responsibility of the contractor to ensure that collection of materials for the construction work will proceed in a manner not have adverse effect on river flow (regime).
74. **Site Clearance:** The construction works begin with the site clearance which includes clearing of shrubs/grass and removal of trees, making sure that trees removal is

minimum as based on the survey the total of 1,199 non fruit willow trees will be affected, that out of that 817 are sapling, 279 pole size and 101 tree size, to manage the trees during construction phase tree management plan (TMP) will be provided. The excavator will be used for site clearance and excavation for foundation based on construction drawings. Equipment movement will be restricted to the construction site. The excavated earth will be stored in the bank of canal or next to construction site.

75. **Construction of Diversion Works:** For canal water diversions government barren land will be used as far as possible. If barren land is not available, community (WUA) will be requested to provide the land during construction period. Since the construction work for an individual CR/HR may last for 6 months, removal of diversion work and land reinstatement will be done after 6 months. Depending on the area turfing/plantation can be done after reinstatement. Depending on the area, making good and tree planting can be done after reinstatement.
76. **Foundations, Backfilling, and Turfing:** A masonry foundation will be prepared with crushed stone/gravel, and above that stone masonry/concreting or reinforce concreting work is carried out as per construction drawings. At completion of structure, earth backfilling will be carried out using the excavated earth, the extra earth obtained after backfilling shall be used to maintain the depression (if any) of the canal bank or used in dressing of canal banks. After completion of the construction work, naked earthen-face of the structure will be turfed with the suitable species of grass/plant. The life of structure will be 25 years as per design.
77. **Contractor's Schedule manpower and Equipment:** The contractor has an 18-month schedule for completing the works. His equipment will consist of 1 excavator, 1 dump truck, 1 Static Steel Roller, 1 concrete mixer machine, 2 Mazda pickup, 2 water pumps, and 2 vibrators, as shown in Table 6 below.
78. **Mechanical excavator is used for site clearance and foundation.** Equipment movement will be restricted to the construction site and contractor will be required to use equipment less than 10-year-old to avoid pollution due to sound and gas. Excavated earth will be stored in the bank of canal or next to construction site.

2.6.5. Human Resources:

79. Using Form PER - 1 and PER - 2 in Section 6 (Bidding Forms), the Bidder must demonstrate that it has personnel who meet the following requirements:

Table 3: List of required equipment for project implementation

No.	Equipment Type and Characteristics	Min. Number Required
1	Excavator (0.75 m ³ , 90 HP)	1
2	Dump truck	1
3	Static Steel Roller min 8-10	1
	Mazda pickup	2
	Concrete Mixture Machine	1
	Water pump	2

4	Vibrator	2
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80. The number of personnel described in the table above for each position is what is expected for completion of the works and it may well be necessary to appoint others when necessary.
81. It is conceivable that some proposed personnel could have the qualifications and experience to cover more than one of the key positions, with the exception of Management Positions, however this is not desirable and is unlikely to be accepted by the Employer and/or the Engineer.

2.6.6. Machinery Requirement:

82. Using Form EQU in Section 6 (Bidding Forms), the Bidder must demonstrate that it has the key equipment listed below:

Table 4: List of required Personnel for project implementation

No.	Position	Min No. Required	Total Work Experience [years]	Experience In Similar Work [years]
1	Project Manager/Irrigation Design Engineer	1	10	5
2	Environmental Engineer	2	8	3
3	QC Engineer	1	8	5
4	Safety Officer	1	8	3
5	Junior Civil Construction Supervisors/Engineers	1	5	5
6	Auto Cad Technicians	1	5	2
	Skilled labor	10	8	4
	Unskilled labor	20	-	-
7	Supporting staff	10	5	2

2.7. PARB Project Implementation Arrangements

2.7.1. Central Project Management Offices (CPMO)

83. CPMOs are established within the Kabul headquarters of NWARA and MAIL. Each monitor and evaluate progress, procurement, accounting, and report findings regularly to MOF and the ADB.
84. NWARACPMO has a full-time environment safeguards officer who is shared equally between the Project and the ongoing Water Resources Development Investment Project (WRDIP). The NWARA CPMO environment safeguards officer oversees implementation of the NWARA environmental safeguards set forth in the EARF.
85. MAIL CPMO is based in the Irrigation Directorate, but includes the Output 3 Natural Resources Management (NRM) Coordinator based in the NRM Directorate, to avoid creating two MAIL CPMOs. MAIL CPMO staffing includes provision for a part-time environmental safeguards officer.

2.7.2. Project Implementation and Coordination Offices

86. The NWARA CPMO has established a Project Implementation Office (PIO) under the RBA. MAIL CPMO has established PIOs in the Project area DAILs. The existing MOF Project Coordination Office (PCO) will facilitate coordination among MOF, NWARA, and MAIL.

2.7.3. Civil Works Contractor

87. The contractor will be required to Prepare contractor EMPs (C-EMP) and site specific environmental management plan (SSEMP) with management systems for adverse impacts, e.g., dust control, noise control, traffic management, addressing as minimum the requirements of this EMP and the IEE. The C-EMP will be renewed on a yearly basis, submitted to CPMO and PIO for review, and to NWARA or ADB (if desired). Each civil work contractor will appoint an environment engineer and safety officer to coordinate contractor EMP implementation. To ensure that the contractors comply with the EMP provisions, the CPMO with the help and technical support of NWARA, will prepare and provide the following specification clauses for incorporation into the bidding procedures: (a) a list of environmental management requirements to be budgeted by the bidders in their proposals; (b) environmental clauses for contractual terms and conditions; and (c) the full EMP. Contractors will submit monthly contractor EMP implementation reports to the CPMO, and provide information including reports, monitoring results or other information relating to EMP implementation as requested by the CPMO and NWARA.

2.7.4. ADB Review Missions

88. ADB will conduct review missions annually during the first two years of Project implementation to:
- assess implementation effectiveness and propose any necessary adjustments to the implementation arrangements;
 - monitor implementation progress against expectations, identify constraints, and define actions to address them; and
 - Ensure compliance with ADB safeguards conditions set out in the grant agreement and financial framework agreement. In particular, EMP implementation will be scrutinized.
89. Three years following grant effectiveness, ADB will field a comprehensive midterm review mission (MRM) to assess performance, identify problems, and reach formal agreement with GoIRA on any needed changes to the scope of work or implementation arrangements to address shortfalls. MOF, NWARA, MAIL, and ADB will jointly prepare full terms of reference for the MRM during the second year of implementation. Prior to MRM, NWARA and MAIL will each submit a detailed progress report on their respective components, including documentation of safeguards implementation.

2.8. Implementation Schedule

90. The construction of the Sharawan and Momen Abad subprojects are scheduled to be implemented in eighteen months. The detailed implementation schedule is presented in Table 6 below.

Table 5: Project Construction Schedule

S.N	Activities																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Mobilization																		
2	Survey and Construction Design Drawings																		
3	Supervision and Quality Control																		
4	Site clearances and preliminary works																		
5	Earth works																		
6	Concrete works																		
7	Stone masonry work																		
8	Protection Works																		
9	Installation of water control equipment																		
10	Environmental and Social safeguards																		
11	Miscellaneous Works																		
12	Performance test																		
13	Demobilization																		

3. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

3.1. Environment Related Policy and Legislations

3.1.1. Environmental Issues in the Constitution of Afghanistan

91. Afghanistan Constitution on Article 7/Chapter 1, states the “State shall abide by international treaties and conventions signed by Afghanistan”, and Article 15/Chapter 1 states the “State is obliged to adopt necessary measures for safeguarding forests and the environment”.

3.1.2. Environment Law of Afghanistan, 2007

92. Umbrella law on environment, requires projects to go through environmental assessment process prior to start of construction. It also makes creating pollution a punishable act. In order to facilitate the implementation of the provisions of this law, NEPA has brought following regulations:

- National Environmental Strategy
- EIA Policy
- National Air Quality Regulation
- Water Quality Regulation
- Regulation on Controlling Materials Destructive to the Ozone Layer
- Waste Management Policy
- National Environmental Action Plan
- National Biodiversity Strategy and Action Plan (NBSAP)
- Noise Pollution Prevention and Control Regulation
- Regulation on Hospital Waste Management
- Waste Management Regulation (under approval process)
- Hazardous Waste Management Regulation (under approval process)
- Environmental and Social Impact Assessment Regulation (recently brought to replace the previous interim regulation on EIA)
- Environmental Standards (air quality, noise quality, water quality) (annex 3)
- List of Protected Species in Afghanistan (Annex 4)
- Relevant Policies, Strategies, Plans and Legislations on Forestry and Agriculture Sector

3.1.3. National Comprehensive Agriculture Development Priority Program for Afghanistan (2016-2020):

3.1.4. This program sets a very ambitious goal for the next five years:

93. Expand the land under irrigation from 2.2 to 2.7 million hectares; and
94. Increase wheat production from 4.5 to 5.9 million metric tons.
95. And the ways identified to achieve these goals among others include:
96. Increasing investments in water management, with rehabilitation of more than 1,000 irrigation schemes, developing new irrigation networks and building small water reservoirs; and

97. Expanding agroforestry and reforestation with over 60,000 hectares that support environmental conservation and income generation for farmers.

3.1.5. National Forest Management Plan (NFMP) for Afghanistan:

98. NFMP has set the target of increasing the forest cover across Afghanistan by 3% by 2030. In order to achieve this target, it has set two timeline- 3 years and 10 years. In a period of three years approximately 2000 sq km of forest land (15% of degraded land) and within ten years approximately 5000 sq km of forest land (37.5% of degraded forest land) will be rehabilitated and regenerated.

3.1.6. Forestry Law (Forest Management Act, 1391/2012)

99. The Forest Law of Afghanistan brought on 2012 has forbidden the destruction of the forest land to any other purposes including the agriculture without the approval of council of ministers and agreement with the local forest association. This law provides the right to use the forest resources to all Afghan citizen in compliance with the special regulation of MAIL. It also provides opportunities to national and even international citizen to grow the forest area in private land.

3.1.7. Community Forestry Regulation, TOR and Authorities

100. This regulation is brought to determine the scope of work and authorities of MAIL, MAIL provinces offices, Interdepartmental Committee, and Forest Association for the management of community forestry in Afghanistan.

3.2. Relevant Policies and Legislation on Water Resources Sector

3.2.1. Water Sector Strategy:

101. It aims to facilitate the management of the nation's water resources so as to reduce poverty, increase sustainable economic and social development, improve the quality of the lives of Afghans and ensure an adequate supply of water now and in the future. It focuses on developing legal and institutional mechanism based on the guiding principle of integrated water resources management.

3.2.2. Water Law, 2009

102. A legal framework for implementing Integrated Water Resources Management (IWRM) approach in Afghanistan, it focuses on institutional structure for IWRM implementation, developing a system of water use permits and infrastructure licensing, a system of water pricing to recover the cost of water infrastructure, and for environmental protection. The organizational structures identified for the implementation of IWRM in Afghanistan include Supreme Council for Water Resources Management, River Basins Council, River Basin Agencies, and Water Users Associations (WUAs) and Irrigation Associations (IAs). WEAs are related to NWARA and IAs to MAIL. These associations aim to minimize the conflict on water distribution and smooth operation of the irrigation systems.

3.2.3. Regulation on Bed and Right of Way of Water Resources in Afghanistan, 2014:

103. Right of Way for River Bodies, Natural Canals and Streams: As per the Article 4 of this regulation, the ROW is as follows:

104. Rivers which do not need cleaning and dredging for water quality protection, the ROW is half the width of the river on both sides. IF it requires for cleaning and dredging for the protection of water quality it is 150 m to 500 m. For natural streams used for drinking water purposes, ROW is 150 meters.
105. Rivers, natural canals and washes that have permanently or seasonal water flow, ROW for the cleaning and dredging from both side is 5-20 meters. For the rivers that their natural duct is not determined, the ROW will be set based on the local tradition.
106. Right of Way on Canals and Streams: As per Article 5 of this regulation, ROW is as follows:

• Canal Capacity: 150 liters per second	ROW: 1 meter both sides
• Canal Capacity: 150 liters/s to 2 m ³ /s	ROW: 2-3 meter both sides
• Canal Capacity: 2 m ³ /s to 5 m ³ /s	ROW: 4-5 meter both sides
• Canal Capacity: 5 m ³ /s to 10 m ³ /s	ROW: 6-8 meter both sides
• Canal Capacity: 10 m ³ /s to 15 m ³ /s	ROW: 8-12 meter both sides
• Canal Capacity: 15 m ³ /s to 20 m ³ /s	ROW: 12-20 meter both sides
107. If there are roads along the canals, and right of way in such cases is 2 meter from the side of the road for the protection of the road.

3.3. Legal Framework on Land Management

108. There are four important laws and policies that provide the basis for acquisition of land for public purpose, namely:
 - a. The Law on Land Expropriation (8 October 2000);
 - b. The Land Affairs Management Law (LML) (2008);
 - c. Amendment to The Law of Land Expropriation (3 April 2005); and
 - d. The Land Policy (2006)
109. Besides these 4 laws, the constitution of Afghanistan guarantees of protection of private property, right to live anywhere in the country, and provision of the right of state to acquire private land for public purposes.

3.4. Afghanistan's Commitment to Related Conventions and Protocol

3.4.1. United Nation's Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol

110. Despite being a LDC, Afghanistan in its Nationally Determined Contribution submitted to the UNFCCC during the Paris convention has set the following target:
111. There will be a 13.57% reduction in GHG emissions by 2030 compared to a business as usual (BAU) 2030 scenario, conditional on external support.
112. GOIRA has made the following commitments in its NDC:

113. At least 10% of Afghanistan land area and the habitat of selected species under a system of conservation
114. Regeneration of at least 40% of existing degraded forests and rangeland areas (the area covered will be approximately 232,050 ha for forestry; and 5.35 million ha for rangelands).

3.4.2. United Nation's Convention on Biological Diversity (UNCBD)

115. In line with the Aichi Targets, GoIRA has also set targets with implementation strategies. Some of the key targets that are relevant here are:
116. at least 10% of each ecological region effectively conserved, and areas of particular importance to biodiversity protected
117. genetic diversity of crops, livestock and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained
118. rate of loss and degradation of natural habitats decreased
119. Traditional knowledge, innovations and practices protected, and rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefits sharing, protected.

3.4.3. Convention on International Trade on Endangered Species of Wild Fauna and Flora (CITES):

120. CITES had been ratified and as such the provisions of this convention are made part of the Environmental Law 2007, Article 54 to Article 57 of this law are all related to CITES. And as per the Article 47 of this Law, NEPA has published the list of protected species in Afghanistan (Annex 4) which will be updated regularly. In 2014 Afghanistan also became party to Convention on Conservation of Migratory Species of Wild Animals, also known as CMS which aims to conserve terrestrial, marine and avian migratory species throughout their range.

3.5. Other Multilateral Environmental Agreements:

- United Nations Convention to Combat Desertification (UNCCD),
- NAGOYA Protocol
- Vienna Convention and Montreal Protocol,
- Basel Convention on the Trans-Boundary Movements of Hazardous Wastes and Their Disposal,
- Stockholm Convention on Persistence Organic Pollutants (POPs)
- Rotterdam Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade.
- Minamata Convention on Mercury (under ratification process)

3.6. ADB SPS 2009

121. ADB SPS 2009: ADB affirms that environmental and social sustainability is a cornerstone of economic growth and poverty reduction in Asia and the Pacific. ADB's Strategy 2020 therefore emphasizes assisting DMCs to pursue environmentally sustainable and inclusive economic growth. In addition, ADB is committed to ensuring the social and environmental sustainability of the projects it supports. In this context, the goal of the SPS is to promote the sustainability of project outcomes by protecting the environment and people from projects' potential adverse impacts.
122. The objectives of ADB's safeguards are to:
- avoid adverse impacts of projects on the environment and affected people, where possible;
 - minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
 - help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

3.7. *Environmental Screening and Categories*

3.7.1. ADB

123. ADB water resources projects and subprojects are screened using a rapid environmental assessment 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.
124. 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 environmental management plan (EMP), is required. The raising of the Dahla Dam has been categorized as Category A, impacts are adverse and cannot be mitigated on site. An EIA report has been prepared accordingly. All hydropower developments are categorized as "Category A" according to ADB environmental assessment guidelines (2003).
125. 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 initial environmental examination (IEE), including an EMP, is required.
126. 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.

3.7.2. Government of Afghanistan

127. NEPA brought the new regulation on Environmental and Social Impact Assessment in the beginning 2018 with annexes to follow while preparing the IEE and EIA reports. In addition to this regulation, other regulations that have been introduced recently are Noise Pollution Prevention and Control Regulation, Water Quality Prevention and Control Regulation; Hospital Waste Management Regulation. Regulation on Solid Waste (Domestic) Management and Hazardous Waste Management Regulations are in the final process of approval.
128. As per the Interim EIA Regulation 2008, (construction or upgrading of irrigation or drainage projects serving 15,000 ha or more) falls under Category I, requiring to prepare and submit the Screening Report to NEPA to determine whether the project needs to undertake the Environmental Assessment or can proceed with the approval of the Screening Report itself.
129. Recently in the beginning of 2018, NEPA promulgated the Environmental and Social Impact Assessment Regulation and as per this new regulation, irrigation projects with more than 15,000 ha command area put in Category II requiring to conduct IEE study.
130. As per this new regulation, the validity of environmental clearance is of three years and it is the responsibility of the project proponent to inform NEPA the date of initiation of the construction activities as well as the date of start of operation of the project. The proponent should submit monitoring report every year to NEPA during construction and operation of the project.
131. The proponent of the following projects shall require conducting the IEE study and preparing a report as per the prescribed format (Annex VI of regulation), and in accordance with the procedures outlined for IEE in this regulation, prior to application for environmental clearance to the authority or authorized concerned authority.
132. **National Legal Framework**
133. Table 7 provides a summary of relevant NEPA's Environmental Regulations, Guidelines and Policies for the project, Table 8 provides Comparison of International and local Air Quality Standards and Table 9 provides Comparison of International and Local Noise Standards.

Table 6: NEPA's National Regulations, Guidelines and Policies

Regulation/Guideline/Policy	Date	Key Areas
Interim Environmental Impact Assessment Regulations	Draft 2.3	<p>These regulations govern the process of environmental impact assessment in Afghanistan on an interim basis pending the establishment of the EIA Board of Expert in terms of Article 20 of the Environmental Law and issuing of final regulations.</p> <p>These regulations provide the detailed process of EI category A and B based on potential impacts.</p>

Administrative Guidelines for the Preparation of Environmental Impact Assessments	June 2008-2007	The Director-General of NEPA issues this document in t 1/87 dated 3 June 2008. These guidelines are in draft fo by NEPA in coordination with UNEP. The purpose guidance to proponents while undertaking a developm potential impact on the environment. The guidelines als public should be consulted and define the roles and stakeholders' in the process
Environmental Impact Assessment Policy – “An Integrated Approach to Environmental Impact Assessment in Afghanistan”	November 2007	NEPA with the assistance from UNEP has developed the EIA Policy of Afghanistan. The policy stipulates energy sector guidelines to the project proponents to integrate EIA in the process of development and the procedures to address environmental consequences and involve necessary institutions in the process of project implementation.
Environmental and Social Impact Assessment (ESIA) Regulation 2017	December 2017	<p>This regulation is adopted under the Environmental Law of Afghanistan, 2007 (Article 22) to govern the procedures of environmental assessment of projects in Afghanistan.</p> <p>This regulation defines responsibilities and procedures for the implementation of the provision of Environmental Law of Afghanistan 2007 concerning the Management of Activities Affecting Environment (Chapter Three, Article 13 to Article 26), and:</p>
Environmental Impact Assessment Regulations	March, 2008	These Regulations are issued in accordance with Article 22 of the Environmental Law in order to govern the process for environmental impact assessment.
National Strategy of Environment	December, 2007	Afghanistan confirms the new era of environmental regulation. So, the strategy is that most of the development capacity of NEPA and its capabilities due to law enforcement activities & coordination should be increased. The policy focuses on existing scenarios to integrate the environment through environmental regulations including the National Development Strategy and Afghanistan Development Goals.
Multilateral Environmental Agreements: United Nations Environment Programme Post-Conflict and Disaster Management Branch A Handbook for Afghan Officials	March, 2008	This handbook has been produced in both Dari and English and is an output of UNEP's Programme for Institutional and Capacity Building for Environmental Management in Afghanistan, which was initially implemented in 2003 and is funded by the European Commission, the Government of Finland and the Global Environment Facility.

Table 7: Comparison of International and local Air Quality Standards*

Pollutants	USEPA		WHO/IFC		Afg. NEQS	
	Avg. Time	Standard	Avg. Time	Standard	Avg. Time	Standard
SO ₂	3 hrs	0.5 ppm	24 hr	20 ug/m ³	24 hr	50 ug/m ³
	1 hr	75 ppb	10 min	500 ug/m ³		
CO	8 hrs	9 ppm (11 mg/m ³)			8-hour	10 mg/m ³
	1 hr	35 ppm (43 mg/m ³)			1-hour 30 minute	30 mg/m ³ 60 mg/m ³
NO ₂	Annual Mean	100 ug/m ³ (53 ppb)	1 yr	40 ug/m ³	Annual	40 ug/m ³
	1 hr	100 ppb	1 hr	200 ug/m ³	24 hr	80 ug/m ³
O ₃	8 hrs	0.07ppm (148 ug/m ³)	8 hrs	100 ug/m ³	8-Hour	100 ug/m ³
PM ₁₀	24 hrs	150 ug/m ³	1 yr	20 ug/m ³	Annual Mean	70 ug/m ³ **
			24 hr	50 ug/m ³	24 hrs	150 ug/m ³ **
PM _{2.5}	Annual Mean	15 ug/m ³	1 yr	10 ug/m ³	Annual	
	24 hrs	35 ug/m ³	24 hr	25 ug/m ³	24-hours	35 ug/m ³ 75 ug/m ³

*: Afghanistan has not established its own ambient AQ standards and the Government is still in the process of adoption of standards (Urban Air Quality Management Report, ADB, 2006). Therefore; the standards highlighted in green for each respective pollutant are the most stringent based on a comparison between two international regulations i.e. USEPA and WHO/IFC and thus shall be applicable for the proposed project.

** High PM₁₀ concentrations have been measured in initial samples under the ADB Kabul Air Quality Management (KAQM) Project in 2004 and in previous short-term studies conducted during 2003 by an Environmental and Industrial Health Hazard (EIHH) Special Support Team (SST).

Table 8: Comparison of International and Local Noise Standards

Category Zone/Area	Limit in dB(A) Leq			
	AFG- NEQS		WHO/IFC	
	Day Time	Night Time		
Industrial	75	65	55	45
Commercial	70	60	70	70
Residential	60	55	70	70

Sensitive	50	45	55	45
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*The standards highlighted in green for each respective Area/Zone are the most stringent based on absence of local regulations and standards for Noise; therefore, international regulations shall be applicable for the proposed project.

4. ANALYSIS OF ALTERNATIVES

134. Under ADB's Safeguards Policy Statement (2009) there is a requirement to examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and consider the no project alternative. During the project preparation, various alternatives have been proposed, screened against technical, economic, as well as environmental criteria. In terms of the environmental consideration for the alternatives, the primary objective was to identify and adopt options with the least adverse environmental impacts and maximum environmental benefits.

4.1. No-Project Alternative

135. In the no-project alternative, irrigation schemes in the Panj-Amu basin would likely be rehabilitated and upgraded by NWARA with funding from other sources in much the same manner as under the P-ARBSP. This is believed to be the case because (i) the P-ARBSP is designed to support Afghanistan and NWARA in implementing their pre-existing irrigation development plans, and (ii) the Project utilizes commonly-used technical options for irrigation rehabilitation and upgrading that would likely also be used in the no- project alternative (i.e. with alternative funding).
136. Selection of the Sharawan and Momen Abad subprojects came about from a candidate shortlist of 21 potential initiatives screened from a long list of 62 subprojects identified and prioritized by NWARA, RBA, and SBAs. Shortlisting criteria included indicators of technical, economic, social and environmental viability and consistency with Project design. The process is described in more detail in the EARF.

4.2. The project design alternative

137. The Sharawan and Momen Abad canal involves rehabilitation of existing irrigation infrastructure and the technologies. The rehabilitation essentially puts the existing irrigation systems back into its full operational potential and the structural improvements will be optimized during detailed design. The interventions now have standard details available for each type, affected sections of the canal will be strengthened to withstand anticipated floods and landslides. For droughts irrigation scheduling will be done based crop water requirement. Hydrological analysis will be done to forecast the river flows, water availability and extreme floods/droughts.

5. DESCRIPTION OF THE ENVIRONMENT

5.1. Physical Environment

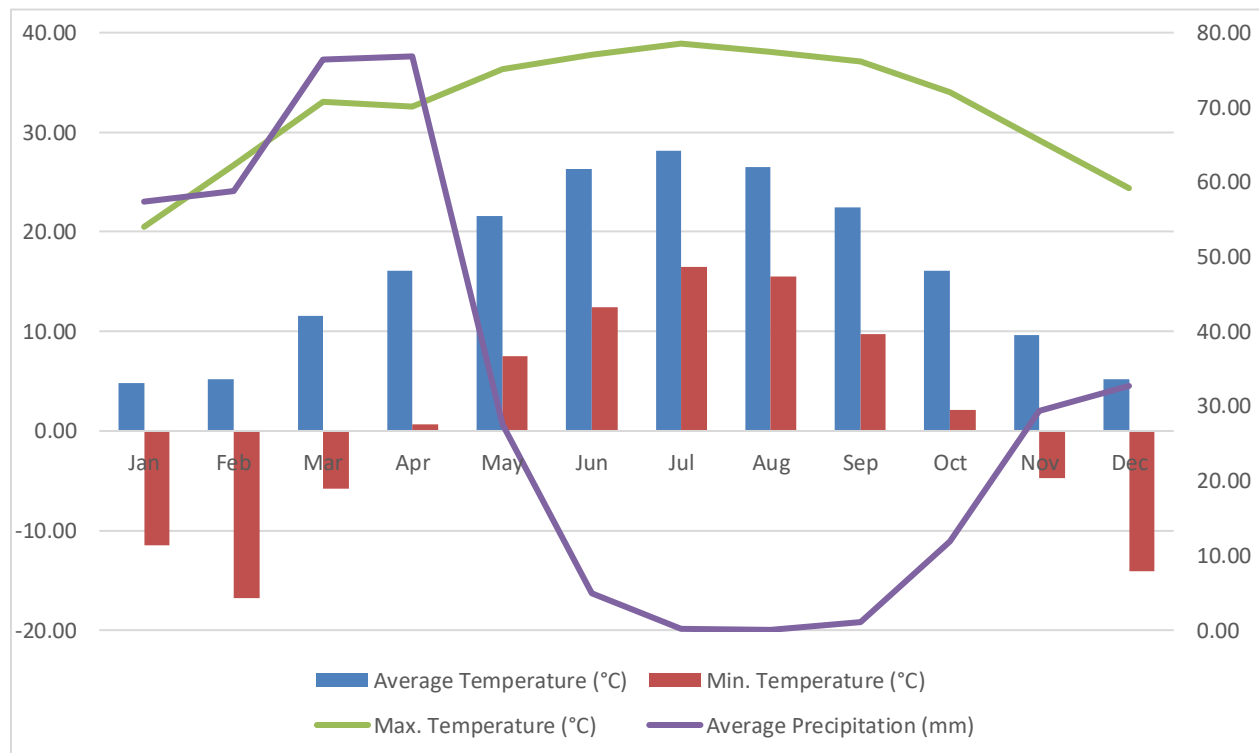
5.1.1. Climate

138. **Climate Classification** - The Köppen climate classification of the basin is predominantly cold steppe (Kabul, Denver USA), with smaller areas of BWk cold desert (Isfahan Iran), CSa hot summer Mediterranean (Dushanbe Tajikistan), and DSa high altitude hot summer continental (only occurs adjacent to CSa). Climate is characterized by a cold winter (November to April) with significant snowfall. Spring (April to mid-June) is wet and unsettled with cool days and frosty nights. Summer (mid-June to August) is clear and dry, with modest precipitation in brief downpours. Autumn (September to October) is cloudy and wet⁶.
139. **Upper Catchment** - The Panj-Amu basin flow originates as snowmelt in upper high-altitude catchments. Historical direct hydro-meteorological measurements for the upper catchments are unavailable. Snow-cover recession can readily be inferred from satellite imagery, but it is not directly proportional to river discharge which also requires knowledge of snow-pack depth or equivalent rainfall depth, and of rates of snowmelt percolation (which is substantial) into local ground water storage in screes, alluvial terraces. In addition, local physiographic impact has a strong influence upon microclimatic variation in mountainous areas. Therefore, generation of representative upper basin hydrometeorology data requires instrumentation and analysis sufficient to cope with rain shadow, barrier impact, snowdrift, summit exposure, exposure, and macro-aerodynamic turbulence.
140. **Meteorology Data, Averages, Trends** - Kulyab weather data. The longest continuous and highest-quality weather record for the lower (or possibly entire) Panj-Amu basin is said to be the 51-year record from the meteorological station at Kulyab, Tajikistan, for the years 1940-1990. Kulyab is located on the relatively low-lying flood plain of the Yakhsu and Kulyab rivers at 500 m above sea level, and is approximately 130 Km from Qualbars-Shorab subproject sites. Further the meteorological data has been obtained from Water Resources Department (WRD), Kabul for the years 2008 to 2018 and its list is shown in Annex 10.
141. **Precipitation and Temperature**, Takhar Province. Based on the meteorological data recorded in Automatic Hydrometeorology Station in Nazdik-Taloqan, code 14-1. R00-5A obtained from WRD, the climate in Taloqan capital of Takhar province is warm and temperate. The climate here is considered to be a local steppe climate. There is little rainfall throughout the year. The climate here is classified as BSk by the Köppen-Geiger system. The average annual temperature is 16.1 °C in Taloqan. In a year, the average rainfall is 377 mm.
142. July is the warmest month of the year. The temperature in July averages 28.1 °C. The lowest average temperatures in the year occur in January, when it is around 4.8 °C.

⁶World Bank: Climate Change Knowledge Portal for Afghanistan
(http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisRegion=asia&ThisCcode=AFG)

143. There is a difference of 122 mm of precipitation between the driest and wettest months. The variation in temperatures throughout the year is 23.3 °C.

Figure 6: Climate Graph // Weather by Month Taloqan



144. Taloqan weather by month/ weather average

Figure 7: Yearly Weather Record of Taloqan, Takhar

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temperature (°C)	4.84	5.15	11.60	16.08	21.62	26.31	28.10	26.47	22.48	16.13	9.61	5.23
Min. Temperature (°C)	-11.50	-16.80	-5.80	0.70	7.50	12.40	16.50	15.50	9.70	2.10	-4.70	-14.10
Max. Temperature (°C)	20.50	26.70	33.10	32.60	36.30	37.80	38.90	38.10	37.10	34.00	29.20	24.40
Average Precipitation (mm)	57.41	58.85	76.38	76.82	27.54	4.97	0.20	0.04	1.08	11.88	29.36	32.71

Source: Meteorological Data from Water Resources Department, Kabul

145. **Recent Droughts.** Periods of large-scale, multi-year drought are characteristic of central Asia. Recent drought years recorded for northern Afghanistan are 1997-2004 (1998-2002 in Southwest Asia more broadly), 2008, and 2010.⁷ It has been suggested that Central Asian droughts are correlated with large scale climate indices related to the El Niño-Southern Oscillation cycle (ENSO). In Central Asia, wetter than normal conditions are associated with the ENSO warm phase (El Niño); drier conditions are associated with the cold phase (La Niña).
146. **Regional Paleoclimate** The paleoclimate of Central Asia is believed to have been characterized by progressive aridization with occasional minor fluctuations to moister phases, from the middle Pleistocene (781,000 to 126,000 years before present, years before present (ybp)) up to the present. One hypothesized reconstruction of Central Asian Holocene climate (11,700 ybp to the present) has a first wet transgression occurring during 5000-3000 BCE, during which lacustrine landscapes and human niches occurred in areas now occupied by deserts and takyr formations (shallow depressed areas with heavy clay soils that are submerged after seasonal rains), followed by moister transgressions of lesser dimension between 1400-1000 BCE, 600-250 BCE, 900-1200 CE and 1600-1800 CE.⁸
147. **Regional Prehistory** - The Panj-Amu basin has been inhabited and modified by human activities for millennia. Extremely rich concentrations of Mesolithic and Neolithic settlements dating as far back as 10,000 BCE have been found south of the Amu Darya in the Turkistan plain. This indicates that the Neolithic revolution took place in northern Afghanistan about 9000 years ago, indicating that the area may have been one of the earliest centres for the domestication of plants and animals. Mounds that seem artificial and alien to the surrounding flat area are the remnants of monumental Neolithic palaces and complex circular temples.⁹ Lapis lazuli mining in the narrow Upper Koksha canyon from before 3000 BCE was the main source of lapis to ancient Sumer and Egypt, and likely what attracted Harappans in ~2000 BCE to Shortugai in modern-day Yangi Qala district, Takhar province, the settlement furthest from Harappa itself.¹⁰
148. In the second half of the third millennium BCE, a new type of social organization, suggestive of a form of large-scale colonization involving mastery of advanced techniques of large-scale irrigation, appeared in settlements in northern Afghanistan and Turkmenistan, which archaeologists have named the Bactria-Margiana Archaeological Complex (BMAC).

5.1.2. Topography

⁷Beekma, Jelle, and Joel Fiddes. 2011. Floods and Droughts: The Afghan Water Paradox. Afghanistan Human Development Report. Kabul: Centre for Policy and Human Development.

⁸Sala, Renato. 2003. Historical Survey of Irrigation Practices In West Central Asia. Almaty, Kazakhstan: Laboratory of Geo-archaeology, Centre of Geologo-Geographical Research, Ministry of Education and Science. <http://lgakz.org/Texts/LiveTexts/CAsialrrigTextEn.doc>

⁹As a result, excavation anywhere in the region poses a risk of disturbing physical cultural resources, specifically archaeological materials. ADB guidance on environmental safeguards for physical cultural resources are documented in Section VII Physical Cultural Resources (pp. 66-71), ADB (2012) Environment Safeguards, A Good Practice Sourcebook—Draft Working Document. Retrieved from <http://www.adb.org/sites/default/files/environment-safeguards-good-practices-sourcebook-draft.pdf>

¹⁰Bancroft, Peter. 1984. Gem and Crystal Treasures. Fallbrook, California, USA: Western Enterprises/Mineralogical Record. http://www.palagems.com/lapis_lazuli_bancroft.htm

149. Similar to many irrigated river valleys' the command area is a fairly level agricultural zone with some interspersed small low hills. The surrounding topography contributes to the dramatic increase in river flow after rains.

5.1.3. Geology

150. As a landlocked country dominated by the Hindu Kush Mountains, Afghanistan has some of the most complex and varied geology in the world.

5.1.4. Soils

151. Soil in Afghanistan can be considered "pedologically young" because of the arid and semiarid climate conditions. Because of the high content of calcareous material, the pH of Afghan soils is usually greater than 7 and considered as alkaline in terms of reaction (FAO/UNDP, 1972). More than 50% of the soils have a pH between 8 and 8.5, about 35% of the soils have a pH between 8.5 and 9 and only 10% of the soils have a pH of 9 and above (FAO/UNDP, 1972). The soils, in general, have low fertility and low organic matter content (usually less than 2%). Generally, Afghanistan has the following soil orders Aridisols, Entisols, Inceptisols, Alfisols and Mollisols (Shroder, 2014). One of the first studies conducted on Afghan soils was done by the Institute of Applied Botany of Leningrad. In 1924 and 1926 – 1927 the institute sent scientists to Afghanistan for soil evaluation. They made general observations of the soils and took soil samples for physical and chemical analysis.
152. A general soil map was developed with the following four soil groups: 1) Soils in low river valleys classified as heavy loam. 2) Soils of the foothills in northern Afghanistan identified as loess-like loam. 3) Soils on slopes were classified as medium loams and 4). The irrigated cultivated soils of the oases (urban centers) (Hildreth, 1957). Salem and Hole (1969), conducted research on Afghan soil properties and classification. This research studied eight pedons and found that most of the soils in these areas were classified as Aridisols and Entisols. In 2001, the Natural Resource Conservation Service of the United States Department of Agriculture (NRCS/USDA) developed a soil regions map for Afghanistan. This map was based on soil Great Groups, moisture regimes and temperature regimes and identified 25 different soil regions in the country (Shroder, 2014)¹¹.
153. Based on the research which has been conducted by Food and Agriculture Organization of the United Nation, the soil characteristic of Taloqan district of Takhar, province, is as follow:

Surface characteristics	
Rock cover:	None
Slope (%):	0.5
Flooding:	None

¹¹<https://pdfs.semanticscholar.org/81c2/6e0dca946910680984321c89194b28ca05e9.pdf>

Surface sealing:	None. Erosion: None
Presence of cracks:	Yes
Presence of salt deposit:	None
Drainage:	Moderately well drained
Landform:	Foot slope
Current land use:	cropland
Crop:	Eggplant, Tomato and Rice
Land cover type:	Irrigated Agriculture
Profile description: A-Horizon (0– 60 cm)	
Colour:	dry: 4/3 10YR wet: 6/3 10YR
Structure type:	blockya size: Medium
Presences of mottles:	None
Calcium Carbonate:	3.4%
Texture:	Sand: 28% Clay: 19.2%
Texture class:	Silty loam
N:	0.123% P: 17.7ppm K: 92ppm
S:	27.7 ppm Zn: 0.49 ppm Fe: 1.02 ppm
Mn:	2.8 ppm Cu: 1.54 ppm B: 0.34 ppm
CEC:	14.22 (cmol+)/Kg
pH (H ₂ O):	7.74 EC (dS/m): 0.26
OC:	1.23% WHC: 560ml/lit

5.2. Rivers and Water Bodies:

5.2.1. Hydrology

154. The waterways of the Sharawan and Momen Abad Canal subproject area are the main canal and its secondary branch and higher-order canals which are diverted from Talgon and Panj River. In an average year, there is water in the main and higher-order canals year-round. There are no natural or man-made lentic water bodies in the area.

155. **Irrigation:** Jargon used to label specific areas within an irrigated area includes (i) Head, the (ii) middle and (iii) tail areas. Irrigation is basically gravity driven. These terms therefore translate to (i) the top, the (ii) middle and (iii) the lowest part of the irrigated area.
156. **Groundwater:** Due to natural accessions to the water table during regular irrigation, there can be considerable recharge occurring. The Head areas will tend to have a higher water table, the middle less and the tail lowest. In the head area, wells are found in about half the villages. During the field visit it had observed that the areahas dig wells and hand pumps. As per information of WUA members and local peoples there are totally 30 functional wells (10 hand pumps and 20 dig wells) along the Momen Abad canal subproject and the water table is varies between 15 to 40 meters. Ground water bearing layers in the mountain areas are permeable layers of the base rock and faults within these rocks. Without having detailed data, it seems that there is a ground water base flow into the flood plain subsurface. Nevertheless, groundwater in the flood plain is significantly fed by infiltration of the rivers. Usually water for domestic use is taken from the streams and canals or is extracted by shallow or tube wells (Feasibility study report of Qulbars and Shurab).

Figure 8: source of ground water and surface water using by local community at Sharawan



Figure 9: source of ground water using by local communityat Momem Abad



5.2.2. Water Quality

157. River Water Quality. While the quality of water in the rivers is believed to be good, in order to understand the impact of construction work on water quality a water quality assessment is required before the construction work to provide qualitative data.
158. While the quality of water in the rivers is believed to be good, although local residents told, during the flood season the water of Taloqan River become salty as result of passing through salt mine located in Namakab district of Takhar province. Since Sharawan canal is passing from middle of the Taloqan city and the canal water is contaminating by frequently disposing of the solid and liquid wastes of the city, Figure 10 is showing the canal water contaminated by solid and liquid waste of the city, therefore the water quality assessment is required before the construction work in order to provide qualitative data. To avoid potential impact water quality monitoring for drinking and irrigation to will be planned during the construction phase. The monitoring of water quality is a planned task of the river basin agency and sub-basin agencies.

Figure 10: View of the canal water contaminated by solid and liquid wastes at Sharawan



5.2.3. Air Quality and Noise

159. Afghanistan has set the National Ambient Air Quality Standard as well as National Ambient Noise Quality Standard that has to be complied with. Ambient air quality facilities are very limited and only one monitoring station is installed in Kabul inside the compound of NEPA office. There are no permanent air quality monitoring facilities in other cities of Afghanistan, neither has any campaign monitoring has been done outside Kabul. Therefore, no data on ambient air quality is available for the project area. There are no major industries emitting air pollutants in the project area. Vehicles, moving in the dusty roads are the sources of air pollution. In addition, majority of people use animal dung and fuel wood for cooking and heating purposes, and because of this the indoor air in the area contains household cooking particulates. No major sources of noise pollution except the movement of vehicles, sometimes using pressure horns. As this is rural area and most of the people are busy with agriculture, and the sensitive receptor for air and noise are the community living near to the canal, agriculture crops, birds on the trees, domestic animals also schools and mosque, though based on the survey there is no any school near the project and the nearest school is about 500 meters away from the project the sound level recorded using mobile software but the instrument for air quality measurement is not available and it is planned before commencement of civil work and will be included in the IEE as annex, it is mentionable that NTP won't be issued prior to conducting air, water and noise quality instrumental data to establish the baseline condition of the project area . For monitoring of noise (Sound Level Meter Model AWA6228) will be procured by CPMO, currently it is under evaluation by CPMO procurement team.
160. Sensitive Receptor for air quality: Due to the rural agricultural nature of the infrastructure improvements and the rehabilitation nature of the works, there are some villages and agriculture farms that would be sensitive receptors to air and noise. Table 11 and Table 12 shows the Sensitive receptors along the proposed structures of Sharwan and Momen Abad canals.

Table 9: Sensitive receptors along the proposed structures of Sharwan canal

SN	Type of Sensitive Receptor	Distance from Project	Types of impact
1	Majar Qeshlaq (AhanDara)	50 m	Air, Noise, OHS, dust
2	Majar Qeshlaq (Ahan Dara)	50 m	Air, Noise, OHS, dust
3	Majar Qeshlaq (Ahan Dara)	50 m	Air, Noise, OHS, dust
4	Majar Qeshlaq(Ahan Dara)	100 m	Air, Noise, OHS, dust
5	Taloqan river	1000 m	Water quality will be disturbed.
6	Agriculture	2-10 m	Air, Noise, OHS, dust

7	Farmers/ Women		Air, Noise, OHS, dust
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Table 10: Sensitive receptors along the proposed structures of Momen Abad canal

SN	Type of Sensitive Receptor	Distance from Project	Types of impact
1	Naqil Bala village	50 m	Air, Noise, OHS, dust
2	Qarildy Villaged	50 m	Air, Noise, OHS, dust
3	Panj river	1000 m	Air, Noise, OHS, dust
4	Momen Abaad village,	100 m	Air, Noise, OHS, dust
5	Taloqan river	1000 m	Water quality will be disturbed.
6	Farmers/ Women	2-10 m	Air, Noise, OHS, dust
7	Agricultur Land	2-10 m	Air , dust

5.3. The Biological Environment

5.3.1. Proposed Protected Areas in the Project Influence Area

161. National Environmental Protection Agency of Afghanistan has now developed the National Protected Area Action System Plan (NPASP) as the Environmental Law 2007 and Protected Area Tarzulamal 2008. As per this legal provision, Central Management Authority (CMA) is established making it responsible for administration and management of the protected area system. NPASP has included 14 proposed protected areas in Afghanistan Figure 11 and classified them into three types table 13.
162. In the project influence area there is no protected area but there are two protected areas, namely Imam Sahib Wildlife Managed Reserve in Kunduz and Dargad Wildlife Managed Reserve in Takhar, which recently announced as protected area. Based on the field survey and google map the proposed protected areas located about 100-150 km away from the project area. This overlap area is reported to be difficult and risky to access, even by non-local Afghans, because it is in a remote location on the international border affected by insecurity and criminal activity.
163. During the field survey, local communities mentioned that the proposed protected area at Imam Sahib was famous for Tugai forest, an important wetland ecosystem in the dry lands of central Asia and important repositories of wetland biodiversity, and used to be habitat for some wild life.
164. These days there is no forest and also no wildlife are seen. This area is now mainly agricultural land, marshland permanently inundated, some rangeland, and some land as rock outcrop or bare soil. Some important animals found in the project Area are leopard (*Panthera pardus*), lynx (*Felis lynx*), wolf (*Canis lupus*) and Golden Jackal (*Canis aureus*) and Woody plants in the mountainous areas comprise sparse wild pistachio

(*Pistachia* sp.), almond (*Amygdalis* sp.) and juniper woodland with tree heights of 4-10 meters.

Figure 11: Proposed Protected Areas of Afghanistan (NPASPA/NEPA)



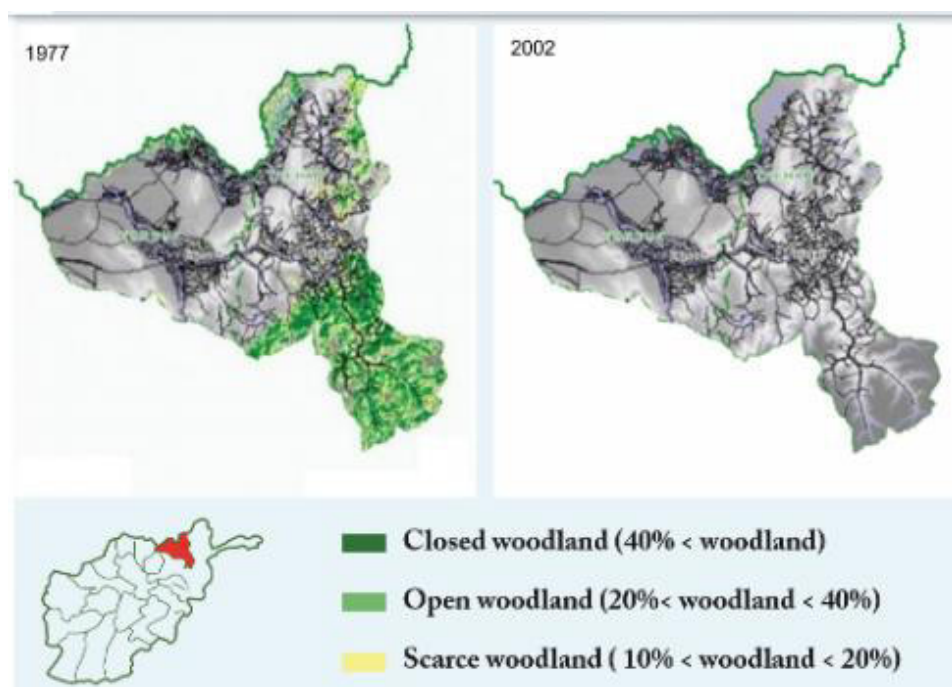
Table 11. Classification of Afghanistan's previously Proposed Protected Areas

Protected Area Type	Description of Classification of Protected Areas
Type I (Green)	Previously proposed protected areas that Afghanistan can expect to gazette within 5 years. NEPA and the CMA, with assistance from partner organizations, have been able to conduct survey and community work in these areas within the past 5 years and their validity as proposed protected areas has been established.
Type II (Blue)	Previously proposed protected areas that require additional survey and community work to determine their suitability as potential protected areas for Afghanistan. Gazettement of these areas is expected within 5-10 years if NEPA and the CMA determine that a Type II area is still viable as a proposed protected area
Type III (Pink)	Previously proposed protected areas that require additional survey and community work to determine their suitability as potential protected areas for Afghanistan. Gazettement of these areas is expected within +10 years if NEPA and the CMA determine that a Type III area is still viable as a

5.3.2. Forest Resources and Terrestrial Biodiversity in Project Influence Area

165. According to HDR/Afghanistan, 2011 “In the middle of the 20th Century, surveyors estimated the total forest cover in Afghanistan at 3.1 million to 3.4 million hectares. Today, woodlands occupy less than 1.0 million to 1.3 million hectares (2 percent of the total area of the county), while the north-eastern and eastern regions are prone to high-intensity floods. A remote sensing analysis undertaken in Kunduz and Takhar provinces in 1977 and then again in 2002 revealed that the forest cover had shrunk by more than 50 percent in the interim. If deforestation continues at the present rate, the country’s woodlands will disappear in three decades.” A comparison of forest land in 1977 and 2002 in the Kunduz and Takhar province in the northern Afghanistan is presented in figure 12. Which shows more than 50% reduction in the forest area in this province, the project influence area.

Figure 12: A comparison of forest land in 1977 and 2002 in Kunduz and Takhar Provinces



(Source: HDR/Afghanistan, 2011)

166. As mentioned above, Imam Sahib was one of the most important repositories of wetland biodiversity in tugai forest along the Panj-Amu River. As mentioned above and shown in the 12, over the years there had been uncontrolled deforestation along the Panj-Amu River resulting in the destruction of the Tugai vegetation found in Imam Sahib District. In the rangelands near Panj-Amu river banks in the Imam Sahib, some of the tugai vegetation are observed in the form of tall grasses, reeds, and herbs such as *Erianthus ravennae*, *Epilobium turkestanika*, *Imperata cylindrica*, *Saccharum spontaneum*, *Phragmites communis*, *Arundo donax*, and *Artemesia* spp. to low trees and scrub including *Populus pruinosa*, *Lonicera parviflora*, *Eleagnos angustifolia*, *Tamarix hispida*, *Lycium dasystemon* and *Salix* spp (Field Survey, 2020). There is no any endemic or rare flora species in the project area.

5.3.3. Forest Resources and Biodiversity along the Canal Alignment

167. The field survey was conducted during June- July 2020 along the canal alignment to determine the area under vegetation, species composition, size of the plants and their ownership. As the area is security sensitive and to complete the survey works as soon as possible, the plants are classified into three groups- siblings with DBH less than 10 cm, pole size trees with DBH 10 cm to 30 cm, and trees with DBH more than 30 cm. The summary of vegetation species and their classification along Canal which will be affected by the project are presented in Table 14, based on the survey 817 sapling, 281 pole size and 101 tree size will be affected.

Table 12 : Summary of Vegetation Species and Classification in the project area

S. N	Province	District	Canal Name	Types of Tree		Tree Category			Total
	Takhar	Khwaja Bahaudin	Char Dara Canal	Local Name	Scientific Name	Sip	Pole	Tree	
2				Bid	Willow	817	279	101	1197
4				Tot	Mulbery	0	2	0	2
Sub-Total						817	281	101	1199

Source: Field Survey, 2019

168. Based on the field survey, there are some natural vegetation found in the project area which are listed in the table 15.

Table 13: Summary of Natural Vegetation found in the project area

SN	Local Name	English Name	Scientific Name	Location
1	Kabal	Turf	Poaceae family	Kunjak
2	Kirmak	worm grass	<i>Cordyceps sp.</i>	Mangal ha
3	Samaroq	mushroom		Aykhanum
4	Podina Lab Jouy	Pudineh	<i>Mentha pulegium</i>	Kunjak
5	Khar Jinjak	Thorn bush	<i>Lycium andersonii</i>	Zadran
6	Qamish	Giant reed	<i>Arundo donax</i>	Dormam
7	Lukh	Papyrus Plant	<i>Cyperus sp.</i>	Shah Wazir
8	Ghawmi	Hemp	<i>Cannabis sativa ssp. sativa</i>	Shah Ghasi

169. Terrestrial Habitats and Vegetation. The main habitat in the subproject is agricultural fields and settlement areas. Trees are found along canals, typically willow, poplar and some fruit trees, and within the walls of household compounds.
170. Wetland Habitats and Vegetation. The subproject area has efficient drainage and, other than the canals themselves, there are forest and shrubs in the right side of the main canal which is using as a common pasture between residents of the area.
171. Terrestrial and Aquatic Wildlife. Afghanistan's National Environmental Protection Agency (NEPA) has officially released Afghanistan's first list of protected species. The species on this list are now protected against illegal hunting or harvest. NEPA, with help from the Wildlife Conservation Society, Kabul University and the Ministry of Agriculture, Irrigation and Livestock (MAIL), created the Afghanistan Wildlife Executive Committee (AWEC) to

facilitate the listing process. 138 species are currently on the list, which includes 74 mammals, 54 birds, seven plants, one amphibian, one reptile and an insect. The list includes well known species such as the snow leopard (*Panthera uncia*), the wolf and the brown bear, as well as lesser-known species such as the Paghman salamander (*Paradactylodon mustersi*), goitered gazelle (*Gazella subgutturosa*), Saker falcon (*Falco cherrug*), markhor (*Capra falconeri*), and the Himalayan elm tree (*Ulmus wallichiana*)¹².

172. Afghanistan NEPA has realized the list of protected species as shown in Annex 4.
173. The proposed project area has no value as a habitat for any important faunal species including threatened and endangered species because of the lack of vegetative cover or other suitable habitat although the, local people reported the larger mammal's jackal Eurasian Golden Jackal; (*Canis aureus*), fox - either red fox; (*Vulpes Vulpes*) or Blanford's fox; (*Vulpes cana*), Caspian tiger; (*Panthera tigrisvirgate*), last confirmed in the wild, lower Amu Darya 1968, now not exist in the area), and Polecat; (*Vormela peregusna*). Locally reported birds include partridge Chukar Partridge; (*Alectoris chukar*), hoopoe (*Upupa epops*), eagles (*Aquila spp.*), doves (*Streptopelia spp.*), and sparrows (*Passer spp.*).
174. The people in the area have small number of cattle of sheep, cow, goats, horse, donkey and etc. Wild animal such as wolf and fox existence have been reported by local communities. No endangered, threatened or vulnerable faunal or avifunal species observed at the site.
175. Based on the primary field visits and consultations with location communities, it is confirmed that no critical wildlife habits occur within the Momen Abad canal subprojects and none of endangered species are sited in the project area. Common wildlife animal species reported in the Momen Abad canal subproject surrounding area are given in table 16.

Table 14: **Status of Wildlife in Project Area**

Sr. No	English Name	Scientific Name	Occurance	Remarks
1	Snakes	<i>Serpentes sp</i>	C	Hot Season
2	Lizard	<i>Lacertilia sp</i>	C	Hot Season
3	Scorpions	<i>Tityus stigmurus,</i>	R	Hot & Moist Season
1	Frog	<i>Anura sp</i>	C	Summers
2	Tortoise	<i>Testudo graeca</i>	C	
1	jackal,	<i>Canis aureus</i>	C	Round the year
2	Wolf	<i>Canis lupus</i>	R	

¹²<https://www.afghan-web.com/plants-and-animals/protected-species/>

3	Fox	<i>Vulpes vulpes</i>	C	Round the year
4	Squirrel	<i>Sciurus sp.</i>	R	Round the year
5	Rabbit	<i>Oryctolagus cuniculus</i>		Round the year
6	Bats	<i>Chiroptera sp.</i>		Round the year
7	wildhare	<i>Lepus Linnaeus</i>		Round the year
8	Miceandrats	<i>Muridae sp.</i>		Round the year

Note: Occurrence: C= common, R= Rare.

176. **Birds;** during the field visits and consultation with local peoples it has found that the birds' population has significantly reduced to the last 40 years of war conflict and even some species of migratory birds are not returning these areas due to destruction of the habitats. Countless numbers of migratory birds are being caught and killed every year in Afghanistan. Many Afghan people hunt birds for meat and also trap and sold them as house pets. There is also a thriving trade in canaries and finches.
177. There are approximately 390 bird species found in Afghanistan. Lists of species of birds found in Afghanistan on the protected list of IUCN are given in Annex 4.
178. Pigeon, parrot, dove, myna, owl, house sparrow, common teal, eagle owl, peregrine falcon, kestrel, bulbul, crow, kite, duck, quail, and partridge are common bird species in the region, Photographs of birds found in the northeast region are given in below;

Figure 13: Photograph of Birds Found in the Region



Sand Grouse

Lark

Desert Warbler

179. Approximately 320 species are potentially found in Afghanistan. Lists of species of birds found in Afghanistan on the protected list of IUCN are given in Annexure 4.
180. Migratory Birds: Migratory birds of Afghanistan includes a wide variety of ducks and waders, raptors, and passerines such as warblers, pipits, and buntings. List of migratory birds in Afghanistan are given in Annexure 4. As per information provided by the local people, the migratory birds of the subproject areas are a varieties of Ducks, Doves falcon and cranes as shown bellow in Table 17.

Table 15: **Migratory birds of Project Area**

S.N	Scientific Name	Family	Species	English Name	Migratory season
1	Anas Family	Anatidae	Anas acuta	Duck	Autumn and early spring
2	Columbidae Family	Columbidae	Domestic pigeon	Doves	Autumn and early spring
3	Falcon species	Falconidae	Mauritius kestrel	Falcon	Autumn and early spring
4	Gruidae Family	Gruidae	Sarus Crane - Antigone antigone	Cranes	Autumn and early spring

181. **Fish;** In Mountain Rivers available fish species are Brown trout and Milk fish; these are basically carp from the family Cyprinidae. Based on the site survey and consultations with local community, there is no fishes in the canal/ project area.
182. As per literature review and information provided by the local residents, the Kokcha, Amu Darya and Darya Panj River have some varieties of fish like Rangin Kaman trout (*Salmo trutta*), Tass Mahi (*Pseudoscaphirhynchus kaufmanni*), Cappor (*Alburnoides taeniatus*), Sia mahi (*Capoeta capoeta*) and Shir mahi, Gaw mahi (*Rhinogobius similis*), Torkistan Katfish (*Glyptosternum reticulatum*).
183. Based on the protected wildlife species list of NEPA the Fringebarbel Sturgeon (*Acipenser nudiiventris*) and Amu Darya Shovelnose Sturgeon (*Pseudoscaphirhynchus kaufmanni*) are the only two protected fishes in Afghanistan. The mentioned fishes reported from Panj Amu river, while the projects are located on Taloqan district of Takhar province and there is no such kind of fishes.

Table 16: **Fish Species Native to Afghanistan Rivers**

Sr. No	Native Fish of Afghanistan	Scientific Name
1.	Schneider Riffle Minnow	<i>Alburnoides bipunctatus</i>
2.	Helicopter Catfish	<i>Wallago attu</i>
3.	False Osman	<i>Schizopygopsis stoliczkai</i>
4.	Tibetan Stone Loach	<i>Triplophysa stoliczkai</i>
5.	Turkestan Sisorid Catfish	<i>Glyptosternon reticulatum</i>
6.	Indus River Bagrid Catfish	<i>Rita macracanthus</i>
7.	Giant River Catfish	<i>Sperata seenghala</i>
8	Fringebarbel Sturgeon	<i>Acipenser nudiiventris</i>
9	Amu Darya Shovelnose Sturgeon	<i>Pseudoscaphirhynchus kaufmanni</i>

Source: Fish of Afghanistan an annotated checklist 1981 by Coad, B.W

5.4. Social and Economic Conditions

5.4.1. Population

184. In 2017, the total basin population was estimated to be 4.211 million (1,029,473 in Takhar province, 1,000,336 in Takhar province, 926,969 in Baghlan province, 186,300 in the Panj-Amu basin part of Bamyan province, 966,789 in Badakhshan province, 7,000 in the Panj-Amu basin part of Samangan, and 95,000 in the Shortepa watershed). The main ethnic groups in the North (the area of the Panj-Amu basin) are the Tajik, Uzbek, Turcoman, Pashtun and some Kyrgyz. The Tajik are the second largest ethnic group in Afghanistan and in the majority in the Northern provinces.¹³
185. Based on the field survey total population of Sharawan is 13,252 and Momenabad is 5,040. The total population in both the canals is 18,292.

5.4.2. Land Tenure and Rural Livelihoods

186. As per field visit and socioeconomic survey, the main source of income of the residents of the project areas is agriculture, livestock and daily wages with little employment and small business (shopkeeper, toiler and driver).
187. In the absence of observations specific to the studied area, a description of the national situation with respect to land tenure and its implications for rural livelihoods is provided in the following paragraphs.¹⁴
188. In Afghanistan, agrarian land relations have feudal origins and remain complex and inequitable. A few large landlords likely still own around 40 % of farmland as was the case in the 1981. Most of the cropped area is farmed by smallholders, but with great variations in farm size by region. Rent-seeking absentee landlordism is common in many areas and has been reported to be a source of conflict within local populations.
189. Around one-quarter of the rural population is entirely landless, surviving on off-farm piecework, farm labouring, sharecropping, or some combination thereof. In some areas over half of all households are entirely landless. Farm labourers generally receive one-fifth of the crop as payment and sharecroppers, who tend to have more skills, up to one-third.
190. A large number of rural families are homeless as well as landless, and must depend upon landlords or relatives for shelter from one generation to the next. The men from these families form a significant body of mobile farm labour, going from landlord to landlord every year or two with their only capital asset, a small herd of karakul sheep. Although possibly numbering in the hundreds of thousands, these poorest of the poor are not considered a permanent part of (any) community and rarely appear in survey statistics.

¹³<http://cso.gov.af/fa/page/demography-and-socile-statistics/demograph-statistics/3897111>

¹⁴The text in this section is a lightly edited version of pp. 4-6 of the excellent paper: L. A. Wily. 2004 (April). Putting Rural Land Registration in Perspective: The Afghanistan Case. Paper presented to Symposium on Land Administration in Post-Conflict Areas, hosted by the International Federation of Surveyors, 29-30 April, 2004, United Nations, Geneva. <http://www.fig.net/commission7/geneva2004/papers/lapca06aldenwily.pdf>

191. Indebtedness is very high in the rural population with up to 92 % and 57 % of sample populations in 2002 borrowing respectively cash and wheat. Many landowners have their land under a form of mortgage that is to the full advantage of the creditor. These loans are typically taken up out of desperation, to buy food or cover health or bride price costs, not to invest in economically productive activities. Outright land sales by smaller farmers typically soar during droughts and other difficult times. Land purchases tend to be by those who already own land, suggesting continuing consolidation of holdings.
192. Those who lose their land find it difficult to re-acquire land and tend to end up in cities as unskilled domestic or market labour. For the better-off as well as the poor, periodic outmigration in search of work within and beyond Afghanistan (especially to Iran and Pakistan) is a well-established routine dating back to the 1960s, and may inflate or confuse figures of refugees and internally displaced persons (IDPs).
193. Rural society is intensely stratified, and its socio-cultural mores remain largely effective in perpetuating the status quo. Large and powerful socio-cultural barriers exist between those referred to as landlords, small farmers, and the landless (neither the rich nor labourers are referred to as 'farmers'), and especially between those with and without land. Farming, an artisan skill and the preserve of tenants and sharecroppers, is considered to be beyond the homeless and landless mobile labourer, who typically perceives landownership as not only financially impossible but as getting above his station or 'not permitted'. Very few of these mobile labourers were likely among the classified landless who benefited from the (short-lived) revolutionary land redistributions of 1978-1984.
194. Women are customarily barred from landholding despite religious law recognizing limited female land inheritance rights. This restriction affects the significant proportion of the population living in households that are woman-headed, either de facto due to male labour out-migration or by widows.

5.4.3. Rural Housing

195. People in the project area live in the traditional Afghan house or part of a shared house, occupied by an extended family. These conditions are quite uniform. Houses are made of traditional material and therefore it can be said that the age of the premises is relatively young.¹⁵
196. As per observation during field survey it has found that all the residential houses along the Momen Abad canal are made from mud traditionally without improved housing system.

5.4.4. Public Health

197. **Diarrhoeal and other Water-borne Disease.** Water-borne diseases are highly prevalent due to unsafe water and unsanitary conditions. While poor water quality is

¹⁵SNC-Lavalin, 2013, Lower Kokcha Irrigation Project Feasibility Study.

emphasized as a cause of water-borne disease alone, the impact of inadequate water quantity on personal and household hygiene may be as or more important.¹⁶

198. As per explanation of local residents during field survey it is found that more families have no access to safe water (wells) and they use the canal water which is the main Cause of diarrhoeal diseases in the area, especially in children.
199. **Malaria.** In 2002, most of Afghanistan's estimated 3 million malaria cases per year occurred in Takhar Province. In late 2003, Takhar province had a 31 per cent incidence of Plasmodium falciparum malaria. Between 2001 and 2005, P. falciparum and P. vivax malaria re-emerged rapidly in Takhar, with cases peaking during 2002 and then declining independently of each other. Control campaigns were successful against P. falciparum malaria transmitted by the freshwater breeding mosquito Anopheles superpictus, but as of 2007, P. vivax remained highly endemic in Takhar, transmitted by the rice-field breeders A. pulcherrimus and A. hyrcanus. Field studies in northern Afghanistan found anthropogenically-induced increases in ricefield vivax malaria, indicating that control strategies in rice-growing areas, including large-scale larval mosquito eradication, needed to continue.¹⁷ By 2011, anti-malarial control interventions had reduced the confirmed malaria case rate Takhar provinces to <1 per 1000 population.¹⁸
200. **Cutaneous Leishmaniasis.** Endemic to northern Afghanistan and caused by sand flies, outbreaks can occur when individuals without immunity to the disease, such as migrant agricultural or construction workers, move to an endemic area to engage in activities that expose them to sand flies. During the site visit and consultation meeting people have declared that recently there are no seem any incident of the mentioned disease.
201. The health center in Taloqan during 2018 recorded the following diseases in the project area:
202. Acute bloody diarrhea. Diarrhea with dehydration, acute watery diarrhea without dehydration and Malaria. Water-borne diseases are highly prevalent due to unsafe water and unsanitary conditions. While poor water quality is emphasized as a cause of water-borne disease alone, the impact of inadequate water quantity on personal and household hygiene may be as or more important.
203. Also Diarrhoeal and other Water-borne Disease, and a few sample of Malaria Cutaneous Leishmaniasis recorded in the project area.

5.4.5. Domestic Water Supply

204. **Sources and Availability.** From field observation and interpersonal meetings, it has found that the main source of domestic surface water in the Shrawan Thakkar area is

¹⁶Huttly, S.R.A., S.S. Morris, and V. Pisani. 1997. "Prevention of Diarrhoea in Young Children in Developing Countries." Bulletin of the World Health Organization 75(2):163-174.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2486931/pdf/bullwho00393-0073.pdf>

¹⁷Faulde, Michael K., Ralf Hoffmann, Khair M. Fazilat, and Achim Hoerauf. 2007. "Malaria Reemergence in Northern Afghanistan." Emerging Infectious Diseases 13. <http://www.cdc.gov/eid/content/13/9/1402.htm>

¹⁸WHO. 2015. Afghanistan Country Profile, World Malaria Report. http://apps.who.int/iris/bitstream/10665/200018/1/9789241565158_eng.pdf?ua=1

Taloqan river and Sharawan canal as per the explanation of local residents in the middle and downstream the water table is deep therefore more people couldn't want to dig wells therefore less families have hand-pump or dug well as ground water. In downstream some villagers travel so far to collect water, and in areas where domestic water supply is scarce, villagers have been observed collecting water from puddles during the rainy season

205. **Links between Domestic Water Supply and Irrigation.** Domestic water supply and irrigation water distribution can be linked in several ways. Some communities use irrigation canal water for their domestic supply. Others use ground water, and in some cases ground water quantity and quality can be affected by irrigation water quantity and quality. Thus, irrigation system management can both directly and indirectly affect the domestic water supplies of individuals, families, and communities.
206. **Domestic Water Supply Behaviours.** A study to understand unexpected behaviours around access to water supplies was commissioned by the NGO, DACAAR, which installed more than 24,000 wells to provide safe drinking water primarily to rural communities in south, east, and west Afghanistan between 1990 and the early 2000s. Though DACAAR's work area did not include northern Afghanistan, the study findings indicate the types of issues that could be in play in the LKIP area. The remainder of this section consists of an extended paraphrase from this study.¹⁹
207. **Owned Space and Water.** Land ownership has a substantial impact on how water supply is perceived and used. Three forms of village land ownership were identified: public, private and tribe or clan. Tribe or clan owned village land is considered to be the joint property of a group of families from one tribe or clan. The families sometimes compete in claiming temporary land ownership, and newly installed tube-wells can play a part in this process. There is less overt competition between families for control of private and public land but a family can enhance their relative social status by providing water to other families from their own private well, or by paying for the maintenance of a public well.
208. **Water Patronage.** A practice common to all three forms of land ownership is that the wealthy and the landowners provide water or the means to obtain water to the poor. They regard this as almsgiving that will be rewarded either in this life or later, 'at Gods door'. There is also an expectation of reciprocity. Something given now will be repaid later by a similar item or in the form of loyalty or service.
209. **Gendered Space and Water.** Village water collection patterns are related to purdah, which in turn is related to living standard. Following purdah is an ideal. Wealthy families tend to send their men to collect water when necessary since that is less shameful then sending their women, given the fact that these families are able to practice purdah. Within poorer families who are unable to practice purdah, however, the women generally collect water as it is considered shameful for men to do so. What is considered shameful

¹⁹Klijn, Floortje. 2002. Water Supply and Water Collection Patterns in Rural Afghanistan - An Anthropological Study. Kabul: DACAAR. <http://reliefweb.int/sites/reliefweb.int/files/resources/835738AA2919E2DBC1256BE50055F5D7-dacaar-afg-21jun.pdf>

for men and women depends on their family social and economic status. Water sources, routes to water sources, and times at the source can all be gender segregated, governed by shared understandings of when and where men and woman may collect water. A change in water sources very often disrupts the balance, since it forces men and women to negotiate new patterns of water collection. New water sources can be assigned as 'women's places' if they meet the requirements for public seclusion.

210. **External Influence and Interventions.** Exposure to life outside rural Afghanistan as an internally displaced person (IDP) or refugee and the trend in some areas to follow purdah more strictly can affect village water collection patterns and well site preferences. Another influence has been aid agencies' involvement of a broader section of the community in discussions of well siting. Formerly these discussions were dominated by richer households, who have the resources to follow stricter purdah and in turn a preference for wells on private land. Now, the issue of whether a well site is appropriate for women to use has become something that is discussed and debated.
211. **Water Supply and Drought.** The drought in Afghanistan during the 1999-2002 had both direct and indirect impacts on drinking water supply. Wells ran dry and community-based maintenance was also affected. Traditionally wealthy families paid the maintenance costs of public wells; but they became less inclined to do so during the drought when funds were tight. Another factor is that wealthy families increasingly have their own private wells, which insulates them from the impact of public well breakdowns and reduces their motivation to pay public well maintenance costs.

5.4.6. Subprojects Province Agriculture

212. Based on the field visit and meeting with Community Development Council-CDC, local people and Department of Agriculture, Irrigation and Livestock-DAIL, Agriculture is the mainstay of the people in the subproject area, representing the major source of income for more than half the households in the province. The most important field crops grown in Takhar province are wheat, maize, barley, rice, and flax. The most common garden plants include fruit and nut trees (53 per cent), grapes (12 per cent), vegetables, potatoes, beans and alfalfa, and clover or other fodder. Wheat (12 per cent) is also frequently grown in garden plots. Nearly nine in ten households with access to fertilizer use it on field crops (86 per cent) and to a much lesser degree on garden plots (10 per cent); a very small proportion of households use fertilizer on both (5 per cent).

5.4.7. Transport, Communications

213. Taloqan district is 100 percent accessible by road year-round, with 45 km paved road, 100 km gravel road, and over 150 km unimproved road. The main road connecting Taloqan town to Baharak and Khwaja Ghar is paved and allows easy transportation of agricultural inputs, produce, and other movements crucial to the livelihoods of people in the area. A few road sections are narrow and lack drainage systems which sometimes cause problems in winter. The main roads are from Cell phone service are available. The photovoltaic panels for lighting, television, cell phone charging etc. Bottled gas and biomass is used for cooking. In Momen Abad the road of the villages located along the canal is unpaved and it is made locally some places have culverts which are made by National Solidarity Program (NSP) and other Non-Governmental Organizations (NGOs).

5.4.8. Source of Income:

214. In Taloqan district, estimated average income is slightly below the national average at about AFN101, 500, however the uncertainty of this value, as in any income figure, is high. An estimated 29 per cent of district residents are considered to be food insecure, and an estimated 3 per cent are considered severely food insecure, based on a World Food Programme (WFP) analysis of ALCS data of 2013-14.
215. It is to be informed that due to security reasons detailed census and socio-economic surveys were not conducted. However, from the previous LARPs prepared for other canal projects the average household income in area is 21,353 Afns per month. Most of the households are below poverty line. As per Afghanistan Living Condition Survey 2016-17 the average GDP per capita income was 591 \$.
216. As per field visit and socioeconomic survey the main source of Sharawan and Momen Abad canal residents is agriculture, livestock sharecropper and daily wages with little employment and small business (shopkeeper, carpenter, toiler and driver).

5.4.9. Educational facilities:

217. The people living along the canal have better access to educational centres there are totally 44 high schools (17 male,14 female and 13 for both male and females), 15 secondary or middle schools (4 boys, 2 Girls and 9 for both boys and girls) and 8 primary schools for both boys and girls as well as there are 7 private institutes for higher educations and one governmental university (Takhar university) located along the canal it is mentionable that all the canal residents have easy access to primary educational centers.

5.4.10. Health facilities.

218. Upstream residents of Sharawan canal have better access to public hospital of Taloqan and basic health centers located in the city of Taloqan, but the residents of middle and downstream like Bahrak and Khwaja Ghar districts' residents have a little access to health centers they are able to reach primary health facilities in the districts centers. For advanced treatment they must go to Takhar Centre (Taloqn hospital).

5.4.11. Physical Cultural Resources

219. Archaeological sites of significance are shown in Annex 8. It has been established that there are no known historical sites in the Sharawan and Momen Abad area. However, during construction of the subprojects works the contractor and SBA site engineers will be vigilant for chance finds during excavation activities.
220. Local stakeholders stated that no physical cultural resources of importance to them (mosques, graveyards, etc.) were located in or near areas potentially affected by RSP activities.

6. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1. Impact Assessment Methodology

222. The significance of potential impacts was assessed using the risk assessment methodology that considers impact magnitude and sensitivity of receptors, described below.

6.1.1. Impact Magnitude

223. The potential implications of the project have been categorized as major, moderate, minor or nominal based on consideration of the parameters such as i) duration of the effect; ii) the spatial extent of the impact; iii) reversibility; iv) likelihood; and v) legal standards and established professional criteria.

224. The magnitude of each potential impact of the Project has been identified according to the categories outlined in Table 19.

Table 17: Parameters for Determining Magnitude

Parameters	Major	Moderate	Minor	Minimal
Duration of potential impact	Long term (beyond the project period)	Medium Term Lifespan of the project (within the project period)	Limited to construction period	Temporary with no detectable potential impact
Spatial extent of the potential impact	Widespread far beyond project boundaries	Beyond next project components, site boundaries or local area	Within project boundary	Specific location within project component or site boundaries with no detectable potential impact
Reversibility of potential impacts	Potential impact is effectively permanent, requiring considerable intervention to return to baseline	Benchmark needs a year or so with some responses to come back to baseline	Baseline returns naturally or with limited response within a few months	Baseline remains constant
Legal standards and established professional criteria	Breaches national standards and or international guidelines/obligations	Complies with limits given in national standards but violates international lender guidelines in one or more parameters	Meets minimum national standard limits or international guidelines	Not applicable
Likelihood of potential impacts occurring	Occurs under typical operating or construction conditions (Certain)	Happens under worst-case (negative consequences) or best case (positive impact) working conditions (Likely)	Occurs under abnormal, exceptional or emergency conditions (occasional)	Unlikely to happen

6.1.2. Sensitivity of Receptor

225. The sensitivity of a receptor has been determined based on a review of the population (including proximity/numbers/vulnerability) and the presence of features on the site or the surrounding area. Each detailed assessment has defined sensitivity to the topic. Criteria for determining receptor sensitivity of the Project's potential impacts are outlined in Table 20.

Table 18: **Criteria for Determining Sensitivity**

Sensitivity Determination	Definition
Very Severe	Vulnerable receptor with little or no ability to absorb proposed changes or minimal opportunities for mitigation.
Severe	Vulnerable receptor with little or no ability to absorb proposed changes or limited opportunities for mitigation.
Mild	Vulnerable receptor with some ability to absorb proposed changes or moderate opportunities for mitigation
Low	Vulnerable receptor with good ability to absorb proposed changes or/and excellent opportunities for mitigation

6.1.3. Assessing Significance

226. Following the assessment of impact magnitude and determining the quality and sensitivity of the receiving environment or potential receptor, the significance of each potential impact was established using the impact significance matrix shown in Table 21.

Table 19: **Criteria for Determining Impact Significance**

Magnitude of Impact	Sensitivity of Receptors			
	Very Severe	Severe	Mild	Low
Major	Critical	High	Medium	Negligible
Moderate	High	High	Medium	Negligible
Minor	Medium	Medium	Minor	Negligible
Minimal	Negligible	Negligible	Negligible	Negligible

6.2. CONSTRUCTION PHASE IMPACTS AND MITIGATION MEASURES:

6.3. Momen Abad Subproject Impacts and mitigation measure:

6.3.1. Soil erosion

227. Structure construction activities due to excavation works, vegetation clearing, dumping of spoils will result in soil. As the Projects are the rehabilitation project, main construction activities include structure rehabilitation and canal lining in some area. The overall excavation work is around 5.1 cubic meters. Very less spoil will be generated as compared to new irrigation projects. Majority of the generated spoil will be used in the planned right of way roads and still there is the possibility of some of this to be dumped in the slopes that can trigger landslides during rainy season.

Mitigation Measures:

228. To minimize the risk of erosion during the construction period, following best practices need to be followed:
- Minimize the extent and duration of the construction activities particularly in and around the drainage lines and water courses and progressively carryout the stabilization works,
 - Sub-divide the whole site into separate catchment areas, including drainage path,
 - Keep loose soil material and stockpiles out of the drains, flow lines and water courses,
 - Install, complete and stabilize the cross drainage structures early,
 - Manage water at non-erosive velocities

Impact Significance:

229. As the project scope is construction and rehabilitation of a number of structures along the canal, and there will be minimum excavation work over the period of construction phase, so it is not anticipated that excavation work will impact greatly and impacts are expected to be non-significant as follow.
230. Potential soil contamination may also be associated with waste handling/disposal practices and potential spillage and/or leaks during the course of the construction activities. However, with proper waste management procedures being followed such impacts could be controlled and/or minimized.

Impact of/on	Extent of impact
Soil	= low
Vegetation removal	= Medium

Residual Impact

231. The impact of the Project on the soil and vegetation are not expected to be significant. With the implementation of mitigation measures outlined above, the environmental impact will be low in magnitude. Therefore, residual impact are expected to be not significant.

6.3.2. Impact on Land use

232. Land use during construction would be affected by intrusive impacts such as ground clearing, increased traffic, noise, dust, and human activity, as well as by changes in the visual landscape.
233. Vegetation removal and ground disturbance could result in visual impacts that produce contrasts of color, form, texture, and line. Excavation for foundations and ancillary structures; surfacing roads; clearing and leveling staging areas; and stockpiling soil and

spoils (if not removed) would (1) damage or remove vegetation, (2) expose bare soil, and (3) suspend dust.

Mitigation measure

234. Specific mitigation measures recommended during the construction phase of the project are:

- Bring construction material from authorized sites.
- Avoid creating excessive slopes during excavation.
- Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials.
- Save topsoil removed during construction and use to reclaim disturbed areas.
- Stabilize soils during final landscaping of project site.

Impact Significance:

235. As the project scope is construction and rehabilitation of a number of structures along the canal, and there will be minimum excavation work over the period of construction phase, so it is not anticipated that excavation work will impact greatly land use and impacts are expected to be non-significant.

Residual Impact

236. Provided the proposed mitigative measures are implemented as suggested, the potential Impact is considered non-significant. Therefore; no significant adverse residual environmental impacts on soil, vegetation and agriculture are likely to occur.

6.3.3. Impact on Noise Quality

237. The main noise generating activities during the construction phase are rock crushing, movement of trucks and heavy equipment, and operation of heavy machineries and construction activities. Based on the baseline information the current noise level is below the national standards as the maximum noise level during the day is 59 dB(A) and 45 dB(A) during the night. While based on the national standard the daytime dBA is 60 dB(A) and nighttime is 45 dB(A). However, the noise level is exceeding the WHO / IFC guideline limit of 55 dB(A) for daytime. The higher noise level during the daytime can be considered as temporary and intermittent in nature and occurs only when a tractor or machinery is working in the project area. While during the rest of time, the noise levels are likely to meet the WHO/IFC threshold limits. If the heavy machineries and trucks move during the nighttime, it's impact will be much higher. It is a short term localized and moderate magnitude impact. Noise instrumental monitoring will be included in the EMP.

Mitigation Measures

238. Ensure that all equipment's and vehicles are maintained as per the manufacture's requirement and fitted with mufflers. Make mandatory to use the ear muffs to workers working in high decibel equipment and nearby. Make aware the drivers that they do not use pressure horn. Do not schedule the works during the night time that generates noise and disturb the people living in the area. Noise instrumental monitoring will be conducted in the construction site and will be compared with national and international standard. All sensitive receptors such as school, health post, etc will identified and activities that cause noise pollution will not be allowed and managed based on the site condition.

239. Engineering Control: this involves replacing or modifying equipment, or bringing relevant changes at the source of noise or along the noise transmission path. The contractor must make sure that the low noise level machinery and tools are utilized. Maintain and lubricate equipment and machinery (oil bearings) in accordance with its respective manufacturer recommended periods. Place a noise barrier such as curtains and sound walls between the employees and the noise source. And isolate or enclose the noise source.
240. Administrative Control: this includes changes in the schedule or workplace that eliminate or minimize the labor's exposure to noise. The contractor must schedule the noisy machinery operation when fewer workers are exposed in case possible, limit the time a worker spends near a noisy source, and provide a quiet area where employees can gain relief from noise sources. Furthermore, the control of the noise exposure through distance is often a simple, inexpensive and yet effective administrative noise control way. To be precise, for every double of the distance between the workers and the noise source the noise could be reduced by 6 dBA (OSHA, 2017).
- a) Limit noisy activities to the least noise-sensitive times of the day (weekdays only between (07:00- 22:00).
 - b) Whenever feasible, schedule different noisy activities to occur at the same time, since additional sources of noise generally do not add a significant amount of noise. That is, less-frequent noisy activities would be less annoying than frequent less-noisy activities.
 - c) Heavy-duty equipment should have sound-control devices no less effective than those provided on the original equipment.
 - d) Notify nearby residents in advance when noisy activities are required.
 - e) To the extent feasible, route heavy truck traffic supporting construction activities away from residences and other sensitive receptors.

Impact Significance:

241. As mentioned above the project is located far away from residential houses except a few sections, in the same time no construction activities will be conducted during the night time. Therefore; the potential noise impacts are expected to be moderate and temporary.

Impact of/on	Extent of impact
Community	= Moderate
Birds	= Moderate

Residual Impact

242. Provided the proposed mitigative measures are implemented, the noise impacts will be temporary, and medium in magnitude. Therefore, no significant adverse residual environmental impact is likely to occur.

Mitigation and Monitoring of residual impacts:

243. To minimize the impact of noise on community, animal and birds during construction of the project, the following mitigation will be applied as required:

- Prepare noise management plan.
- To limit construction to daytime hours.
- Changes in Machinery to avoid noise
- Monitoring of noise in monthly basis or when getting community complaints.

6.3.4. Impacts on Air Quality:

244. Emissions generated during the construction phase include diesel emissions from generators and large construction equipment, vehicle emissions; emissions from storage and transfer of fuels for construction equipment; and fugitive dust from various sources such as disturbing and moving soils (clearing, excavating, backfilling, dumping, and truck and equipment traffic), mixing concrete. Air quality impacts could also occur if cleared vegetation is burned. Therefore, measures need to be taken to mitigate these emissions.
245. The construction work of the project generates particulate matter, which can be a significant pollutant particularly in any nearby areas such as residential areas. During the construction of the project, fugitive dust comes from blowing exposed soil or other particles. Fugitive dust becomes an issue as the land is cleared and graded, and as delivery trucks and other vehicles and equipment travel on dirt or gravel roadways in the construction area. The dust becomes a nuisance in nearby neighborhoods, a face and lung irritant, or a visual obstacle in nearby streets. The dust must be suppressed, and this is usually done by spraying unpaved roads with water and stabilizing exposed soil areas. Vehicle and diesel generator emission will have a negative impact on the environment.

Mitigation Measure

246. The dust emissions should be minimized by methods, such as spraying water on soil, where required and removal of dirt and mud from vehicles wheels before leaving the project site and the loading plants. In addition, the vehicle should move at a slow speed in the site and on unpaved roads to avoid excessive dust emissions. Attention should be given to conserve water during the construction. The construction and operation worker should be provided with liquefied petroleum gas (LPG) for cooking and heating if required, and the usage of fuelwood should not be allowed. Generators and vehicles used in this project should have exhaust mufflers to minimize the exhaust and noise. The below mitigation measures are recommended in all phases of the project to control the air quality particularly during the construction phase:
247. In order to know the impact of construction activities, regular dust instrumental monitoring (PM10) will be conducted at project area during construction pahse, and this will be included on monitoring plan.
- Use dust abatement techniques on unpaved surfaces to minimize dust and during earthmoving activities, prior to clearing, before excavating, backfilling, compacting.
 - Introduce speed limits to reduce airborne fugitive dust from vehicular traffic.
 - Limit access to the construction site and staging areas to authorized vehicles only through the designated treated roads.

- When possible, schedule construction activities during periods of low winds to reduce fugitive dust.
- Cover construction materials and stockpiled soils if they are a source of fugitive dust.
- Train workers to handle construction materials and debris during construction and dismantlement to reduce fugitive emissions.
- Keep soil moist while loading into dump trucks.
- Keep soil loads below the freeboard of the truck.
- Minimize drop heights when loaders dump soil into trucks.
- Tighten gate seals on dump trucks.
- Around the work area, the NO₂ (annual average concentration) must not exceed 0.053 ppm and Sulphur Dioxide (SO₂) - 0.14 ppm.
- Cover dump trucks before traveling on public roads (TEEIC, 2017).

Impact Significance:

248. In the absence of other sources for these pollutants in the project area the slight increase in concentration of toxic air pollutants level for a small duration of period, will not have serious impact on health of the people. The impact of air pollution is short term, localized but with moderate magnitude due the increased particulates at construction sites. Also the project is located far away from residential houses except a few section. Therefore: the potential air quality impacts are expected to be non-significant as follow:

Impact of/on	Extent of impact
Community	= Moderate
Workers	= Moderate
Economic resources	=Moderate

Residual Impact

249. Provided the proposed mitigative measures are implemented, the impacts will be, temporary, and moderate in magnitude. Therefore, no significant adverse residual environmental impact is likely to occur.

6.3.5. Impacts on Cultural and Historic Resources

250. Though there is no any cultural and historic resource to be affected due to the project but Potential impacts to cultural resources include:

- Complete destruction of the resource if present in areas undergoing surface disturbance or excavation;
- Vandalism, theft and illegal export of movable Physical Cultural Resources (PCR), and of pieces of monumental PCR.
- Degradation or destruction of near-surface cultural resources on- and off-site resulting from changing the topography, changing the hydrological patterns, and soil movement (removal, erosion, sedimentation).
- Unauthorized removal of artifacts because of human access to previously inaccessible areas.
- Soil compaction, damaging buried PCR (archaeological and paleontological) on site.
- Vibration, air, soil and water pollution, leading to damage to natural and human-made PCR in the vicinity (ADB, 2012; Environment Safeguard a Good Practice Sourcebook).

Mitigation Measure

251. To avoid adverse impacts to PCRs it is recommended to undertake the following mitigation measures:

- Searches need to be conducted to determine the presence of known archaeological sites and historic structures within the area of potential effect. Identify the need for an archaeological and/or architectural survey.
- Periodic monitoring of significant cultural resources near the development may be required to reduce the potential for looting and vandalism.
- An unexpected discovery of cultural resources during any phase of the project shall result in a work stoppage near the find until the resources can be evaluated by a professional archaeologist.
- Educate workers and the public on the consequences of unauthorized collection of artifacts.
- During all phases of the project, keep equipment and vehicles within the limits of the initially disturbed areas.
- Prepare and follow a cultural resources management plan, if cultural resources are present at the site or if areas with a high potential to contain cultural material have been identified.
- Use existing roads to the maximum extent feasible to avoid additional surface disturbance.

Impact Significance:

252. In the light of the above, the impact on the archaeological features would be "Negligible" significance.

Likelihood of occurrence =	2 – certain to occur
Consequence =	1 – impact largely not discernible on a local scale
Significance =	2 low

Residual Impact

253. No significant adverse residual environmental impact on physical and cultural resource are likely to occur.

6.3.6. Impacts on Water Quality

254. There will be construction activities and movement and operation of heavy construction machineries in the water bodies in order to make the intake structures. Construction activities within the water bodies will result in high turbidity which will reduce the dissolved oxygen in water as well as there will be less sunlight for aquatic plants for photosynthesis. High turbidity significantly affects the microbiological quality of drinking water. Risk of leakage of petroleum products into water bodies can contaminate the canal water. Also during the construction period along the canal line, increased turbidity in the streams as well as contamination with toxic substances due to leakages from poorly maintained machineries and equipment may occur. Poor storage of petroleum and chemicals during the construction can lead to ground water contamination which is the main source of drinking water in the area.

Mitigation Measures

255. While constructing the approach channels along the river banks, use coffer dams to ensure that no construction activities take place on water bodies. Schedule the construction activities during the months when the flow in the river is low. Ensure that all the equipment's are properly maintained and no leakage of chemicals and petroleum products in the water bodies water sampling will be done and it is included in the EMP. Issues associated with the design, construction, and use of the camps relate both to the potential environmental impacts of the camps, and the need to suitably plan camps to protect the environment and maximize worker health, safety and amenity.
256. The workshop will be located in an appropriate distance of around 500 meter from the water body and appropriate volume and type of spill response materials will be available at each work site, Spill will be contained and cleaned-up immediately. Resultant wastes (soils, rags and absorbent material) appropriately stored and disposed of by an appropriately licensed waste contractor as controlled waste. All equipment will be regularly serviced to reduce emissions and reduce the chance of oil leaks on site and in marine environments. Appropriate controls in place to contain hydrocarbon leaks should they occur whilst servicing. Controls may include use of drip trays when changing oil and transporting waste oils in bonded containers. Refueling of vehicles/equipment will be undertaken on land (not over water), unless the task is not possible The following aspects of camp development should be addressed:
257. Definition of elements to be included in construction work camps.
258. criteria/principles for the location of components of the work camps to minimize soil and water pollution, diseases and possible outbreaks, and conflict situation with villagers, local/central authorities and/or the contractor.
259. Specific management requirements for construction of components of the work camps, and management of camp operation.

Impact Significance:

260. As the project construction activity planned during the season which there will be no water in the canal, also there is a very limit activity in Kunduz river. The impact significance of canal rehabilitation and construction on Surface water and aquatic ecosystem is therefore, considered to be "Low".

Impact of/on	Extent of impact
Water quality	= Low
Aquatic ecosystem	= Low

Residual Impact

261. Provided the proposed mitigative measures are implemented, the environmental impact will be temporary, and low in magnitude on water quality, in the same time on aquatic ecosystem. Therefore, no significant adverse residual environmental impact are likely to occur.

6.3.7. Impacts due to Waste Generation

262. **Domestic Waste:** During the construction period, waste is generated in the administration/residential buildings and labor camps, in the form of food leftovers,

vegetable peels, plastic, house sweepings, clothes, ash, waste paper, cardboard, plastic, used batteries, bulbs, tube lights etc., and which are classified as domestic waste. Most portion of this type of wastes if followed the proper segregation and good management practices can be reused/recycled and small portion only need for disposal. The impact can be adverse in case of haphazard dumping in the public area and river banks. Otherwise it can easily be mitigated with simply following the good management practices.

263. Hazardous Waste Construction activities in major infrastructure projects like big irrigation canals, there is some possibility of generation of small quantity of hazardous wastes. Storage of fuels, lubricants, coolants, product packaging (cement bags, containers, etc.), cantering oil/formwork oil, batteries, and electronic wastes be hazardous if not properly collected and disposed into the safe place. If released to the environmental medium, the impact can be significantly adverse with long-term consequences.

Mitigation Measures:

264. It is recommended to strictly follow the Good Practices for construction management with priority on waste reduction, easy collection, segregation, reuse/recycle and proper disposal of the remaining wastes. Ensure that the labor camps have proper facilities for waste segregation and even for composting of the biodegradable waste. There will be very less quantity of hazardous waste generation in the project site. As Afghanistan is party to Basel Convention and the Regulation on Hazardous Waste Management is in the process of approval, strict follow of the good practices in construction management will ensure the compliance to the national requirement. In the same time waste management plan will be prepared as part of SSEMP.

Impact Significance:

265. This is rehabilitation project and a minimum quantity of waste will be produced, in the same time there won't be a large camp with a big number of workers. Therefore; the potential waste impacts are expected to be non-significant and it will be moderate as follow:

Impact of/on	Extent of impact
Vegetation	= Moderate
Soil	= Moderate
Water	= Low

Residual Impact

266. Provided the proposed mitigative measures are implemented, the environmental impact will be temporary, and moderate in magnitude. Therefore, no significant adverse residual environmental impact are likely to occur.

Mitigation and Monitoring of residual impacts:

267. To minimize the impact of waste on environment, soil and water bodies during construction of the project, the following mitigation will be further applied as required.
- All construction waste material (including excavated soil and creosote timber waste) will be disposed of in a provincially approved manner.

- Careful maintenance and monitoring of all equipment will be carried out to minimize the risk of spills or leaks of petroleum based products.
- Equipment refueling operations will take place at least 30 m from any watercourse and as well as Stormont Bay harbor and the refueling will take place on a prepared impermeable surface with a collection system with the exception of marine equipment.
- All equipment to be used in canal is to be free from leaks or coating of hydrocarbon-based fluids and/or lubricants that are harmful to the environment.
- Hoses and tanks will also be inspected on a regular basis to prevent fractures and breaks.

Impacts on Occupational and Community Health , Safety and socioeconomic:

268. During the construction, workforce will be exposed to high level of particulate or dust particles and noise pollution, risk of injury in the operation of heavy equipment's, chances of accidents, poor quality of drinking water, and inadequate facilities are the main concerns for the occupational health and safety of workforces. Dusts and noise generated will also directly impact the health of people living in the surroundings of the project construction sites. It will also risk the people from accidents due to resuspension of dusts in the road resulting in poor visibility. In the same time spread of any diseases or accident will have direct impact on socioeconomic situation of the people.

Mitigation Measures

269. Compliance to mitigation measures on air and noise quality will minimize the impacts on community health and safety as well as occupational health and safety. Further, ensure best measures to prevent fires particularly in areas of storage of petroleum products and chemicals. OHS related guidelines of Afghanistan National Standards Authority need to be complied with for the safety and health of workers and communities. In addition to these, follow the IFC Guideline on Environment, Health and Safety for the best practices in construction activities. Besides that, HSE plan will be prepared by contractor as part of SSEMP to mitigate any risk regarding the occupational, community health, safety and adverse impact of socio economic.

6.3.8. Coronavirus disease 2019 (COVID-19):

270. Covid-19 is a respiratory illness caused by a virus called SARS-CoV-2. The virus is thought to spread mainly from person to person:

Mitigation Measures

271. Potential sources of exposure include having close contact with a coworker or member of the public who is ill with COVID-19 and touching your nose, mouth, or eyes after touching surfaces contaminated with the virus or handling items that others infected with COVID-19 have touched. To avoid spreading of Covid- 19 the following mitigation measure are recommended:
- Notify your supervisor and stay home if you have symptoms.
 - If you are sick. You should not return to work until the criteria to discontinue home isolation are met, in consultation with healthcare providers, your employer, and state and local health departments.

- Notify your supervisor if you are well but have a sick family member at home with COVID-19.
- Limit close contact with others by maintaining a distance of at least 6 feet, when possible.
- Limit the number of workers in small workspace areas such as job site elevators, trailers and vehicles, and spaces under construction if possible.
- Wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain, especially in areas where there is significant community-based transmission of COVID-19.
- Cloth face coverings may prevent people who don't know they have the virus from transmitting it to others.
- Clean and disinfect frequently touched surfaces such as shared tools, machines, vehicles and other equipment, handrails, ladders, doorknobs, and portable toilets. Clean and disinfect frequently touched surfaces periodically throughout the shift but also:
 - At the beginning and end of every shift
 - After anyone uses your vehicle, tools, or workstation
- Limit tool sharing if possible.
- Practice proper hand hygiene. This is an important infection control measure. With appropriate hand hygiene, you do not need gloves to protect you from COVID-19. When possible, wash your hands regularly with soap and water for at least 20 seconds or use an alcohol-based hand sanitizer containing at least 60% alcohol.
- Key times to clean hands include:
 - Before and after work shifts and breaks
 - After blowing your nose, coughing, or sneezing
 - After using the restroom
 - Before eating and before and after preparing food
 - After touching objects which have been handled by coworkers, such as tools and equipment
 - Before putting on and after taking off work gloves
 - After putting on, touching, or removing cloth face coverings
 - Before donning or doffing eye or face protection (safety glasses, goggles, etc.)
 - Do not touch your eyes, nose, or mouth.
- Use tissues when you cough, sneeze, or touch your face. Throw used tissues in the trash and wash your hands or use hand sanitizer containing 60% alcohol if a sink to wash your hands is not available.

Impact Significance:

272. Construction and rehabilitation of project will have moderate impact on workers and community.

Likelihood of occurrence =	5 – certain to occur
Consequence =	1 – impact largely not discernible on a local scale
Significance =	5 low

Residual Impacts

273. A preventative health and safety program will be implemented for construction, operation, and decommissioning that ensures that the public and workers are not adversely affected during routine operations, and that contingency plans will be in place to prevent impacts during accidents, malfunctions, and unplanned events.
274. Provided the proposed mitigative measures are implemented, the environmental impacts will: be low in magnitude, intermittent and short term.
275. Therefore, the significance of the environmental impact is expected to be not significant

6.3.9. Ecological Environment (Flora and Fauna)

Impact on Vegetation:

276. There is no forest area as per the legal definition in the project influence area. However, along the existing canal line there exist vegetation of different species. Due to the project implementation 1199 trees will be removed, that out of these numbers 817 are sapling, 281 medium and 101 are large willow and mulberry trees. All these species are local species and none of them are in the protected species.

Avoiding tree removal

277. To avoid tree removal construction work will be occurred on the site with no trees though during the discussion with design team, they claim that it will affect the sustainability of Structures and will cause environmental impact such as sedimentation, soil erosion and etc. Also unnecessary removal of vegetation and felling of trees will be prevented and moving of construction vehicles and machineries will be restricted only to designated areas in order to save vegetation beyond the proposed project area due to trample.

Tree Replacement or Replantation

278. The removed non-native trees have been designated as having no particular ecological significance; rather they have aesthetic and economic values for the property owners. Based on consultation with NEPA there is no any regulation regarding the replantation ratio, but they emphasize that 1:10 should be implemented and MAIL also follow this ratio.
279. Based on survey out of 1199 trees will be removed due the rehabilitation of structures, at least to reduce the adverse environmental impact of these trees, offset mitigation measure will be used as replantation of 12,000 trees will be replanted. Concern and suggestion of the government considered during consultation meeting, and they will cooperate in selection of suitable site.

6.3.10. Impact on Terrestrial and aquatic wildlife:

280. Based on Local people report the larger mammal's jackal (Eurasian Golden Jackal *Canis aureus*), fox (either red fox *Vulpes vulpes* or Blanford's fox *Vulpes cana*), tiger (Caspian tiger *Panthera tigris virgate*, last confirmed in the wild, lower Amu Darya 1968, now not exist), and polecat (*Vormela peregusna*). Locally reported birds include partridge (Chukar Partridge *Alectoris chukar*), hoopoe (*Upupa epops*), eagles (*Aquila* spp.), doves (*Streptopelia* spp.), and sparrows (*Passer* spp.). The aquatic environment of the irrigation canals has no fish nor amphibians etc

Impact Significance:

281. As the project construction activity planned during the season which there will be no water in the canal, also there is a very limit activity in Kunduz river. In the same time these are irrigation canals where there is no any fishes except some aquatic life. Therefore; the project impacts on aquatic life is low.

Impact of/on	Extent of impact
Fishes	= Low
Other Aquatic life	= Low

Residual Impact

282. Provided the proposed mitigative measures are implemented, the environmental impact will be temporary, and low in magnitude. Therefore, no significant adverse residual environmental impacts are likely to occur.

6.3.11. Impact on Protected Species

283. Project will have no impact on the protected species of Afghanistan as no such species are reported in the area.

Mitigation Measures

284. Possible impacts on wildlife will be reduced through the following measures:
285. The construction contractor shall avoid excessive destruction of wildlife habitats and illegal hunting;
286. Posting appropriate signs in the important wildlife areas and applying speed limits for sections passing through those areas;
287. Strict prohibition of illegal hunting by the workforce and killing of wild animals due to reluctances of drivers like over speeding of vehicles; and
288. Particular attention shall be paid and the above indicated mitigation measures strictly implemented for the section between Elwiha and Mille since the corridor of this section is inhabited by threatened species

Impact Significance:

289. Based on the baseline study there is no protecte species in the project area, so the impacts are expected to be non-significant.

6.4. Operation Phase Impacts and Mitigation Measures**6.4.1. Impacts on Water Quality**

290. As stated in Heading 3.1.8 (Water Quality) the river water quality is good for irrigation purposes, though water sampling hasn't conducted but the water is used for irrigation for long time, however, the water quality mainly the salinity in the surface water collected from springs, ponds and stagnant water varies significantly. The agriculture run offs during the raining seasons will also have the possibility of bringing the pesticides residues in the surface waters.

Mitigation Measures

291. To prevent the water quality pollution, following measures are recommended:
- 1) Maximize the use of organic fertilizer and minimize the use of chemical fertilizer, and minimum use of insecticides and pesticides in the area
 - 2) Training to farmers on the proper use of pesticides, appropriate dose and timing of use.
 - 3) Regular monitoring of the water quality including the hill streams and ponds, ground water to understand the problem and take adequate measures.

6.4.2. Impacts on Soil Quality

292. Salinity from irrigation can occur over time, since almost all water even the natural rainfall contains some dissolved salts. When the plants use the water, the salts are left behind and begin to accumulate in the soil making it more difficult for plants to absorb soil moisture. In order to leach out of these salts from the plant root zone, it needs to apply additional water. As highlighted in impacts on water quality and soil erosion, problems increases the risk of salinization from use of saline water for irrigating agricultural crops. On irrigated lands salinization is one of the most prolific adverse environmental impacts and saline conditions severely limit the choice of crop, adversely affect crop germination and yields, and can make soils difficult to work.

Mitigation Measures

293. It is recommended to do the soil mapping of the area in future to evaluate the extent of the salinity problem during the main growing season, when symptoms of soil salinity may be visible.

6.4.3. Natural disasters, climate change and impact on infrastructures

294. Afghanistan is one of the highly vulnerable country to the impact of climate change in the world. The future climate prediction (RCP 2.6 and RCP 8.0 scenarios) for Afghanistan (World Bank: Climate Change Knowledge Portal, Afghanistan) are:
295. Average annual temperature in Afghanistan is projected to increase between 1.4° C and 4.0° C by the 2060s, and between 2.0° C and 6.2° C by the 2090s. Spring and summer are projected to experience the fastest rate of warming under these projections with pretty uniform warming over the country's regions;
296. Annual precipitation projections from the Fifth Assessment Report of the Intergovernmental Panel on Climate Change indicate that there will be little or no change in precipitation over Afghanistan throughout the 21st century;
297. The frequency of 'hot' days and nights per year are projected to increase throughout the middle and late 21st century. 'Hot' days are projected to increase and occur on 14-25% of days by the 2060s and 16-32% of days by the 2090s, while 'hot' nights are projected to increase and occur on 16-26% of nights by the 2060s and 19-36% of nights by the 2090s. Both 'hot' days and nights are projected to increase most rapidly in the summer months of June-August

- 298. 'Cold' days and nights are projected to decrease in frequency and become exceedingly uncommon, with projections for the 2090s indicating that they will occur on 0-6% of days per year;
- 299. Projections for maximum 1- and 5-day rainfall indicate small increases in every season but March through May;
- 300. And because of these changes in the climatic system, the projected impacts of the climate change in Afghanistan are:
- 301. Floods are the most frequent natural hazard in Afghanistan and result in the largest economic damage. Changes in precipitation patterns as well as earlier spring snowmelt that are expected with climate change will increase risks for different types of floods (e.g. flash floods);
- 302. Drought is a natural hazard that affects Afghanistan on a regular cycle. From 1998-2005/2006 the country went through the worst drought in known climatic history in terms of duration and strength;
- 303. Climate change is expected to exacerbate public health issues by increasing the incidence of certain water, food, and vector-borne diseases that are associated with climate (e.g. malaria). Flooding from heavy rainfall and snowmelt, and rising temperatures, can cause an increase in the incidence of diseases, such as malaria, typhoid, and diarrhea.

Mitigation Measures

- 304. Climate change poses a threat to Afghanistan's natural resources, of which the majority of Afghans depend for their livelihoods. Therefore, Afghanistan need to promote and strengthen adaptation strategies that aim at improving water management and use efficiency; improved agricultural practices and research; rangeland management; development of a disaster management strategy; development and research into climate and early warning systems; improved food security; and diversification of livelihoods.

6.5. Sharawan Subproject Impacts and Mitigation measure:

6.5.1. Soil erosion

305. Structure construction activities due to excavation works, vegetation clearing, dumping of spoils will result in soil. As the project is the rehabilitation project, main construction activities include structure rehabilitation and canal lining in some area. The overall excavation work is around 5.1 cubic meter. Very less spoil will be generated as compared to new irrigation projects. Majority of the generated spoil will be used in the planned right of way roads and still there is the possibility of some of this to be dumped in the slopes that can trigger landslides during rainy season.

Mitigation Measures:

306. To minimize the risk of erosion during the construction period, following best practices need to be followed:
- 1) Minimize the extent and duration of the construction activities particularly in and around the drainage lines and water courses and progressively carryout the stabilization works,
 - 2) Sub-divide the whole site into separate catchment areas, including drainage path,
 - 3) Keep loose soil material and stockpiles out of the drains, flow lines and water courses,
 - 4) Install, complete and stabilize the cross drainage structures early,
 - 5) Manage water at non-erosive velocities

Impact Significance:

307. As the project scope is construction and rehabilitation of a number of structures along the canal, and there will be minimum excavation work over the period of construction phase, so it is not anticipated that excavation work will impact greatly and impacts are expected to be non-significant as follow.
308. Potential soil contamination may also be associated with waste handling/disposal practices and potential spillage and/or leaks during the course of the construction activities. However, with proper waste management procedures being followed such impacts could be controlled and/or minimized.

Impact of/on	Extent of impact
Soil	= low
Vegetation removal	= Medium

Residual Impact

309. The impact of the Project on the soil and vegetation are not expected to be significant. With the implementation of mitigation measures outlined above, the environmental impacts will be low in magnitude. Therefore, residual impacts are expected to be not significant.

6.5.2. Impact on Land use

310. Land use during construction would be affected by intrusive impacts such as ground clearing, increased traffic, noise, dust, and human activity, as well as by changes in the visual landscape.
311. Vegetation removal and ground disturbance could result in visual impacts that produce contrasts of color, form, texture, and line. Excavation for foundations and ancillary structures; surfacing roads; clearing and leveling staging areas; and stockpiling soil and spoils (if not removed) would (1) damage or remove vegetation, (2) expose bare soil, and (3) suspend dust.

Mitigation measure

312. Specific mitigation measure recommended during the construction phase of the project are:
- 1) Bring construction material from authorized sites.
 - 2) Avoid creating excessive slopes during excavation.
 - 3) Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials.
 - 4) Save topsoil removed during construction and use to reclaim disturbed areas.
 - 5) Stabilize soils during final landscaping of project site.

Impact Significance:

313. As the project scope is construction and rehabilitation of a number of structures along the canal, and there will be minimum excavation work over the period of construction phase, so it is not anticipated that excavation work will impact greatly land use and impacts are expected to be non-significant.

Residual Impact

314. Provided the proposed mitigative measures are implemented as suggested, the potential Impact is considered non-significant. Therefore; no significant adverse residual environmental impacts on soil, vegetation and agriculture are likely to occur.

6.5.3. Impact on Noise Quality

315. The main noise generating activities during the construction phase are rock crushing, movement of trucks and heavy equipment, and operation of heavy machineries and construction activities. Based on the baseline information the current noise level is below the national standards as the maximum noise level during the day is 59 dB(A) and 45 dB(A) during the night. While based on the national standard the daytime dBA is 60 dB(A) and nighttime is 45 dB(A). However, the noise level is exceeding the WHO / IFC guideline limit of 55dB(A) for daytime. The higher noise level during the daytime can be considered as temporary and intermittent in nature and occurs only when a tractor or machinery is working in the project area. While during the rest of time, the noise levels are likely to meet the WHO/IFC threshold limits. If the heavy machineries and trucks move during the nighttime, it's impact will be much higher. It is a short term

localized and moderate magnitude impact. Noise instrumental monitoring will be included in the EMP.

Mitigation Measures

316. Ensure that all equipment's and vehicles are maintained as per the manufacture's requirement and fitted with mufflers. Make mandatory to use the ear muffs to workers working in high decibel equipment and nearby. Make aware the drivers that they do not use pressure horn. Do not schedule the works during the night time that generates noise and disturb the people living in the area. Noise instrumental monitoring will be conducted in the construction site and will be compared with national and international standard. All sensitive receptors such as school, health post, etc will identified and activities that cause noise pollution will not be allowed and managed based on the site condition. .
317. **Engineering Control:** this involves replacing or modifying equipment, or bringing relevant changes at the source of noise or along the noise transmission path. The contractor must make sure that the low noise level machinery and tools are utilized. Maintain and lubricate equipment and machinery (oil bearings) in accordance with its respective manufacturer recommended periods. Place a noise barrier such as curtains and sound walls between the employees and the noise source. And isolate or enclose the noise source.
318. **Administrative Control:** this includes changes in the schedule or workplace that eliminate or minimize the labors exposure to noise. The contractor must schedule the noisy machinery operation when fewer workers are exposed in case possible, limit the time a worker spends near a noisy source, and provide a quiet area where employees can gain relief from noise sources. Furthermore, the control of the noise exposure through distance is often a simple, inexpensive and yet effective administrative noise control way. To be precise, for every double of the distance between the workers and the noise source the noise could be reduced by 6 dBA (OSHA, 2017).
319. Limit noisy activities to the least noise-sensitive times of the day (weekdays only between (07:00- 22:00).
320. Whenever feasible, schedule different noisy activities to occur at the same time, since additional sources of noise generally do not add a significant amount of noise. That is, less-frequent noisy activities would be less annoying than frequent less-noisy activities.
321. Heavy-duty equipment should have sound-control devices no less effective than those provided on the original equipment.
322. Notify nearby residents in advance when noisy activities are required.
323. To the extent feasible, route heavy truck traffic supporting construction activities away from residences and other sensitive receptors.

Impact Significance:

324. As mentioned above the project is located fare away from residential houses except a few section, in the same time no construction activities will be conducted during the night time. Therefor; the potential noise impacts are expected to be moderate and temporary.

Impact of/on	Extent of impact
Community	= Moderate
Birds	= Moderate

Residual Impact

325. Provided the proposed mitigative measures are implemented, the Nosie impacts will be temporary, and medium in magnitude. Therefore, no significant adverse residual environmental impacts are likely to occur.

Mitigation and Monitoring of residual impacts:

326. To minimize the impact of noise on community, animal and birds during construction of the project, the following mitigation will be applied as required:
- a) Prepare noise management plan.
 - b) To limit construction to daytime hours.
 - c) Changes in Machinery to avoid noise
 - d) Monitoring of noise in monthly basis or when getting community complaints

6.5.4. Impacts on Air Quality

327. Emissions generated during the construction phase include diesel emissions from generators and large construction equipment, vehicle emissions; emissions from storage and transfer of fuels for construction equipment; and fugitive dust from various sources such as disturbing and moving soils (clearing, excavating, backfilling, dumping, and truck and equipment traffic), mixing concrete. Air quality impacts could also occur if cleared vegetation is burned. Therefore, measures need to be taken to mitigate these emissions.
328. The construction work of the project generates particulate matter, which can be a significant pollutant particularly in any nearby areas such as residential areas. During the construction of the project, fugitive dust comes from blowing exposed soil or other particles. Fugitive dust becomes an issue as the land is cleared and graded, and as delivery trucks and other vehicles and equipment travel on dirt or gravel roadways in the construction area. The dust becomes a nuisance in nearby neighborhoods, a face and lung irritant, or a visual obstacle in nearby streets. The dust must be suppressed, and this is usually done by spraying unpaved roads with water and stabilizing exposed soil areas.
329. Vehicle and diesel generator emission will have a negative impact on the environment. Therefore, vehicles and generators should be kept in good working condition and properly maintained, in order to minimize the exhaust emissions. The dust emissions should be minimized by methods, such as spraying water on soil, where required and removal of dirt and mud from vehicles wheels before leaving the project site and the loading plants. In addition, the vehicle should move at a slow speed in the site and on unpaved roads to avoid excessive dust emissions. Attention should be given to conserve water during the construction. The construction and operation worker should be provided with liquefied petroleum gas (LPG) for cooking and heating if required, and the

usage of fuelwood should not be allowed. Generators and vehicles used in this project should have exhaust mufflers to minimize the exhaust and noise.

Mitigation Measure

330. The below mitigation measures are recommended in all phases of the project to control the air quality particularly during the construction phase:
- a) Use dust abatement techniques on unpaved surfaces to minimize dust and during earthmoving activities, prior to clearing, before excavating, backfilling, compacting.
 - b) Introduce speed limits to reduce airborne fugitive dust from vehicular traffic.
 - c) Limit access to the construction site and staging areas to authorized vehicles only through the designated treated roads.
 - d) When possible, schedule construction activities during periods of low winds to reduce fugitive dust.
 - e) Cover construction materials and stockpiled soils if they are a source of fugitive dust.
 - f) Train workers to handle construction materials and debris during construction and dismantlement to reduce fugitive emissions.
 - g) Keep soil moist while loading into dump trucks.
 - h) Keep soil loads below the freeboard of the truck.
 - i) Minimize drop heights when loaders dump soil into trucks.
 - j) Tighten gate seals on dump trucks.
 - k) Around the work area, the NO₂ (annual average concentration) must not exceed 0.053 ppm and Sulphur Dioxide (SO₂) - 0.14 ppm.
 - l) Cover dump trucks before traveling on public roads.

Impact Significance:

331. In the absence of other sources for these pollutants in the project area the slight increase in concentration of toxic air pollutants level for a small duration of period, will not have serious impact on health of the people. The impact of air pollution is short term, localized but with moderate magnitude due the increased particulates at construction sites. Also the project is located far away from residential houses except a few section. Therefore: the potential air quality impacts are expected to be non-significant as follow:

Impact of/on	Extent of impact
Community	= Moderate
Workers	= Moderate
Economic resources	=Moderate

Residual Impact

332. Provided the proposed mitigative measures are implemented, the impacts will be, temporary, and moderate in magnitude. Therefore, no significant adverse residual environmental impacts are likely to occur.

6.5.5. Impacts on Cultural and Historic Resources

333. Potential impacts to cultural resources include:

- a) Complete destruction of the resource if present in areas undergoing surface disturbance or excavation;
- b) Vandalism, theft and illegal export of movable Physical Cultural Resources (PCR), and of pieces of monumental PCR.
- c) Degradation or destruction of near-surface cultural resources on- and off-site resulting from changing the topography, changing the hydrological patterns, and soil movement (removal, erosion, sedimentation).
- d) Unauthorized removal of artifacts because of human access to previously inaccessible areas.
- e) Soil compaction, damaging buried PCR (archaeological and paleontological) on site.
- f) Vibration, air, soil and water pollution, leading to damage to natural and human-made PCR in the vicinity (ADB, 2012; Environment Safeguard a Good Practice Sourcebook).

Mitigation Measure

334. To avoid adverse impacts to PCRs it is recommended to undertake the following mitigation measures:
- a) Searches need to be conducted to determine the presence of known archaeological sites and historic structures within the area of potential effect. Identify the need for an archaeological and/or architectural survey.
 - b) Periodic monitoring of significant cultural resources near the development may be required to reduce the potential for looting and vandalism.
 - c) An unexpected discovery of cultural resources during any phase of the project shall result in a work stoppage near the find until the resources can be evaluated by a professional archaeologist.
 - d) Educate workers and the public on the consequences of unauthorized collection of artifacts.
 - e) During all phases of the project, keep equipment and vehicles within the limits of the initially disturbed areas.

335. Prepare and follow a cultural resources management plan, if cultural resources are present at the site or if areas with a high potential to contain cultural material have been identified.
336. Use existing roads to the maximum extent feasible to avoid additional surface disturbance.

Impact Significance:

337. In the light of the above, the impact on the archaeological features would be "Negligible" significance.

Likelihood of occurrence =	2 – certain to occur
Consequence =	1 – impact largely not discernible on a local scale
Significance =	2 low

Residual Impact

338. No significant adverse residual environmental impacts on physical and cultural resource are likely to occur.

6.5.6. Impacts on Water Quality

339. There will be construction activities and movement and operation of heavy construction machineries in the water bodies in order to make the intake structures. Construction activities within the water bodies will result in high turbidity which will reduce the dissolved oxygen in water as well as there will be less sunlight for aquatic plants for photosynthesis. High turbidity significantly affects the microbiological quality of drinking water. Risk of leakage of petroleum products into water bodies can contaminate the river water. Also during the construction period along the canal line, increased turbidity in the streams as well as contamination with toxic substances due to leakages from poorly maintained machineries and equipment may occur. Poor storage of petroleum and chemicals during the construction can lead to ground water contamination which is the main source of drinking water in the area.

Mitigation Measures

340. While constructing the approach channels along the river banks, use coffer dams to ensure that no construction activities takes place on water bodies. Schedule the construction activities during the months when the flow in the river is low. Ensure that all the equipment's are properly maintained and no leakage of chemicals and petroleum products in the water bodies water sampling will be done and it is included in the EMP. Issues associated with the design, construction, and use of the camps relate both to the potential environmental impacts of the camps, and the need to suitably plan camps to protect the environment and maximize worker health, safety and amenity.
341. The workshop will be located in an appropriate distance from the water body and appropriate volume and type of spill response materials will be available at each work site, Spill will be contained and cleaned-up immediately. Resultant wastes (soils, rags and absorbent material) appropriately stored and disposed of by an appropriately

licensed waste contractor as controlled waste. All equipment will be regularly serviced to reduce emissions and reduce the chance of oil leaks on site and in marine environments. Appropriate controls in place to contain hydrocarbon leaks should they occur whilst servicing. Controls may include use of drip trays when changing oil and transporting waste oils in bonded containers. Refueling of vehicles/equipment will be undertaken on land (not over water), unless the task is not possible. The following aspects of camp development should be addressed:

- 342. Definition of elements to be included in construction work camps.
- 343. criteria/principles for the location of components of the work camps to minimize soil and water pollution, diseases and possible outbreaks, and conflict situation with villagers, local/central authorities and/or the contractor.
- 344. Specific management requirements for construction of components of the work camps, and management of camp operation.

Impact Significance:

- 345. As the project construction activity planned during the season which there will be no water in the canal, also there is a very limit activity in Kunduz river. The impact significance of canal rehabilitation and construction on Surface water and aquatic ecosystem is therefore, considered to be "Low".

Impact of/on	Extent of impact
Water quality	= Low
Aquatic ecosystem	= Low

Residual Impact

- 346. Provided the proposed mitigative measures are implemented, the environmental impact will be temporary, and low in magnitude on water quality, in the same time on aquatic ecosystem. Therefore, no significant adverse residual environmental impacts are likely to occur.

6.5.7. Impacts due to Waste Generation

- 347. **Domestic Waste:** During the construction period, waste is generated in the administration/residential buildings and labor camps, in the form of food leftovers, vegetable peels, plastic, house sweepings, clothes, ash, waste paper, cardboard, plastic, used batteries, bulbs, tube lights etc., and which are classified as domestic waste. Most portion of this type of wastes if followed the proper segregation and good management practices can be reused/recycled and small portion only need for disposal. The impact can be adverse in case of haphazard dumping in the public area and river banks. Otherwise it can easily be mitigated with simply following the good management practices.
- 348. Hazardous Waste Construction activities in major infrastructure projects like big irrigation canals, there is some possibility of generation of small quantity of hazardous wastes. Storage of fuels, lubricants, coolants, product packaging (cement bags, containers, etc.), cantering oil/formwork oil, batteries, electronic wastes be hazardous if not properly

collected and disposed into the safe place. If released to the environmental medium, the impact can be significantly adverse with long-term consequences.

Mitigation Measures

349. It is recommended to strictly follow the Good Practices for construction management with priority on waste reduction, easy collection, segregation, reuse/recycle and proper disposal of the remaining wastes. Ensure that the labor camps have proper facilities for waste segregation and even for composting of the biodegradable waste. There will be very less quantity of hazardous waste generation in the project site. As Afghanistan is party to Basel Convention and the Regulation on Hazardous Waste Management is in the process of approval, strict follow of the good practices in construction management will ensure the compliance to the national requirement. In the same time waste management plan will be prepared as part of SSEMP.

Impact Significance:

350. This is rehabilitation project and a minimum quantity of waste will be produced, in the same time there won't be a large camp with a big number of workers. Therefore; the potential waste impacts are expected to be non-significant and it will be moderate as follow:

Impact of/on	Extent of impact
Vegetation	= Moderate
Soil	= Moderate
Water	= Low

Residual Impact

351. Provided the proposed mitigative measures are implemented, the environmental impact will be temporary, and moderate in magnitude. Therefore, no significant adverse residual environmental impacts are likely to occur.

Mitigation and Monitoring of residual impacts:

352. To minimize the impact of waste on environment, soil and water bodies during construction of the project, the following mitigation will be further applied as required.
- All construction waste material (including excavated soil and creosote timber waste) will be disposed of in a provincially approved manner.
 - Careful maintenance and monitoring of all equipment will be carried out to minimize the risk of spills or leaks of petroleum based products.
 - Equipment refueling operations will take place at least 30 m from any watercourse and as well as Stormont Bay harbor and the refueling will take place on a prepared impermeable surface with a collection system with the exception of marine equipment.
 - All equipment to be used in canal is to be free from leaks or coating of hydrocarbon-based fluids and/or lubricants that are harmful to the environment.
 - Hoses and tanks will also be inspected on a regular basis to prevent fractures and breaks

6.5.8. Impacts on Occupational and Community Health , Safety and socioeconomic:

353. During the construction, workforce will be exposed to high level of particulate or dust particles and noise pollution, risk of injury in the operation of heavy equipment's, chances of accidents, poor quality of drinking water, and inadequate facilities are the main concerns for the occupational health and safety of workforces. Dusts and noise generated will also directly impact the health of people living in the surroundings of the project construction sites. It will also risk the people from accidents due to resuspension of dusts in the road resulting in poor visibility. In the same time spread of any diseases or accident will have direct impact on socioeconomic situation of the people.

Mitigation Measures

354. Compliance to mitigation measures on air and noise quality will minimize the impacts on community health and safety as well as occupational health and safety. Further, ensure best measures to prevent fires particularly in areas of storage of petroleum products and chemicals. OHS related guidelines of Afghanistan National Standards Authority need to be complied with for the safety and health of workers and communities. In addition to these, follow the IFC Guideline on Environment, Health and Safety for the best practices in construction activities. Besides that, HSE plan will be prepared by contractor as part of SSEMP to mitigate any risk regarding the occupational, community health, safety and adverse impact of socio economic.

6.5.9. Coronavirus disease 2019 (COVID-19):

355. Covid-19 is a respiratory illness caused by a virus called SARS-CoV-2. The virus is thought to spread mainly from person to person:

Mitigation Measures

356. Potential sources of exposure include having close contact with a coworker or member of the public who is ill with COVID-19 and touching your nose, mouth, or eyes after touching surfaces contaminated with the virus or handling items that others infected with COVID-19 have touched. To avoid spreading of Covid- 19 the following mitigation measure are recommended:
- a) Notify your supervisor and stay home if you have symptoms.
 - b) If you are sick. You should not return to work until the criteria to discontinue home isolation are met, in consultation with healthcare providers, your employer, and state and local health departments.
 - c) Notify your supervisor if you are well but have a sick family member at home with COVID-19.
 - d) Limit close contact with others by maintaining a distance of at least 6 feet, when possible.

- e) Limit the number of workers in small workspace areas such as job site elevators, trailers and vehicles, and spaces under construction if possible.
- f) Wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain, especially in areas where there is significant community-based transmission of COVID-19.
- g) Cloth face coverings may prevent people who don't know they have the virus from transmitting it to others.
- h) Clean and disinfect frequently touched surfaces such as shared tools, machines, vehicles and other equipment, handrails, ladders, doorknobs, and portable toilets. Clean and disinfect frequently touched surfaces periodically throughout the shift but also:
 - i) At the beginning and end of every shift
 - j) After anyone uses your vehicle, tools, or workstation
 - k) Limit tool sharing if possible.
 - l) Practice proper hand hygiene. This is an important infection control measure. With appropriate hand hygiene, you do not need gloves to protect you from COVID-19. When possible, wash your hands regularly with soap and water for at least 20 seconds or use an alcohol-based hand sanitizer containing at least 60% alcohol.
- m) Key times to clean hands include:
 - n) Before and after work shifts and breaks
 - o) After blowing your nose, coughing, or sneezing
 - p) After using the restroom
 - q) Before eating and before and after preparing food
 - r) After touching objects which have been handled by coworkers, such as tools and equipment
 - s) Before putting on and after taking off work gloves
 - t) After putting on, touching, or removing cloth face coverings
 - u) Before donning or doffing eye or face protection (safety glasses, goggles, etc.)
 - v) Do not touch your eyes, nose, or mouth.
 - w) Use tissues when you cough, sneeze, or touch your face. Throw used tissues in the trash and wash your hands or use hand sanitizer containing 60% alcohol if a sink to wash your hands is not available.

Impact Significance:

357. Construction and rehabilitation of project will have moderate impact on workers and community.

Likelihood of occurrence =	5 – certain to occur
Consequence =	1 – impact largely not discernible on a local scale
Significance =	5 low

Residual Impact

358. A preventative health and safety program will be implemented for construction, operation, and decommissioning that ensures that the public and workers are not adversely affected during routine operations, and that contingency plans will be in place to prevent impacts during accidents, malfunctions, and unplanned events.
359. Provided the proposed mitigative measures are implemented, the environmental impact will: be low in magnitude; intermittent and short term.
360. Therefore, the significance of the environmental impacts is expected to be not significant

6.6. Ecological Environment (Flora and Fauna)

6.6.1. Impact on Vegetation:

361. There is no forest area as per the legal definition in the project influence area. However, along the existing canal line there exist vegetation of different species. Bu there is no any impacts on trees.

6.6.2. Impact on Terrestrial and aquatic wildlife:

362. Based on Local people report the larger mammal's jackal (Eurasian Golden Jackal *Canis aureus*), fox (either red fox *Vulpes vulpes* or Blanford's fox *Vulpes cana*), tiger (Caspian tiger *Panthera tigris virgate*, last confirmed in the wild, lower Amu Darya 1968, now extinct), and polecat (*Vormela peregusna*). Locally reported birds include partridge (Chukar Partridge *Alectoris chukar*), hoopoe (*Upupa epops*), eagles (*Aquila* spp.), doves (*Streptopelia* spp.), and sparrows (*Passer* spp.). The aquatic environment of the irrigation canals has no fish nor amphibians etc

Impact Significance:

363. As the project construction activity planned during the season which there will be no water in the canal, also there is a very limit activity in Kunduz river. In the same time these are irrigation canals where there are no any fishes except some aquatic life. Therefore; the project impacts on aquatic life is low.

Impact of/on	Extent of impact
Fishes	= Low
Other Aquatic life	= Low

Residual Impact

364. Provided the proposed mitigative measures are implemented, the environmental impact will be temporary, and low in magnitude. Therefore, no significant adverse residual environmental impacts are likely to occur.

6.6.3. Impact on Protected Specie

365. Project will have no impact on the protected species of Afghanistan as no such species are reported in the area.

Mitigation Measures

366. Possible impacts on wildlife will be reduced through the following measures:
367. The construction contractor shall avoid excessive destruction of wildlife habitats and illegal hunting;
368. Posting appropriate signs in the important wildlife areas and applying speed limits for sections passing through those areas;
369. Strict prohibition of illegal hunting by the workforce and killing of wild animals due to reluctances of drivers like over speeding of vehicles; and
370. Particular attention shall be paid and the above indicated mitigation measures strictly implemented for the section between Elwiha and Mille since the corridor of this section is inhabited by threatened species

Impact Significance:

371. Based on the baseline study there is no protected species in the project area, so the impacts are expected to be non-significant.

6.7. OPERATION PHASE IMPACTS AND MITIGATION MEASURES

6.7.1. Impacts on Water Quality

372. Water Quality of the river water quality is good for irrigation purposes, though water sampling hasn't conducted but the water is used for irrigation for long time, however, the water quality mainly the salinity in the surface water collected from springs, ponds and stagnant water varies significantly. The agriculture run offs during the raining seasons will also have the possibility of bringing the pesticides residues in the surface waters.

Mitigation Measures

373. To prevent the water quality pollution, following measures are recommended:
- 1) Maximize the use of organic fertilizer and minimize the use of chemical fertilizer, and minimum use of insecticides and pesticides in the area
 - 2) Training to farmers on the proper use of pesticides, appropriate dose and timing of use.
 - 3) Regular monitoring of the water quality including the hill streams and ponds, ground water to understand the problem and take adequate measures.

6.7.2. Impacts on Soil Quality

374. Salinity from irrigation can occur over time, since almost all water even the natural rainfall contains some dissolved salts. When the plants use the water, the salts are left behind and begin to accumulate in the soil making it more difficult for plants to absorb soil moisture. In order to leach out of these salts from the plant root zone, it needs to

apply additional water. As highlighted in impacts on water quality and soil erosion, problems increases the risk of salinization from use of saline water for irrigating agricultural crops. On irrigated lands salinization is one of the most prolific adverse environmental impacts and saline conditions severely limit the choice of crop, adversely affect crop germination and yields, and can make soils difficult to work.

Mitigation Measures

375. It is recommended to do the soil mapping of the area in future to evaluate the extent of the salinity problem during the main growing season, when symptoms of soil salinity may be visible.

6.7.3. Natural disasters, climate change and impact on infrastructures

376. Afghanistan is one of the highly vulnerable country to the impact of climate change in the world. The future climate prediction (RCP 2.6 and RCP 8.0 scenarios) for Afghanistan (World Bank: Climate Change Knowledge Portal, Afghanistan) are:
377. Average annual temperature in Afghanistan is projected to increase between 1.4° C and 4.0° C by the 2060s, and between 2.0° C and 6.2° C by the 2090s. Spring and summer are projected to experience the fastest rate of warming under these projections with pretty uniform warming over the country's regions;
378. Annual precipitation projections from the Fifth Assessment Report of the Intergovernmental Panel on Climate Change indicate that there will be little or no change in precipitation over Afghanistan throughout the 21st century;
379. The frequency of 'hot' days and nights per year are projected to increase throughout the middle and late 21st century. 'Hot' days are projected to increase and occur on 14-25% of days by the 2060s and 16-32% of days by the 2090s, while 'hot' nights are projected to increase and occur on 16-26% of nights by the 2060s and 19-36% of nights by the 2090s. Both 'hot' days and nights are projected to increase most rapidly in the summer months of June-August
380. 'Cold' days and nights are projected to decrease in frequency and become exceedingly uncommon, with projections for the 2090s indicating that they will occur on 0-6% of days per year;
381. Projections for maximum 1- and 5-day rainfall indicate small increases in every season but March through May;
382. And because of these changes in the climatic system, the projected impacts of the climate change in Afghanistan are:
383. Floods are the most frequent natural hazard in Afghanistan and result in the largest economic damage. Changes in precipitation patterns as well as earlier spring snowmelt that are expected with climate change will increase risks for different types of floods (e.g. flash floods);

384. Drought is a natural hazard that affects Afghanistan on a regular cycle. From 1998-2005/2006 the country went through the worst drought in known climatic history in terms of duration and strength;
385. Climate change is expected to exacerbate public health issues by increasing the incidence of certain water, food, and vector-borne diseases that are associated with climate (e.g. malaria). Flooding from heavy rainfall and snowmelt, and rising temperatures, can cause an increase in the incidence of diseases, such as malaria, typhoid, and diarrhea.

Mitigation Measures

386. Climate change poses a threat to Afghanistan's natural resources, of which the majority of Afghans depend for their livelihoods. Therefore, Afghanistan need to promote and strengthen adaptation strategies that aim at improving water management and use efficiency; improved agricultural practices and research; rangeland management; development of a disaster management strategy; development and research into climate and early warning systems; improved food security; and diversification of livelihoods.

Table 20: Summary of Mitigation Measures

Project Activity	Potential Impact	Sensitivity	Magnitude	Proposed Mitigation	Institutional Responsibility	Cost Estimates
Pre-construction						
IEE and feasibility stage	Delay in IEE preparation	Severe	Moderate	Early preparation of IEE and submission to ADB for review and comment	NWARA PMO & design & support consultant (safeguard expert)	Included in NWARA PMO staff & design & support consultant
Finalize RSP designs	Omission from designs of water access points agreed with local communities	Severe	Major	Incorporate water access points agreed with local communities into SP designs	NWARA PMO & design consultant (design engineer)	Included in NWARA PMO staff & design & support consultant costs
Procure construction services	Deficient/failed contractor implementation of construction-phase mitigation measures	Very Severe	Major	Incorporate standard construction contract environmental safeguard clauses (Annex 5) and EMP into tender documents	NWARA PMO & design & support consultant (procurement expert)	Included in NWARA PMO staff & design & support consultant costs
Public Consultation	No consideration to the stakeholders recommendation and feedback	Severe	Moderate	Conduct consultation, take in account the stakeholders recommendations	NWARA PMO	Included in NWARA PMO staff & design & support consultant costs
Commence construction	Non-compliance with legal requirement for environmental clearance	Very severe	Major	Prepare and submit environmental clearance application to NEPA for each RSP. Track and respond to	NWARA PMO	NWARA PMO staff costs

Project Activity	Potential Impact	Sensitivity	Magnitude	Proposed Mitigation	Institutional Responsibility	Cost Estimates
				NEPA queries		
Source quarried materials	Landslides, erosion, sedimentation, landform/landscape/viewshed degradation at/near quarry sites	Severe	Moderate	Investigate and accept/reject commercial quarries / proposed RSP local quarry sites for acceptable environmental impacts	NWARA PMO, PIO & construction contractors	Included in NWARA PMO & PIO staff costs & construction contractor costs
Update IEE if required	Incorporating EMP in detailed design and updating EMP and based on detailed design decisions	Severe	Moderate	Mitigation measures defined in this EMP will be reviewed, updated and incorporated into the detailed design to minimize adverse environmental impacts. If necessary, update IEE/EMP based on design decisions.		
Commence excavation	Disturbance, damage, loss/theft of physical cultural resources, waste production, impacts on water quality, noise, vibration.	Severe	Major	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 preparing waste management plan for solid and sewage waste, noise and vibration management plan.		
Construction						
Construction site clearance including tree removal	Loss of ecological services and aesthetic value of trees removed from construction sites,	Very Severe	Major	Afforestation - tree plantation Removal of tree after baby birds have fledged and flown off.	NWARA PMO, PIO &	Included in NWARA PMO

Project Activity	Potential Impact	Sensitivity	Magnitude	Proposed Mitigation	Institutional Responsibility	Cost Estimates
	nuisance to birds, reptile and amphibian.				construction contractors	& PIO staff costs & cost of civil works
Excavation	Landscape alteration, canal sedimentation, water pollution and waste (solid and sewage) from improperly managed nuisance to reptiles and amphibian.	Severe	Major	Select and manage soil and waste disposal sites, in consultation with community let reptiles and amphibians to go unharmed away from work site		
Canal rehabilitation and upgrading	Amongst the most likely impacts of the canal activities are increased sedimentation and water pollution risks of canal streams and other waterways crossed by the project.	Severe	Moderate	-Proper handling of hazardous substances such as oil, fuel and cement to avoid water pollution by spillages. Dispensing points of fuels and lubricants by the construction contractor during the construction period should have drip pans, and for the dispensing of petroleum products fuel funnels should be used; Avoiding disposal of surplus excavated materials on canal banks by depositing it only at approved disposal sites	NWARA PMO, PIO & construction contractors	Included in NWARA PMO & PIO staff costs & cost of civil works
Canal rehabilitation and upgrading	Production of waste both solid and sewage.	Severe	Moderate	Proper handling of hazardous substances such as oil, fuel and cement to avoid water pollution by spillages.		

Project Activity	Potential Impact	Sensitivity	Magnitude	Proposed Mitigation	Institutional Responsibility	Cost Estimates
				<p>Dispensing points of fuels and lubricants by the construction contractor during the construction period should have drip pans, and for the dispensing of petroleum products fuel funnels should be used;</p> <p>Avoidance of leakages from vehicles and construction equipment by regular and effective maintenance;</p> <p>Provision of satisfactory disposal of solid and liquid wastes generated by construction camps and maintaining the facilities for sanitation at the campsites in good condition;</p>		
Construction roads	Crop damage from temporary construction roads	Very severe	Major	Community consultation re. road siting and timing. If significant impact, compensation to APs		
Operation of vehicles & equipment; generation of liquid and solid	Excessive noise, dust, air / water pollution, fuel/oil spills, pollution from improper liquid/solid waste disposal	Severe	Moderate	Routine construction housekeeping measures per contractor SEMP monitoring of air quality (PM10, PM2.5, CO NO2, SO2).		

Project Activity	Potential Impact	Sensitivity	Magnitude	Proposed Mitigation	Institutional Responsibility	Cost Estimates
waste				Monitoring of vibration and noise.		
Biological resources	No significant flora and fauna but measures to protect existing resources	Severe	Moderate	Protect existing vegetation near construction sites, Properly backfill and compact after completion of construction Protect existing trees and grassland during constructions; where a tree has to be removed or an area of grassland disturbed, replant trees and re-vegetate the area immediately after construction;		
Borrow pits and redundant canals	Landscape disruption if left unfilled post-construction	Severe	Moderate	Pits and redundant canals filled in		
Construction site safety	Health and safety of workers and community			Construction site safety, Clear signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials and excavation and raising awareness on safety issues. Heavy machinery will not be used after day light and all such equipment will be returned to its overnight storage		

Project Activity	Potential Impact	Sensitivity	Magnitude	Proposed Mitigation	Institutional Responsibility	Cost Estimates
Occupational health and safety	Precautions to protect the health and safety of construction workers			An Environment Health and Safety Officer (EHSO) will be employed to develop, implement and supervise a Health and Safety Management Plan (HSMP), as well as to ensure that the requirements of the EMP are implemented.		
Socioeconomic impacts	Temporary Canal Closures			When construction cannot be accomplished during non-operation periods and canal operations must be maintained, construct temporary bypass structures to maintain canal operations during construction.		
Access road and pathway	Blocked access due to construction activities	Mild	Moderate	Traffic management plan to be implemented; Alternate routes to be identified in consultation with local communities; GRM to be established and implement		
Use of local sources	Additional load on local resources	Mild	Moderate	Contractor to obtain water in a manner not to affect the local communities; liaison with local communities to be maintained; GRM to be established.		
Social conflict	Social conflict and the privacy of women	Mild	Moderate	Camps to be established at least 500 m away from		

Project Activity	Potential Impact	Sensitivity	Magnitude	Proposed Mitigation	Institutional Responsibility	Cost Estimates
				communities; contractor to enforce code of conduct to respect local norms and culture; liaison with local communities to be maintained; GRM to be established.		
Religious and cultural properties	Damage to sites/places of religious/cultural significance	severe	Moderate	Such sites to be demarcated and avoided during construction activities; liaison with local communities to be maintained; GRM to be established.		
GRM	Not existence of functional GRM			GRM should be functional and implement properly		
Operation and Maintenance						
Operation and maintenance of improved irrigation infrastructure	Suboptimal irrigation and agricultural benefits			Establish and strengthen WUAs/IAs and provide training on O&M and improved management of water	NWARA PMO SBAs WUAs MAIL PMO DAILs IAs	Included in NWARA & MAIL staff costs
Increased cropping intensity and input use	Environmental contamination from excessive pesticide and fertilizer use			Training provided to IAs on optimal application and use of pesticides and fertilisers DAIL will have regular monitoring on use of pesticide and fertilizer.	DAILs, IAs	
Construction site clearance including tree	Loss of ecological services and aesthetic value of trees removed			Afforestation – care and maintenance of tree plantations (ongoing watering, fertilizing,	NWARA PMO & PIOs WUAs	

Project Activity	Potential Impact	Sensitivity	Magnitude	Proposed Mitigation	Institutional Responsibility	Cost Estimates
removal(approximately 172 willow small and mature)	from construction services			protecting from damage of afforested trees while initial saplings grown into mature trees)	MAIL PMO & PIOs DAILs IAs	

7. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

Objectives

387. This environmental management plan (EMP) has been prepared for the ADB supported Shrawan Thakkar and Momen Abad Irrigation sub-project, in line with ADB's SPS 2009. Specific measures are developed in relation to the design, construction and operation of each project activity and the impacts identified in relation to physical, biological and socio-economic resources, the impacts and proposed mitigation measures as described above are summarized in the Environmental Management Plan (EMP) Table 26.
388. The EMP for the Project defines mitigation and monitoring measures and describes the institutions, responsibilities and mechanisms to monitor and ensure compliance. Such institutions and mechanisms will seek to ensure continuous improvement of environmental protection activities during preconstruction, construction, and operation of the project in order to avoid, reduce, or mitigate adverse impacts, the mitigation plan will be reviewed and developed to a greater level of detail at several points during Project implementation. The final IEE and EMP will be disclosed on ADB's website following any required updates.
389. Capacity building of MAIL institutions (DAILs and IAs) responsible to implement operation-phase measures at second/tertiary/farm levels, to mitigate the impacts of irrigation operation and knock-on agricultural changes, will be mainstreamed into the activities of Project Output 2, "Improved on-farm water management".

7.1. Roles and Responsibilities

390. Environmentally Responsible Procurement as a Mitigation Measure Prior to sourcing construction materials from an existing quarry, or before creating a quarry from which to source construction materials, contractors will identify the quarry or potential quarry site to the relevant PIO. Procurement can proceed only after a PIO construction supervisor, advised and assisted by their PMO environment safeguards officer and field staff if necessary, has determined that no significant adverse impacts are posed by the quarry site or quarrying activities (e.g. sedimentation, erosion, or sliding adversely affecting water courses, settlements, roads, agriculture etc.). If significant adverse impacts are identified, mitigation measures at the proposed quarry / quarry site may be considered, or a different existing quarry / quarry site / quarrying activity can be substituted and assessed.
391. **Responsibility for Mitigation Implementation - Overview.** Responsibilities for mitigation implementation (pre-construction to operation) are shown in Table 23.
392. **Pre-construction Phase.** Responsibility for implementing pre-construction mitigation measures will rest with NWARA PMO, FSDC, and MAIL PMO (Table 23).
393. **Construction Phase.** Responsibility for implementing construction mitigation measures will rest with contractors selected to implement civil works packages, under the

supervision and overall management of the responsible ministry's PIO and PMO respectively (Table 23).

394. **Executing Agency (EA).** The project executing agency will oversee overall project implementation and management activities to ensure smooth and timely implementation and completion of project activities. The EA has overall responsibility for the project and therefore is ultimately responsible for ensuring the implementation of the mitigation in the EMP. The EA will guide and coordinate closely with other government agencies and the ADB for the timely resolution of any issue and completion of the project within the target dates. The EA has designated a project management Office (PMO) Directorate to oversee the day-to-day management of the project and liaise with all relevant government offices.
395. **Central Project Management Office (PMO).** The PMO will assume day-to-day management of the project and will be responsible for coordinating and implementing project activities, including procurement, recruitment, disbursement, contract administration, monitoring and reporting. The PMO will be headed by a Project Director and will comprise full-time core staff, including environmental management staff (Table 23 show the PMO responsibilities).
396. Civil Works Contractors will be required to formulate Site Specific Environmental Management Plans (SSEMP with management systems for adverse impacts, e.g., dust control, noise control, traffic management, addressing as minimum the requirements of this EMP and the IEE. The SSEMPs will be renewed on when there are any changes in project design and as needed, submitted to PMO for review, and to ADB (if desired). Each civil work contractor will appoint an environment, health and safety officer (EHSO) to coordinate contractor EMP implementation. To ensure that the contractors comply with the EMP provisions, the PMO will prepare and provide the following specification clauses for incorporation into the bidding procedures: (a) a list of environmental management requirements to be budgeted by the bidders in their proposals; (b) environmental clauses for contractual terms and conditions; and (c) the full EMP. Contractors will submit semi-annual environmental monitoring report (SAEMR) to the PMO, and provide information including reports, monitoring results or other information relating to EMP implementation as requested by the PMO.
397. Operation Phase. Mitigation of operation-phase impacts involves, first, capacity building of sub-basin and RSP level institutions (SBAs, DAILs, WUAs, IAs), and then implementation of mitigation measures by the strengthened institutions. Capacity building to implement operation-phase mitigation will be planned by NWARA PMO and MAIL PMO with the advice and assistance of FSDC and ISC. The planned capacity building activities will be delivered by staff or contract trainers under their supervision to staff/members of the SBAs, DAILs, WUAs, and IAs, who will be responsible for implementing operation-phase mitigation (Table 23).

Table 21: Implementation Responsibilities of the EMP

Institutions	Roles and Responsibilities
NWARA and MAIL	Overall responsibility in ensuring the project compliance of safeguard policies and compliance reporting to ADB and NEPA.
NEPA	National authority to approve IEE/EMP and ensure their compliance.
DAIL	Coordinating role at the province and direct level in the implementation of water management improvement sub-output Formation and capacity enhancement of Irrigation Associations Coordinate with RBA and Water Users' Association for EMP implementation
RBA	Coordinating role in the implementation of PARB-P sub-output I at the basin and sub-basin level Formation of Water Users Association and their capacity enhancement in coordination with CPMO, NWARA, MAIL, DAIL
CPMOs	Ensure that the project implementation fully complies with the ADB environmental and social safeguard policies Support RBA/DAIL in the design and execution of the institutional strengthening and training programs of sub-output II. Provide technical support in the evaluation of the monitoring results obtained from the monitoring programs and update the EMP if needed.
PIOs	Mainly responsible for the supervision of the works done at the field level and coordinating with all the stakeholders Reporting the progress of implementation and also the difficulties faced in the implementation to CPMO.
Contractors	Implementation of the recommended mitigation measures during the construction phase of the project. Ensuring the compliance with the Occupational Health and Safety standards. Training of the workforce in Good Practices in construction management and waste management in the construction sites. Preparation of Site specific Environmental management plan. Removal of trees and submitting to farmers.
WUAs and IAs	Main stakeholders in the implementation of the Water Management Improvement component of PARB-P and implement the mitigation measures and best practices in O&M phase of project Participate in the implementation of the programs in the watershed management and reforestation and RE-vegetation programs in the area
Local authorities	Coordinating role at district level and village level to avoid conflict and also resolution of conflict and also addressing the grievances of the communities.

7.2. EMP Cost:

398. Cost estimates for mitigation measures, environmental monitoring, re-vegetation and capacity building is summarized in Table 24, the compliance monitoring costs will be borne by the implementing agency as part of their implementation functions. Internal monitoring costs will be borne by the contractors and the implementing agency. Independent monitoring costs will be from the PMO consultancy budget. Before implementing a monitoring plan, responsible agencies will present a more detailed breakdown of the estimated budget. During project implementation, the budgets will be adjusted based on actual requirements. Contractors will bear the costs of all mitigation measures during construction, which will be included in the tender and contract

documents. The implementing agency will bear the costs related to mitigation measures during operation. Costs related to environmental supervision during construction and operation will be borne by the implementing agency and the operators. Costs for capacity building will be borne by the project as a whole.

Table 22: Cost Estimates for (EMP)

Items/Activities	Unit	Quantity	Cost/unit (\$)	Person Month	Total	Remarks
Cost for Environmental Monitoring						
Ground Water Quality test	No	6	1220		\$7,320.00	
Air and Noise quality test	No	6	1220		\$7,320.00	
River and Stream Water Quality	No	8	1220		\$9,760.00	
Trainings (Environmental awareness, water resource management, use of fertilizer, Grievance redress mechanism, health and safety, Covid 19 mitigation measure etc), for 40 person (including materials, logistics, venue)	No	1	4000		\$4,000.00	
Sub-total					\$28,400.00	
Contingency 10% of the total direct cost					\$2,840.00	
Total					\$31,240.00	

Table 23: Estimated budget for Tree management plan

Items/Activities	Unit	Total	Cost/unit (\$)	Person Month	Cost \$
Mobilization	No.	1	1400		1,400.00
Hole for plant/sapling	No.	6000	0.5		3,000.00
Sapling	No.	6000	1.8		10,800.00
Transportation saplings to the site	Truck	13	100		1,300.00
Labor (Plantation, watering)	Man-day	150	5		750.00
Fertilizer (DAP) 0.1 kg/plant	Kg	600	1		600.00
Maintenance	Month	24	500.00		12,000.00
Transportation of Fertilizer	Truck	11	60		660.00
Technical Supervisions (Horticulturist) 24 person/month	Month	1	300	24	7,200.00
Total					36,310.00

7.3. Monitoring Requirements / Plan

399. Monitoring Activities are shown in Table 27. The monitoring plan will be reviewed and developed further at several points during the Project.
400. **Pre-construction Phase.** Responsibilities for pre-construction monitoring will rest with FSDC, NWARACPMO, and MAILC PMO (Table 27).
401. **Construction Phase.** Under the direction of the responsible ministry's CPMO and with advice and assistance from ISC, monitoring of construction-phase impacts and mitigation will be integrated into the work plans of the responsible ministry's PIO construction supervisors. Schedules of monitoring activities, procedures, and checklists to be used by these supervisors will be prepared in collaboration with them. On-the-job training and backstopping of PIO construction supervisors will be provided as required by the CPMO environment safeguards with support from the ISC national environment specialist (Table 27).
402. **Operation Phase.** Monitoring of operation-phase impacts involves, first, capacity building of sub-basin and RSP level institutions (SBAs, DAILs, WUAs, IAs) to undertake participatory monitoring, and then the undertaking of monitoring activities the strengthened institutions. Capacity building to undertake operation-phase participatory monitoring will be planned by the PMOs with the advice and assistance of ISC. The planned capacity building activities will be delivered by staff or contract trainers under their supervision to staff/members of the SBAs, DAILs, WUAs, and IAs, who will in turn be responsible to undertake operation-phase monitoring (Table 27).
403. Note that due to the limited potential impact, no monitoring is planned for soil and water quality, and as such no baseline survey has been undertaken. Note however, that monitoring of water quality is a planned task of the river basin agency and sub-basin agencies. A separate ADB TA project (TA-9095 REG: Strengthening Integrated Water Resources Management in Mountainous River Basins) will likely provide assistance to the Panj-Amu RBA in undertaking a water quality baseline for the river environment, and build its capacity for follow-up water quality monitoring as part of its institutional mandate.
404. **Sensitive Receptor for Monitoring;** The sensitive receptors from social aspects include settlements, educational centers, and culturally and religiously important places like mosque, shrine; and from the environmental side include river, stream, pasture/ grazing, wetland and natural habitats.

Table 24: Environmental Management Plan

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
1. Recommendation during Project Location, Design and Contract Completion Phase						
Non-compliance of the technical design to applicable national and international guidelines	- Quality of construction (i) to ensure structures and canals are not vulnerable to the anticipated increase in flash flooding with ability to withstand potential impact of increase in high velocity storms.	Medium	Long Term	- Final technical design of the building should take into consideration the following: (i) construction specifications to incorporate technical specification to withstand increase in uncharacteristic storm events anticipated with climate change. .	Included in the project cost	NWARA PMO,
Need for vegetation / tree removal.	- Design layout may initiate need to remove existing vegetation.	Medium	Long-term	- Design should at all times aim to follow existing canal alignment so to minimise need for vegetation removal. - An SRP will be applied using template for any vegetation removal.	Included in the project design cost	NWARA, PIO
Protected areas; Areas of ecological significance & historical and cultural monuments and values	- The sub project is located outside all of the protected areas and multiple use area. The surrounding land use is dominated by cultivated agricultural land. Thus, potential impact on local protected, ecological and cultural features is not envisaged.	Low	Long term	- It is specified in project documentation that an archaeological assessment will be completed prior to any on-site works. - In the event of unanticipated discoveries in the course of the work, contractor shall take all necessary measures to protect findings, notifying PIO and SBA	Included in the project cost	Contractor, PIO

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
				representatives.		
Downstream impacts (Water Quantity)	- Increased irrigation could cause decrease in available water for downstream farmers but this project is CSA water management irrigation so risk is not likely to be significant.	Low	Short	- As part of the environmental monitoring plan, water availability monitoring will be conducted in downstream villages during the wet and dry seasons to minimize any adverse impacts and take any necessary remedial measures in a timely manner if necessary.	Project cost (capacity building & FWUC Package)	PMO/PIO/ WUAs Monitor by: PMO/PIO
Flooding and erosion	- Some sections of the project alignment could be vulnerable to flooding and erosion especially during intense melt-down periods.	Low	Short Term	- Impacts will be reduced or avoided by appropriate qualitative design and skilled contractor together with environmental consideration including incorporation of bio-engineering factors like use of gabions and plantation of shrubs & tree along alignment where applicable.	Cost of the plantation (in construction contract)	PMO/PIO
Contractor not aware of specific on-site EMP responsibilities.	- Contractors may not have previously been required to comply with environmental safeguards and there may not maintain standards.	High	Contract	- Contractor to develop and table a SSEMP 10 days minimum before commencing construction.	Contractor.	Contractor, PIO, PMO.
2. Impacts during Construction						
Confusion and anger by community	- Lessons learnt from other projects indicate ignorance by farming community of size,	Low	Short Term	- Communication regards the scope or activity should be shared with the Community	PIO and Contractor costs.	

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
regarding scope and size of construction activity.	scope and temporary impact from project activities.			using clear photographs, plans and sketches to illustrate works to be done across the site.		
- Privacy issue of local people while fetching water, washing clothes in the canal/river or water uses for domestic use	- The project area is agricultural area and mostly ladies work in the farm, also people taking their drinking water or washing in the canal.	- High	- Short Term	- Contractors will discuss and agree on start of construction work to each construction site with farmers & community prior to any on-site works. - Contractor will have provided water access point in the temporary canal for taking water and washing.	- Included in the contractor cost.	- Contractor, PIO, PMO.
- Impact on fish fauna of canals, reptiles and amphibian and birds nesting on the trees etc	- The canal rehabilitation work will impact fishes, fauna, reptiles, amphibian and bird nesting on the trees during the construction work.	Low	Short Term	- Though there is no fish and fauna in the project area but if during the construction work it was observed, the contractor will report to PMO Environmentalist. - For amphibian's buffers can be placed around critical habitats, to deter human access. - Special areas for amphibians and reptiles need complete protection and should be set aside from developed areas	-	- Contractor, PIO, PMO.
Water pollution	- Currently, use of agricultural chemicals is available in the project area. The primary objective of the Project is to	Low	Long Term	- Educational program on the fertilizer uses and environmental impacts should be provided. - Environmental monitoring of	Training budget; monitoring budget	DOA Monitor by: PMO

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
	provide supplementary wet season irrigation and dry season irrigation but the project scale is very small. Therefore, it is not likely to significantly increase the use of agricultural chemicals. However environmental consideration, especially about the toxic chemical used, must be considered.			water quality is conducted by PMU to assess any negative impact on the water bodies and collaborate with DOA to ensure appropriate use of agricultural chemicals. The frequency of monitoring will be added in the monitoring plan.		
Creation of access to site & establishment of temporary storage sites	<ul style="list-style-type: none"> - Contractor will need to access the entire length of canals, thru farming land and crossing existing canals and rivers. - Crop damage could occur. 	Medium	Short Term	<ul style="list-style-type: none"> - Contractors will discuss and agree on specific vehicular access to each construction site with farmers & community prior to any on-site works. - Contractor will make good these tracks and storage areas at completion of works. 	Contractor shall absorb the costs of such activities into contract.	Contractor, PIO.
Covid-19	<ul style="list-style-type: none"> - The gathering of workers will cause the spreading of covid-19. 	High	Short Term	<ul style="list-style-type: none"> - Cloth face coverings may prevent people who don't know they have the virus from transmitting it to others. - Clean and disinfect frequently touched surfaces such as shared tools, machines, vehicles and other equipment, handrails, ladders, doorknobs, and portable 	Contractor shall absorb the costs of such activities into contract.	Contractor , PIO, CPMO

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
				<p>toilets. Clean and disinfect frequently touched surfaces periodically throughout the shift but also:</p> <ul style="list-style-type: none"> - At the beginning and end of every shift - After anyone uses your vehicle, tools, or workstation - Limit tool sharing if possible. - Practice proper hand hygiene. - Conducting awareness program for workers and community. 		
Land required for temporary canal diversion.	- Water flows maybe required during construction period and land will be required to establish canals.	Low	Short Term	<ul style="list-style-type: none"> - Land and alignment of temporary canals. - Discussions with WUA and community before construction to get written agreements about location, size, and length of time for a diversion – 	Agreed with WUA's before commencement.	Contractor, WUA's, PIO.
Covid-19	- Temperature and other symptoms of covid-19	High	Short term	<ul style="list-style-type: none"> - Cloth face coverings may prevent people who don't know they have the virus from transmitting it to others. - Clean and disinfect frequently touched surfaces such as shared tools, machines, vehicles 	Included in project cost	Environmental Contact Person and safety person

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
				<p>and other equipment, handrails, ladders, doorknobs, and portable toilets. Clean and disinfect frequently touched surfaces periodically throughout the shift but also:</p> <ul style="list-style-type: none"> - At the beginning and end of every shift - After anyone uses your vehicle, tools, or workstation - Limit tool sharing if possible. - Practice proper hand hygiene. - Conducting awareness program for workers and community. 		
Mature tree removal and general vegetation clearance	<ul style="list-style-type: none"> - During construction, there may be a need to remove existing vegetation and excavate existing soil profiles. Such activity will incur loss of view-shed, habitat, amenity, fuelwood source and existing erosion control. 	Medium to High	Medium to long term	<ul style="list-style-type: none"> - The contractor is obliged to exercise care to preserve the natural environment (including soils, water and vegetation). - All trees for removal will be quantified and replaced on a ratio 1:10 - Specific species, location and period of maintenance for establishment will be agreed with in collaboration with community members and concern govt. authorities. 	<p>Contractor shall absorb the costs of such activities into contract.</p> <p>Costs for specific tree specimens & planting to be included</p>	Contractor, PIO

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
					in contract	
Excavation of existing canals for construction.	<ul style="list-style-type: none"> - Excavation will be required along canal length and at regulator sites. - Soil erosion could occur during earthwork and clearing along the line of irrigation canal. 	Low	Short term	<ul style="list-style-type: none"> - All excess spoil is to be relocated from site and relocated to the discretion of the community. - Good construction practices shall help to mitigate soil erosion and siltation - Top soil is to be kept separate from other. - At works completion, all excavations made good. 	Contractor - costed into construction contract (and requirement in contract docs)	Contractor Monitor: PIO/PMU
Impact from waste and sewage waste within and across the site	<ul style="list-style-type: none"> - Contractor activity will generate waste and will require management. 	Medium	Short term	<ul style="list-style-type: none"> - On site need for Solid Waste Management (SWM) plan. 	Contractor obliged to manage.	
Dust from material transportation and construction and	<ul style="list-style-type: none"> - Impact from dust could occur during the construction thru improper construction management. . 	Low	Short Term	<p>Water shall be sprayed during construction if activity is located close 50 m to villages to ensure that dust is minimized in construction zones.</p> <p>Dry material handling and transport generate large amounts of dust thus:</p> <p>The Contractor shall prepare a dust control program.</p> <p>Water shall be sprayed where dry materials are handled,</p>	Costed into Construction contract (and requirement in contract docs)	Contractor Monitor: PIO/PMO

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
				crushed and transported. Vehicles transporting materials are to be covered to reduce spills and dust. Instrumental Monitoring of air quality will be conducted in the project area and near the sensitive receptor in regular basis.		
Air pollution and noise	- Vehicle and equipment emissions cause air pollution and noise. Adverse impact could occur during the construction phase in case of improper construction management but is not likely significant.	Low	Short Term	<ul style="list-style-type: none"> - Vehicles and equipment are to be maintained to meet emission and noise standards. - Construction within 100 m of a village or town is to be limited to times agreed with community. - Instrumental Monitoring of noise and vibration will be conducted in the project area and near the sensitive receptor in regular basis. 	Costed into Construction contract (and in contract docs)	Contractor Monitor: PIO/PMO
Human waste from construction	- An adverse impact could occur if contractors have no designated on-site latrines during the construction phase. Informal latrines can generate flies and transmitted diseases which can result in unsanitary condition.	Low	Short Term	- Provision of sanitary facilities (latrines, burying, etc.) with proper waste disposal will be provided by contractors for the entire period of the on-site construction period.	Costed into Construction contract (and in contract docs)	Contractor Monitor: PIO/PMO
Solid waste generation from	- Solid waste can create nuisance and bad odor, and	Low	Short Term	- An appropriate SWM plan is to be put in place by the	Costed into Construction	Contractor Monitor:

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
construction, work sites and workers.	encourage disease vectors. - Solid Waste Management (SWM) is recognized as an import indicator for contract success.			contractor for construction camps and work sites. and be emptied daily, the waste being disposed of in an approved dump site. - The data regarding the amount of generated waste should be recorded by the contractor and reported in weekly basis. - Every camp and work site should be clean during stay and before moving to a new sites, Data record should be maintained.	contract (and in contract docs)	PIO/PMO
Soil erosion	- Soil erosion could occur during excavation earthworks and clearing along the line of irrigation canal.	Low	Short	- Appropriate construction practices shall help to mitigate soil erosion and siltation.	Costed into Construction contract (and in contract docs)	Contractor Monitor: PIO/PMO
Worker safety and health	- Some workers will be recruited for construction activities and workers' camp will be constructed. These will include non-skilled workers, operators and drivers as well as surveyors and construction supervisors. Since the works	Low	Short Term	- Workers should wear protection equipment during works to ensure that they are safe and good health. - A contractor should develop a guideline on working mechanism, health and safety during construction. Manager	Costed into Construction contract (and requirement in contract docs)	Contractor Monitor: PIO/PMO

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
	will be relatively small scale and expected to be completed within one-year, large numbers of workers are not expected. However, safety and health impacts will be also expected.			<p>should educate his workers on health and safety projection. work and camp sites should to have first aid facilities, drinking water availability, Standard accommodation etc.</p> <ul style="list-style-type: none"> -Ensure existence of first aid kit in the construction comp and construction site. -Adequate segregation facilities -No dumping in public places and river banks -Movable toilets in construction sites. -Composting of organic wastes in camps -Proper collection and disposal of hazardous materials 		
Pollution from cement, fuels and black oil	- During the construction period there will be use of cement, fuels and oils for machinery. These materials could be spilt on site and there can be impact on surrounding agricultural land.	Low	Medium Term	<ul style="list-style-type: none"> - Secure storage of all toxic and hazardous materials including cement, fuels and oils. - Ensure mixing of concrete and maintenance of vehicles and plant is limited to designated sites. - Fuels & oils should be securely stored. Hazardous waste should be handle and 	Costed into Construction contract (and requirement in contract docs)	Contractor Monitor: PIO/PMO

Potential Impacts	Nature of Impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
				disposal as per national and international standards and good practice.		
3. Environmental Impacts during Operation						
Inadequate O&M	- Poor and inadequate operation and maintenance (O&M) of the improved irrigation systems could cause unintended adverse environmental impacts.	Low	Medium Term	- Acceptable and appropriate O & M should be developed for sustainable operation and maintenance. - Sufficient training must be also provided so seed farm personnel will be able to manage, operate and maintain the irrigation in sustainability. - WUA's to be given training in O&M.	Project Cost (in design, capacity building)	PMO/PIO/PIC
Hydrological changes Conflict of water utilization	- Change in timing, flows, flooding, drainage, erosion and sedimentation will occur by default with the project. - expected conflict on water use	Low	N/A	- Irrigation works are well designed and constructed; WUA's and RBA's are supported to achieve intended benefits while mitigating adverse impacts.	N/A	RBA /management and PMO/PIO WUAs
Ground Water Resources	- The groundwater in project command area should benefit from construction.	Low	N/A	- N/A	N/A	N/A

Table 25: Summary of Monitoring Requirements

Mitigation Measure	Monitoring Parameters	Location	Measurements	Frequency	Responsibility	Cost
Pre-construction						
Incorporate water access points agreed with local communities into SP designs	Designs	FSDC (NWARA) / Contractor (MAIL) office	Check designs against water access point list	Once, before signing off on designs	NWARACPMO	Included in design & support consultant costs
Incorporate standard construction contract environmental safeguard clauses (IEE Appendix 3) and EMP into tender documents	Tender documents	FSDC (NWARA) / Contractor (MAIL) office	Check tender documents for required inclusions	Once, before signing off on tender documents		
Prepare and submit environmental clearance application to NEPA for each RSP. Track and respond to NEPA queries	Environmental clearance certificate progress	FSDC (NWARA) / Contractor (MAIL) office	Query status of applications	Ensure they are obtained prior to planned construction start dates so certificate process continues to progress.	NWARACPMO	Included in NWARA staff & construction contractor costs
Investigate and accept/reject commercial quarries / proposed RSP local quarry sites for acceptable environmental impacts	Indications of erosion, landslides, landform & viewshed damage	Candidate quarry sites	Photographs	Once for each site, prior to quarry selection	NWARA PIOs & construction contractors	Included in NWARA staff & construction contractor costs
Archaeology inspection	Archaeology test	Excavation	Presence/absence	Once at each	Archaeology	Included in

Mitigation Measure	Monitoring Parameters	Location	Measurements	Frequency	Responsibility	Cost
of excavation sites, rescue archaeology / excavation monitoring as required, prior to commencing excavation	pit(s)	sites	of archaeological findings	site, prior to commencing excavation	expert, respective ministry's design & support consultant	NWARA design & support consultant's staff costs
Construction						
Afforestation - tree plantation and on-going replacements.	Number of trees planted; trees surviving/died; tree growth and replacements.	Community DAIL, WUAs, IAs and NEPA identified afforestation -	Photographs; inventory; girth/height measurements; visual assessment	Included in construction supervisor site visits	NWARA PIOs & construction contractors	Included in NWARA staff & construction contractor costs
Water shall be sprayed during construction if activity is located close 50 m to sensitive receptors villages to ensure that dust is minimized in construction zones. Dry material handling and transport generate large amounts of dust thus: The Contractor shall prepare a dust control program.	Dust and Smoke inspection(PM10, PM2.5, CO NO2, SO2)	Construction sites	Instrumental monitoring	regularly (once before construction work and after that every six month)	Environmental Contact Person	

Mitigation Measure	Monitoring Parameters	Location	Measurements	Frequency	Responsibility	Cost
<p>Water shall be sprayed where dry materials are handled, crushed and transported.</p> <p>Vehicles transporting materials are to be covered to reduce spills and dust</p> <p>Monitoring of air quality in regular basis.</p>						
Covid-19	Compliance monitoring	Temperature and other symptoms of covid-19	Camp site and construction sites	Daily in the morning time	Environmental Contact Person and safety person	
<p>Vehicles and equipment are to be maintained to meet emission and noise standards. Construction within 100m of a village or town is to be limited to times agreed with community. Monitoring of noise in regular basis.</p>	Inspection of Noise Generating Equipment's	Construction sites	Instrumental monitoring	regularly (once before construction work and after that every six month)	Environmental Contact Person	
Educational program on the fertilizer uses and	Drinking/Irrigation Water Quality	Upstream and downstream	Instrumental monitoring	every six month	Contractor and PIO	

Mitigation Measure	Monitoring Parameters	Location	Measurements	Frequency	Responsibility	Cost
environmental impacts should be provided. Environmental monitoring of water quality is conducted by PMU to assess any negative impact on the water bodies and collaborate with DOA to ensure appropriate use of agricultural chemicals.	Standards	of the Momen Abad canal				
An appropriate SWM plan is to be put in place by the contractor for construction camps and work sites and be emptied daily, the waste being disposed of in an approved dump site. The data regarding the amount of generated waste should be recorded by the contractor and reported in weekly basis. Every camp and work site should be clean during stay and before	Waste	Camp site and construction sites	General observation of waste data record and disposal method	Once in a month or in once a week	Environmental Contact Person	

Mitigation Measure	Monitoring Parameters	Location	Measurements	Frequency	Responsibility	Cost
moving to a new sites.						
Select and manage soil disposal sites, in consultation with community	Soil disposal	Soil disposal sites	Photographs	Included in construction supervisor site visits	Included in NWARA staff & construction contractor costs	Included in construction contractor costs
Construct water access points agreed with local communities	Construction of access points per design	Design access point locations	Photographs	Included in construction supervisor site visits		
Temporary irrigation channels or roads/paths. Works prioritized, where possible in late autumn/winter	Water availability for farmers	Construction sites	Photographs; farmer interviews	Included in construction supervisor site visits	WUA's, NWARA PIO,	Included in construction contractor costs
Community consultation re. road siting and timing. If significant impact, compensation to the affected.	Meeting reports & minutes.	Construction sites or adjacent community sites.	Reports and photographs of completed work.	At commencement of site work.	NWARA PIO, Contractor	Included in construction contractor costs
Routine construction housekeeping measures per contractor SEMP	Management of oils, fuels, solid waste, spoil etc.	Construction sites	Monthly reports, photographs.		Contractor	Included in construction contractor costs
Pits and redundant canals filled in	Quality of fill, making good.	Adjacent new canal works.	Photographs of before and after.	At completion of site works.	Contractor, WUA's.	Contractor.
Operation and maintenance						
Establish and	WUA and IA	Training	Photographs,	As/when	NWARA PMO	Included in

Mitigation Measure	Monitoring Parameters	Location	Measurements	Frequency	Responsibility	Cost
strengthen RSP WUAs and IAs re: (i) improved management of water, soil, & agricultural pests / pesticides; increased resilience to climate & other variability and (ii) participatory monitoring	establishment status, date, place, training plans; training type trainers, participants vs plan targets	locations per training plan	training sign- in sheets, training reports	training occurs	RBA SBA MAIL PMO DAILs NWARA design & support consultant	NWARA& MAIL staff costs
Implementation of improved management of water, soil, & agricultural pests / pesticides; increased resilience to climate & other variability	Irrigation flow, crops grown, yields, soil quality, pesticide use, agricultural pests	Monitored locations in agricultural fields	Irrigation records; participatory / farmer self-reporting of other parameters monitoring of pesticides use.	Monthly		
Afforestation – care and maintenance of tree plantations (ongoing watering, fertilizing, protecting from damage of afforested trees while initial saplings grown into mature trees)	Trees surviving/died; tree growth	Afforested locations	Photographs; inventory; girth / height measurements; visual assessment	Included in WUA, IA or CMA monitoring workplans	NWARA PMO RBA, SBA; WUAs, IAs, MAIL PMO DAILs CMA, NWARA design & support consultants	Included in (i) NWARA& MAIL staff costs (ii) WUA, IA or CMA budgets

8. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

8.1. Methodology and Objective of Public Consultation

405. The consultation meetings with men were held with the potentially affected people along the Momen Abad and Sharawan subproject route. The objectives of the meetings were to share the project relevant information with communities and understand their concerns. The information shared included project activities, proposed hydraulic structures to be constructed and their expected impacts on the physical, biological and socio-economic conditions. In coordination with resettlement experts, the concerns of the affected population associated with the project were documented and understood.
406. Public consultation during the environmental screening process of development projects is increasingly considered an important imagination and requirements which increases the authenticity and acceptability of assessment itself but more importantly can possibly enhance the quality of decisions making as well. Stakeholder consultation/participation during various stages of developmental projects helps improve the decision making and ultimately leads towards sustainable development.
407. Stakeholder consultation is a two-way process. For stakeholders, the consultation process is an opportunity to obtain project information, to raise issues and concerns, and ask questions. For the project proponents, the consultation process offers opportunity to understand the stakeholders and their concerns about the project, their needs and aspirations, and also their suggestions that can potentially help shape the project. Listening to stakeholder concerns and feedback can be a valuable source of information that can improve project design and outcomes and help the project proponent to identify and control external risks.
408. The national legislation and ADB safeguard policies require consultations to be carried out particularly with the affected communities as part of the environmental assessment process. The consultation carried out during the present IEE and reported in this Chapter meet these requirements.

8.2. Sub Project IEE Consultation and Disclosure

409. **Overview of Public Consultation Programme.** In each subproject area IEE public consultation meetings (PCM) were held. A total of 8 meetings were held in in head, mid-canal, and tail areas of each RSP. As 3 meetings in Sharawan with men as well as 3 consultation meetings with women (in head, mid-canal, and tail areas of each RSP. Also a total of 2 meetings were held in Momen Abad with men and women (in head, mid-canal, and tail areas of each RSP) Meeting participants were Water User Association (WUA) members, affected people, Community Development Council's head and Mirabs of relevant canal. The dates, places, attendees, and records of these meetings are documented in Annex 6.

410.

411. **Men's Meetings:** The concerns expressed by men who attended meetings at the head, mid-canal, and tail areas of the RSP are shown in the combined Table 29. All of these expressed concerns should be incorporated in the RSP designs.
412. **Women's Meetings:** Female consultation meetings were conducted by national social and gender consultant from 11 to 14 November, 2019 with women participants from up middle and downstream and their view, recommendation and concern have reflected which were focused on domestic water and livestock access points issues. They stated that canal water is an important domestic water source, and therefore they face domestic water supply shortages when there is less water in the canal, typically during the May to Aug/Sep/Oct period. They expect the RSPs will result in more water in the canal during this period, which will benefit them. They expressed a need for domestic water supply physical works – wells or feeder canals to bring water from the irrigation canal to the settlement areas. RSP designs will include water access points for domestic water collection, laundry, and livestock watering. Water access point locations will be identified early in the Project implementation period in consultation with local stakeholders.

Table 26: Public Consultation Meeting location and Dates

Date	Location of meeting		Number of participant	Gender
	District	Village		
11 Nov 2019	Taloqan	Chila Water User Association	(10) Head canal area	Men
14 Nov 2019	Bahrak	Hazar Bagh	(9) Mid canal area	Men
16 Aug 2019	Taloqan	Haji Musa village	(25) Tail canal area	Women
12-Nov-2019	Bahrak	Baghak 2 village	(21) Tail canal area	Women
14-Nov-2019	Bahrak	Hazar Bagh	(14) Tail canal area	Women
12-Nov-2019	Bahrak	Qarildy village	(14) Tail canal area	Women
14-Nov-2019	Bahrak	Hazar Bagh	(15) Tail canal area	Men
		Total	108	

8.3. Disclosure of RSP IEE Findings

413. ADB requires proponents to disclose IEE findings relevant to local stakeholders, in a form, place, and languages accessible to them, prior to Project appraisal. An analogous requirement exists for local disclosure of social safeguards findings. A single combined environmental and social disclosure is planned, recognizing its advantages in efficiency, clarity, and reduced security risk to proponent representatives.
- a) Information relevant to local stakeholders that will be provided includes:
 - b) What will be affected by the subproject?
 - c) When will these impact occur?
 - d) When and how will the impact be mitigated and/or compensated and how?
414. How were concerns expressed by stakeholders in the IEE public consultation meetings addressed by the Project proponents? Have any concerns not been addressed, and if so, which ones and why?
415. Who is available to listen to concerns, answer questions, and receive complaints?
416. The PMO and PIO will prepare a presentation of this information in English and in Dari translation, and, after reviewing it with representative local stakeholders (WUA and IA members, mirabs, elders, district governors, women, etc.), print and distribute brochures and/or handbills to be placed in public places (typically local mosques).

Table 27: Concerns Expressed in RSP Public Consultation Meetings

Concerns	Frequency	Sharawan Thakhar	
		Head	Tail
Don't change canal alignment	2	X	X
Include community structures in the design (animal water and clothes washing points)	2	X	X
Offtake problems	2	X	X
Canal erosion	2	X	
Intake/headwork's problems	2	X	
Land slides into canal	1		X
Land & water levels misaligned in some places	2	X	X
Don't interrupt irrigation water supply during construction	2	X	X
Compensate farmers for crop damage due to temporary construction roads	2	X	X
Hire unskilled labourers locally	2	X	X
Provide a spillway at the head of the canal for flood control	2	X	X
Wash problems	1	X	
Contractor should work according to design	2	X	X

Concern	Frequency	Momen Abad
		Head, Middle and Tail
Don't change canal alignment	1	X
Include community structures in the design (animal water and clothes washing points)	1	X
Offtake problems	1	X
Canal erosion	1	X
Intake/headwork's problems	1	X
Land slides into canal	1	
Land & water levels misaligned in some places	1	X
Don't interrupt irrigation water supply during construction	1	X
Compensate farmers for crop damage due to temporary construction roads	1	X
Hire unskilled labourers locally	1	X
Provide a spillway at the headworks for flood control	-	
Wash problems	-	-
Contractor should work according to design	1	X
Support tree plantation to compensate for tree removal at construction sites	1	X

417. **On ADB Website.** The draft IEE will be disclosed on the ADB website. Any revised IEE received by ADB will be disclosed on the ADB website when it is received. If no revision is made to the IEE, the draft IEE becomes the final document.

418. **Consultation and disclosure during EMP implementation will include:**

419. pre-construction stakeholder involvement in the design of mitigation measures (specifically, in selecting the locations of water access points and afforestation areas);

420. notification to local communities when project activities are going to take place;

421. provision for public participation in environmental monitoring;

422. public consultation during the preparation of biannual environmental monitoring reports;

423. disclosure of biannual environmental monitoring reports on the ADB website; and

424. Local disclosure of monitoring results to local communities.

425. Construction-Phase Consultation and Disclosure Construction-phase environmental monitoring will be incorporated into the on-site work plans and checklists of PIO construction supervisors. These supervisors will be in regular contact with WUAs and IAs to exchange information about monitoring activities and results, construction schedules, activities, progress, complaints, and concerns. WUAs and IAs may arrange to participate in construction monitoring as and when they wish.

- 426. Construction supervisors will include environment-related matters in their regular reporting to PIO management. Management will in turn follow up with stakeholders as needed and appropriate to provide information and resolve issues.
- 427. Notification of upcoming construction and other PARB activities will be provided to WUAs and IAs for posting at construction sites (e.g. signboards) and in places readily accessible to local people.
- 428. **Semi-annual environmental monitoring reports (SAEMRs)** will be prepared documenting environment-related consultation and disclosure events during the reporting period. An example SAEMR outline is provided in Annex 7. WUAs and IAs will be consulted during SAEMR preparation. Monitoring results will be locally disclosed in an appropriate manner. SAEMRs will be disclosed on the ADB website.
- 429. **Operation-Phase Consultation and Disclosure** – When the subprojects become operational, the EMP and operation-phase public consultation plan will be reviewed and revised. Public consultation and disclosure on impacts and mitigation of irrigation scheme operation and knock-on agricultural changes will be mainstreamed into the activities of Project Output 2, improved on-farm water management, and into NWARA activities related to operation and maintenance of water conveyance infrastructure and WUA establishment and capacity building.

9. GRIEVANCE REDRESS MECHANISM

9.1. Introduction

430. A grievance redress mechanism (GRM), consistent with the requirements of the ADB Safeguard Policy Statement (2009) will be established to prevent and address community concerns, reduce risks, and assist the project to maximize environmental and social benefits. In addition to serving as a platform to resolve grievances, the GRM has been designed to help achieve the following objectives: (i) open channels for effective communication, including the identification of new environmental issues of concern arising from the project; (ii) demonstrate concerns about community members and their environmental well-being; and (iii) prevent and mitigate any adverse environmental impacts on communities caused by project implementation and operations. The GRM is accessible to all members of the community including workers of contractors.

9.2. Purpose of GRM

431. The main purpose of the GRM is to educate Project Affected Families (PAFs) about the grievance mechanism and to publicize the complaints procedures to the affected families. It will also inform PAFs about the present arrangement for grievance handling and to assist them to seek redress to unresolved grievance from land acquisition, resettlement dispute and it will also facilitate people who might have objections or concerns regarding the project activities to rise.
432. The GRM was introduced during community consultations and will be publicly available to stakeholders throughout the project and all parties should comply with it particularly the implementation contractor and EA. In the event of a grievance issue, up to three stages will be implemented, as follows;
433. Stage 1 (maximum 7 days): If a concern arises during construction of the Momen Abad canal, the affected person may raise the issue with the contractor. All stakeholders including local residents and the contractors will be aware of the GRM and will be requested to immediately report any incidents to the Project owner. If the issue is resolved directly between the affected person and contractor, no follow-up is required. But the log/record shall be saved in the GRM logbook at the Project owner
434. Stage 2 (maximum 15 days): If the issue is not resolved, the affected person can submit an oral or written complaint to the project authority or district officials. The district and the Project owner will reply within two weeks and keep a written record of the whole process.
435. Stage 3 (maximum 15 days): If the issue is still not resolved, the project owner will, if agreed by the affected person, arrange a meeting with the district officials and relevant community representatives to identify a solution. If the issue still cannot be resolved it will be referred to the relevant higher-level authorities including the specialized inspection agency in the province. The project owner may report the process to ADB at any of Stages 1–3, but will do so immediately if Stage 3 is reached.

436. **Complaints on Similar ADB Water Resources Projects in Afghanistan-** As mentioned previously, the monitoring reports of four similar ADB projects report very small numbers of complaints made to their GRMs, most related to construction site waste management and were resolved relatively quickly.
437. **Model for construction-phase GRM.** The GRM arrangements of the Western Basin Project appear to provide a good model for the Project to adopt.
438. **Construction-phase GRM.** The GRM will be established prior to commencement of construction in PMOs at central level, PIOs at sub-basin / subproject level, and in the WUAs/IAs at construction level. WUA/IA heads will be provided with logbooks for grievied individuals to record complaints and comments, and will be charged to inform their PIO of new logbook entries within one week. PIO will respond to complainants within two weeks of the complaint registration date. PIO construction supervisors will attempt to address the complaint at field level. If they are unsuccessful, they will refer the matter to the PIO director, who may communicate with or call a meeting of contractors, PMO and PIO staff, and/or ISC consultants. If this is unsuccessful, s/he will refer the matter to PMO for resolution. At any time, the complainant has the option of seeking legal remedy.

Figure17: GRM Process Steps

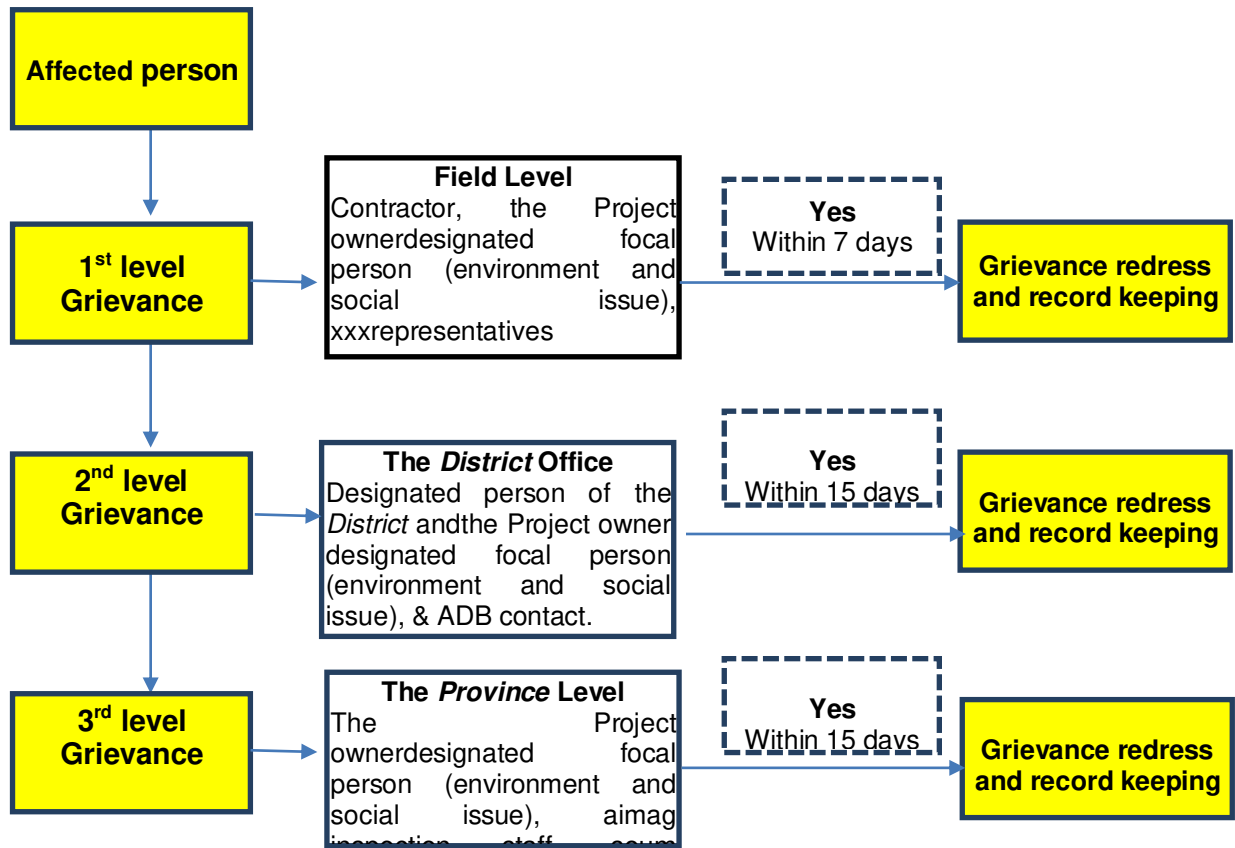
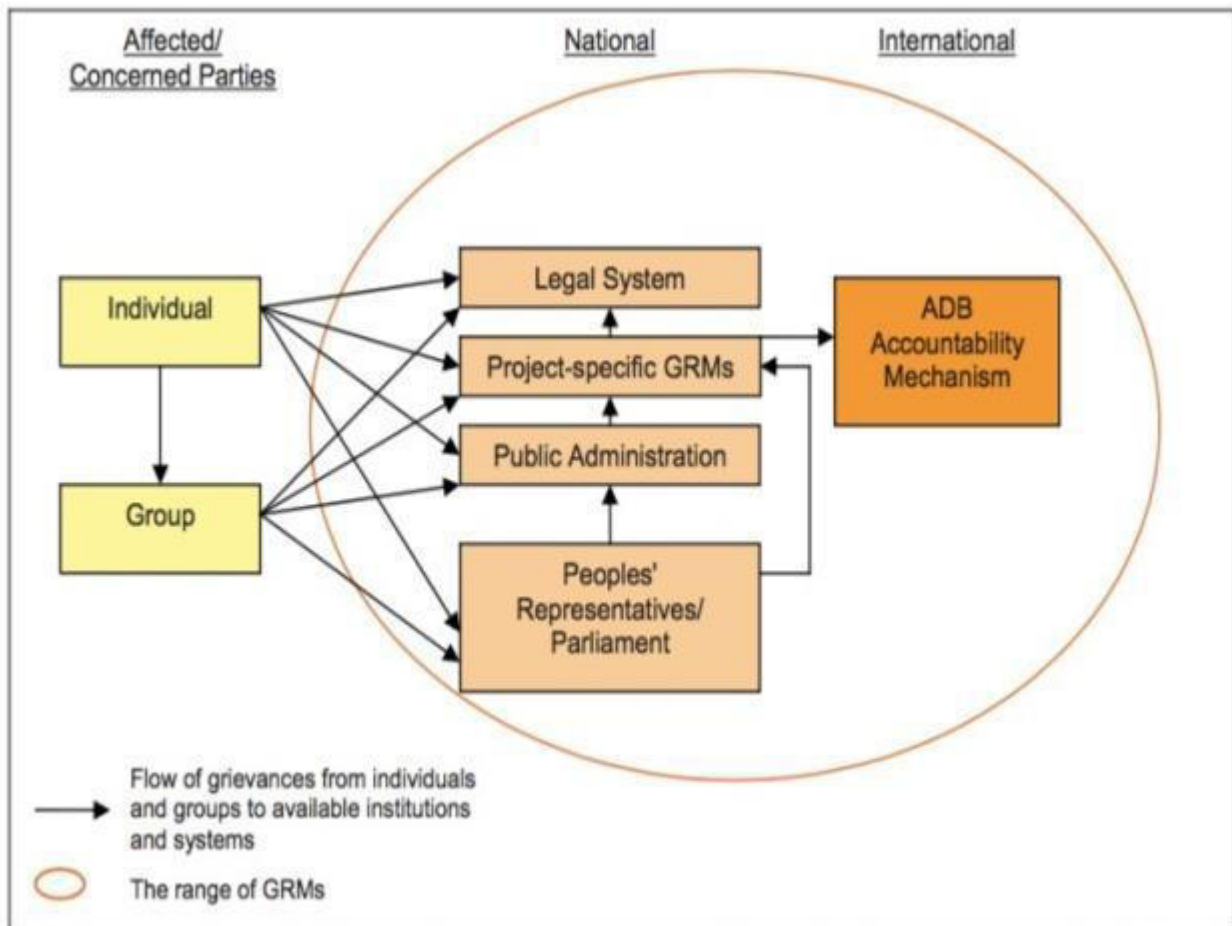


Figure 18: Grievance Redress Mechanism Process Flow Diagram for PARBSP



Adapted from CEPA. 2009. A Review of the Southern Transport Development Project (STDP) Grievance Redress Mechanisms, Consolidated Final Report (ADM/80-046: RSC No. C80610), Colombo.

10. CONCLUSIONS

- 439. Based on site surveys of the locations where structures will be built, and following a review of potential wider impacts following public consultation, the Sharwan Thakkar and Momen Abad projects are not expected to have significant adverse impacts, given the small scale of the works and the fact that it is basically an exercise in rehabilitation and upgrading of an existing irrigation system.
- 440. The project is categorized as B from environmental perspective, and there will be some impact on air quality, noise, water quality, OHS, social impact and removal of 1,199 saplings, medium and large willow and poplar trees. During the construction phase.
- 441. Based on the impact significant analysis, the impacts significant are in the range of low to moderate, and there is no long term and significant impacts.
- 442. Also after implementation of proposed mitigation measures, there won't be any significant residual impact
- 443. This IEE and EMP provided the mitigation measure to avoid or minimize the impacts and also for tree removal, tree management plan provided and attached as annex 12.
- 444. Also as offset mitigation measure 12,000 sapling will be replanted in project area. Consultation conducted with DAIL, and NEPA provincial directorate for the identifying the location for the replantation. The responsibility of these trees will be upon community and WUAs.

11. Recommendations

- 445. Appropriate mitigation measures for all significant impacts are recommended and presented in this IEE. To ensure implementation, the recommended mitigation measures shall be included in the detailed engineering design or in the tender documentation, either as contract and/or special technical specification clauses.
- 446. In addition, adequate budget shall be allocated for the mitigation and management actions in the obligations of the Contractor and the Construction Supervision Consultant, and necessary institutional/specialist arrangement is made for their implementation before the commencement of the construction works.
- 447. Further, a well-planned monitoring programme should be instituted in order to follow up the proper implementation of the IEE and EMP recommendations and their effectiveness, as well as incidence of any unforeseen issues.

12. Annexes

Annex 1: Environmental Screening Checklist for subprojects

Annex 1a: - Environmental Screening Checklist for Sharawan Thakhar Subproject

Instructions:

- (i) The Project team completes this checklist for each potential subproject to support its classification as ADB environment category A, B, or C.
- (ii) The checklist focuses on environmental issues and concerns. Social screening instruments should be used to screen for social dimensions such as involuntary resettlement, indigenous peoples, poverty reduction, and gender.
- (iii) Complete checklist items for the “without mitigation” case to identify potential environmental impacts. Document potential mitigation measures in the “remarks” column.

Subproject name: Sharawan canal, Taloqan, Takhar province

Subproject location: N 36.726251
E 69.576445

Screening Questions	Yes	No	Remarks
A. Subproject Siting Is the Subproject area adjacent to or within any of the following environmentally sensitive areas? (Attach additional sheets if needed for remarks)			
▪ Protected Area		No	No nearby protected area in Sharwan Thakkar canal area.
▪ Wetland		No	No wetland in Sharwan Thakkar area.
▪ Mangrove		No	No mangrove in Sharwan Thakkar area.
▪ Estuarine		No	No estuarine area in Sharwan Thakkar
▪ Buffer zone of protected area		No	No protected area Buffer zone in Sharwan Thakkar .
▪ Special area for protecting biodiversity		No	Not a special area for protecting biodiversity
B. Potential Environmental Impacts Will the subproject cause...			

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Loss of precious ecological values (e.g. result of encroachment into forests/swamplands or historical/cultural buildings/areas, disruption of hydrology of natural waterways, regional flooding, and drainage hazards)? 		No	This project area is not on or near such kind of ecologically valuable land.
<ul style="list-style-type: none"> Conflicts in water supply rights and related social conflicts? 		No	The objective of the PARB project is not just infrastructure rehabilitation and upgrading, but improved water management. This second objective will include training the WUA in improved water allocation canal management plan that will minimize historical inequities. Social conflicts here are largely irrigation water-related, so improved distribution of water will reduce such conflicts.
<ul style="list-style-type: none"> Impediments to movements of people and animals? 		No	The project includes improved footpaths. Infrastructure will not impede movement of animals or people.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Potential ecological problems due to increased soil erosion and siltation, leading to decreased stream capacity? 	Yes		<p>The project not only improves irrigation command area canal structures, but also has a watershed catchment component to provide inputs to the upgrade watersheds that reduce erosion to the downgrade canal system and farmers' fields.</p> <p>Potential impacts:</p> <p>(i) construction phase – during excavation & operation of diversion canals built to avoid irrigation interruption and construction in the dry. (ii) The project will reduce sedimentation from washes. Not a project impact, but landslides sometimes bring sediment into portions of canals sited at the foot of unstable slopes. This is an on-going maintenance problem for the community.</p>
<ul style="list-style-type: none"> Insufficient drainage leading to salinity intrusion? 		No	<p>Drainage is not a problem in this irrigation system.</p> <p>This impact presumably refers to salinity intrusion changes due to reduced flushing (i.e. rather than insufficient drainage per se) in coastal/estuarine etc. settings.</p>
<ul style="list-style-type: none"> Over pumping of groundwater, leading to salinization and ground subsidence? 		No	<p>Groundwater pumping for irrigation is not a part of this project. Some households pump groundwater from shallow wells for domestic use.</p>

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Impairment of downstream water quality and therefore, impairment of downstream beneficial uses of water? 		No	The improved infrastructure in this project does not change historical water quality or quantity conditions for the downstream users. More efficient irrigation water usage can increase downstream supplies. Watershed protection inputs will reduce silt-laden runoff downstream.
<ul style="list-style-type: none"> Dislocation or involuntary resettlement of people? 	Yes		<p>No people will be resettled.</p> <p>If privately-owned trees (on publicly- or privately-owned land) are removed during site preparation, owners will be compensated</p>
<ul style="list-style-type: none"> Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups? 		No	The canal improvement have no any adverse impacts on poor, women, children and other vulnerable groups. Such kind of people don't have any property close to the structures going to be constructed or improved.
<ul style="list-style-type: none"> Potential social conflicts arising from land tenure and land use issues? 		No	Land ownership disputes are not occurring or expected in this area. Land registration documentation in this area dates to >40 years ago and is functioning relatively well.
<ul style="list-style-type: none"> Soil erosion before compaction and lining of canals? 		No	This impact occurs when canals are re-sectioned and compaction/lining is delayed. No re-sectioning is proposed in this project
<ul style="list-style-type: none"> Noise from construction equipment? 	Yes		Contractor will discuss works schedule in consultation with farmers & WUA's.
<ul style="list-style-type: none"> Dust during construction? 	Yes		Contractor will discuss works schedule in consultation with farmers & WUA's.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Waterlogging and soil salinization due to inadequate drainage and farm management? 		No	Improved water management strategies imparted to the farmers through training given to the WUAs means that waterlogging and salinization problems will be less than in the past.
<ul style="list-style-type: none"> Leaching of soil nutrients and changes in soil characteristics due to excessive application of irrigation water? 		No	
<ul style="list-style-type: none"> Reduction of downstream water supply during peak seasons? 		No	Not only will each irrigation subproject WUA be trained in better water management, but also the River Basin and Sub-basin Agencies will receive training in more efficient and equitable water allocations among the basin's irrigation systems. Both physical and non-physical interventions are expected to improve water supply to tail areas.
<ul style="list-style-type: none"> Soil pollution, polluted farm runoff and groundwater, and public health risks due to excessive application of fertilizers and pesticides? 		No	In the OFWM component of the project farmers will be trained to not overuse fertilizers and pesticides.
<ul style="list-style-type: none"> Soil erosion (furrow, surface)? 			This is a problem of over-watering due to poor agricultural practices, and will be dealt with in the training in OFWM component of the project.
<ul style="list-style-type: none"> Scouring of canals? 		No	The redesign of the canal system with improved hydraulic control structures will not result in scouring of canals. Canal design is based on maintaining a non-scour, non-degradation condition during canal operation.

Screening Questions	Yes	No	Remarks
▪ Clogging of canals by sediments?	Yes		This is an annual maintenance task of the irrigators. This issue will be addressed in O&M training given to the WUAs.
▪ Clogging of canals by weeds?	Yes		This is an annual maintenance task of the irrigators. This issue will be addressed in O&M training given to the WUAs.
▪ Seawater intrusion into downstream freshwater systems?		No	
▪ Introduction of increase in incidence of waterborne or water related diseases?		No	The project will not increase this problem; waterborne or water related diseases is present so long as animals and people are using canal water.
▪ Dangers to a safe and healthy working environment due to physical, chemical and biological hazards during project construction and operation?	Yes		Most work will be done using manual labour and tools, but limited amounts of equipment and vehicle related air pollution is possible. Fuel and lubricants; welding materials; concrete materials. Solid and liquid construction and domestic waste. Most will be away from settled areas. Contractor is obliged to manage, monitor and report on this.
▪ Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		No	The size of the contract is relatively small so the number of skilled labourers and engineer managers needed from outside the area is also small. They can easily fit into the local community for housing needs. Most unskilled labourers are local residents

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Social conflicts if workers from other regions or countries are hired? 		No	Most unskilled labourers are local residents. Contractors know they must hire local labourers because this is one of the demands from insurgent groups in the area who are also part of the local communities. WUA rules require unskilled labour hired locally, contractor requirement. Labour can be allocated on a rotating basis so that more families benefit
<ul style="list-style-type: none"> Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation? 	Yes		Limited amounts of equipment and vehicle fuel and lubricants.
<ul style="list-style-type: none"> Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., irrigation dams) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? 	Yes		Safety infrastructure: large structure designs will include fences/gates, handrails etc. Unexploded ordinance: risks to workers and community members during construction and O&M. Mitigation-preconstruction mine clearance certification.

Annex 1b: - Environmental Screening Checklist for Momem Abad Subproject

Instructions:

- (i) The Project team completes this checklist for each potential subproject to support its classification as ADB environment category A, B, or C.
- (ii) The checklist focuses on environmental issues and concerns. Social screening instruments should be used to screen for social dimensions such as involuntary resettlement, indigenous peoples, poverty reduction, and gender.
- (iii) Complete checklist items for the “without mitigation” case to identify potential environmental impacts. Document potential mitigation measures in the “remarks” column.

Subproject name:

Momen Abad canal, Khwaja Bahauadin Distirct, Takhar province

**Subproject
location:**

**N 37.4357441
E 69.5678557**

Screening Questions	Yes	No	Remarks
C. Subproject Siting Is the Subproject area adjacent to or within any of the following environmentally sensitive areas? (Attach additional sheets if needed for remarks)			
▪ Protected Area		No	No nearby protected area in Momen Abad canal area.
▪ Wetland		No	No wetland in Momen Abad area.
▪ Mangrove		No	No mangrove in Momen Abad area.
▪ Estuarine		No	No estuarine area in Momen Abad
▪ Buffer zone of protected area		No	No protected area Buffer zone in Momen Abad area.
▪ Special area for protecting biodiversity		No	Not a special area for protecting biodiversity
D. Potential Environmental Impacts Will the subproject cause...			
▪ Loss of precious ecological values (e.g. result of encroachment into forests/swamplands or historical/cultural buildings/areas, disruption of hydrology of natural waterways, regional flooding, and drainage hazards)?		No	This project area is not on or near such kind of ecologically valuable land.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Conflicts in water supply rights and related social conflicts? 		No	The objective of the PARB project is not just infrastructure rehabilitation and upgrading, but improved water management. This second objective will include training the WUA in improved water allocation canal management plan that will minimize historical inequities. Social conflicts here are largely irrigation water-related, so improved distribution of water will reduce such conflicts.
<ul style="list-style-type: none"> Impediments to movements of people and animals? 		No	The project includes improved footpaths. Infrastructure will not impede movement of animals or people.
<ul style="list-style-type: none"> Potential ecological problems due to increased soil erosion and siltation, leading to decreased stream capacity? 	Yes		<p>The project not only improves irrigation command area canal structures, but also has a watershed catchment component to provide inputs to the upgrade watersheds that reduce erosion to the downgrade canal system and farmers' fields.</p> <p>Potential impacts:</p> <p>(i) construction phase – during excavation & operation of diversion canals built to avoid irrigation interruption and construction in the dry. (ii) The project will reduce sedimentation from washes. Not a project impact, but landslides sometimes bring sediment into portions of canals sited at the foot of unstable slopes. This is an on-going maintenance problem for the community.</p>

Screening Questions	Yes	No	Remarks
▪ Insufficient drainage leading to salinity intrusion?		No	Drainage is not a problem in this irrigation system. This impact presumably refers to salinity intrusion changes due to reduced flushing (i.e. rather than insufficient drainage per se) in coastal/estuarine etc. settings.
▪ Over pumping of groundwater, leading to salinization and ground subsidence?		No	Groundwater pumping for irrigation is not a part of this project. Some households pump groundwater from shallow wells for domestic use.
▪ Impairment of downstream water quality and therefore, impairment of downstream beneficial uses of water?		No	The improved infrastructure in this project does not change historical water quality or quantity conditions for the downstream users. More efficient irrigation water usage can increase downstream supplies. Watershed protection inputs will reduce silt-laden runoff downstream.
▪ Dislocation or involuntary resettlement of people?	Yes		No people will be resettled. If privately-owned trees (on publicly- or privately-owned land) are removed during site preparation, owners will be compensated
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		No	The canal improvement have no any adverse impacts on poor, women, children and other vulnerable groups. Such kind of people don't have any property close to the structures going to be constructed or improved.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Potential social conflicts arising from land tenure and land use issues? 		No	Land ownership disputes are not occurring or expected in this area. Land registration documentation in this area dates to >40 years ago and is functioning relatively well.
<ul style="list-style-type: none"> Soil erosion before compaction and lining of canals? 		No	This impact occurs when canals are re-sectioned and compaction/lining is delayed. No re-sectioning is proposed in this project
<ul style="list-style-type: none"> Noise from construction equipment? 	Yes		Contractor will discuss works schedule in consultation with farmers & WUA's.
<ul style="list-style-type: none"> Dust during construction? 	Yes		Contractor will discuss works schedule in consultation with farmers & WUA's.
<ul style="list-style-type: none"> Waterlogging and soil salinization due to inadequate drainage and farm management? 		No	Improved water management strategies imparted to the farmers through training given to the WUAs means that waterlogging and salinization problems will be less than in the past.
<ul style="list-style-type: none"> Leaching of soil nutrients and changes in soil characteristics due to excessive application of irrigation water? 		No	
<ul style="list-style-type: none"> Reduction of downstream water supply during peak seasons? 		No	Not only will each irrigation subproject WUA be trained in better water management, but also the River Basin and Sub-basin Agencies will receive training in more efficient and equitable water allocations among the basin's irrigation systems. Both physical and non-physical interventions are expected to improve water supply to tail areas.

Screening Questions	Yes	No	Remarks
▪ Soil pollution, polluted farm runoff and groundwater, and public health risks due to excessive application of fertilizers and pesticides?		No	In the OFWM component of the project farmers will be trained to not overuse fertilizers and pesticides.
▪ Soil erosion (furrow, surface)?			This is a problem of over-watering due to poor agricultural practices, and will be dealt with in the training in OFWM component of the project.
▪ Scouring of canals?		No	The redesign of the canal system with improved hydraulic control structures will not result in scouring of canals. Canal design is based on maintaining a non-scour, non-degradation condition during canal operation.
▪ Clogging of canals by sediments?	Yes		This is an annual maintenance task of the irrigators. This issue will be addressed in O&M training given to the WUAs.
▪ Clogging of canals by weeds?	Yes		This is an annual maintenance task of the irrigators. This issue will be addressed in O&M training given to the WUAs.
▪ Seawater intrusion into downstream freshwater systems?		No	
▪ Introduction of increase in incidence of waterborne or water related diseases?		No	The project will not increase this problem; waterborne or water related diseases is present so long as animals and people are using canal water.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Dangers to a safe and healthy working environment due to physical, chemical and biological hazards during project construction and operation? 	Yes		Most work will be done using manual labour and tools, but limited amounts of equipment and vehicle related air pollution is possible. Fuel and lubricants; welding materials; concrete materials. Solid and liquid construction and domestic waste. Most will be away from settled areas. Contractor is obliged to manage, monitor and report on this.
<ul style="list-style-type: none"> Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? 		No	The size of the contract is relatively small so the number of skilled labourers and engineer managers needed from outside the area is also small. They can easily fit into the local community for housing needs. Most unskilled labourers are local residents
<ul style="list-style-type: none"> Social conflicts if workers from other regions or countries are hired? 		No	Most unskilled labourers are local residents. Contractors know they must hire local labourers because this is one of the demands from insurgent groups in the area who are also part of the local communities. WUA rules require unskilled labour hired locally, contractor requirement. Labour can be allocated on a rotating basis so that more families benefit
<ul style="list-style-type: none"> Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation? 	Yes		Limited amounts of equipment and vehicle fuel and lubricants.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., irrigation dams) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? 	Yes		<p>Safety infrastructure: large structure designs will include fences/gates, handrails etc.</p> <p>Unexploded ordinance: risks to workers and community members during construction and O&M. Mitigation-preconstruction mine clearance certification.</p>

Annex 2: General Description of Proposed Subproject Structures

Annex 2a: - General Description of Proposed Sharawan Structures

As per the reconnaissance survey 8 structures are prioritized to be constructed along the Sharawan canal general conditions of each prioritized structure are described below. The location of the structures, including anticipated environmental impacts and its mitigation measures are explained as well.

1. Main Intake (Headwork of Sharawan canal)

Sharawan canal gets its water through a constructed headwork from the Taloqan River. Onwards the canal passes through 8 numbers of gated regulating structures and ultimately reaches the canal headwork. Due to concentration of flow in the Taloqan River towards of Sharawn canal, most of the river has been regulated to Sharawan canal and upstream of the headwork. The automatic spillway due to insufficient head cannot carry out the sediments

The high flood flow in the main canal caused damages in upstream and downstream of the headwork. This floodwater also destroying the public agriculture property. Some part of the u/s and d/s bank is washed away. To protect the costly constructed headwork, upstream and downstream lands the community, SBA wants to provide protection walls in the u/s and d/s of the headwork. The main canal is about 96 Km length and it has capacity to carry up to 40 m³ /sec. It has silted up in many places and crosses a great number of torrents.

Recommendations

- Construction of new headwork around 1-1.5 km upstream from the existing headwork.
- Construction of sedimentation basin.
- Construction of Automatic spillway and sluice gates.
- Construction of canal lining to link existing head works with new one.

The proposed aforementioned structures have no significant environmental impacts, some impacts are anticipated like surface water contamination, nuisance to aquatic animals, occupational health and safety, damage to vegetation result from access road...etc. for which the environmental mitigation measures are mentioned in (table 21).



Annex 2b: - General Description of Proposed Momen Abad Structure

As per the reconnaissance survey 8 structures are prioritized to be constructed along the Momen Abad canal. General conditions of each prioritized structure are described below. The location of the structures, including anticipated environmental impacts and its mitigation measures are explained as well.

1. Qilirdi off-take & cross regulator

This off-take receives water from Momen Abad main canal. The off-take is un-gated and has no control over flow. Farmers used to put sand bags in the Momen Abad canal to get the required amount of water. The non-proportional distribution of flow is created conflict between upstream and downstream water users and farmers. Furthermore, the canal bank is partly washed away.

Recommendations.

- ❖ To avoid water losses and to have a better control of the canal discharge, a drop structure with proportional divider plus one culvert is the appropriate solution.
- ❖ A pier wall in between off-take and main canal is required to divide the flow proportionally.

The proposed structure has no significant environmental impacts, some minor impacts are anticipated like tree cutting, interruption in irrigation system, surface water contamination, nuisance to the local residents, occupational health and safety, dust generation...etc. which are mentioned in environmental mitigation plan (**Table 21**).



2. Parchawa Haji Tawildar spillway

At this part of the Momen Abad main canal, one spillway is present. This spillway doesn't have any type of structure or gates; it is controlled with sand bags, woods, and local materials. Most of the time, flow is spilling from the top of the constructed local spillway. It causes breaches, bank sliding, and in the downstream of the spillway, canal bed erosion. To have better control of the flow, protect the canal bank, and avoid canal bank erosion, construction of an automatic spillway is needed.

Recommendations.

- ❖ Construction of an automatic spillway along with controlling sluice gates are required.
- ❖ To protect the canal about 50 m in upstream and downstream of the spillway is required.

❖ Construction of a foot bridge is a proper solution for moving people from one side to other side of the canal.

The proposed structure has no significant environmental impacts, some minor impacts are anticipated like interruption in irrigation system, surface water contamination, nuisance to the local residents, occupational health etc. which are mentioned in environmental mitigation plan (**Table 21**)



3. Haji Gul Tash canal lining 200m

At this point the Momen Abad canal passes through the weak zone. The weak zone causes bank sliding, breaches, erosion and water losses. This phenomenon decreases the canal carrying efficiency and during irrigation season downstream water users don't receive sufficient irrigation water to be able to irrigate their agriculture lands. To avoid water losses, protect banks from sliding and erosion the best solution is to line the main canal at this portion.

Recommendations

- ❖ To avoid water losses and to have a better control of the canal discharge 200m canal lining is a suitable solution for this problem.
- ❖ To avoid tree cutting which have adverse impacts on surrounding environment it is recommended to design RCC canal lining instead of stone masonry.

The proposed structure has no significant environmental impacts, some minor impacts are anticipated like damage to vegetation, tree cutting, interruption in irrigation system, surface water contamination, nuisance to the local residents , occupational health and safety and...Etc. which are mentioned in environmental mitigation plan (**Table 21**).



4. Haji Hashim off-take

This off-take receives water from Momen Abad main canal. The off-take is un-gated and has no control over flow. Farmers used to put woods, sand bags in the Momen Abad canal to get the required amount of water. The non-proportionally distribution flow is created conflict between upstream and downstream water users as well as the canal bank is partly washed away.

Recommendations.

- ❖ To avoid water losses, have better control of water flow, and to regulate the required amount of flow in the off-taking canal a drop structure at the main canal with proportional divider plus one culvert is the appropriate solution.
- ❖ A pier walls in between off-take and main canal is required to divide the flow proportionally.

The proposed structure has no significant environmental impacts, some minor impacts are anticipated like damage to vegetation, tree cutting, interruption in irrigation system, surface water contamination, nuisance to the local residents, occupational health and safety...etc. which are mentioned in environmental mitigation plan (**Table 21**).



5. Parchawa Haji Janat Gul spillway

At this part of the Momen Abad main canal, one spillway is present. This spillway has stone masonry constructed structure but it is damaged in several parts, it has cracked from the middle of the structure. To control the flow farmers used to put sand bags, woods and local materials. Most of the time flow is spilling from the top of the constructed local spillway. It causes breaches, bank sliding and in downstream of spillway canal bed erosion. To have better control of the flow, protect canal bank and avoid canal bank erosion construction of automatic spillway is needed.

Recommendations.

- ❖ To avoid water losses and to have a better control of the canal flow, replacement of existing spillway with construction of new spillway is suitable solution for this problem.
- ❖ Construction of new foot bridge is a proper solution for the existing wooden foot bridge.
- ❖ Canal lining of both side of the canal from spillway up to Foot Bridge is a proper solution for the canal bank sliding and erosion.

The proposed structure has no significant environmental impacts, some minor impacts are anticipated like damage to vegetation , tree cutting, interruption in irrigation system, surface water contamination, nuisance to the local residents , occupational health and safety, dust generation , air pollution...etc. which are mentioned in environmental mitigation plan (**Table 21**).



Annex 3: AIR and NOISE quality standard

Table3a: Ambient Air Quality Standards (Nation and International)

Parameters	Duration	Afghani stan (NEPA)	WHO Guidelin e Limits	United states of America(USEPA)	India	Pak-EPA
TSP $\mu\text{g}/\text{m}^3$	24 hours	300				500
PM10 $\mu\text{g}/\text{m}^3$	24 hours Annual	150 70	50 20	*150	100 60	150 120
PM2.5 $\mu\text{g}/\text{m}^3$	24 hours Annual	75 35	25 10	* & **35 *12 **15	60 40	35 15
NO2 $\mu\text{g}/\text{m}^3$	24 hours Annual	80 40	40	1 hr *100 * & **53	80 40	80 40
SO2 $\mu\text{g}/\text{m}^3$	24 hours Annual	50	20	1 hr *75 3 hr **50	80 50	120
O3 $\mu\text{g}/\text{m}^3$	8 hours	100	100	* & **70	100	100
CO $\mu\text{g}/\text{m}^3$	8 hours 1 hour Half hour	10 30 60	9	*9 *35	20 40	5 10
Pb $\mu\text{g}/\text{m}^3$	Annual	0.5	-	(3 Month Avg) * & ** 0.15	0.5	1.0

Source: Afghan National Standards Authority (ANSA)

Table 3b: Guideline values for community noise in specific environments as per WHO:

Specific environment	Critical health effect(s)	LAeq [dB]	Time base [hours]	LAm _{ax} , fast [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	—
	Moderate annoyance, daytime and evening	50	16	—
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60
School class rooms and pre-schools, indoors	Speech intelligibility, disturbance of information extraction, message communication	35	During class	—
Pre-school Bedrooms, indoors	Sleep disturbance	30	Sleeping time	45
School, playground outdoor	Annoyance (external source)	55	During Play	—
Hospital, ward rooms, indoors	Sleep disturbance, night-time	30	8	40
	Sleep disturbance, daytime and evenings	30	16	
Hospitals, treatment rooms, indoors	Interference with rest and recovery	#1		
Industrial, commercial, shopping and traffic areas, indoors and Outdoors	Hearing impairment	70	24	110
Ceremonies, festivals and entertainment events	Hearing impairment (patrons:<5 times/year)	100	4	110
Public addresses, indoors and outdoors	Hearing impairment	85	1	110
Music through headphones/ Earphones	Hearing impairment (free-field value)	85 #1	1	110

Impulse sounds from toys, fireworks and firearms	Hearing impairment (adults)	—	—	140 #2
	Hearing impairment (children)	—	—	120 #2
Outdoors in parkland and conservation areas	Disruption of tranquillity	#3		

#1: as low as possible;

#2: peak sound pressure (not L_{Amax}, fast), measured 100 mm from the ear;

#3: existing quiet outdoor areas should be preserved and the ratio of intruding noise to natural background sound should be kept low;

#4: under headphones, adapted to free-field values

Annex 4: AFGHANISTAN Protected Species

Table A 1: Afghanistan Protected Species List (NEPA, 2018)

No	Species name	Scientific Name
01	Snow leopard	Panthera uncia
02	Gray wolf	Canis lupus
03	Asiatic brown bear	Ursus arctos
04	Paghman salamander	Paradactylodon mustersi
05	Goitered gazelle	Gazella subgutturosa
06	Saker falcon	Falco cherrug
07	Markhor	Capra falconeri
08	Himalayan elm tree	Ulmus wallichiana
09	East Himalayan fir	Abies spectabilis
10	Large-billed reed warbler	
11	Eastern barbastelle	Barbastella leucomela
12	Bactrian deer	Cervus elaphus bactrianus
13	Indian gazelle	Gazella bennetti
14	Striped hyena	Hyaena hyaena
15	Stone marten	Martes foina
16	Mehely's horseshoe bat	Rhinolophus mehelyi
17	Blanford's fox	Vulpes cana

18	Large-billed reed warbler	Acrocephalus orinus
19	Eastern imperial eagle	Aquila heliaca
20	Pallas' fish eagle	Haliaeetus leucoryphus
21	White-rumped vulture	Gyps bengalensis
22	Marbled teal	Marmaronetta angustirostris
23	Dalmation pelican	Pelecanus crispus
24	Sociable lapwing	Vanellus gregarious
25	Marco Polo sheep	Ovis ammon polii

¹<https://www.afghan-web.com/plants-and-animals/protected-species/>

Table A 2: IUCN Species of Conservation Significance Found in Afghanistan

Scientific Name	CommonName	Category
<i>Gypsbengalensis</i>	White-rumped Vulture	CR
<i>Grusleucogeranus</i>	SiberianCrane	CR
<i>Vanellusgregarious</i>	SociableLapwing	CR
<i>Acrocephalusorinus</i>	Large-billedReed-warbler	DD
<i>Oxyuraleucocephala</i>	White-headedDuck	EN
<i>Neophronpercnopterus</i>	EgyptianVulture	EN
<i>Aythya nyroca</i>	FerruginousDuck	NT
<i>Aegypiusmonachus</i>	CinereousVulture	NT
<i>Circusmacrourus</i>	PallidHarrier	NT
<i>Falcojugger</i>	LaggarFalcon	NT
<i>Tetraxtetrax</i>	LittleBustard	NT
<i>Numeniusarquata</i>	EurasianCurlew	NT
<i>Limosalimosa</i>	Black-tailedGodwit	NT
<i>Glareolanordmanni</i>	Black-wingedPratincole	NT
<i>Coraciasgarrulous</i>	EuropeanRoller	NT
<i>Phylloscopustytleri</i>	Tytler'sLeaf-warbler	NT
<i>Pelecanuscrispus</i>	DalmatianPelican	VU
<i>Marmaronettaangustirostris</i>	MarbledTeal	VU
<i>Haliaeetusleucoryphus</i>	Pallas'sFish-eagle	VU
<i>Aquilaclanga</i>	GreaterSpottedEagle	VU
<i>Aquila heliaca</i>	EasternImperialEagle	VU
<i>Falcocherrug</i>	SakerFalcon	VU
<i>Chlamydotisundulate</i>	HoubaraBustard	VU
<i>Otistarda</i>	GreatBustard	VU
<i>Columbaeversmanni</i>	Pale-backedPigeon	VU

Note: CR = Critically, EN = endangered, VU = Vulnerable, NT = near-threatened, DD = data deficient, Source: BirdlifeInternational2004

Table A 3: List of Migratory Birds in Afghanistan

Sr No	Scientific Name	English Name
1	<i>Podicipedide</i>	Grebes
2	<i>Pelecaniformes</i>	Pelicans
3	<i>Ardeidae</i>	Herons
4	<i>Threskiornithidae</i>	Plataleidae
5	<i>Ciconiiformes</i>	Ciconiiformes
6	<i>Phoenicopterus chilensis</i>	Flamingos
7	<i>Anas platyrhynchos</i>	Ducks
8	<i>Falco peregrinus</i>	Falcon
9	<i>Phasianide</i>	Pheasants
10	<i>Gruiformes</i>	Cranes
11	<i>Otididae</i>	Bustard
12	<i>Jacanidae</i>	Jacanas
13	<i>Rostratula benhalensis</i>	Greater painted-snipe
14	<i>Recurvirostridae</i>	Stilts and avocets
15	<i>Charadrius novosus</i>	Charadriidae
16	<u><i>Charadriiformes</i></u>	<u>Laridae</u>
17	<i>Petroclidae</i>	Sandgrouse
18	<i>Columbidae</i>	Pigeons and Doves
19	<i>Psittaciformes</i>	Parrot
20	<i>Phalacrocorax carbo</i>	Great Cormorant
21	<i>Phalacrocorax pygmeus</i>	Pygmy Cormorant
22	<i>Egretta garzetta</i>	Little Egret
23	<i>Casmerodius alba</i>	Great Egret
24	<i>Ardea cinerea</i>	Grey Heron
25	<i>Plegadis falcinellus</i>	Glossy Ibis
26	<i>Plegadis falcinellus</i>	Glossy Ibis
27	<i>Platalea leucorodia</i>	Eurasian Spoonbill
28	<i>Anser anser</i>	Greylag Goose
29	<i>Tadorna ferruginea</i>	Ruddy Shelduck
30	<i>Tadorna tadorna</i>	Common Shelduck
31	<i>Anas crecca</i>	Common Teal
32	<i>Anas querquedula</i>	Garganey
33	<i>Mergellus albellus</i>	Smew
34	<i>Anas strepera</i>	Gadwall
35	<i>Anas Penelope</i>	Eurasian Wigeon

Annex 5: Environmental Safeguard Clauses; Construction Contract

Environmental Protection and Control of Pollution General

The Contractor shall observe and comply with all National Laws, Government Regulations, Presidential Decrees, and Ministerial Regulations pertaining to environmental protection, pollution control, waste management and biodiversity protection.

1. In conducting his construction activities, the Contractor shall take all necessary precautions to minimise environmental disturbance to the project area and surroundings and to prevent the escape of polluting substances into streams, water courses, and groundwater. The Contractor shall also utilise all necessary practicable methods and devices as are available to prevent and otherwise minimize atmospheric emissions or discharges of air contaminants.
2. Except where otherwise agreed or provided for by the Employer or expressly stipulated in Particular Specifications or Technical Specifications forming part of the Contract Documents, no separate payment will be made for complying with the provisions of this Clause and attendant sub-clauses; and all costs shall be deemed to be included in the prices for the Contractor's mobilisation for construction, and the various rates and lump sum items for the works included in the priced Bill of Quantities.

1. Pollution of Water Courses and Streams

3. The emission of polluting liquids or other waste into drains, water courses, or groundwater shall not be permitted.
4. No concrete or cement washings from the works or drainage from the Contractor's concrete batching and mixing areas, asphalt (hot mix) plants, or other manufacturing or production facilities shall be allowed to discharge into streams or drains without passing through an adequate system of settling ponds.
5. Storage of fuels, fuelling and maintenance of plant and vehicles, etc. shall take place only on sites and under conditions that do not allow spilt fuels to be discharged to water bodies. Fuel storage and fuelling areas shall be equipped with adequate protective measures to confine and retain accidental spillages. No drainage from fuel store and plant maintenance depots shall be allowed to be discharged without passing through an adequate arrangement of oil traps and separators.
6. Washing of vehicles shall not be permitted in streams but only in specially designated and equipped areas.
7. Operations in quarries and borrow areas shall be carried out in such a way as to minimize any possible pollution from particulate matter entering the streams.
8. Adequate sanitary waste control facilities shall be provided in site offices and workers camps, and sewage waste shall be collected regularly and disposed in accordance with relevant environmental legislation.
9. The Contractor shall accordingly be responsible for the installation, operation and maintenance of a comprehensive drainage system to all areas of the Works. The system shall be constructed such that no discharges of oil, cement, silt or other liquid or solid waste matter can enter the streams and water courses at the site; and it shall have all necessary solid waste and sediment traps, settling ponds, oil separators, etc., required to ensure that pollution of streams watercourses and natural bodies of water does not occur. The Contractor shall be responsible for maintaining the system to the satisfaction of the Employer's Construction

Supervisor and all costs of providing the system shall be deemed to be included in the various rates and lump sum items for the works included in the priced Bill of Quantities.

2. Air Pollution

11. The Contractor shall take all necessary steps to minimize air pollution resultant from his operations.

12. The contractor must to monitor dust regularly and do not allow the generated dust to increase from the national and international standards and pay more attention to the sensitive receptors like residential areas, environmentally sensitive places.

13. Except where stipulated in these Specifications for the disposal of natural vegetation and organic materials from clearing operations, the burning of waste materials for disposal, particularly oil and petroleum wastes, rubber, plastic and similar materials will not be permitted.

14. During the performance of the work required under the Contract or of any operations appurtenant thereto, whether on the Project Site or elsewhere, the Contractor shall take all steps necessary, and shall furnish all labour, equipment, materials and means, required to reduce dust nuisance from the Works, and to prevent dust originating from his operations from damaging crops, orchards, cultivated fields, and dwellings; or causing a nuisance to persons. The Contractor shall be held liable for any damage resulting from dust originating from his operations including on Government roads, rights-of-way or elsewhere.

15. The emission of dust into the atmosphere shall not be permitted during the manufacture, handling and storage and handling of cement and of concrete aggregates, and the Contractor shall use such methods and equipment as are necessary for the prevention, or the collection and disposal, of dust during such operations. All truck-loads of loose materials shall be covered during transportation

16. Concrete batching and mixing areas, asphalt (hot mix) plants, or other manufacturing or production facilities shall be sited at least 500m from the nearest habitation. Emission outlets shall be fitted with pollution control devices in compliance with relevant current Government of Afghanistan emission control legislation.

17. The cost of spraying water on haul roads, access roads, government roads, aggregate stockpiles, etc.; or of any other methods of reducing the formation of dust; and the cost of furnishing and applying materials to maintain the works areas, adjacent areas, and roads, in a dustless condition, shall be deemed to be included in the various rates and lump sum items for the works included in the priced Bill of Quantities.

3. Noise Pollution

17. The Contractor shall take all necessary precautions to minimize the amount of noise and vibrations coming from construction activities.

18. The contractor should recognize the noise sensitive receptors and monitor the noise level regularly during construction phase to do not increase from the permissible level.

19. The Contractor shall ensure that all plant and equipment is properly maintained in good operating condition, and that noisy construction activities shall be effectively sound- reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other

means, to avoid disturbance to any nearby noise sensitive receivers. All plant and equipment shall comply with relevant Government of Afghanistan legislation covering sound emissions.

20. Quarry operations and blasting shall be undertaken so as to minimize blasting and disturbance during the night, and insofar as it is possible, noise, vibration and dust. Operation of trucks and heavy vehicles and machinery shall be restricted to the hours of 06:30 to 19:00.

21. All necessary measures shall be undertaken to protect schools, hospitals and other adjacent noise sensitive receptors, including the use of noise barriers.

4. Damage to Property, Crops and Vegetation

22. The Contractor shall limit the movement of his employees and equipment within the project area and on adjacent land, including access routes approved by the Employer's Construction Supervisor, so as to minimize damage to natural vegetation, farming soils, crops and property, and shall endeavor to avoid any damage to land.

23. The Contractor shall strictly ensure employees and equipment do not enter any sensitive environmental areas that are demarcated as "no-entry" zones.

24. The Contractor shall preserve existing trees, plants and other vegetation that are to remain within or adjacent to the Works and shall use every precaution necessary to prevent damage or injury thereto. Trees or shrubs shall only be felled or removed where such impinge directly on the permanent works or necessary temporary works areas; and where such is approved by the Employer's Construction Supervisor.

25. On completion of the Works all areas disturbed by the Contractor's construction activities shall be restored by the Contractor to their original condition, or as may be acceptable to the Employer.

26. The Contractor shall be responsible directly to the Employer for any excessive or unnecessary damage to crops or lands arising from his operations, whether within the project area, on lands adjacent thereto, or adjacent to approved access roads: and deductions will be made from the payment due to the Contractor to cover the cost of such excessive or unnecessary damage, as determined by the Employer.

5. Reporting

27. The Contractor shall maintain a record of all emissions and spills of liquid, solid, waste (solid and sewage), noise, air and gaseous matter which occur at the site, whether into water courses, streams, on land, or into the air. This record shall be compiled daily and shall include details of date, time and nature of the event, along with details of the remedial and clean-up measures carried out. Copies of these records shall be given to the Employer monthly.

28. The Contractor shall also maintain a record of any complaints made by any Governmental or Community Organization or by the public, regarding his operations. This record shall contain the date and time of receipt of the complaint, the name and address of the complainant and the action taken to remedy the situation. Copies of these records shall be given to the Employer monthly.

29. The SEAMR and final environmental report will be provided by CPMO environmental specialist and will be submitted for review, approval and disclosure.

6. Environmental Management Plan

30. The requirements of this clause and attendant sub-clauses on Environmental Protection and Pollution Control notwithstanding; the Contractor shall observe and comply with all relevant environmental protection and mitigation, monitoring, and reporting requirements in the Environmental Management Plan (EMP) as stipulated in the Particular Specification. In the event of any conflict between the foregoing sub-clauses and the environmental protection and mitigation measures and pollution control requirements of the EMP, the EMP shall take precedence.

31. The Contractor shall prepare and submit to the Employer's Construction Supervisor a Construction Environmental Management and Monitoring Plan (CEMP) demonstrating the manner in which the Contractor will comply with the requirements of the foregoing sub-clauses on Environmental Protection and Pollution Control, the EMP, and any particular environmental mitigation measures as stipulated in the Particular Specifications or Technical Specifications forming part of the Contract Documents.

32. The CEMP shall be submitted within 15 working days of the Contractor receiving the Notice to Proceed with the Works, and shall include a solid waste management plan detailing procedure for site waste management, covering all solid, liquid and gaseous waste materials and emissions. The waste management plan shall include procedures for the collection and disposal of all waste materials in such a way as to ensure that no damage is caused to the environment. Training shall be provided to workers about the appropriate implementation of the CEMP and waste management plan measures.

33. Where stipulated in the Particular Specifications or Technical Specifications forming part of the Contract Documents, and provision has been made in the Bill of Quantities; payment for the implementation of the CEMP will be made in accordance with the Unit Rates, Lump Sum or Provisional Sum Items included in the Priced Bill of Quantities.

Annex 6: IEE Public Consultation Meeting Records

Annex6a: Sharawan Community Consultations

Instructions:

This checklist of 14 items aims to support the site-specific community consultation process which will share anticipated impact and mitigation during construction and operation, with a specific focus upon environmental issues and concerns. It is intended as a support document and checklist in addition to the REA checklist.

Ideally, this checklist is to be completed with the assistance of an Environment Specialist and feedback from the community is to be recorded and returned for inclusion in EIA / IEE.

A. Access, Timing & Involvement of WUA's, and broader community

	Checklist Item	Check
1	Schedule meetings with WUA's & community (community) to outline intended survey. Photographs of constructed items, spatial plans etc. should be available.	✓
2	Identify & share vehicular access needs to each site where works are planned.	✓
3	Identify planned construction area, auxiliary area for storage of building materials etc. during construction.	✓
4	Identify optimum timing and opportunities for preparation and transplanting of any existing vegetation using machinery.	✓

Outputs; Community understandssketch spatial plan for each site and agreed areas of activities. Bullet-point summary of feedback.

B. Vegetation Removal and Replacement

	Checklist Item	Check
5	Identify and quantify number all vegetation to be removed (including shrubs, trees and sections of pasture grazing areas	✓
6	As a baseline, in collaboration with community and Concern govt. authority, develop an inventory of existing plant material on common and farmer land including fruit trees, hedge trees/shrubs, trees for firewood, fodder and other purposes.	✓
7	Broadly categorize existing vegetation with a view to re-vegetation.	✓
8	In collaboration with community identify on paper where replacement vegetation will be planted.	✓
9	Specifically discuss with community the establishment and maintenance period for all the replacements. All revegetation issues should be in the SRP .	✓

Outputs; Community has ownership of the existing vegetation, replacement species, plan from community regarding establishment and maintenance. Bullet-point summary of feedback.

C. Construction – possible impact upon soil, existing channels and surrounding farmer fields

	Checklist Item	Check
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10	Spatial plan of agreed planned construction site, auxiliary storage and access area for contractor.	✓
11	Identification of all farmer fields where contractors must agree are no-go areas.	✓
12	Identify areas for storage of any construction spoil and top soil	✓
13	Plan for all removal of solid waste from the site as added detail for the EMP.	✓
14	Any other additional issues raised by the community.	✓

Outputs: Specific plans where Contractor can protect, operate and store materials. Bullet-point summary of feedback.

NB: On the next page is a Recording sheet – notes of discussion with community. This page is only a summary. If you need more space to record, use additional pages.

MEETING RECORDING SHEET

Meeting with Sharawan Canal Upstream (head area), men	
Meeting date & time:	11-11-2019 10:00am to 12:00pm
Place:	Chila Water User Association (WUA) middle stream of Sharawan
Topics:	Explanation about the project, discussion about environmental and social impacts, community feedback concern and recommendations.
Attending:	Proponents: Tawoos Wafa, national environmental specialist, Eng. Mohabatullah, national resettlement specialist, Mohammad Shaiq Agriculturist, Eng. Roozba Taloqan sub basin representative, Eng. Omergul Baharak district water manager, WUA members and relevant Stakeholders per sign-in sheet below, 9 participants
Concerns raised by stakeholders	
Discussion and Negotiation on the proposed structures	1. Stated that they are fully consulted in the selection of proposed structures, they added that they were part of the preliminary survey and selection process, they added that the selected structures are their first and foremost priority and upon construction there will be a notable and crucial change in the area in terms of reliable water for irrigation and increment of yield and definitely enhancement of living standard of the local communities.
Beneficiaries cooperation's and commitments for the smooth implementation of project	2. Stated that they are fully committed in paving the way for smooth implementation of the project, they added they will solve any potential dispute if any, they stated that they will provide access road for the transportation of construction materials. They added that they are eager for this vital project, and they said

	that they will provide full support for making it possible and prosper.
Don't interrupt irrigation water supply during construction	3. Stated that they did not want the water supply to be interrupted during the irrigation season, and that temporary bypass canals should be provided at any construction site that blocks irrigation flows. Team assured them that this would be done.
Compensate farmers for crop damage due to temporary construction roads	4. Stated that farmers should be compensated for crop damage due to temporary roads used to bring construction materials to each of the proposed construction sites. Team stated that they did not have the details of the compensation policy for this situation, but would flag it up to the Project.
Hire unskilled laborers locally	5. Stated that unskilled laborers should be hired locally and from the immediate area of project, this has many advantages like; locally deployed workforce do not need any camp and they are much aware of the tradition and culture of the people, Team stated that this would be done.
Contractor to don't pollute canal water	6. Stated that mostly resident's use canal water for drinking and animals therefore contractor should to pay special attention to don't pollute the canal water.
Additional structures to be considered	7. They stated that the Ahandara Wash need to be improved to protect the canal against the heavy flood as well as the opposite part of the Taloqna river close to the proposed headwork need to be protected.
Priority to canal head work	8. All the canal beneficiaries are requested and willing to start the canal headwork at first priority, because the canal existing off take is full of sediment and have no capacity to pass the required amount of water to reach middle and downstream.

Meeting with Sharawan Canal Middle and Downstream, men	
Meeting date & time:	14-11-2019 9:00am to 11:30am
Place:	Hazar Bagh Water User Association Office, Bahrak district middle and downstream
Topics:	Explanation about the project, discussion about environmental impacts, community feedback concern and recommendations.
Attending:	Proponents: Tawoos Wafa, national environmental specialist , Eng. Mohabtullah , national Resettlement specialist, Eng. Shaiq National Agriculturist , Eng. Roozba Taloqan sub basin representative Stakeholders: per sign-in sheet below, 9 participants - mirabs, landowners, farmers, WUA representatives
Concerns raised by stakeholders	

Discussion and Negotiation on the proposed structures	1. Stated that they are fully consulted in the selection of proposed structures, they added that they were part of the preliminary survey and selection process, they added that the selected structures are their first and foremost priority and upon construction there will be a notable and crucial change in the area in terms of reliable water for irrigation and increment of yield and definitely enhancement of living standard of the local communities.
Beneficiaries cooperation's and commitments for the smooth implementation of project	2. Stated that they are fully committed in paving the way for smooth implementation of the project, they added they will solve any potential dispute if any, they stated that they will provide access road for the transportation of construction materials. They added that they are eager for this vital project, and they said that they will provide full support for making it possible and prosper.
Don't interrupt irrigation water supply during construction	3. Stated that they did not want the water supply to be interrupted during the irrigation season, and that temporary bypass canals should be provided at any construction site that blocks irrigation flows. Team assured them that this would be done
Compensate farmers for crop damage due to temporary construction roads	4. Stated that farmers should be compensated for crop damage due to temporary roads used to bring construction materials to each of the proposed construction sites. Team stated that they did not have the details of the compensation policy for this situation, but would flag it up to the Project.
Hire unskilled laborers locally	5. Stated that unskilled laborers should be hired locally. Team stated that this would be done.
Contractor to don't pollute canal water	6. Stated that mostly resident's use canal water for drinking and animals therefore contractor should to pay special attention to don't pollute the canal water.
Start work at earliest convenient time	7. Meeting participants request for starting physical work at earliest convenient time because they have more problems with irrigation water shortage as well as canal destroyed structures.

Minutes of the Meeting: Sharawan Canal up Stream, Women

Meeting with Sharawan canal head (Upstream), Women	
Meeting date & time:	11-Nov-2019 9:00 am to 10:30 am
Place:	Haji Musa village, house of WUA member, Taluqan district, Takhar province
Topics:	Explanation about the project, discussion about the village profile, economic situation, difficulties of women in terms of access to water, women occupation, main economic stay/resources of women in the project area, resettlement impacts, community feedback concern and recommendations.

Attending:	Proponents: Mursal Satarzada, national social and gender consultant, female WUA members and users Taluqan District, Takhar Stakeholders: per sign-in sheet below, 23 participants – WUA members, landowners, farmers, CDC representatives
Concerns raised by stakeholders	
Information regarding the project intervention	1. Stated that they are well aware of the project intervention and they are consulted by men WUA members and their family members, they had optimistic feelings regarding the project, they stated that each structure will bring positive outcome in their living condition, and they were pleasant for the project intervention.
Women idea regarding the domestic and livestock access point which are considered by the project	2. Stated that they were not aware of the domestic access points, upon hearing this, that the project is going to build one, they become so happy and added that they are experiencing too much difficulties in access to water for domestic usage, especially cloth washing and etc. They added that by construction of domestic access point they will be no more in trouble in access to water for domestic use like cloth washing etc.
General concerns and feedback from women	3. Stated that, it is very important a vital project because they need irrigation intervention in their concerning village, they stated that they have a lot of problems like; lack of proper place for washing clothes and watering of their animals. 4. They were pleasant of the anticipated positive impact of the project especially the domestic access point, because, currently, there is no such provision for women. They also stated that, upon completion of the project they will have access to reliable water because currently they face water shortage especially when flood hits the canal and there are no control measures in the off takes. 5. The main occupations of women is Tailoring, Livestock raring and working in Agriculture fields are the major activities of the rural women in the project area. They also stated about the shortage of access to potable drinking water.
Compensate affected farmers for tree cutting	4. Stated that, most of them are economically poor farming households, thus, they should be compensated for any crop loss, if happen and for cutting of trees.

Minutes of the Meeting: Sharawan Canal middle stream, Women

Meeting with Sharawan canal middle (middle), Women	
Meeting date & time:	12-Nov-2019 8:00 am to 10:00 am

Place:	Baghak 2 village, house of WUA member, Baharak district, Takhar province
Topics:	Explanation about the project, discussion about the village profile, economic situation, difficulties of women in terms of access to water, women occupation, main economic stay/resources of women in the project area, resettlement impacts, community feedback concern and recommendations.
Attending:	Proponents: Mursal Satarzada, national social and gender consultant, female WUA members and users Baharak District, Takhar Stakeholders: per sign-in sheet below, 21 participants – WUA members, landowners, farmers, CDC representatives
Concerns raised by stakeholders	
Information regarding the project intervention	1. Stated that they are well aware of the project intervention and they are consulted by men WUA members and their family members, they had optimistic feelings regarding the project, they stated that each structure will bring positive outcome in their living condition, and they were pleasant for the project intervention.
Women idea regarding the domestic and livestock access point which are considered by the project	2. Stated that they were not aware of the domestic access points, upon hearing this, that the project is going to build one, they become so happy and added that they are experiencing too much difficulties in access to water for domestic usage, especially cloth washing and etc. They added that by construction of domestic access point they will be no more in trouble in access to water for domestic use like cloth washing etc.
General concerns and feedback from women	3. Stated that, it is very important a vital project because they need irrigation intervention in their concerning village, they stated that they have a lot of problems like; lack of proper place for washing clothes and watering of their animals. 4. They were pleasant of the anticipated positive impact of the project especially the domestic access point, because, currently, there is no such provision for women. They also stated that, upon completion of the project they will have access to reliable water because currently they face water shortage especially when flood hits the canal and there are no control measures in the off takes. 5. The main occupations of women is Tailoring, Livestock rearing and working in Agriculture fields are the major activities of the rural women in the project area. They also stated about the shortage of access to potable drinking water.
Compensate affected farmers for tree cutting	4. Stated that, most of them are economically poor farming households, thus, they should be compensated for any crop loss, if happen and for cutting of trees.

Minutes of the Meeting: Sharawan Canal downstream, Women

Meeting with Sharawan canal downstream (down), Women	
Meeting date & time:	14-Nov-2019 11:00 am to 12:30 pm
Place:	Hazarbagh village, house of WUA member, Baharak, Takhar province
Topics:	Explanation about the project, discussion about the village profile, economic situation, difficulties of women in terms of access to water, women occupation, main economic stay/resources of women in the project area, resettlement impacts, community feedback concern and recommendations.
Attending:	Proponents: Mursal Satarzada, national social and gender consultant, female WUA members and users Baharak, Takhar province Stakeholders: per sign-in sheet below, 34 participants – WUA members, landowners, farmers, CDC representatives
Concerns raised by stakeholders	
Information regarding the project intervention	1. Stated that they are well aware of the project intervention and they are consulted by men WUA members and their family members, they had optimistic feelings regarding the project, they stated that each structure will bring positive outcome in their living condition, and they were pleasant for the project intervention.
Women idea regarding the domestic and livestock access point which are considered by the project	2. Stated that they were not aware of the domestic access points, upon hearing this, that the project is going to build one, they become so happy and added that they are experiencing too much difficulties in access to water for domestic usage, especially cloth washing and etc. They added that by construction of domestic access point they will be no more in trouble in access to water for domestic use like cloth washing etc.
General concerns and feedback from women	3. Stated that, it is very important a vital project because they need irrigation intervention in their concerning village, they stated that they have a lot of problems like; lack of proper place for washing clothes and watering of their animals. 4. They were pleasant of the anticipated positive impact of the project especially the domestic access point, because, currently, there is no such provision for women. They also stated that, upon completion of the project they will have access to reliable water because currently they face water shortage especially when flood hits the canal and there are no control measures in the off takes. 5. The main occupations of women is Tailoring, Livestock rearing and working in Agriculture fields are the major activities of the rural women in the project area. They also stated about the shortage of access to potable drinking water.
Compensate affected farmers for tree cutting	4. Stated that, most of them are economically poor farming households, thus, they should be compensated for any crop loss, if happen and for cutting of trees.

List of participants participated in consultation meeting held at Chaila WUA

List of meetings participants

Name of Canal: Shah Rawan

Section of Canal: Up Middle tail

Location: Chaila Water User Association office

Date: 11, 11, 2019

S/No	Name	Age	Village	Occupation	Phone Number	Signature /Stamp
1	Rozbeh	46	Talagan	Engineer	0799092701	
2	Rahmat shah	48	Chaila	Mir Ab	0700714764	
3	Razi	67	Chaila	Farmer and head association	0707095131	
4	Kar Mohamoud	38	Tora Khan Araban	Farmer	0776988949	
5	M. Mosa	59	Chaila	Farmer	076733747	
6	Dil Agha	60	Tora Khan Araban	Farmer		
7	Imam Mohad	57	Tora Khan	"	0707371569	
8	Omar Araf	38	Dorahy	Engineer	0785975364	
9	Yaseen	33	Arabian	Farmer	0745763597	
10						
11						

List of participants participated in consultation meeting held at Hazar Bagh WUA

List of meetings participants




Name of Canal: Sharawan

Section of Canal: Up Middle ☒ tail

Location: Water User Association of Hazarbagh Date: 14-11-2019














S/No	Name	Age	Village	Occupation	Phone Number	Signature /Stamp
1	Haji Ab. Latif		Hazarbagh	WUA Chairman	0702019178	
2	Erg Ro2beh			Talooka basis Representation	0799052701	
3	Ab. Bashir	45		Farmer	073654429	
4	Khair Din	30		~		
5	Noor-e-ulah	47		~		
6	Khaleel			~		
7	M. Asif			~		
8	Rahimullah	20		Agriculture Agronomist	0765741865	
9	Ali mursal	62		Farmer	0774047078	
10						
11						

List of women participants participated in consultation meeting held at Haji Musa village

Participants List, Social survey

Date: / / 2019

SN	Name (اسم)	Position (مقام)	Organization (تعلقہ)	Contact (تلفون)	Sign (تصدیق یا امضاء)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

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Participants List, Social survey

Date: / / 2019

SN	Name (اسم)	Position (مقام)	Organization (از کون سی عہدہ)	Contact (تلفون)	Sign (تصدیق یا امضاء)
1	میرزا	معاون			
2	وہاب	معاون			
3	کوثر	معاون			
4	نور				
5	وصی اللہ				
6	لیلیا				
7	سہیل				
8	سہیل				
9	فریخت				
10	بہار				
11	شیبا				
12	عہدہ خاں				
13	فرمان خاں				
14	روشن خاں				
15	فانی				
16	سہیل				
17	سہیل				

epi:sa

[illegible]

List of women participants participated in consultation meeting held at Hazarbagh village

ADB

Participants List, Social survey

Date: / / 2019

SN	Name (نام)	Position (شغل)	Organization (ازگان مربوطه)	Contact (تلفن)	Sign (تصدیق)
1			
2			
3			
4			
5			
6			
7			
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9			
10			
11			
12			
13			
14			
15			
16			
17			

epi:sa

ADB

Participants List, Social survey

Date: / / 2019

SN	Name (نام)	Position (شغل)	Organization (ازگان مربوطه)	Contact (تلفن)	Sign (تصدیق)
16			
17			
18			
19			
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33			
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Photographs of Public Consultation Meetings at upstream and middle stream



Participants photos of public consultation meeting in down stream



Annex 6b: Momem Abad Community Consultations

PARB Sub-Project Community Consultation and Site Disturbance Data

Momen Abad Subproject (Head, Mid & Tail)

Instructions:

This checklist of 14 items aims to support the site-specific community consultation process which will share anticipated impact and mitigation during construction and operation, with a specific focus upon environmental issues and concerns. It is intended as a support document and checklist in addition to the REA checklist.

Ideally, this checklist is to be completed with the assistance of an Environment Specialist and feedback from the community is to be recorded and returned for inclusion in EIA / IEE.

A. Access, Timing & Involvement of WUA's, and broader community

	Checklist Item	Check
1	Schedule meetings with WUA's & community (community) to outline intended survey. Photographs of constructed items, spatial plans etc. should be available.	✓
2	Identify & share vehicular access needs to each site where works are planned.	✓
3	Identify planned construction area, auxiliary area for storage of building materials etc. during construction.	✓
4	Identify optimum timing and opportunities for preparation and transplanting of any existing vegetation using machinery.	✓

Outputs; Community understand sketch spatial plan for each site and agreed areas of activities. Bullet-point summary of feedback.

B. Vegetation Removal and Replacement

	Checklist Item	Check
5	Identify and quantify number all vegetation to be removed (including shrubs, trees and sections of pasture grazing areas	✓
6	As a baseline, in collaboration with community and Concern govt. authority, develop an inventory of existing plant material on common and farmer land including fruit trees, hedge trees/shrubs, trees for firewood, fodder and other purposes.	✓
7	Broadly categorize existing vegetation with a view to re-vegetation.	✓
8	In collaboration with community identify on paper where replacement vegetation will be planted.	✓
9	Specifically discuss with community the establishment and maintenance period for all the replacements. All revegetation issues should be in the SRP .	✓

Outputs; Community has ownership of the existing vegetation, replacement species, plan from community regarding establishment and maintenance. Bullet-point summary of feedback.

C. Construction – possible impact upon soil, existing channels and surrounding farmer fields

	Checklist Item	Check
10	Spatial plan of agreed planned construction site, auxiliary storage and access area for contractor.	✓
11	Identification of all farmer fields where contractors must agree are no-go areas.	✓
12	Identify areas for storage of any construction spoil and top soil	✓
13	Plan for all removal of solid waste from the site as added detail for the EMP.	✓
14	Any other additional issues raised by the community.	✓

Outputs: Specific plans where Contractor can protect, operate and store materials. Bullet-point summary of feedback.

NB: On the next page is a Recording sheet – notes of discussion with community. This page is only a summary. If you need more space to record, use additional pages.

MEETING RECORDING SHEET

Meeting with Momen Abad Canal representatives (head, Middle and tail), men	
Meeting date & time:	12-11-2019 1:00pm to 2:30pm
Place:	Qarildy village, Masjid Jami ,Qalirdy Town
Topic :	Explanation about the project, discussion about environmental and social impacts, community feedback concern and recommendations.
Attending:	Proponents: Tawoos Wafa, national environmental specialist, Mr. Mohabatullah, national resettlement specialist, Mr. Shaiq Agriculturist Stakeholders: per sign-in sheet below, 15 participants - mirabs, landowners, farmers, WUA representatives
Concerns raised by stakeholders	
Discussion and Negotiation on the proposed structures	1. Stated that they are fully consulted in the selection of proposed structures, they added that they were part of the preliminary survey and selection process, they added that the selected structures are their first and foremost priority and upon construction there will be a notable and crucial change in the area in terms of reliable water for irrigation and increment of yield and definitely enhancement of living standard of the local communities.
Beneficiaries cooperation's and commitments for the	2.Stated that they are fully committed in paving the way for smooth implementation of the project, they added they will solve any potential dispute if any, they stated that they will provide access road for the

smooth implementation of project	transportation of construction materials. They added that they are eager for this vital project, and they said that they will provide full support for making it possible and prosper.
Don't interrupt irrigation water supply during construction	3. Stated that they did not want the water supply to be interrupted during the irrigation season, and that temporary bypass canals should be provided at any construction site that blocks irrigation flows. Team assured them that this would be done.
Compensate farmers for crop damage due to temporary construction roads	4. Stated that farmers should be compensated for crop damage due to temporary roads used to bring construction materials to each of the proposed construction sites. Team stated that they did not have the details of the compensation policy for this situation, but would flag it up to the Project.
Hire unskilled laborers locally	5. Stated that unskilled laborers should be hired locally and from the immediate area of project, this has many advantages like; locally deployed workforce do not need any camp and they are much aware of the tradition and culture of the people, Team stated that this would be done.
Contractor to don't pollute canal water	6. Stated that mostly resident's use canal water for domestic and animals therefore contractor should to pay special attention to don't pollute the canal water.
Priority to canal head work(protection of intake)	7. The meeting participants requested to start the intake protection wall at first priority, because the canal intake is treated by flood and huge amount of water during the flood season therefore, to avoid disturbance to the intake the protection is urgent need.

Participant Sign in Sheets

Momen Abad Canal: Qarildy village


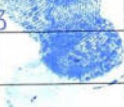


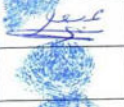
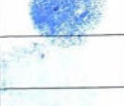









List of meetings participants

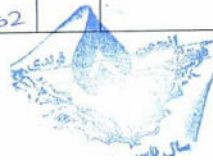
Name of Canal: Momen Abad.

Section of Canal: Up ☒ Middle ☐ tail ☐

Location: Masjid Jami Qalardi

Date: 12-11-2019

S/No	Name	Age	Village	Occupation	Phone Number	Signature /Stamp
1	Abdul Samad	40	Qalardi	Farmer	0736468883	
2	Fazl Mohammed	40	Kona Shar	~	0789214703	
3	Haji Abdul Hamid	65	Qalardi	~	-	
4	Abdul Mohammed	66	Qalardi	~	-	
5	Mola din moh.	64	~	~	0767590576	
6	Fazl Mohammed	68	~	~	-	
7	Khudidaee	65	~	~	-	
8	Gul Mohammed	58	~	~	-	
9	Mola Qados	35	~	~	0774316371	
10	Fazl Mohammed	60	~	~	-	
11	Nizamuddin	~	~	~	-	
12	Eisken bilal	65	~	~	-	
13	Shah Mohammed	60	~	~	-	
14	Amir	38	38	~	-	
15	Arbab Nawroz	~	~	Mirza bish	0770104737	



Photos of Public Consultation Meeting Participants

Momen Abad Participants.



تاریخ: 12, 11, 2019

جلسه مشورتی با دهامی و نمایندگان کانال مؤمن آباد

اجندا:

- ① - تشریح پروژه در ساختمان های پیشین شده.
- ② - تاثیرات محیط زیستی و اجتماعی و ایستگاه مجدد برای حاضرین جلسه.
- ③ - نظر اکثریت کنندگان مجلس در مورد طرح در همان و همان شایع مجدد.
- ④ - سند اقدام کارگران غیر فنی از محل کار.

خبر:

جلسه با تواتر آیات چند از قرآن مجید آغاز گردید و در پی توضیحات و بحث گردید.
ساختمان های پیشین شده توسط کارشناسان و ایستگاه مجدد و اجتماعی
به حاضرین جلسه مقرر شد تشریح گردد.
و ضابطه ای برای استخدام کارگران فنی از محل و همچنین نهال های مجدد در جای مناسب
بحث و موافقت گردید که حاضرین به همکاری شان و عده خود و ارزش پروژه
برای منطقه های دانیست. و قصد بر این شد که در هم مولد با کارهای پروژه
تا حد توان همکاری با هم مانند انتقال مواد به کار با ساختمان و همچنین برای نمودن
راه و برای مواد ضرورت به ساختمان های انتخاب شده در سام همکاری
کردن زمین دهامی و احداث کانال با بزرگترین منطقه هم نظری با هم.
و در باره تهیه نمودن جای مناسب برای مواد ساختمانی پروژه و همچنین سام مناسب
که در آن نهال های جدید غرس نمایم معتمدی با هم این بار و هیچ کدام معزله اجتماعی
و نشاندن روح خواهر داره.

در صورت متفر شدن گشت و زنی در ساعتی از طرف قرارداد در جریان چهارده برده شود
 و نامتفرین جلسه از کارمندان متفر بشکری و غایب که از تأثیرات محیط از منتهی
 و هم امور آن اجتماعی ما را قبل از آنکه شایسته آنی که ما در این زمینه همکاری با یک
 و آن شایسته هیچ کدام خلل یا معترض او نخواهد داد تا مانع کار پروژه
 گردد و

لیست حاضرین جلسه کانال تونس آبار

- ۱۱ - عبدالحامد
- ۱۲ - نظام الدین
- ۱۲ - ریشان بلال
- ۱۳ - شام محمد
- ۱۴ - محمد امیر
- ۱۵ - لیست نفرین

ارباب نوروز
 0770104737



- ۱ - عبد الحمید
- ۲ - فزیز محمد
- ۳ - حاجی عبد الحمید
- ۴ - عبد الحمید
- ۵ - ملا محمد بن محمد
- ۶ - فزیز محمد

- ۷ - خداید
- ۸ - گل محمد

۹ - ملا محمد بن محمد

Annex 7: IEE Example; Environmental Monitoring Report (EMR)

Project Number: {XXXXXX}

{Reporting period: Month Year}

{Full Country Name}: {Project Title}

{(Financed by the <source of funding>)}

Prepared by {author(s)}

{Firm name}

{City, country}

For {Executing agency}

{Implementing agency}

Endorsed by: (staff name of IA/PIU) and signature, submission date

Introduction

Preamble

This report represents the Semi - Annual Environmental Monitoring Review (SAEMR) for INSERT PROJECT NAME.

This report is the (insert number of report, i.e. 1st, 2nd etc.) EMR for the project.

Headline Information

Include a brief summary of significant outcomes of the project construction process and any specific areas of concern of which ADB should be informed.

Project Description and Current Activities

Project Description

Provide a brief description of the project. – This should not vary from one report to the next.

Project Contracts and Management

Provide a list or table of main organizations involved in the project and relating to Environmental Safeguards. This should include lender, borrower, PIU, Main Contractor/s and significant sub-contractors, environmental staff of various organizations should be named, and contact details provided.

Provide a description of how the contracts are being managed and names of key personnel.

Project Activities During Current Reporting Period

Provide an outline of major activities which have been carried out during the current reporting period.

Description of Any Changes to Project Design

Describe any changes to the project design from that which was assessed in the Impact Assessment phase of the project and is set out in the Initial Environmental Examination/Environmental Impact Assessment. If none have taken place, please state – No changes.

Note if significant changes have occurred the PIU should have already informed ADB of this and made a decision on the need for updates to the EIA/IEE and/or Environmental Management Plans

Description of Any Changes to Agreed Construction methods

Provide a description and reason for changes to any construction processes, for example, blasting of rock rather than excavation, open channel rather than thrust boring at road crossings.

Environmental Safeguard activities

General Description of Environmental Safeguard Activities

Please provide a summary of the routine activities undertaken by environmental safeguard staff during the current reporting period. This should include the work undertaken by the contractor's environmental manager, the Environmental Supervisor and any informal visits by the PIU environmental staff.

Site Audits

Please provide details (table form preferred) of any formal audits undertaken by environmental safeguard process staff during the current reporting period. This would include Contractors Environmental Manager, Environmental Supervisor, PIU Staff and ADB staff during review missions.

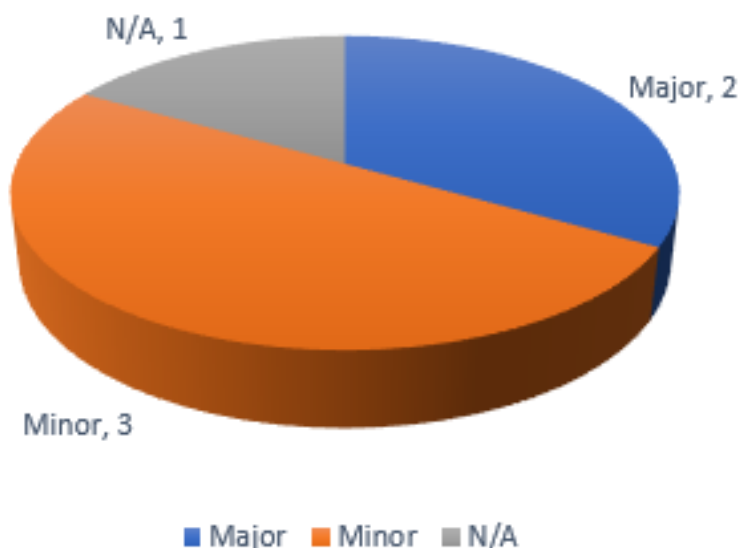
Information required includes:

Summary of Issues Tracking Activity for Current Period

Summary Table	
Total Number of Issues for Project	6
Number of Open Issues	1
Number of Closed Issues	5
Percentage Closed	17%
Issues Opened This Reporting Period	5
Issues Closed This Reporting Period	4

Figure 19; Summary of Issues by Non-Conformance

Non-conformance Level



Use data from workbook as required.

Trends

Use information from previous period reports and the current period information to identify trends in issues. For example -

Quarterly Report No	Total No of Issues	% issues Closed	% issues closed late
1	5	87	0
2	18	56	15
3	59	23	26

Provide a commentary on the trends, explain why they may be occurring and in the case of negative trends explain what steps have been taken to make corrections.

Provide a copy of all NCN's for all major Non-Conformances in an annex. If none state this.

Unanticipated Environmental Impacts or Risks

Document any unanticipated environmental impacts and risks which have been identified in the current period (as a reminder, these are impacts or risks which were not identified in the Impact Assessment process). State what actions were taken to mitigate the impacts and risks, were these successful.

Results of Environmental Monitoring

Overview of Monitoring Conducted during Current Period

Provide a commentary on what environmental measurements have been undertaken during the current reporting period. Highlight any areas where agreed monitoring has not taken place.

Include sub sections for the report on those environmental media which have been measured, for example

Noise**Air Quality****Water Quality**

The sections should present highlights of the outcomes of the monitoring focusing on a comparison of the results with the agreed standards as set out in the Specific Environmental Management Plan and/or Monitoring Plan.

In particular make clear where exceedances in the standards have occurred and provide reasons and actions which have been implemented to correct – refer to relevant NCN as appropriate.

Detailed monitoring results should be presented as an annex.

Trends

Based on the current and past periods of monitoring identify and discuss any trends which may be developing.

Summary of Monitoring Outcomes

Provide any recommendations on the need for additional monitoring, or requests for ceasing/altering monitoring if activities have been completed or monitoring is showing no significant impact over long period.

Material Resources Utilization***Current Period***

Provide any recommendations on the need for additional monitoring, or requests for ceasing/altering monitoring if activities have been completed or monitoring is showing no significant impact over long period.

Cumulative Resource Utilization

Provide values (tables, graphs etc.) for cumulative resource utilization of power water etc., for whole project life. Identify trends or significant changes and provide reasons for any such changes.

Waste Management

Provide summary of waste management activities during the current period. Provide waste contractors/s names and location of waste sites.

Current Period

Provide any recommendations on the need for additional monitoring, or requests for ceasing/altering monitoring if activities have been completed or monitoring is showing no significant impact over long period.

Type of Waste (description and classification – e.g. hazardous – non-hazardous;

Waste Source – what activity generated the waste and where;

Quantity of waste generated;

Treatment/disposal route – provide information on quantities of waste reused, recycled and sent to landfill or incineration; and

Final disposal sites for waste.

Provide commentary on results.

Cumulative Resource Utilization

Using the above bullet points for waste develop cumulative waste generation results.

Discuss trends and provide suggestions for waste reduction, increase in reuse and recycling if possible.

Health and Safety

Community Health and Safety

Provide information on any incidents which have occurred during the reporting period which resulted in or could have resulted in Community Health and Safety issues. Include within this section traffic accident.

Worker Safety and Health

Provide detailed statistics on accident rates, including Lost Time Incidents, Accidents and near misses.

Provide information on safety campaigns conducted during the reporting period.

Training

Provide information on all environmental safeguard related training activities undertaken in this period and cumulatively for project life to date. These may include specific training of environmental staff, HSE inductions of site workers etc.

Discuss the need for additional training and what training is planned for coming quarter.

Functioning of the SEMP

SEMP Review

Provide a commentary on the SEMP in terms of the ability of the contractor to implement fully the requirements set out. Highlight any areas where the contractor has not been able to implement mitigation or monitoring measures.

Is the SEMP effective, are mitigation measures set out still appropriate and are they working as intended – do they need changing?

Are there better alternative mitigation measures?

Can some mitigation measures be reduced or removed as the specific risk identified in the IEE/EIA and/or SEMP has not materialized?

Provide a table of requests for changes to the current mitigation measures for consideration by ADB. Note you can send these at any time during the project, there is no need to wait until the quarterly reporting period to be completed. If PIU has supplied requests to ADB, these should be listed along with ADB response. Where changes (additions/deletions and modifications) of mitigation or monitoring measures have been approved, the PIU shall ensure that the SEMP is updated to reflect these changes.

Good Practice and Opportunity for Improvement

Good Practice

Provide an overview with charts, images etc. of examples of continuing good practice for the project. State why these have been implemented and how they are reducing environmental impacts or risks.

Opportunities for Improvement

Identify any areas which may be outside of the formal NCN process, but which changes to construction techniques, mitigation etc would result in an improvement in environmental, health and safety performance of the project.

Summary and Recommendations

Summary

Provide a summary of the effective implementation of Environmental Safeguards during the reporting period and for the overall project construction period to date.

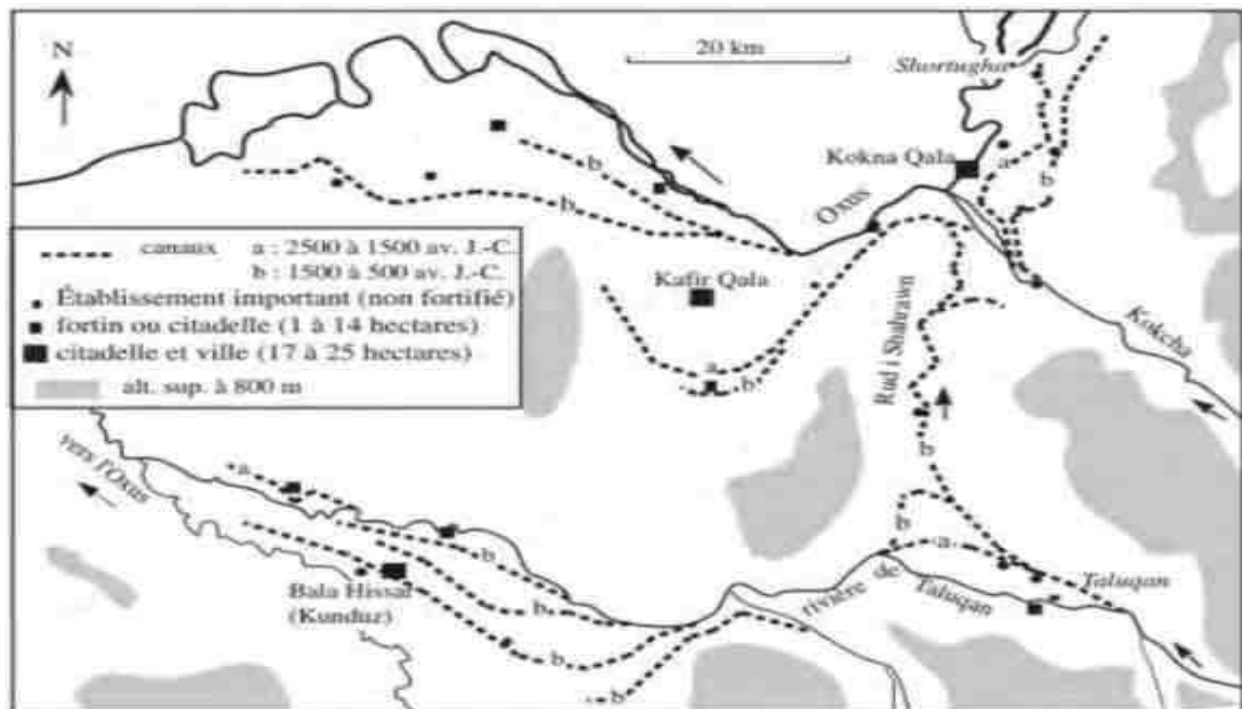
Recommendations

Provide any recommendations for consideration by the ADB for changes to the Environmental Safeguarding process for the project.

Annex 8: Archaeological Dating of Irrigation Canals

Regional History - 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 in catastrophe 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 Afghanistan²⁰.

Figure 20: Archaeological Dating of Irrigation Canals, Panj-Amu Basin



Source: Figure 2.20. Viollet, Pierre-Louis. 2004. *L'hydraulique dans les civilisations anciennes - 5000 ans d'histoire*. Paris: Presse des Ponts. http://graduateschool.paristech.fr/Files/001_130.pdf

Modern water management was introduced to northern Afghanistan in the mid-20 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.

During the two decades of war from 1979 to 2001, irrigation systems 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 systems, and to restore community-based water management.

²⁰Afghanistan v. Languages." 2013. in Encyclopedia Iranica. New York: Center for Iranian Studies, Columbia University. <http://www.iranicaonline.org/articles/afghanistan-v-languages>

Annex 9: Basis for Estimation of Re-vegetation work under PARBSP package-5

Typical cost for vegetation works under PARBP (per ha)				
Items/Activities	Unit	Total	Cost/unit (\$)	Cost \$
Land Preparation				
Land clearing	Man-day	14	5	70
Ploughing by Tractor	Hour	4	20	80
Animal Manure/transportation	Donkey-load	100	3	300
Harrowing by Tractor	Hour	2	20	40
Farrowing by Tractor	Hour	2	20	40
Hole for plant/sapling	No.	450	0.1	45
Sub total				575
Planting Materials and Transport				
Sapling	No.	400	2	800
Transportation saplings from Nursery to the village store	Truck	1	100	100
Transportation saplings from village store to the site	Man-day	10	5	50
Labor loading and unloading of sapling	Man-day	6	5	30
Sub total				980
Planting of Saplings				
Labor (Plantation, watering)	Man-day	9	5	45
Water Tanker	Day	1	50	50
Sub total				95
Inputs, Tools, Transport				
Fertilizer (DAP) 0.1 kg/plant	Kg	45	1	45
Mineral Fertilizer (urea) 0.1 kg/plant	Kg	45	0.5	22.5
Animal Manure 0.1 kg/plant	Kg	45	0.1	4.5

Barb wire	kg	75	1.2	90
Wooden pole	pole	52	5	260
Nails (3''')	kg	3	1.6	4.8
Shovel	each	2	3.5	7
Shovel handle	each	2	1.2	2.4
Pickaxe	each	1	4.5	4.5
Pickaxe handle	each	1	1.5	1.5
Rake with the handle	each	1	3	3
Iron bucket	each	2	3	6
Meter tape	each	1	1.5	1.5
Sledgehammer	each	1	12	12
Jabal (long iron)	each	1	17	17
Watering can	each	1	7	7
Wheelbarrow	each	1	35	35
Transportation of inputs		1	60	60
Sub-total				583.7
Total				2,233.7
Provisional Sum 5 %				111.685
Miscellaneous 5 %				111.685
Grand Total				2,457.07

Annex 10: Climate Data

Table A9.1 : Monthly and Annual Precipitation (mm) at Taleqan, Takhar

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2009	71.37	92.49	95.76	122.43	11.92	13.64	0.00	0.00	0.00	16.33	29.84	35.49	489.27
2010	72.14	80.65	115	20.79	9.95	8.54	0.00	0.00	0.00	15.95	35.6	38.23	397.13
2011	70.29	72.65	117	99.66	7.85	0.10	0.00	0.00	1.64	16.96	29.25	31.55	447.34
2012	70.26	82.15	115	68.18	9.41	4.39	0.00	0.00	0.00	0.61	50.73	69.65	470.24
2013	44.4	63.73	38.02	115	24.88	8.52	0.00	0.20	0.00	16.11	11.53	52.1	374.77
2014	4.91	30.17	102.56	107.9	40.84	5.29	0.00	0.00	0.00	5.84	37.99	17.12	352.62
2015	55.94	82.49	41.74	31.7	77.08	5.38	0.00	0.00	0.00	14.58	67.36	51.95	428.22
2016	41.27	13.74	57.03	98.84	21.91	1.63	1.27	0.20	0.00	6.46	36.36	20.59	299.30
2017	77.8	25.13	40.19	97.76	9.38	0.00	0.91	0.00	0.00	0.2	2.03	29.69	283.09
2018	16.51	45.2	59.57	44.97	38.15	7.20	0.00	0.00	10.23	37.68	22.27	13.4	295.18
AVG	52.49	58.84	78.24	80.75	25.14	5.47	0.22	0.04	1.19	13.07	32.30	35.98	383.72

Source: Afghanistan Water Resources Department, Kabul

Table A9.2 : Maximum Temperature oC at Taleqan, Takhar

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2009	15	17.9	27.30	27.30	30.60	33.20	36.30	36.80	34.30	28.90	27.00	15.20	27.48
2010	19.3	22.2	33.10	28.90	31.40	33.20	36.30	36.10	33.10	30.10	24.30	21.30	29.11
2011	16.6	19.8	26.30	30.70	35.90	35.80	36.90	38.10	32.60	30.70	24.80	16.10	28.69
2012	13.3	14.9	27.30	27.00	30.40	33.10	36.00	35.60	31.90	26.30	24.70	20.20	26.73
2013	17.4	16.9	25.60	30.30	34.80	36.80	37.80	36.80	37.10	34.00	22.20	21.80	29.29
2014	20.5	14.9	24.60	28.00	32.70	36.20	37.40	34.90	32.90	29.40	20.50	16.70	27.39
2015	18.2	22.8	29.00	32.60	33.20	36.70	37.80	36.10	31.20	31.90	21.90	24.40	29.65
2016	19	26.7	27.00	30.10	34.20	36.70	38.90	34.80	33.70	27.00	0.00	24.00	27.68
2017	15.8	20.9	24.10	29.10	34.10	37.80	38.10	36.60	33.70	29.60	29.20	19.60	29.05
2018	18.6	19.8	32.40	29.80	36.30	35.10	0.00	34.70	32.90	26.40	19.60	19.00	25.38

Table A9.3 : Minimum Temperature oC at Taleqan, Takhar

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2009	-4	-5.3	4.10	2.50	10.60	13.90	16.50	18.10	12.20	6.50	2.20	-1.20	6.34
2010	-10	-13	-0.20	6.90	12.70	12.40	16.50	15.50	9.70	5.60	1.90	-3.80	4.51
2011	-6.3	-5.5	-2.40	3.60	14.80	15.50	19.90	15.50	12.40	5.50	-4.70	-14.10	4.52
2012	-7.4	-17	-5.80	9.80	10.60	15.20	19.80	18.60	13.20	5.60	-0.10	-12.30	4.22
2013	-7.9	-2	-3.80	4.70	7.50	16.90	19.10	16.80	15.10	4.10	1.20	-9.80	5.16
2014	-4.2	-17	-0.40	6.30	13.20	15.00	19.10	16.90	14.40	2.10	-0.40	-2.80	5.20
2015	-4.9	-6.1	-1.30	4.90	10.40	17.30	20.50	16.50	11.90	3.70	0.40	-7.40	5.49
2016	-4.1	-7.9	1.40	4.50	14.60	17.80	19.50	17.90	15.80	6.50	0.00	-2.80	6.93
2017	-3.6	-8.2	-0.20	0.70	10.90	16.80	19.90	17.30	10.50	7.90	1.30	-6.00	5.61
2018	-12	-3.1	4.30	2.10	12.40	17.30	0.00	16.50	13.40	4.00	3.80	-1.70	4.79

Source: Afghanistan Water Resources Department, Kabul

Maximum Snow Depth Cm at Taleqan, Takhar

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2010	6	3.8	16.8	0	0	0	0	0	0	0	0	0	26.6
2011	12.6	14.4	9	0	0	0	0	0	0	0	50	15	101
2012	12	18	3	0	0	0	0	0	0	0	0	12	45
2013	5	0	8	0	0	0	0	0	0	0	0	16	29
2014	11	33	0	0	0	0	0	0	0	0	0	2	46
2015	5	16	0	0	0	0	0	0	0	0	0	11	32
2016	1.3	17	0	0	0	0	0	0	0	0	38	15	71.3
2017	14	17	0	0	0	0	0	0	0	0	0	13	44

Annex 11: Demographic of Subproject villages.

Villages and Demographic Information of Momenabad Canal Beneficiaries²¹

Sl.no.	Village Name	Number of HH	Population	Location of the Scheme
1	Qarildy	200	1,200	Upstream
2	Naqil Bala	100	600	
3	Markaz Alawdin	80	480	
4	Sangi by	150	900	
5	Qaria Jamaluddin	80	480	
6	Kohna Shakh	160	960	
7	Qaria Said Alam	30	180	
8	Andar Abad	40	240	Middle stream
9				
Total		840	5,040	

Villages and Demographic Information of Sharawan Canal Beneficiaries²²

Sl.no.	Village Name	Number of HH	Population	Location of the Scheme
1	Qarabaye	202	1408	Upstream
2	Qomandan Qasam	60	420	
3	Haji Sarar/Panj bagh Zakhira	70	490	
4	Malim Pashto Nahia 5	60	420	
5	Mohd Qul bik Nahia 5	100	700	
6	Sayed Hakim Agha Nahia 5	40	280	
7	Mirza Ahmad Khan Nahia 5	200	1400	
8	Choorchi	60	420	

²¹Source: Momenabad Water User Association

²²Source: Taluqan SBA

9	Torakhan	12	84	Middle stream
10	Arbab Shah Mahmood	80	560	
11	Qomandan Dayan	50	350	
12	Shaikhha	50	350	
13	Mawlawi Wahab	90	630	
14	Qomandan Musa	60	420	
15	Haji barakat	85	595	
16	Haji Rahim	45	315	
17	Qazi Ghafoor	50	350	
18	Qomandan M. Qol	35	245	
19	Choorchi	60	420	Down stream
20	Haji Rahim	45	315	
21	Qazi Ghafoor	50	350	
22	Qomandan M. Qol	35	245	
23	Mohammad Mir	15	105	
24	Shash Tapa Nawroz	190	1330	
25	Qomandan Nazak Mir	15	105	
26	Islam Qala	55	385	
27	Masjid Jami Chila	80	560	
Total		1,894	13,252	

NEED OF TREE MANAGEMENT PLAN

1. During the detailed design of the project while conducting the survey it was found that around 1199 trees need to be removed while doing the rehabilitation and infrastructure improvement works in the subproject. As the loss of about 1199 trees in a project is significant numbers with significant adverse impact on forest resources, biodiversity, climate mitigation and livelihood of the people living in the area. Because of this, a Tree Management Plan is felt necessary.

OBJECTIVES OF TREE MANAGEMENT PLAN

2. The main objectives of preparing this Tree Management Plan (TMP) are:

- To offer more ecologically acceptable way of bank stabilization with the aims of bioengineering;
- To comply the Environmental Safeguard requirements of Asian Development Bank and Government of Islamic Republic of Afghanistan;
- Establish a maintenance management system for tree assets
- Outline responsibilities in regards to tree management
- Identify priority risk inspection areas
- Establish frequency of proactive inspections
- Establish reactive response timeframes and
- Identify acceptable mitigation actions.
- To identify loss of private trees and livelihood to local people.
- To conduct Re-vegetation activities compliance with national laws with community participation; and

METHODOLOGY FOR DEVELOPING TREE MANAGEMENT PLAN

3. The following methodology is followed in the development of Tree Management Plan:

4. **Review of Reports:** Review of the Project Documents, Feasibility Study Report, Detailed Design Report, and also project document of other projects being implemented or planned in the area. Understanding the project and also possibility of coordination with other projects to address the problem.

5. **Review of Policy and Legislative Framework:** Review of national policies and legislations on forestry sector, environment sector and water resources sector including the related multilateral environmental agreements to have full understanding of the national priorities as well as legally mandatory requirements.

6. **Consultation with Key Stakeholders:** Consultation meetings with ministries responsible for environmental management, management of forest resources, and management of water resources to understand the institutional views on the problems and designing of the future course of actions.

7. **Field Survey and Consultation with Communities:** Detailed survey to identify the actual number of trees that are along the canal planned for rehabilitation and improvement. Details on

type of vegetation, species composition, and ownership of the trees. Consultation with local communities and local level government institutions to understand their views and priorities as well as preferred solutions to the problem.

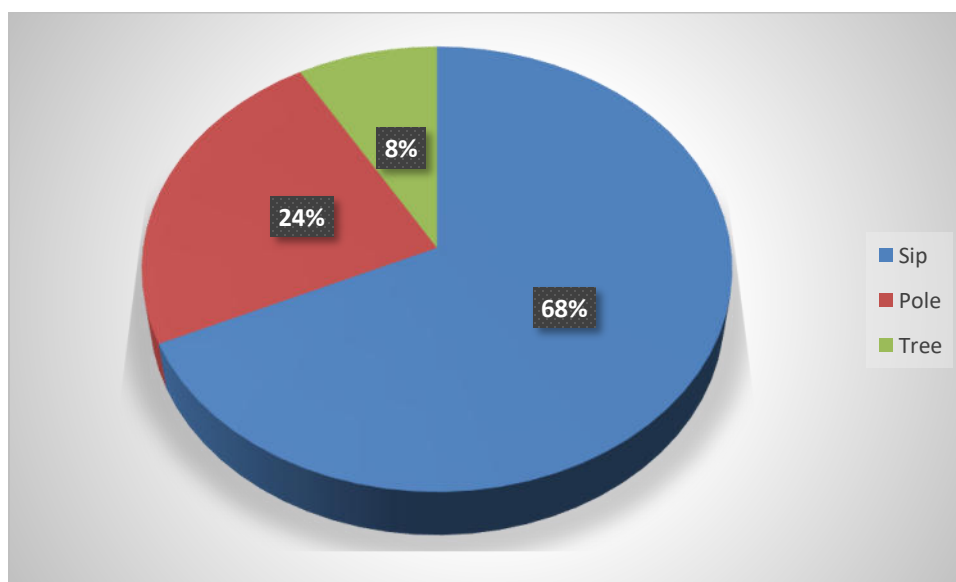
TREE MANAGEMENT

8. As stated above “Objectives of Tree Management Plan”, the main objectives of preparing this Tree Management Plan (TMP) to ensure that the Project is in full compliance with the Environmental Safeguard requirements of Asian Development Bank and Government of Islamic Republic of Afghanistan. In order to achieve this objective, this Tree Management Plan prioritizes actions focusing on the following key issues:

- Proposed Mitigation Plan
 - 1 Changing the direction of canal
 - 2 Tree Replacement or replantation
 - 3 Tree Transplanting
 - 4 Promotion of Agroforestry in the Command Area
- Proposed Land for Replantation
 - 1 Public owned Land
 - 2 Roadside
 - 3 Rehabilitation of the Degraded Land in the Area
 - 4 Support for Protected Area Initiatives of NEPA
- Basis of Action Plan

PROPOSED MITIGATION PLAN TO MINIMIZE THE ADVERSE IMPACTS ON TREES.

9. As per the figure below, out of the total 1199 trees, 68% are sapling, 24% are pole size and rest 8% as mature trees. Loss of this number of trees in the area This may in turn result in loss of soil moisture and improve air quality, reduction of aesthetic value and loss of shade. So to avoid or at least minimize the adverse impacts of the trees the following steps should be followed:



Avoiding tree removal

To avoid tree removal construction work will be occurred on the site with no trees though during the discussion with design team, they claim that it will affect the sustainability of Structures and will cause environmental impact such as sedimentation, soil erosion and etc. Also unnecessary removal of vegetation and felling of trees will be prevented and moving of construction vehicles and machineries will be restricted only to designated areas in order to save vegetation beyond the proposed project area due to trample.

Tree Transplanting

10. In addition to planting replacement trees from local nursery stock, the project proposed to save and transplant healthy, native trees from within the proposed limit of disturbance where feasible. But it is mentionable that the types of trees which are to be removed from the construction site are not Afghanistan native and protected trees. But for the protection of environment MEW/PMO will try to transplant the sapling if feasible as follow:

11. Sapling size: Generally, the average DBH is estimated 8 cm. The average estimated height is 3m. These category of trees will be transplanted and during the consultation meeting with affected people they agreed to transplant the trees into their private land.

12. Based on the survey there are 817 saplings that all of them will be transplanted to avoid adverse environmental impact and reduce climate change impacts. Consultation conducted with local people, that these sapling will be transplanted using local equipment prior to start of construction work.

REMOVAL AND UTILIZATION OF TREES

13. Following actions are proposed prior to removal of trees:

14. Getting approval from NEPA;

15. There are 11 affected people due to removal of trees while rehabilitating the canals. As per practices in similar projects and outcomes of consultation with stakeholders and communities following actions are proposed for utilization of removed trees:

16. Allow trees including the roots that have to be removed during the construction activities to the people utilizing the trees at the moment

TREE REPLACEMENT OR REPLANTATION

The removed non-native trees have been designated as having no particular ecological significance; rather they have aesthetic and economic values for the property owners. Based on consultation with NEPA there is no any regulation regarding the replantation ratio, but they emphasize that 1:10 should be implemented and MAIL also follow this ratio.

Based on survey out of 1199 trees will be removed due the rehabilitation of structures, at least to reduce the adverse environmental impact of these trees, offset mitigation measure will be used as replantation of 12000 trees will be replanted. Concern and suggestion of the government considered during consultation meeting, and they will cooperate in selection of suitable site.

REPLANTATION/ AFFORESTATION PROCESS:

Plantation site selection

17. The afforestation and improvement activities should be conducted at selected sites with geo-ecological importance or outstanding ecological problems, and the problems could be remediable.

18. The sites selected should not contain cultural or heritage resources, rare plants, wildlife habitats or nature reserves.
19. Areas less than 2000 m from the buffer zones of nature or cultural heritages, less than 100 m from the designated ecological public welfare forest, less than 50 m of the banks of main rivers or 20 m of the banks of the subsidiary rivers, are strictly forbid for afforestation.
20. Existing forest with canopy closure over 0.2 should not be selected.
21. Besides the terraced lands along the ditches and roads, lands with medium and high soil salt content should be selected for project sites.
22. Government in the project sites provides commitment for maintenance and households are willing to participate in the project.
23. Sites selection for afforestation is ranked as: barren mountain land, saline land, land convertible from agriculture to forest, degraded bare land, bush land, sparse forest land. Priority is given to the land along the road, ditch and dyke in establishing windbreak forests, and then the heavily, medium, and lightly salinized land. For soil and water conservation protection forest, the priority is given to the barren land with high gradient degree, and then alluvial land.

PLANTING SITE CLEARING AND LAND PREPARATION

• Planting sites clearing

24. Bushes and grasses burning is forbidden for the site clearing.
25. For slope lands over 15 degrees, bushes or grasses that hinder the afforestation activities should be removed in patch or strip forms.
26. Removed bushes or grasses should be piled between such strips or planting holes for natural decomposition.
27. The original vegetation at hill top, hillside and foot of the hills should be maintained.
28. When clearing the planting sites at streamside areas, protection zone of sufficient size should be retained based on the conditions of stream size, water flow, cross section and river course stability.

• Planting land site preparation

29. In accordance with the degree of slopes, site preparation should select among the pit type, strip type or overall type of site preparation, with the ground breaking area less than 25% (Table 1).

Table 6.1. Relationship between site preparation method and slopes.

Site Slope	Site Preparation Method
<15 degrees	Overall type
15-25 degrees	Hole type, strip type along the contour line or terrace type
>26 degrees	Hole type in triangle form layout; water retention gully prepared along the contour line.

30. Vegetation protection belt of 10 m wide should be retained between forest plantation plot edge and farmland; For long slope surface where overall site preparation method is adopted, a 3-meter-wide raw grass protection belt should be retained for every 100 meters.
31. For afforestation of economic tree crops at slopes over 15 degrees, terraced site preparation type (the adverse-angle terrace) should be adopted, to transport the runoff water of the slope face to stable ground or streams capable to capture overflowed runoff water.

ESTABLISHMENT OF PROTECTION FOREST PLANTATION

- **Tree species (varieties) selection**

32. Water Management Improvement Component of PARB-P is primarily working for the promotion of agro-forestry in the area and because of this the PARB-P experts with consultation of FAs, NGOs and community promoting agro-forestry in the area and PARBSP experts working for watershed management will help the project to suggest appropriate species for re-vegetation along the roads adjoined with the canals.

33. To reinforce biodiversity conservation, indigenous tree species should be selected firstly. The superior provenance, families or clones of indigenous tree species are selected for afforestation to strengthen plant resistance against pests and diseases and to reduce risks and threats of incidence of them. Only when exotic species surpassed the indigenous species in this resistance and growth performances can the exotic species be adopted.

34. In planting land design and layout, protection, recovery and maintenance of natural plant communities should be promoted.

- **Selection of afforestation model**

35. The afforestation model will be selected by the Ministry of Agriculture Irrigation and Livestock, Department of forestry. Research show that the Potential threats of pest & diseases to poplar plantation resulted from the mono-culture practice. So it is recommended to establish mixed forest plantation by adopting multi-species.

- **Planting arrangement**

36. Arrangement of sub-compartment: area of sub-compartment in degraded mountainous is no more than 20 ha.

37. Area of single tree species in degraded mountain: if there is relay in single tree species there will be no maximum block size and for multiples species, the maximum block size shall be less than 2 ha.

38. Width of planting strips in mountain areas used to separate blocks should be at least 3 rows or 10 m wide.

39. Maximum abundance of dominant tree species in a mixture in degraded mountain area should not exceed 70% of the total number of trees in the planting block.

The strips/belts can be up to 70m wide and distance between strips/belts shall be 10-20 times the expected tree height.

40. The survival and growth of planted trees is influenced by the size of the tree when it is planted, the type of plant packaging and the tree species. Planting depth can impact tree survival: trees that are planted too deeply, with too much soil covering the root ball, are at greater risk of mortality. Additionally, tree health and condition reflect overall tree vigor and should also be related to the survival of the tree. Also The biophysical environment also influences tree success. Such as surrounding land use type as well as available growing space and rooting volume, which constrains root growth and therefore also aboveground growth.

41. MAIL with DAIL and forest association will consider all above concern as they have expert in the field of afforestation/ replantation to have higher survival rate also will define community to be the people within and surrounding a resource system who provide, use, and benefit from that resource as community has potential to influence tree success. In the same time the replantation process described from para 168-202 to ensure higher survival rate of tree sapling.

FOREST TENDING MANAGEMENT

- **Intercropping**

42. In order to reduce surface water evaporation rate and the competition of weeds, intercropping is encouraged in semi-arid region. However, 50cm in each side of the tree row would be kept to protect trees planted. All intercropping activities on the slope should be carried out horizontally, and no intercropping is allowed for slopes over 25 degrees or slopes between 15-25 degrees when the hole type site preparation is adopted; Only when the strip type or terrace type are conducted along the contour line can intercropping be conducted.

- **Weeding and soil loosening**

43. Herbicide is forbidden for weeding. The young forest tending should be with the partial treatment method, i.e., to enlarge the planting hole, loosen the soil and weed around the young tree retaining the site natural vegetation as much as possible. The weed removed thereby should be kept in-site as mulches. Firewood collection of the forest litters is prohibited to maintain site capability of water retention and soil fertility.

- **Fertilization**

44. Application of fertilizer should prioritize organic fertilizers. Use of chemical fertilizers should strictly follow the afforestation models by related fertilization timing, frequency, quantity and manner in line with the specific requirement and the property of fertilizers. Fertilization schemes should be formed in accordance with related research accomplishments or test results of soil and plant growth. Fertilizer should be applied by planting holes or trenches, strictly forbidding the broadcast sowing. The fertilizer should be applied with soil buried, at upper part of the slope to prevent nutrient runoff and the pollution of surface water.

- **Irrigation**

194. Irrigation mainly depends on the precipitation in rainy season although supplementary irrigation is needed in dry season. Water-saving irrigation measures should be applied as far as possible to save water resources. Irrigation methods such as spray irrigation, sprinkling irrigation are preferred.

- **Exclusion of grazing animals**

45. Measures of grazing animal exclusion will be taken to protect the plantation from free browsing damage on the condition that livelihood level of households will be ensured.

- **Selective felling**

46. Selective felling is necessary to maintain the forest stand health. Sanitation felling should be done simultaneously with the thinning felling. Dead trees, wind-toppled trees, damaged trees would be selected for felling.

- **Fire prevention and control**

47. Forest fire prevention and control activities must be integrated with the local fire management system at all levels. Each afforestation entity must prepare a forest fire control plan establishing a fire control organization, detailing prevention, public education, patrolling, and enforcement and fire response programs.

48. Each afforestation entity should formulate its own forest fire control plan. Area of responsibility should be zoned and fire man be appointed according to acreage.

49. Fire control organizations would be established and fire control utilities would be equipped. Responsibility and punishing system would also be applied. When planting trees, fire isolation belt would be kept. Forest guardian sheds and communication facilities should also be provided.

50. All the wild fires and other fire sources such as burning dry grasses and litters are strictly prohibited during fire control period.

51. All plantation plots over 100 ha shall have fire breaks dividing the area into sub-compartments of not more than 80 ha. Fire breaks should be 10-20 m wide and should utilize stream courses and fire resistant native vegetation wherever possible.

- **Monitoring & evaluation**

52. The development of this Tree management plan is to ensure that the operation of the project is in compliance with project design approved.. NWARA/ CPMO would monitor and supervise the afforestation activities will be operated within the requirements of TMP. Standard reporting form would be adopted to ensure the consistence and continuity of monitoring. Priority of monitoring would be given to biodiversity, river protection, land preparation, forest tending, pest & disease management (selection of pesticides, application methods, safety of farmers /workers).

PROPOSED LAND FOR REPLANTATION

-Land for Transplantation of Pole and sapling:

-Public owned Land: During the consultation meeting with affected people they have agreed on replantation in their own land, farmers suggested that their trees which are affected in canal ROW will be transplanted to their land.

-Land for replantation:

Based on consultation meeting with DAIL, they will survey and identify the land for the replantation of 6000 saplings in the project area.

-Roadside: Some trees will be planted along the roadside to function as shelterbelt for the agriculture farms, and it will have enough distance and the future activity won't affect them.

ESTIMATED BUDGET FOR RE -VEGETATION:

53. All TMP costs will be paid for with ADB grant funding.

54. The budget for this TMP covers the re-vegetation of 6000 Sapling. It is set at US\$ 36,310.00.

Table 7.1: Typical cost for re-vegetation of 16.9 ha

Items/Activities	Unit	Total	Cost/unit (\$)	Person Month	Cost \$
Mobilization	No.	1	1400		1,400.00
Hole for plant/sapling	No.	6000	0.5		3,000.00
Sapling	No.	6000	1.8		10,800.00
Transportation saplings to the site	Truck	13	100		1,300.00
Labor (Plantation, watering)	Man-day	150	5		

					750.00
Fertilizer (DAP) 0.1 kg/plant	Kg	600	1		600.00
Maintanance	Month	24	500.00		12,000.00
Transportation of Fertilzer	Truck	11	60		660.00
Technical Supervisions (Horticulturist) 24 person/month	Month	1	300	24	7,200.00
Total					36,310.00

IMPLEMENTATION STRATEGY OF TMP

Approval of Updated IEE:

55. This TMP is now made part of the IEE report and included in the Environmental Management Plan which needs to be approved by NEPA. This IEE is developed as per the prescribed format in this regulation. First of all, the IEE will be submitted to NEPA for their approval. NEPA's concerns and suggestions, if any, will be incorporated in the IEE and EMP. Once approved it will have the legal status and to ensure the implementation of EMP, NEPA requires self-monitoring report every year during construction and operation phase. In addition, NEPA can do auditing as well after 2 years of operation.

56. Tree plantation will be in the spring season that is start from 20th March and it will continue for 20 days or one month. In general, summer is not a common transplanting season as evapo-transpiration rate is high and the planted trees will be under stress when plantation work is taken place during that time.

57. As the project time is for 15 months, the plantation planned in one year. So the plantation will be done in coming 2021 spring.

Figure 8.1: Tree plantation work plan for 2020-21

No	Province	District	Activities	2020-2021					
				Dec	Jan	Feb	Mar	Apr	May
1	Takhar	Taloqan	Consultation with DAIL						
			Identification of site						
			Procurement of Sapling						
			Supervising by technical team						

INSTITUTIONAL ARRANGEMENTS FOR TMP IMPLEMENTATION:

58. TMP is part of IEE and there is institutional arrangement made for the implementation of EMP of project, there will be no need of separate institutional arrangement for the implementation of TMP in the NWARA and MAIL, and safeguard team will supervise the implementation of IEE and TMP.

59. Also this is the afforestation/ replantation and require to be implemented by expert, MAIL CPMO will manage the entire process, identify suitable species, arrange nurseries, plan the timeline by season, hire and supervise local farmers to do the work (dig holes, plant seedlings, watering and tending) check the survival, organize replanting where needed, control pest and disease etc. that they can manage the entire process in coordination with local forest association, farmers and CDCs. And community with local forest association in coordination with DAIL will take care of sampling. The institutional arrangement includes

Table 5. 1: institutional arrangement

Institutions	Roles and Responsibilities
NWARA and DAIL	<p>Overall responsibility in ensuring the project compliance of safeguard policies and compliance reporting to ADB and NEPA.</p> <p>DAIL will manage the entire process, identify suitable species, arrange nurseries, plan the timeline by season, hire and supervise local farmers to do the work (dig holes, plant seedlings, watering and tending) check the survival, organize replanting where needed, control pest and disease etc. This can provide substantial local employment too.</p>
NEPA	National authority to approve IEE/EMP and ensure their compliance.
RBA	<p>Coordinating role in the implementation of PARB_P sub-output I at the basin and sub-basin level</p> <p>Formation of Water Users Association and their capacity enhancement in coordination with PMO, NWARA, MAIL, DAIL</p>
CPMOs	<p>Ensure that the project implementation fully complies with the ADB SPS 2009.</p> <p>Support RBA/DAIL in the design and execution of the institutional strengthening and training programs of sub-output II.</p>
PIOs	<p>Mainly responsible for the supervision of the works done at the field level and coordinating with all the stakeholders</p> <p>Reporting the progress of implementation and also the difficulties faced in the implementation to CPMO.</p> <p>Coordinate with DAIL on implementation of TMP by supporting of and contractor in the field level. Plantation of sapling in coordination of CPMO and MAIL, Monitoring of Planted sapling on regular basis,</p>
Contractors	<p>Implementation of the recommended mitigation measures during the construction phase of the project.</p> <p>Ensuring the compliance with the Occupational Health and Safety standards.</p> <p>Training of the workforce in Good Practices in construction management and waste management in the construction sites.</p> <p>Removal of trees along the canal</p> <p>Preparation of Site specific Environmental management plan.</p>
WUAs and	Main stakeholders in the implementation of the Water Management

IAs	<p>Improvement component of PARB_P and implement the mitigation measures and best practices in O&M phase of project</p> <p>Participate in the implementation of the programs in the watershed management and reforestation and re-vegetation programs in the area</p> <p>Cooperation in identification of site for replantation.</p>
FAs	<p>Taking responsibility of planted trees.</p> <p>Maintenance of forest.</p>
Local authorities	<p>Coordinating role at district level and village level to avoid conflict and also resolution of conflict and also addressing the grievances of the communities.</p>

Table 5. 2: Tree Management Action Plan

Action Area	Proposed Actions	Time Frame	Implementation Responsibility	Supervision Responsibility	Estimated Cost (US\$)
	Providing the IEE and TMP	By July 2020	CPMO	NWARA	PARB-P activities
<i>Removal of Trees and Utilization</i>	Getting approval from NEPA;	By September 2020	CPMO	NWARA	PARB-P activities
	Transplantation of sapling categories trees	Prior to construction and during construction	PIO,CPMO, contractor, RBA	NWARA	
	Provide trees including the roots that have to be removed to the people utilizing the trees at the moment	Prior to construction and during construction	PIOs, WUAs, IAs, DAIL, RBA, SBA	NWARA and MAIL	
Maintaining the Right of the Way and Vegetation Along the Road	Plantation along the roadside with local species (Pistachio and Almond) after construction	By March 2021	Farmers, WUA, IA, DAIL	RBA and DAIL	PARB-P activities
	Provide proper care for survival of sapling	2 years after plantation	Farmers, WUAs, IAs	DAIL, RBA, SBA	
<i>Promotion of Agroforestry in the Command Area</i>	Training of Farmers on promoting agro-forestry in the command area	During Project Period	DAIL	MAIL	PARB_P Activities
	Provide support to farmers on selection of species for fodders, fuel wood and orchards species	During Project Period	DAIL	MAIL	
	Provide training and resources for survival of siblings	During Project Period	PIOs, NGO, DAIL	MAIL	

ADB: Asian Development Bank; DAIL: Department of Agriculture, Irrigation and Livestock; FA: Forestry Association; IA: Irrigation Association; MAIL: Ministry of Agriculture, Irrigation and Livestock; NWARA: National Water Affair Regulation Authority; NEPA: National Environmental Protection Agency; PARBSP: Panj-Amu River Basin Sector Project; PIO: Project Implementation Office; CPMO: Central Project Management office; NGO: Non-Governmental Organization; RBA: River Basin Authority; SBA: Sub Basin Authority; WUA: Water Users Association.