

Initial Environmental Examination

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Afghanistan: Panj Amu River Basin Sector Project

(Chardara Irrigation Scheme Chardara District of Kunduz Province– NCB006)

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
CBNRM	Community Based Natural Resources Management
CMC	Central Management Authority
CPMO	Central Program Management Office
EIA	Environmental Impact Assessment
EARF	Environmental Assessment Review Framework
EMP	Environment Management Plan
ESIA	Environmental and Social Impact Assess
FAO	Food Agriculture Organization
GCF	Green Climate Fund
GEF	Global Environmental Facility
GoIRA	Government of Islamic Republic of Afghanistan
HDR	Human Development Report
IEE	Initial Environmental Examination
MAIL	Ministry of Agriculture, Irrigation and Livestock
MEAs	Multilateral Environmental Agreements
MEW	Ministry of Energy and Water
MFF	Multi-tranche Financial Facility
MOF	Ministry of Finance
NWARA	National Water Affairs Regulation Authority
NFMP	National Forestry Management Plan
NEPA	National Environmental Protection Agency
NPP	National Priority Programs
PARB-P	Panj Amu River Basin Project
SSEMP	Site Specific Environmental Management Plan
UNFCCC	United Nations Framework Convention on Climate Change
UNCBD	United Nations Convention on Biological Diversity

UNCCD	United Nations Convention to Combat Desertification
TMP	Tree Management Plan
WRDIP	Water Resources Development Investment Project

Table of Contents

Acronyms	I
Table of Contents	III
List of Tables	VI
Executive Summery	1
1. INTRODUCTION	1
1.1. Introduction to Project and Project Proponent	1
1.2. Brief Description of Location, Nature and Size of the Project	1
1.3. Project Influence Area	1
1.4. Source areas of environment-on-project (EOP):	2
1.5. Scope of Environmental Assessment Study	2
1.6. IEE Study Team	3
2. Project Description	4
2.1. Description of Panj Amu River Basin Project (APRB-P)	4
2.2. Description of sub-projects	5
2.2.1. Location of Chardara Irrigation Scheme	5
2.3. Construction camp Setup	7
2.4. Construction wastes	7
2.4.1. Disposal of Waste	8
2.5. Plaques and Sign Boards	8
2.6. Description of construction activity	8
2.7. DETAIL OF RESOURCE USAGE DURING CONSTRUCTION	9
2.7.1. Human Resources:	10
2.7.2. Machinery Requirement	10
2.7.3. Water Supplies	11
3. Review of Policy and Legislative Frameworks	12
3.1. Environment Related Policy and Legislations	12
3.1.1. Environmental Issues in the Constitution of Afghanistan	12
3.1.2. Environment Law of Afghanistan, 2007	12
3.1.3. National Comprehensive Agriculture Development Priority Program for Afghanistan (2016-2020):	12
3.1.4. National Forest Management Plan (NFMP) for Afghanistan:	13
3.1.5. Forestry Law (Forest Management Act, 1391/2012)	13
3.1.6. Community Forestry Regulation, TOR and Authorities	13

3.2.	Water Sector Strategy:	13
3.2.1.	Water Law, 2009:	13
3.2.2.	Regulation on Bed and Right of Way of Water Resources in Afghanistan, 2014:	13
3.3.	Legal Framework on Land Management	14
3.4.	Afghanistan's Commitment to Related Conventions and Protocol	14
3.4.1.	United Nation's Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol	14
3.4.2.	United Nation's Convention on Biological Diversity (UNCBD)	14
3.4.3.	Convention on International Trade on Endangered Species of Wild Fauna and Flora (CITES):	15
3.4.4.	Other Multilateral Environmental Agreements:	15
3.5.	ADB SPS 2009	15
3.6.	ENVIRONMENTAL SCREENING AND CATEGORIES	16
3.6.1.	ADB	16
3.6.2.	Government of Afghanistan	16
3.7.	National Legal Framework	17
4.	Description of the environment (Baseline data)	22
4.1.	Physical Environment	22
4.1.1.	Land Use in Project Influence area	22
4.1.2.	Topography	22
4.1.3.	Geology	23
4.1.4.	Soil and soil salinity	23
4.1.5.	Hydrology	24
4.1.6.	Water Quality	27
4.1.7.	Air and Noise Quality	28
4.1.8.	Climate	29
4.1.9.	Key Climate Periods and The Key Trends	29
4.1.10.	Natural Disasters in the kunduz Provinces	31
4.2.	Biological environment	31
4.2.1.	Proposed Protected Areas in the Project Influence Area	31
4.2.2.	Forest Resources and Terrestrial Biodiversity in Project Influence Area	32
4.2.3.	Forest Resources and Biodiversity along the Canal Alignment	34
4.2.4.	Aquatic Biodiversity	34
4.3.	Socio Economic and Cultural Environment	36
4.3.1.	Socio-Economic Status of Afghanistan:	36

4.3.2.	Socio-Economic Status of Project Area	36
4.3.3.	Culturally and Socially Significant Sites	41
4.3.4.	Current Traditional Resource Use by Indigenous Peoples	41
4.3.5.	Mineral, Oil and Gas, and Large Industrial Development	41
4.3.6.	Tourism	41
5.	ANALYSIS OF ALTERNATIVES	39
5.1.	No-Project Alternative	39
5.2.	Design Alternative	39
5.3.	Key indicators for Alternative	39
6.	Anticipated Environmental and Social Impacts and Mitigation Measures	41
6.1.	Impact assessment methodology	41
6.1.1.	Pre-Construction Phase Impacts and Mitigation Measures	41
6.1.2.	Construction Phase Impacts and Mitigation Measures	43
6.1.3.	Operation Phase Impacts	54
6.1.4.	Beneficial Impacts	58
7.	Information Disclosure, Consultation, and Participation	59
7.1.	Public Consultation Methodology and Locations	59
7.2.	Summary of Consultation	59
7.2.1.	Focus Group Responses Related to Project area:	59
7.3.	Outcome of Consultation Meeting at NAWARA:	60
7.4.	The Grievance Redress Mechanism	60
7.4.1.	Purpose of GRM	60
8.	Environmental Management and Monitoring Plan	63
8.1.	Environmental Monitoring Plan	63
8.1.1.	Construction Phase Monitoring Plan	63
8.1.2.	Operation Phase Monitoring Program	63
8.2.	REPORTING	63
8.3.	PREPARATION OF SITE SPECIFIC ENVIRONMENTAL MANAGEMENT PLAN (SSEMP)	63
8.4.	Environmental Management Plan	64
8.5.	Institutional Arrangement and Grievance Redress Mechanism	64
8.5.1.	Institutional Arrangement	64
9.	CONCLUSION AND RECOMMENDATION	79
9.1.	Conclusions	79
9.2.	Recommendations	79

List of Tables

Table 1: IEE team	3
Table 2: Salient Features on Chardara Irrigation Scheme Infrastructure Improvement and Rehabilitation	6
Table 3: Human Resource for the project	10
Table 4: Machinery Requirement for the project	10
Table 5: NEPA's National Regulations, Guidelines and Policies	17
Table 6: Comparison of International and local Air Quality Standards*	19
Table 7: Comparison of International and Local Noise Standards	20
Table 8: Flood Frequency (Discharge and Return Period)	26
Table 9: Discharge and Water Level of Kunduz River (Chardara Canal)	26
Table 10: Noise Level in the project area	28
Table 11: Historical Climatic Data on Project Influence Area (1901-2015)	29
Table 12: <i>Classification of Afghanistan's previously Proposed Protected Areas</i>	32
Table 13 : <i>Summery of Vegetation Species and Classification in Chardara Subproject</i>	34
Table 14 : <i>Summery of Natural Vegetation found in the project area</i>	34
Table 15: <i>Fish Species in Kunduz River</i>	35
Table 16: <i>List of Threatened Fish for Afghanistan</i>	35
Table 17: Population of the project area	37
Table 18: list of schools in the project area	38
Table 19: list of health centers in the project influence area	40
Table 20: Consultation meeting Date, location and number	59
Table 21: <i>Institutional Roles and Responsibilities in EMP Implementation</i>	65
Table 22: <i>Estimated budget for environmental management plan</i>	66
Table 23: <i>Estimated budget for Tree management plan</i>	66
Table 24: <i>Environmental Monitoring Programme of Chardara subproject</i>	68
Table 25: <i>Environmental Management Plan of Chardara subproject</i>	70
Table 26: List of Bacteriological Drinking Water Quality Standards	80
Table 27: List of Physical Drinking Water Quality Standards	80
Table 28: List of essential inorganic Chemical Drinking Water Quality Standards	81
Table 29: List of toxic inorganic chemical Drinking Water Quality Standards	82
Table 30: Maximum permissible limit for water saltiness and efficient factors of production and poisoning of plants	83
Table 31: Maximum amount of chemical materials in industrial effluents for irrigation and livestock purposes	83
Table 32: Maximum other industrial effluents chemical characteristics/specifications	84
Table 33: Some main pollution threats to water resources of Afghanistan	86
Table 34: Recommended standards for drinking water (underground and surface waters)	86
Table 35: Recommended standards for water resources which are used for irrigation or livestock purposes (underground and surface waters)	87
Table 36: Recommended standards for water resources which are used for aquatic life or fish preservation purposes (underground and surface waters)	87
Table 37: Particulate matter emissions standard table for brick kilns	89
Table 38: Particulate matter emissions standard table for cement manufacturing plants/factories	89

List of Figures

Figure 1: Afghanistan Panj-Amu Basin and its sub-basin	5
Figure 2: Location Map of the Chardara Irrigation Scheme	6
Figure 3: Land Use map of Kunduz.....	22
Figure 4: Satellite image of Kunduz River Basin (Joint presentation of the KRBP and DWHH/GAA 005)	25
Figure 5: Kunduz river flow duration curve at Chardara canal intake.....	27
Figure 6: <i>Proposed Protected Areas of Afghanistan (NPASPA/NEPA)</i>	32
Figure 7: <i>A comparison of forest land in 1977 and 2002 in Kunduz and Takhar Provinces</i>	33
Figure 8: <i>Vegetation to be removed along the Canal Line</i>	42
Figure 9: <i>Composition of Species to be removed during Rehabilitation of Canals</i>	42
Figure 10: <i>GRM organogram</i>	62

List of Annexes:

Annex 1: National Drinking Water Quality Standard of Afghanistan	80
Annex 2: Standards for underground and surface water resources	86
Annex 3: National Ambient Air Quality Standard for Afghanistan 2017.....	88
Annex 4: National standard for noise pollution in Afghanistan 2017	91
Annex 5: List of Protected Species in Afghanistan	92
Annex 6: Climate Data.....	96
Annex 7: Evapotranspiration (ET) (mm/day) for Kunduz based on Kunduz climatic parameters	98
Annex 8: Project area Pictures	99
Annex 9: Details on Public Consultation	101
Annex 10: Attendance List of Public Consultation Meetings.....	104
Annex 11: Photographs of Public Consultation Meetings	110
Annex 12: Basis for Estimation of Mitigation Cost.....	111
Annex 13: Water Quality and Soil Quality Monitoring.....	113
Annex 14: Emergency Response Framework	114
Annex 15: W.H.O. DRINKING WATER STANDARDS	119
Annex 16: Chance Find procedures	121
Annex 17: Waste Management/ Guidelines.....	122
Annex 18: Fuels and Hazardous Substance Management/ Guidelines	124
Annex 19: Worker Health and Safety Guideline	126
Annex 20: DRAFT TREE MANAGEMENT PLAN.....	130

Executive Summary

1. The importance of the Project is in its impact on the well-being of rural communities in the basin, and in its support for GIRA sector investment plan, the \$1.1 billion National Water and Natural Resources Development Program.
2. The proposed 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. The project will improve yields, cropping intensities and irrigated areas on a command area of 74,500ha, resulting in increased farm incomes and reduced rural poverty for over 400,000 beneficiaries, 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.
3. The Project will support (i) new construction, rehabilitation, and upgrading of irrigation and ancillary infrastructure in the Panj-Amu basin at about 21 priority schemes selected during implementation, and strengthened basin-based integrated water management capacity; (ii) improved on-farm water management, and (iii) watershed management schemes.
4. The executing agency is the Ministry of Finance, and the implementing agencies are the National Water Afaris Regulation Authority (NWARA) and the Ministry of Agriculture, Irrigation, and Livestock (MAIL).
5. **Impact:** Increased per-capita income and reduced poverty among rural and pastoral communities.
6. **Outcome:** Increased agricultural productivity in the Panj-Amu river basin

Outputs:

1. Water allocation and availability improved
2. On-farm water management enhanced
3. Watersheds properly managed and protected
4. The Project is classified Category B for environment. The objective of this initial environmental assessment (IEE) is to assess the impacts of Gul Tepa and Qala e Zal subprojects of the Panj-Amu River Basin Project (the Project), Afghanistan and provide mitigation measures to avoid the occurrence of impacts.

Description of Environment:

5. **River Basin and Hydrology:** The Kunduz river basin covers a total area of about 35,000 square km in North-eastern Afghan provinces of Bamiyan, Baghlan, Kunduz and Takhar. The river system is formed by two major rivers the Baghlan and the Takhar (often also referred to as Khanabad) River, which merge about 10 km North of Kunduz city and discharge into the Amu Darya 30 km further, at the Afghan – Tajik / Uzbek border.
6. The Kunduz river basin covers the mountainous area of the Hindukush in the Southern parts of the basin, hilly areas of Kunduz consisting of Palaeogene and Neogene sediments covered by Loess deposits of 30 m to more than 100 metres thickness in the centre and along the rivers several wide flood plains have been formed. The flood plains consist of highly fertile medium grained soils with good agricultural land, which comprises the main economic centres of the basin.
7. The higher areas in the basin are partly used for rain fed agriculture but mostly consist of deforested lands. Even though these areas have traditionally a low population density and a limited carrying capacity an increasing number of people is forced into these inhospitable areas due to population pressure.

8. Characteristic for the Kunduz river basin is constant run off of the rivers throughout the whole year. The peak river run off occurs in summer due to the snow melting in May and June. The rivers maintain a base flow in fall and winter. This river water allows an intensive irrigated agriculture which is the main economic basis of the region.
9. ***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.
10. The area within 2 miles of Kunduz is covered by cropland (57%) and artificial surfaces (39%), within 10 miles by cropland (63%) and bare soil (15%), and within 50 miles by cropland (38%) and grassland (33%).
11. ***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. While, average annual precipitation has decreased between 1960 and 2008, with an average rate of decrease of 0.5 mm per month per decade. Kunduz province is amongst the high flood risk provinces of Afghanistan. Over the years, the two provinces had lost many life and properties due to natural disasters like flood/flash floods, landslides/mudflow, avalanche and heavy snow fall; and earthquake.
12. ***Water Quality:*** According to the feasibility report 2020, the river water quality at the intake points is of good quality for irrigation purposes. Surface water quality is excellent in the upper basins of all rivers throughout the year and good in the lower basins in spite of large irrigated areas. As far as known, the presence of saline soil in irrigated areas is not caused by poor water quality but rather by either over-irrigation (waterlogging) or lack of irrigation water (fallow fields and high groundwater table) (Qureshi, 2002).
13. River salinity is extremely low in the upper reaches of the Amu Darya and Kunduz River exhibiting less than 100 ppm of salt. The high slopes of Northern Afghanistan provide good drainage which protects against increasing soil salinity. To avoid potential impact, water quality monitoring for drinking and irrigation 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.
14. ***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.

15. ***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 70-100 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.
16. ***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.
17. ***Vegetation along the Canal Banks:*** As per the field survey conducted in June-July 2020 along the canal lines, 35% species found are willow, and majority of famers said they use it for fuel wood and sometimes used as wooden truss. Another most common species is mulberry around 22% used as fuel wood. Other species are Populus Alba 5%, Platanus 26%, and Russian Olive (*Elaeagnus Angustifolia*) 12%.
18. ***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%).

Population, Poverty, GDP and HDI at National Level:

19. Afghanistan's total population is estimated at 29.70 million in 2017 of which about 39.1% were living under the national poverty line in 2016 despite the country achieved significant GDP growth averaging in double digit since 2002 for a decade. In recent years, GDP came down to 0.9% in 2015, 2.1% in 2016 and 2.5% in 2015. Majority of population almost 85% rely directly or indirectly on agriculture as their main livelihood, which constitutes 28% of GDP. The service sector contributes the equal share to GDP at 28%, while industry contributes around 20% which is expected to grow in the future due to development within the mining industry. As per the APNDF, 2017-2021, a great deal has been achieved in the human development index over the past 15 years. Important human development indicators including school enrollment, life expectancy, access to clean water, access to basic health services, and access to power and communication facilities. The ongoing conflict constrains Afghanistan's prospects for reducing poverty. The lack of security affects Afghans every day and hampers the delivery of services across the country's 34 provinces. Access to education, particularly for young women and girls, is affected by the fighting and by conflict-induced displacement.
20. ***Socio-Economic Status of Project Influence Area:*** In 2011, the total basin population was estimated to be 3.90 million (935,600 in Kunduz province, 917,700 in Takhar province, 848,500 in Baghlan province, 186,300 in the Panj-Amu basin part of Bamyan province, 889,700 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 provinces¹.

21. With area 3100 sq.km, total population in 2016/17 (2011 is 990,000 and growth rate 1.9%) is 1087,000 (Male 52% and Female-48%) with average household size of 7.1 persons and population density of 350 persons per sq.km. Only 0.4% population is migrant population. 75% of population is rural and 25% is urban². The socio economic status of project area presented in section 4.
22. ***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.
23. ***Mineral, Oil and Gas, Industries and Tourism:*** No operating mines, wells, or industries are present in the project area.

Summary of Adverse Environmental and Socio-Economic Impacts

Physical Environment:

24. Structure construction activities due to excavation works, vegetation clearing, dumping of spoils will result in soil. As the Chardara 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.
25. 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.
26. 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.
27. 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.
28. 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:

¹ Landell-Mills. (2013).

² Socio-Demographic and Economic Survey Takhar, 2015 and National Risk and Vulnerability Assessment, 2011/12

29. Chardara canal rehabilitation and improvement works will result in loss of 1081 trees (121 saplings, 669 pole size and 291 trees size). The number of affected trees determined based on the engineering design.
30. Kunduz River has a limit types of fishes, also there is a minimum construction work in the intake and for short time there will be 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:

31. The project will be implemented in the existing ROW of canal and there is no need for land Acquisition and resettlement.
32. About 13 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.
33. 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.
34. 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.
35. 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.
36. There are one high school and four elementary school in the project area, the name and location of the schools are listed in the table 18.
37. There are three health center (clinic) in the project area, and there is no any hospital in the district, the list of health centers is listed in table 19.
38. Agriculture is the major economic activity in the project area and providing about 93 % of all employment for their income earning. Traditionally, men are involved in bulk of the income earning activities.

Summary of Mitigation Measures:

Physical Environment

39. 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.
40. 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.

41. 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.
42. 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

43. ***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 10800 saplings will be re-planted with local species with participation of Water Users Association, Irrigation Associations, and Forestry Association.

Promotion of Agroforestry in the Command Area:

44. As per the Feasibility Study Report of Chardara subproject, the current command area of the project is 15904 ha while after implementation of the project it will increase by 17528 ha. There will be increase of Fodders area by 1624 ha. This will not only offset the loss of carbon sequestration potential due to removal of trees along the canals but will contribute significantly in adding the national capacity.

Rehabilitation of the Degraded Land in the Area:

45. 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.
46. 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.
47. 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

48. 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.
49. A total of 13 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.
50. LARP has the provisions of cash compensation at replacement rate for affected trees free of salvageable materials, depreciation and transaction costs.
51. 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.
52. 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.
53. 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:

54. Chardara 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. Chardara Project will have the following beneficial impacts:
55. Chardara Project, once in operation after rehabilitation and infrastructure improvement will supply uninterrupted water in the cultivable command area of 15409 ha with gross command area of 17528 ha.
56. LKIP is estimated to increase the cropping intensity by 02% and crop yield will be increased by 4-13% for different crops post project.
57. It will directly benefit about 87,074 people living in Chardara districts in the project influence area by 2021, once the Chardara comes in full operation.

58. There will be more area under vegetation cover by increasing the Fodders area by 1624 ha, which will enhance the carbon sequestration capacity in the project area.
59. About 39.1% of population in Afghanistan are living below the national poverty line and people living below the national poverty line in Kunduz is below the national average, and because of almost 87,074 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.
60. 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.
61. 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.
62. 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

63. 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\$ 21,604.00. 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 \$ 61,140.00.

Institutional Arrangement:

64. 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:

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

1. INTRODUCTION

1.1. Introduction to Project and Project Proponent

1. The Panj-Amu River Basin Project Sector Project (PARB), Afghanistan Project will support improved water allocation and availability, enhanced 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 subprojects (construction costs approximately \$50 million); the establishment, strengthening, and support of subproject water user associations (WUAs) and irrigator associations (IAs); training on on-farm water management and improved agronomic techniques; implementation of watershed management plans at sites adjacent to the priority subprojects; and improved 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 Chardara sub-projects continue 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 PARB 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. Brief Description of Location, Nature and Size of the Project

4. Chardara irrigation scheme is located around 28 km from Kunduz center. The GPS of the intake is N 36.492372 E 68.880859. The length of the main canal is approximately 61 km. It is located in Omerkhil Village of Ali Abad district of Kunduz province. The command area is located on left bank of Kunduz River. It has a command area of around 15,904 ha. The canal is the traditional one has been running more than 100 years.
5. The original age of the Chardara irrigation scheme is unknown but according to local people the canal is about 100 years old. After taking water from the Kunduz River the canal is aligned in the south direction passing through the villages and along the Kunduz River. The headwork is constructed by the KRBP it includes automatic escape structure and weir structure to divert the water into the river during flood season. The main canal intake has 10 gates in Chardara Headwork (Intake has 10 nos. of gate with size of 1.5m (w), 1.2m (h), the canal is unlined and irregular.

1.3. Project Influence Area

6. The project influence area covered while carrying out this IEE study included all areas that are directly impacted by the proposed Chardara Subproject interventions and also the source areas of potential environment-on-project (EOP) impacts.
7. The area of potential impact covers the Chardara district, the length of potential area is 61 km and the wide is around 1 km in both side of the canal.

8. As this is category B project (rehabilitation of existing canal), there won't be potential impact, the only impact will be during the construction phase.
9. **Potentially Impacted Areas:** The potentially impacted areas include:
10. Areas that currently or post-project could receive water originating from the Chardara intakes for irrigation or any other beneficial purpose (irrigation, domestic, in-stream, ground water recharge etc.).
11. Downstream areas that could be affected by project activities e.g. increased water abstraction at Chardara intakes; and
12. Areas adjacent to or downstream from the current and potential irrigated areas that receive or could receive drainage from the existing or rehabilitated Chardara system, including adjacent lower areas outside the commanded area that are or are not suitable for agriculture (e.g. Panj-Amu floodway).

1.4. Source areas of environment-on-project (EOP):

13. The areas on EOP include: Kunduz River catchments that are upstream of the project intakes, from which the sediment, snowmelt, and other runoff conveyed to the intakes originate;

1.5. Scope of Environmental Assessment Study

14. As per the ADB requirements, the Environmental Assessment and Review Framework prepared for PARB_P prepared. As per the ADB categorization criteria, PARB-P is categorized as Category B project and thus requiring IEE with EMP to comply with the Environmental Safeguards of ADB.
15. 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. As per this new regulation, the validity of environmental clearance is of three years and it is the responsibility of 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.
16. The proponent should submit monitoring report every year to NEPA during construction and operation of the project.
17. As per the ESIA regulation 2018, Chardar Project with the total gross command area of 15,904 ha falls under Category II, Therefore, the updated IEE with EMP are prepared to ensure that the project fulfils the Environmental Safeguards requirement of both ADB and GoIRA. The scope of IEE include:
18. Minimizing 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 it involves all players in the project.
19. The design of the PARB 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.
20. The boundaries of the Chardara subprojects irrigation IEE study include:

- The larger-scale longer-term environmental baseline description (climate, hydrology, history of human occupation etc) and impacts (cumulative, environment-on- project);
- Provinces or districts within which Chardara subprojects are located for baseline description relying on secondary census data;
- 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;
- The Chardara 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;
- Construction site and adjacent areas for assessment and management of construction impacts; and
- Potential quarry sites and adjacent areas for assessment and management of quarrying impacts.

1.6. IEE Study Team

21. This IEE prepared was prepared in July, 2020 by the Eptisa Servicios De Ingenieria in association with APAMA Consultancy Services consultant team for the National Water Affair Regulation Authority. This IEE is prepared by international and national environmental experts. A team of 8 people from 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	Dr. Gautam Kumar Basu	International Environmental Specialist
2	Javid Ahmadzai	National Environmental Specialist
3	Mohabatullah	National resettlement specialist/ Biologist
4	Morsal Satarzada	Gender Specialist
5	Najeeb Ziayee	Surveyor / Designer
6	Said Amin	Bahark district water manager(surveyor)
7	Habibullah	Takhar Taloqan district water manager (Surveyor)
8	Sohail Moqim	Kunduz, Ali Abad district water manager (Surveyor)

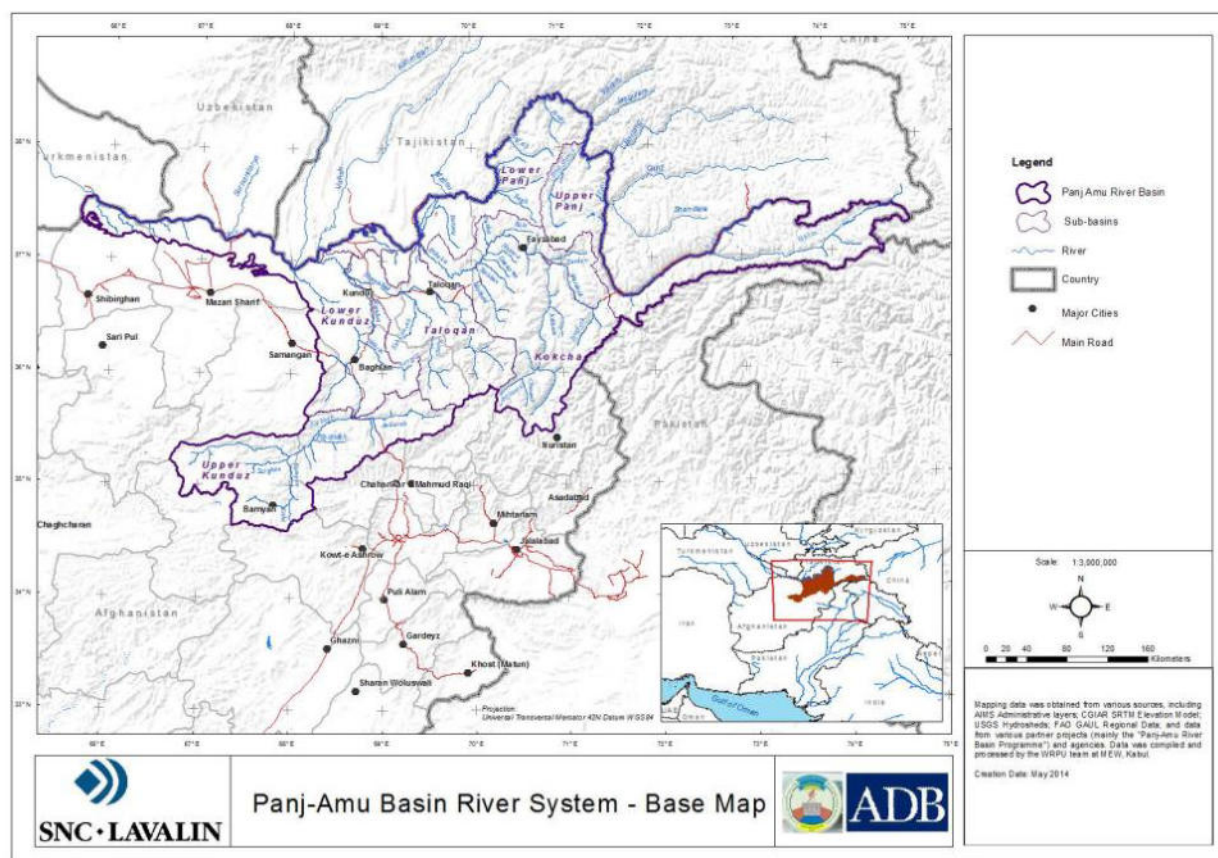
2. Project Description

2.1. Description of Panj Amu River Basin Project (APRB-P)

22. The importance of the Project is in its impact on the well-being of rural communities in the basin, and in its support for GIROA sector investment plan, the \$1.1 billion National Water and Natural Resources Development Program.
23. The proposed 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. The project will improve yields, cropping intensities and irrigated areas on a command area of 74,500ha, resulting in increased farm incomes and reduced rural poverty for over 400,000 beneficiaries, 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.
24. The Panj Amu River Basin Project has the following two sub-outputs:
25. **Output 1:** Water allocation and availability improved. This output will provide the capacity and resources for NWARA, and associated river basin agency (RBA), and sub basin agencies (SBAs) in the Panj-Amu river basin, to: (i) improve the conveyance and allocation of water to irrigated areas through rehabilitating and upgrading head works and main canals in priority schemes; (ii) establish and strengthen the capacity of 112 water user associations (WUAs) to operate and maintain (O&M) conveyance infrastructure in these schemes to better distribute water between the head, middle and tail end of canals more equitably; and for them to work with RBA and SBAs to facilitate water sharing between schemes; and (iii) enhance the capacity of NWARA, RBA and SBAs for more effective water allocation between schemes to benefit downstream users. In addition, support will also be provided to Afghan members of the Afghanistan-Tajikistan trans-boundary technical working group to prepare them for technical meetings and strengthen their ability to conduct negotiations regarding the set-up and operations of the Panj River Basin Commission.
26. **Output 2:** Command areas enhanced. This output will provide the capacity and resources for Ministry of Agriculture Irrigation and Livestock (MAIL), and associated Department of Agriculture Irrigation and Livestock (DAIL) in the Panj-Amu river basin, to: (i) improve irrigation infrastructure at the secondary and tertiary canal level, in schemes identified for improvement under Output 1 in order to secure an integrated approach; (ii) establish and strengthen the capacity of at least 105 irrigation Associations (IAs) to operate and manage irrigation infrastructure in these schemes to improve distribution of water within schemes; and (iii) improve water use efficiency at the farm level by improved on-farm water management and agronomic techniques (such as land levelling, bed and furrow irrigation, and intercropping) with at least 6,300 farmers having improved knowledge from 21 demonstration plots.
27. **Output 3:** Watersheds properly managed and protected. This output provides the capacity and resources for MAIL, and associated DAILs in the Panj-Amu river basin to improve community-based watershed management. This output includes (i) preparation of a community-based natural resources management technical manual and guidebook; (ii) training of DAILs' staff as master trainers who will conduct training of communities; (iii) identification of approximately 21 watershed/rangeland sites for restoration and protection; (iv) creation of community

forestry/rangeland associations for these sites; and (v) preparation and implementation of natural resource management plans for these sites. These activities will help restore 10,500 hectares of forestry and/or rangeland in the vicinity of 21 prioritized subprojects and protect irrigation structures under Outputs 1 and 2 from flash floods and sedimentation.

Figure 1: Afghanistan Panj-Amu Basin and its sub-basin

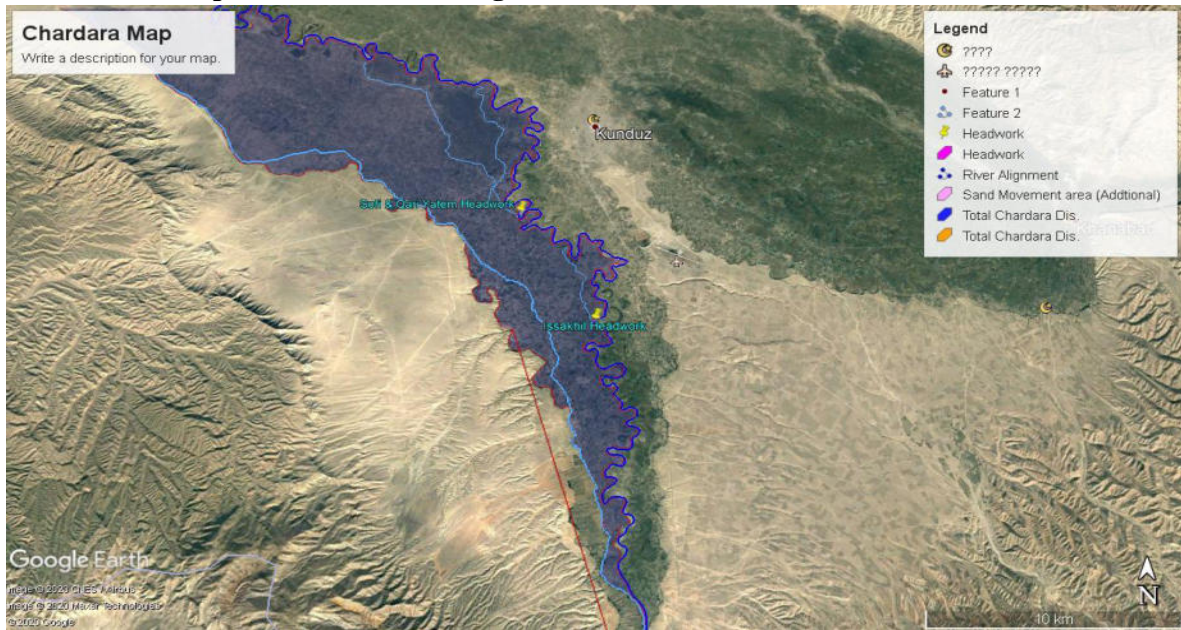


2.2. Description of sub-projects

2.2.1. Location of Chardara Irrigation Scheme

28. Chardara irrigation scheme is located around 28 km from Kunduz center. The GPS of the intake is N 36.492372 E 68.880859. The length of the main canal is approximately 61 km. It is located in Omerkhil Village of Ali Abad district of Kunduz province. The command area is located on left bank of Kunduz river. It has a command area of around 15,904 ha. The canal is the traditional one has been running more than 100 years.
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Figure 2: Location Map of the Chardara Irrigation Scheme



30. The salient features of the Chardara irrigation scheme infrastructure improvement and rehabilitation including the drainage improvement works are presented in **Error! Reference source not found. 2.**

Table 2: Salient Features on Chardara Irrigation Scheme Infrastructure Improvement and Rehabilitation

S.N	Structure Name	Chainage	GPS Coordinates	
			N	E
1	River Training Works	0+000	68.880859	36.492372
2	Headwork Crest Raising	0+000	68.880859	36.492372
3	Canal Lining		68.880859	36.492372
4	Canal Bank Protection 1	4+360	68.887927	36.503715
5	Spillway	4+400	68.888585	36.516887
6	Canal Bank Protection 2	8+340	68.885532	36.51988
7	Offtake 1	18+725	68.857418	36.596086
8	Canal Bank Protection 3	28+975	68.856891	36.597024
9	Canal Bank Protection 4	32+500	68.848837	36.621856
10	Canal Bank Protection 5	32+750	68.822173	36.654848
11	Offtake 2	34+810	68.798232	36.677203

S.N	Structure Name	Chainage	GPS Coordinates	
			N	E
12	Canal Bank Protection 6	36+040	68.794117	36.680117
13	Canal Bank Protection 7	36+600	68.793396	36.680003
14	Canal Bank Protection 8	37+750	68.791487	36.679689

2.3. Construction camp Setup

31. 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.
32. 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.
33. The Contractor shall construct and maintain a camp /camps to provide living accommodation for his/her staff and operatives.
34. 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.
35. 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.
36. 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

2.4. Construction wastes

37. 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.
38. 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 coordinated with local administration. Agreement for disposal site(s) should also include the collection and disposal of any existing waste material.

2.4.1. Disposal of Waste

39. The disposal of waste materials shall be as follows:

- Waste materials, including but not restricted to refuse, garbage, sanitary wastes, industrial wastes and oil and other petroleum products, shall be disposed of by the Contractor. Disposal of waste material, except from oils and other chemicals shall be by burning (preferred) where burning of such materials is approved by the Supervisor, where burning is not possible, burying can be used, provided burial of such materials is approved by the Supervisor. All methods should be in accordance with the environmental law. It is the contractor's responsibility to familiarize himself with the law, find appropriate disposal locations or waste handling agents. Failure to comply may result in penalties and further action as appropriate by the supervisor.
- All waste material to be disposed of by burning shall be piled in designated burning areas in such a manner as will cause the least fire hazard. Burning shall be thorough and complete and all charred pieces remaining after burning, except for scattered small pieces, shall be removed from the construction area and disposed of as otherwise provided in this Clause. The Contractor shall at all times take special precautions to prevent fire from spreading beyond the piles being burned and shall be liable for any damage caused by his burning operations.
- The waste materials to be disposed of by removal from the construction area shall be disposed of prior to the completion of the work under these Specifications. All waste materials removed except trees, shall become the property of the Contractor. Waste materials to be disposed of by dumping shall be hauled to an approved dumpsite. It shall be the responsibility of the Contractor to make any necessary arrangements.

40. Exact procedures should be outlined in detail in the Site Environmental Management Plan (SEMP, see article 1.38 and appendix A).

2.5. Plaques and Sign Boards

41. The Contractor shall erect plaques and sign boards on all the structures giving the location and name of the structure. The location, dimensions and style of the sign boards and plaques shall be as per the approval of the Supervisor, who will seek approval from the ADB office.

2.6. Description of construction activity

42. **Long-term Informal System Rehabilitated:** The Chardara 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 Chardara Civil Works / Construction Activities include:

- Construction site clearance and preparation including tree removal;
- Re-excavation of foundations, borrow pits and canals;
- Management and disposal of excavation spoil;
- Temporary closure of irrigation canals;
- Temporary blockage of foot / vehicle paths / roads;
- Excavation of temporary canals (diversions);

- Sourcing construction materials from existing quarries or quarrying of such materials;
 - Creation and management of on-site stockpiles of construction materials;
 - Creation and disposal of solid and liquid waste;
 - Operation and maintenance of vehicles and equipment;
 - Creation of reinforced concrete structures;
 - Decommissioning and clean-up of construction sites, including infilling temporary canals and borrow pits.
43. Of specific importance to this IEE is the amount of excavation, vegetation clearance and replanting required for each sub-site where construction of the rehabilitated canals will occur? These items are considered to be amongst the most important from the environmental management perspective.
44. **Operation.** Activities will comprise water management and irrigation through the new and upgraded irrigation structures with resultant knock-on changes to agriculture.
45. Proposed civil works for the project include:
- **Offtake** – Construction of 6 new off take and weir.
 - **Spillway**- Construction of 4 new spillways for spilling the sediments during flood season and upgrading of the existing spillway;
 - **Basin sedimentation**- Removal of sediments for new proposed intake to the existing intake of Chardara canal;
 - **Protection wall**: construction of 200 m protection wall on the right side of canal
 - **Rehabilitation**- Rehabilitation of Chardara existing intake;
 - **Canal bank protection**- Bank protection at the proposed project area;
 - **Head work** – protection of upstream and downstream of intake;
 - **Flow Measurement Infrastructure** – Provide a calibrated staff gauge at each upgraded offtake to support water distribution proportional to offtake command areas;
 - **Cross-regulators& Head regulators** – Constructing of cross-regulators and head regulators in the main canal;
 - **Canal Lining**- Construction of canal lining to prevent water losses and seepage;

2.7. DETAIL OF RESOURCE USAGE DURING CONSTRUCTION

46. 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).
47. Mechanical excavators are 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.
48. 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.

2.7.1.Human Resources:

49. 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: Human Resource for the project

No.	Position	Min No. Required for every package	Total Work Experience [years]	Experience in Similar Work [years]
	Project Manager/Irrigation Design Engineer	2	10	5
	Environmental Engineer	1	8	3
	QC Engineer	2	8	5
	Safety Officer	2	8	3
	Junior Civil Construction Supervisors/Engineers	4	5	5
	Auto Cad Technicians	2	5	2

50. 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.
51. 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.

2.7.2.Machinery Requirement

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

Table 4: Machinery Requirement for the project

No.	Equipment Type and Characteristics	Min. Number Required for each package
	<i>a) Excavator ($\geq 0.35m^3$ bucket)</i>	2 nos
	<i>b) Truck+Tippers+Dump truck (≥ 6 tonnes or 4.5 cum capacity)</i>	2 nos
	<i>c) Tractor with trailer</i>	2 nos

	<i>d) Road Roller (Loading Capacity =>8 tonne)</i>	<i>1 nos</i>
	<i>e) Grader</i>	<i>1 nos</i>
	<i>f) Concrete Mixture (Capacity =>7'/10' cft)</i>	<i>4 nos</i>
	<i>g) Vibrator</i>	<i>4 nos</i>
	<i>h) Water Tanker/Truck mounted water tanker</i>	<i>2 nos</i>
	<i>i) Theodolite</i>	<i>1 no</i>
	<i>j) Leveling Machine</i>	<i>4 no</i>

53. In case of lease or hire of the equipment, an agreement with the owner of equipment must be submitted clearly stating the availability of the equipment for the construction period of the proposed work.

2.7.3. Water Supplies

54. The Contractor shall make his own arrangements for the supply of water for the purposes of the Contract. The quality of the water shall be to the approval of the Engineer and suitable for the purpose for which it is intended. Waste water shall be disposed of clear of the Site to the satisfaction of the Engineer so as to cause no damage or complaint.

3. Review of Policy and Legislative Frameworks

3.1. Environment Related Policy and Legislations

3.1.1.Environmental Issues in the Constitution of Afghanistan

55. 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

56. 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 1-4)
- List of Protected Species in Afghanistan (Annex 5)
- Relevant Policies, Strategies, Plans and Legislations on Forestry and Agriculture Sector

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

57. This program sets a very ambitious goal for the next five years:
58. Expand the land under irrigation from 2.2 to 2.7 million hectares; and
59. Increase wheat production from 4.5 to 5.9 million metric tons.
60. And the ways identified to achieve these goals among others include:
61. Increasing investments in water management, with rehabilitation of more than 1,000 irrigation schemes, developing new irrigation networks and building small water reservoirs; and
62. Expanding agroforestry and reforestation with over 60,000 hectares that support environmental conservation and income generation for farmers.

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

63. 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.

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

64. 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.

3.1.6.Community Forestry Regulation, TOR and Authorities

65. 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.
66. Relevant Policies and Legislation on Water Resources Sector

3.2. Water Sector Strategy:

67. 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.

3.2.1.Water Law, 2009:

68. 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.

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

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

70. 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.
71. 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.
 - **Right of Way on Canals and Streams:** As per Article 5 of this regulation, ROW is as follows:

• Canal Capacity: 150 litres per second	ROW: 1 meter both sides
• Canal Capacity: 150 litres/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
72. 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

73. There are four important laws and policies that provide the basis for acquisition of land for public purpose, namely:
 - The Law on Land Expropriation (8 October 2000);
 - The Land Affairs Management Law (LML) (2008);
 - Amendment to The Law of Land Expropriation (3 April 2005); and
 - The Land Policy (2006)
74. 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

75. Despite being a LDC, Afghanistan in its Nationally Determined Contribution submitted to the UNFCCC during the Paris convention has set the following target:
76. 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.
77. GOIRA has made the following commitments in its NDC:
78. At least 10% of Afghanistan land area and the habitat of selected species under a system of conservation
79. 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)

80. In line with the Aichi Targets, GoIRA has also set targets with implementation strategies. Some of the key targets that are relevant here are:
81. at least 10% of each ecological region effectively conserved, and areas of particular importance to biodiversity protected
82. 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
83. rate of loss and degradation of natural habitats decreased
84. 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):

85. 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 5) 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.

3.4.4. 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)

3.5. ADB SPS 2009

86. 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.
87. 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.

3.6. ENVIRONMENTAL SCREENING AND CATEGORIES

3.6.1.ADB

88. 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.
89. 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).
90. 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.
91. 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.

3.6.2.Government of Afghanistan

92. 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.
93. 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.
94. 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.
95. 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.
96. 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.

3.7. National Legal Framework

97. Table 5 provides a summary of relevant NEPA's Environmental Regulations, Guidelines and Policies for the project, Table 6 provides Comparison of International and local Air Quality Standards and Table 7 provides Comparison of International and Local Noise Standards.

Table 5: 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 EIA and list the projects into 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 terms of Executive Order No. 1/87 dated 3 June 2008. These guidelines are in draft form and have been prepared by NEPA in coordination with UNEP. The purpose of guidelines is to provide guidance to proponents while undertaking a development project that may have a potential impact on the environment. The guidelines also provide guidance on how public should be consulted and define the roles and responsibilities of various stakeholders' in the process.
Environmental Impact Assessment Policy – “An Integrated Approach to Environmental Impact Assessment in	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

Afghanistan”		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.
<p>Multilateral Environmental Agreements:</p> <p>United Nations Environment Programme</p> <p>Post-Conflict and Disaster Management Branch</p> <p>A Handbook for Afghan Officials</p>	March, 2008	<p>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</p> <p>Finland and the Global Environment Facility.</p>

Table 6: 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	NA	NA
	1 hr	75 ppb	10 min	500 ug/m ³		
CO	8 hrs	9 ppm (11 mg/m ³)			NA	NA
	1 hr	35 ppm (43 mg/m ³)				
NO ₂	Annual Mean	100 ug/m ³ (53 ppb)	1 yr	40 ug/m ³	NA	NA
	1 hr	100 ppb	1 hr	200 ug/m ³		
O ₃	8 hrs	0.07ppm (148 ug/m ³)	8 hrs	100 ug/m ³	NA	NA
PM ₁₀	24 hrs	150 ug/m ³	1 yr	20 ug/m ³	Annual Mean	401 ug/m ^{3**}
			24 hr	50 ug/m ³	24 hrs	247 ug/m ^{3**}

PM _{2.5}	Annual Mean	15 ug/m ³	1 yr	10 ug/m ³	NA	NA
	24 hrs	35 ug/m ³	24 hr	25 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 (EIH) Special Support Team (SST).

Table 7: Comparison of International and Local Noise Standards

Category of Area/Zone	Limit in dB(A) Leq				
	AFG- NEQS			WHO/IFC	
	Day Time	Night Time	Day Time	Night Time	
Residential area (A)	NA	N A	55		45
Commercial area (B)	NA	N A	70		70
Industrial area (C)	NA	N A	70		70
Silence zone (D)	NA	N A	55		45

*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.

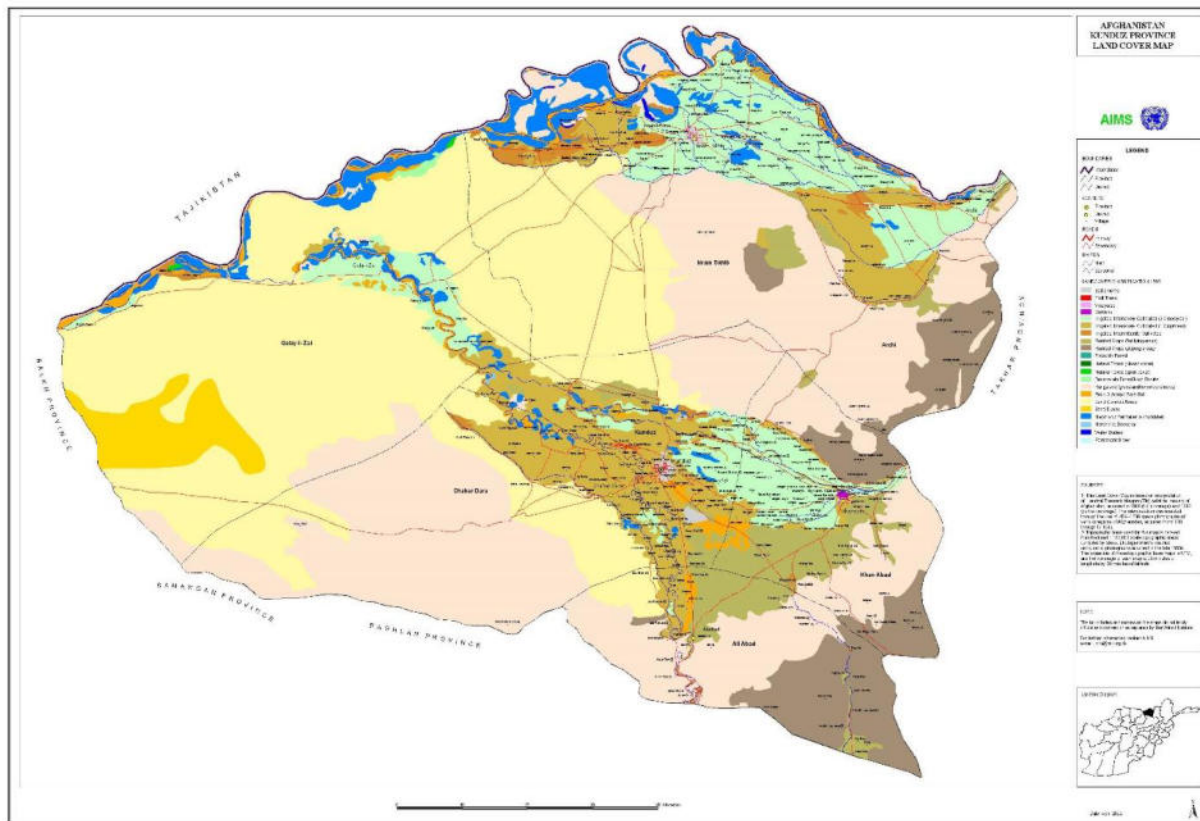
4. Description of the environment (Baseline data)

4.1. Physical Environment

4.1.1. Land Use in Project Influence area

98. 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.
99. The area within 2 miles of Kunduz is covered by cropland (57%) and artificial surfaces (39%), within 10 miles by cropland (63%) and bare soil (15%), and within 50 miles by cropland (38%) and grassland (33%).

Figure 3: Land Use map of Kunduz



4.1.2. Topography

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

101. The topography within 2 miles of Kunduz contains only modest variations in elevation, with a maximum elevation change of 207 feet and an average elevation above sea level of 1,287 feet. Within 10 miles contains only modest variations in elevation (814 feet). Within 50 miles contains significant variations in elevation (13,038 feet).

4.1.3. Geology

102. Afghanistan has some of the most complex and varied geology in the world. The oldest rocks are Archean succeeded by rocks from the Proterozoic and every Phanerozoic system up to the present day. The country also has a long and complicated tectonic history, partly related to its position at the western end of the Himalaya. This diverse geological foundation has resulted in a significant mineral heritage with over 1400 mineral occurrences recorded to date.
103. The Tadjik block of northern Afghanistan formed the southern margin of the Eurasian continental plate during Permo-Triassic times. The Palaeozoic basement was intruded by Triassic granitoids as a result of subduction related to the first stages of the closure of the Tethys Ocean during the Cimmeride Orogeny. Subsequent to this, a Jurassic clastic sequence was deposited, which changes upwards to Cretaceous carbonate platform sedimentation. This area is now the prime target for hydrocarbon exploration, although the exposed granitoids in the northeast of the block are prospective particularly for precious (and base) metal mineralization. Quaternary sediments, quaternary sands and dunes mark the geological situation of the Investigation area (The Cenozoic Afghan-Tajik depression spans southeastern Tajikistan, southeastern Uzbekistan, and northern Afghanistan).

4.1.4. Soil and soil salinity

104. 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. 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

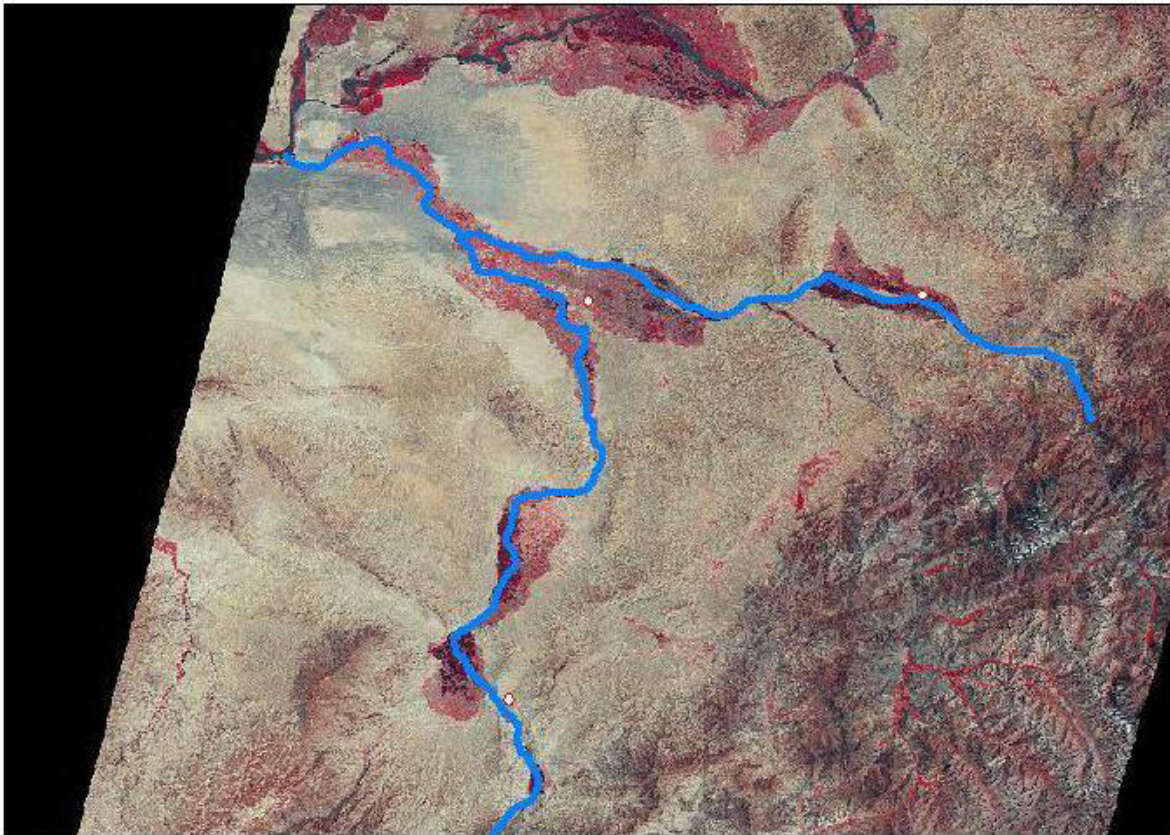
Groups, moisture regimes and temperature regimes and identified 25 different soil regions in the country ³(Shroder, 2014).

4.1.5.Hydrology

4.1.5.1. Kunduz River Basin

105. The Kunduz river basin covers a total area of about 35.000 square km in North-eastern Afghan provinces of Bamiyan, Baghlan, Kunduz and Takhar. The river system is formed by two mayor rivers the Baghlan and the Takhar (often also referred to as Khanabad) River, which merge about 10 km North of Kunduz city and discharge in to the Amu Darya 30 km further, at the Afghan – Tadjik / Uzbek border.
106. The Kunduz river basin covers the mountainous area of the Hindukush in the Southern parts of the basin, hilly areas of Kunduz consisting of Palaeogene and Neogene sediments covered by Loess deposits of 30 m to more than 100 metres thickness in the centre and along the rivers several wide flood plains have been formed. The flood plains consist of highly fertile medium grained soils with good agricultural land, which comprises the main economic centres of the basin.
107. The higher areas in the basin are partly used for rain fed agriculture but mostly consist of deforested lands. Even though these areas have traditionally a low population density and a limited carrying capacity an increasing number of people is forced into these inhospitable areas due to population pressure.
108. Characteristic for the Kunduz river basin is constant run off of the rivers throughout the whole year. The peak river run off occurs in summer due to the snow melting in May and June. The rivers maintain a base flow in fall and winter. This river water allows an intensive irrigated agriculture which is the main economic basis of the region.

Figure 4: Satellite image of Kunduz River Basin (Joint presentation of the KRBP and DWHH/GAA 005)



109. The Kunduz river (Surkhab in the midstream) originates at Shibar pass. The river receives two tributaries at the left: Seygan and Kamerd. At the right the following tributaries flow into Surkhab: the Anderab river, which originates at Khavak pass (height 3600 m) and flows into Surkhob around settlement Doni. The Anderab river receives Arzu and Banu tributaries at the left, the Khanabad river, which consists of such tributaries as Varsaj, Khost, Chal and Narik.
110. The Khanabad river flows into Kunduz at Yakala-iy-Zad village. Up to Churi village, the Kunduz river flows through a narrow gorge, after this village it flows across a vast valley, then below Kunduz town getting 3 m wide. The outlet of Kunduz in some places is swampy and overgrown with tugais. The length of the river is about 400 km. The width in the downstream reaches 150-200 m, with a depth of 3 m.

4.1.5.2. Hydrology and Flood Level

111. Analysis on Kunduz River flood frequency were deemed necessary to forecast design floods for the planned intake of the canal at the specified location. For this analysis the annual peak flow data from 2007 to 2018 of Gerdab Gauge station were analysed using Log Pearson Type III method for fitting frequency distribution data to predict the design flood for the canal intake design in the river. The different options used in return period in Kunduz River are Design Flood Recurrence Period of 1, 2, 5, 25, 50, 100 and 200 years as shown in the table 8.

Table 8: Flood Frequency (Discharge and Return Period)

Return Period	Discharge
(Years)	Q (m ³ /s)
1.0101	30
2	177
5	290
10	366
25	458
50	524
100	587
200	648

112. As Afghanistan is highly susceptible and severely affected by climate so taking into account the mitigation and adaptation strategies, the design flood recurrence period of 50 years has been considered. Parameters of the river including slope (0.003229), bed width (16.89 m) obtained from the topographic survey conducted for Kunduz River were used in Manning's equation for determining the Q_{min}, H_{min}, Q_{max}, and H_{max} for 50 years return period flow summarised in the table 9.

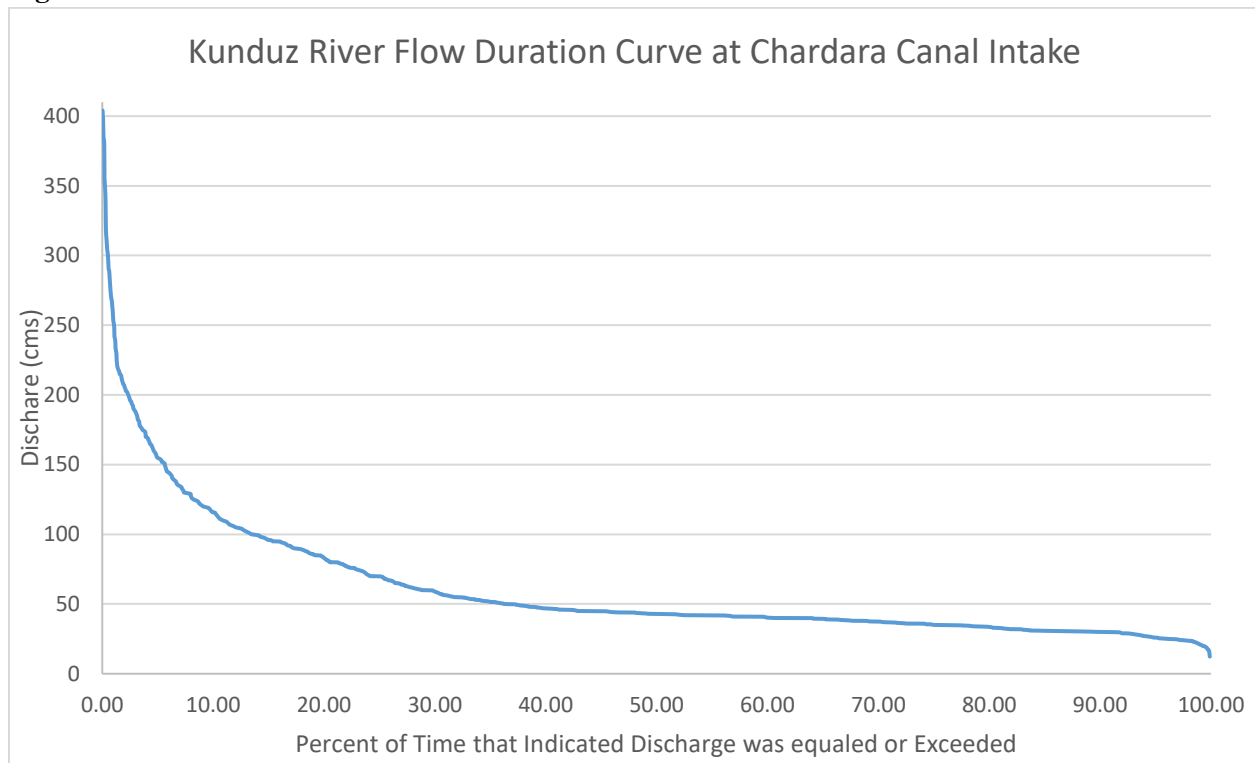
Table 9: Discharge and Water Level of Kunduz River (Chardara Canal)

Parameter	Unit	Quantity
Width of Kunduz River	meter	50
Q _{max}	m ³ /sec	524
H _{max}	meter	2.472
Q _{min}	m ³ /sec	8.15
H _{min}	meter	0.25

4.1.5.3. Water Availability

113. Gerdab river flow measurement gauge is located about 14.75 km upstream of Chardara Canal Intake on Kunduz River. Sufficient amount of data is available from the record of stream flows. Hydrological Year book 2008 – 2017 is collected from the Ministry of Energy and Water having records of daily, monthly and annual Kunduz river discharges. As plenty amount of data is available so in this case flow duration curve was developed for Kunduz River at Chardara Canal Intake point. The FDC is given below.

Figure 5: Kunduz river flow duration curve at Chardara canal intake



114. Interpreting the FDC indicates that 33.7 Cubic's flow will be equaled or exceeded 80% of the time in Kunduz River. This flow of 33.7 m³/sec is 80% reliable flow.
115. The recurrence design flood of 1 in 50 year return period in Kunduz River is 524 m³/s with maximum flood level of 2.472 m determined using Log Pearson Type III in conjunction with Manning's equation. The minimum discharge calculated for Kunduz River is 8.15 m³/s having a depth of 0.25 m.
116. **Chardara:** The waterways of the Chardara Canal subproject area are the main canal and its secondary branch which gets its water through a constructed headwork from the Kunduz 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.
117. **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. During the field visit it had observed that the area has dug wells and hand pumps in depth of approximately 15-40 meters.
118. 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.

4.1.6. Water Quality

119. According to the feasibility report 2020, the river water quality at the intake points is of good quality for irrigation purposes. Surface water quality is excellent in the upper basins of all rivers throughout the year and good in the lower basins in spite of large irrigated areas. As far as known, the presence of saline soil in irrigated areas is not caused by poor water quality but rather by either over-irrigation (waterlogging) or lack of irrigation water (fallow fields and high groundwater table) (Qureshi, 2002).
120. River salinity is extremely low in the upper reaches of the Amu Darya and Kunduz River exhibiting less than 100 ppm of salt. The high slopes of Northern Afghanistan provide good drainage which protects against increasing soil salinity. To avoid potential impact, water quality monitoring for drinking and irrigation 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.

4.1.7. Air and Noise Quality

121. 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.

Table 10: Noise Level in the project area

Location	Day time			National Standard (dB)	Night			Standard (dB)
	Max	Min	Average		Max	Min	Average	
Qasim Ali (Village area)	55	40	50	60	40	25	32.5	55
Arbab Husain, (Agriculture area)	55	35	45	60	35	20.5	27.75	55

Khalzai (Village area)	57	39	51	60	45	27	36	55
Ahmad Zai (Agriculture area)	58	38	48	60	36	18	27	55
Mangal (Agriculture area)	59	44	51.5	60	36	22	29	55
Maghoul ha village (Village area)	58	47	54.5	60	44	26	35	55

122. National standards on ambient air quality and noise quality are provided in Annex 3.

4.1.8. Climate

123. Afghanistan has a semi-arid to arid climate that is classified within the Desert and/or Desert Steppe climate classification scheme. The climate in the project influence area is predominately arid, with an average rainfall from 1901 to 2015 of 313.33 in Kunduz, as per the database maintained for Afghanistan in the World Bank: Climate Change Knowledge Portal for Afghanistan (http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisRegion=asia&ThisCcode=AFG). The maximum monthly average precipitation, maximum monthly average temperature, and maximum monthly minimum temperature for the same period from the same knowledge portal is presented in table 11.

Table 11: Historical Climatic Data on Project Influence Area (1901-2015)

Description	Kunduz	Chardara
Annual Precipitation (mm)	313.33	314.14
Maximum Monthly Average Precipitation (mm)	65.02	63.99
Minimum Monthly Average Precipitation (mm)	3.24	2.52
Maximum Monthly Average Temperature °C	30.69	29.94
Minimum Monthly Average Temperature °C	3.46	3.58

Source: Meteorological Department of Afghanistan 2018

124. Afghanistan Meteorological Department of Government of Afghanistan has meteorological stations in Kunduz and the observed data from 2009 to 2017 are presented in Annex 6. According to the national data of Kunduz it varies from 168 mm to 490 mm from 2008 to 2013 (Annex 7), raining mainly from November to May, and the months from June to October being very dry in the provinces. The snowy months are December through February, while heavy frost is experienced during the winter months. Details on the monthly precipitation, monthly snow cover, and monthly maximum and minimum temperatures recorded in the meteorological stations established in provincial headquarters of Kunduz are presented in Annex 6.

4.1.9. Key Climate Periods and The Key Trends

4.1.9.1. The Key Climate Periods

125. 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. Annual precipitation ranges from 51.56 mm in the southwestern regions of Afghanistan to 992.1 mm per year in the northeastern mountainous regions. Areas in the Eastern provinces of Kunar, Nuristan, Laghman, and Nangarhar can receive a lot of precipitation in the summer (1,200 mm), which is around 5 times the country's average, as they lie near the margin of the monsoon regime.
126. Most precipitation in Afghanistan falls during winter through spring, in the months of November through April, and usually falls as snow in high altitude areas, with peaks in precipitation during February and March. These are a result of winter storms that are of Mediterranean origin. Rainfall typically occurs in the high northern latitudes from March to April.
127. Temperature varies between the lowland plains to the south and the mountainous regions in the north. The lowland plains experience wide seasonal variations in temperature, with average summer (June-August) temperatures above 33° C and average winter (December-February) temperatures around 10° C. The high altitude regions of Afghanistan experience lower annual temperatures, with summer temperatures averaging 15° C, and winter temperatures below 0° C in the highest areas (World Bank: Climate Change Knowledge Portal for Afghanistan http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisRegion=asia&ThisCcode=AFG).

4.1.9.2. The Key Climate Trends

128. **Temperature:** 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.
129. **Precipitation:** Average annual precipitation has decreased between 1960 and 2008, with an average rate of decrease of 0.5 mm per month per decade.
130. **Extreme:** Extreme events like the maximum, 1 and 5-day precipitation, frequency of hot days and nights, the average days of 'cold' days and nights per year, and drought cycle and heavy precipitation events are summed up as follows:
131. Observations of maximum 1- and 5-day precipitation has decreased slightly in March-May rainfall, but has also slightly increased in other seasons.
132. The frequency of 'hot' days and nights in Afghanistan has increased in each season since 1960; the average number of 'hot' days per year increased by 25 days while 'hot' nights per year increased by 26 nights between 1960 and 2003. September through November saw the greatest rate of increase in 'hot' days and nights.
133. The average number of 'cold' days and nights per year have decreased since 1960; the average number of 'cold' days per year decreased by 12 days and 'cold' nights experienced a similar amount of decrease between 1960 and 2003. December through February experienced the greatest rate of decrease in 'cold' days and nights.
134. Drought cycle within Afghanistan in recent years has tended to occur more frequently.

135. Heavy precipitation events have increased in frequency in South Asia while decreases have been observed in light rainfall events.

4.1.10. Natural Disasters in the kunduz Provinces

136. According to the Human Development Report of Afghanistan, 2011, Kunduz province are amongst the high flood risk provinces of Afghanistan. The Amu River, every year it swells and changes course during the spring and summer seasons, washing away settlements, traditional irrigation systems and irrigated agricultural land. In 2004, it destroyed 24,000 hectares of farmland along its banks in Balkh, Jawzjan, Kunduz and Takhar provinces. The population living there depends mainly on farming and livestock, while the Amu River provides 57 percent of the total irrigation water. In 2005, the river washed away more than 5,000 hectares of farmland and pasture.
137. As per UNOCHA (United Nations Office for the Coordination of Humanitarian Affairs) data base for the period of 01 January 2012 to 31 December 2017, the provinces had lost many life and properties due to natural disasters like flood/flash floods, landslides/mudflow, avalanche and heavy snow fall; and earthquake. In this period, Kunduz province had resulted in loss of 22 lives with 22 injured, affecting 8535 individuals (1332 families), 878 houses damaged, and 480 houses destroyed.(source: OCHA; <https://www.humanitarianresponse.info/en/operations/afghanistan/>)

4.2. Biological environment

4.2.1.Proposed Protected Areas in the Project Influence Area

138. National Environmental Protection Agency of Afghanistan have 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 6 and classified them into three types table 12.
139. 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 areal located about 70-100 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.
140. 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.
141. 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*) which is currently not available, 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 6: Proposed Protected Areas of Afghanistan (NPASPA/NEPA)



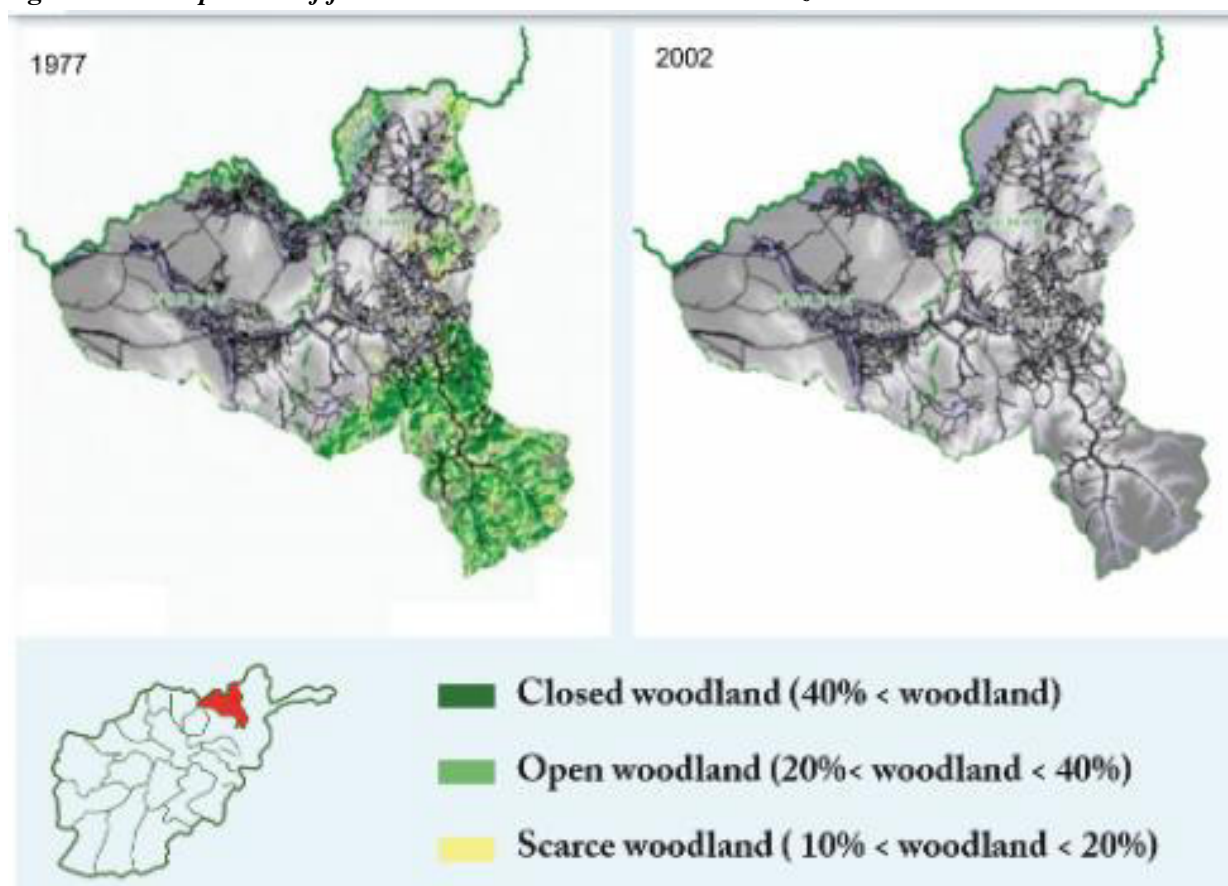
Table 12. Classification of Afghanistan's previously Proposed Protected Areas

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 proposed protected area.

4.2.2. Forest Resources and Terrestrial Biodiversity in Project Influence Area

142. 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 7. Which shows more than 50% reduction in the forest area in this province, the project influence area.

Figure 7: A comparison of forest land in 1977 and 2002 in Kunduz and Takhar Provinces



(Source: HDR/Afghanistan, 2011)

143. 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 figure 7 over the years there had been uncontrolled deforestation along the Panj-Amu river resulting in the destruction of the Tugai Forest 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 *Artemisia 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.

4.2.3. Forest Resources and Biodiversity along the Canal Alignment

144. The field survey was conducted during June- July 2020 along the Chardara 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 summery of vegetation species and their classification along Chardara Canal which will be affected by the project are presented in table 13, based on the survey 121 sapling, 669 pole size and 291 tree size will be affected.

Table 13 : Summery of Vegetation Species and Classification in Chardara Subproject

S. N	Province	District	Canal Name	Types of Tree		Tree Category		
	Kunduz	Ali Abad	Char Dara Canal	Local Name	Scientific Name	Sip	Pole	Tree
1				Chinar	Platanus	31	234	89
2				Bid	Willow	42	138	34
3				Sinjad	Russian Olive	15	48	28
4				Tot	Mulbery	27	89	0
5				Safidar	Populus alba	6	160	140
Sub-Total						121	669	291
Grand Total					1081			

Source: Field Survey, March 2020

145. Based on the field survey, there are some natural vegetation found in the project area which are listed in the table 14.

Table 14 : Summery of Natural Vegetation found in the project area

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

4.2.4. Aquatic Biodiversity

146. In Mountain Rivers available fish species are Brown trout and Milk fish; these are basically carp from the family Cyprinidae. Fishing in Kunduz and Khanabad rivers and streams near the project sites is very limited, and information on the number of fisherman, fish species captures, yields and total catch does not exist.

Table 15: Fish Species in Kunduz River

English Name	Scientific Name	Occurrence
Eel	Anguilliformes	C
Catfish	Siluriformes	C
Carp Fish	Cyprinus carpio	C

Table 16: List of Threatened Fish for Afghanistan

Family	Species	FishBase name	Threat Category	Where Found	Threats
Acipenseridae	<i>Pseudoscaphirhynchus hermanni</i>	Dwarf sturgeon	Critically Endangered (CR)	Mouths of Amu Darya upriver to Termez [>100km downriver from LKIP] on the Afghan border with Uzbekistan.	Info on this sp. is limited. Thought to occur in less than 500 km of the middle Amu Darya. Main threats relate to irrigation abstraction, pesticides esp. from cotton cultivation in Uzbekistan (www.iucnredlist.org/details/18600/0)
Acipenseridae	<i>Pseudoscaphirhynchus kaufmanni</i>	Amu Darya sturgeon	Critically Endangered (CR)	Delta of Amu Darya to the Panj River (Ref. 39701).	Main threats relate to irrigation abstraction, pesticides esp. from cotton cultivation in Uzbekistan (www.iucnredlist.org/details/18601/0)
Cyprinidae	<i>Luciobarbus brachycephalus</i>	Aral barbel	Vulnerable (VU)	Aral basin (extirpated from Aral Sea), survives in the reservoirs of tributaries); Chu drainage and S and W Caspian Sea. Migrates up larger tributaries of W and S coasts to spawn: Terek, Samur, Kura, lower Aras. Rarely in lower Volga (up to Volgograd) and Ural.	Water abstraction leading to increased salinity in seas/reservoirs; hydropower development (www.iucnredlist.org/details/135684/0)
Cyprinidae	<i>Luciobarbus capito</i>	Bulatmai barbel	Vulnerable (VU)	Occurs in Amu Darya, Qonduz and Andarab rivers (Ref. 39701).	Extirpated from Aral Sea, survives in tributary reservoirs. (www.iucnredlist.org/details/135687/0)
Cyprinidae	<i>Schizothorax richardsonii</i>	Snowtrout	Vulnerable (VU)	Himalayan regions of India, Sikkim and Bhutan, Nepal, Pakistan, and Afghanistan.	NA
Cyprinidae	<i>Tor putitora</i>	Putitor mahseer	Endangered (EN)	Kabul river (Ref. 39701).	NA

Source: n.d. List of Threatened Species for Afghanistan. fishbase.org

Ref. 39701: Coad, B.W., 1981. Fishes of Afghanistan, an annotated check-list. Publ. Zool. Natl. Mus. Can. 14:23p.

147. The above species which are under the list of Afghanistan threatened fishes do not exist in the water body of the project area and as mentioned above the available fish species in Kunduz river are Brown trout and Milk fish; these are basically carp from the family Cyprinidae.

4.3. Socio Economic and Cultural Environment

4.3.1.Socio-Economic Status of Afghanistan:

148. Afghanistan, a landlocked least developed country with the total population of 29.70 million (2017) in South and Central Asia, has achieved significant GDP growth averaging in double digit since 2002 for a decade which came down to 3.6% in 2013 from 14.4% in 2012. It went to further down to 0.9% in 2015, 2.1% in 2016 and 2.5% in 2017 (ADB Basic Statistics in 2018, Economic Research and Regional Cooperation Department).
149. Proportion of population living under the national poverty line is 39.1% in 2016, the highest in South Asia. Majority of population almost 85% rely directly or indirectly on agriculture as their main livelihood, which constitutes 28% of GDP. The service sector contributes the equal share to GDP at 28%, while industry contributes around 20%, but is expected to grow in the future due to development within the mining industry.
150. According to Afghanistan Peace and National Development Framework (APNDF, 2017-2021), in the Human Development Index, a great deal has been achieved over the past 15 years. Important human development indicators including school enrollment, life expectancy, and access to clean water have seen marked improvement.
151. School enrollment increased from one million in 2001 to 9.5 million in 2013. Today, girls account for more than one-third of students compared to almost none in 2001.
152. Between 1990 and 2015, infant and maternal mortality declined by 45.5 percent and 70.4 percent respectively.
153. Access to safe drinking water increased from 27 in 2007/08 to 46 percent in 2011-12,
154. In 2016 the population with access to electricity reached to 84%
155. Almost 90% population are covered by mobile network
156. Around 85% of Afghans now live in areas with access to basic health services and infant and under-5 child mortality have decreased significantly.
157. Decades of war coupled with a rising population have deteriorated Afghanistan's traditional systems for sustainable natural resource management. This dynamic has heightened the impact of natural disasters and contributed to deforestation, over-grazing, and food insecurity.
158. There are more than 2.5 million vulnerable persons living with disability, many of whom suffer from social, economic, and political marginalization.
159. Urban poverty, intensified by people moving to suburban areas without a growing urban economy to provide them with jobs, is also an increasing concern.
160. The ongoing conflict constrains Afghanistan's prospects for reducing poverty. The lack of security affects Afghans every day and hampers the delivery of services across the country's 34 provinces. Access to education, particularly for young women and girls, is affected by the fighting and by conflict-induced displacement. (ANPDF, 2017-2021).

4.3.2.Socio-Economic Status of Project Area

161. Socio-Economic data for Kunduz taken from socio economic survey. Also during the field survey data regarding the socio economic data of affected household collected that is included in the table 17,18 and 19.

162. In 2011, the total basin population was estimated to be 3.90 million (935,600 in Kunduz province, 917,700 in Takhar province, 848,500 in Baghlan province, 186,300 in the Panj-Amu basin part of Bamyan province, 889,700 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 provinces⁴.
163. With area 3100 sq.km, total population in 2016/17 (2011 is 990,000 and growth rate 1.9%) is 1087,000 (Male 52% and Female-48%) with average household size of 7.1 persons and population density of 350 persons per sq.km. Only 0.4% population is migrant population. 75% of population is rural and 25% is urban⁵.
164. Based on the survey and data collected from local government agencies and CDCs the population of the project influence area is listed below:

Table 17: Population of the project area

SN	Village Name	Tot population	Male	Female	Children
1	Qasim Ali	622	165	192	265
2	Shah Wazir	594	149	136	309
3	Haji Khan	627	192	188	247
4	Lal Maidan	575	173	169	233
5	Taheri	570	169	191	210
6	Malim Moh. Yousel	698	193	189	316
7	Amir Mosa	492	143	140	209
8	Arbab Hussian	798	233	217	348
9	Mir Shikh	488	136	140	212
10	Kohraaq	646	192	189	265
11	Mughoul Ha	569	187	175	207
12	Qasab	936	267	281	388
13	Char Sheed	554	166	169	219
14	Mangal	680	193	201	286
15	Dorman	477	144	135	198
16	Ahmad Zai	715	201	216	298
17	Shah Ghasi	766	223	218	325
18	Khalzai	549	177	156	216
19	Palaw Kamar	543	166	158	219
20	Kunjak	749	214	221	314
21	Panja	606	183	192	231
22	Zadran	950	311	298	341
23	Yarbaqal	465	135	124	206
Total		14669	4312	4295	6062

⁴ Landell-Mills. (2013).

⁵ Socio-Demographic and Economic Survey Takhar, 2015 and National Risk and Vulnerability Assessment, 2011/12

4.3.2.1. Education

165. Literacy rate of population 15 years and older in 2011 was only 16.3% (M-25.1% and F-6.9%) well below to national level of 31.4% in that year. In 2015, women's literacy rate (15-49 year) is 10* (national average 15), Gross primary attendance ratio was 50 (M-61, F-37) in 2011 and Gross secondary attendance ratio was 27 (M-41, F-13).
166. Based on the field survey there are one high school and four elementary school in the project area, the name and location of the schools are listed in the table 18.

Table 18: list of schools in the project area

SN	Education center Name	Location/ village
1	Jamihat Chardara High School	Center of Chardara
2	Shaikhan Middle School	Chardara, Nahre Sofi
3	Sojani Olia Middle School	Chardar, Sojani village
4	Basoos High School	Bassoos village
5	Mama Khil High School	Mama Khil village

4.3.2.2. Land Tenure and Rural Livelihoods

167. A description of the national situation with respect to land tenure and its implications for rural livelihoods is provided in the following paragraphs, in the absence of observations specific to the studied area⁶.
168. In Afghanistan, agrarian land relations have feudal origins and remain complex and inequitable, as in Pakistan and India. A few large landlords likely still own around 40 per cent 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 can be a source of conflict within local populations.
169. Around one-quarter of the rural population is entirely landless, surviving on off-farm piecework, farm laboring, sharecropping, or some combination thereof. In some areas over half of all households are entirely landless. Farm laborers generally receive one-fifth of the crop as payment and sharecroppers, who tend to have more skills, up to one-third.
170. 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 labor, 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.

⁶ The 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/geneva 2004/papers/lapca 06 alden wily.pdf>

171. Indebtedness is very high in the rural population with up to 92 per cent and 57 per cent 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.
172. Those who lose their land find it difficult to re-acquire land and tend to end up in cities as unskilled domestic or market labor. 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).
173. 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 laborers 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 laborer, who typically perceives landownership as not only financially impossible but as getting above his station or 'not permitted'. Very few of these mobile laborers were likely among the classified landless who benefited from the (short-lived) revolutionary land redistributions of 1978-1984.
174. 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 labor out-migration or by widows.

4.3.2.3. Rural Housing

175. 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 young⁷.

4.3.2.4. Public Health

176. **Diarrhoeal and other water-borne disease.** 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 important⁸.
177. **Malaria.** In 2002, most of Afghanistan's estimated 3 million malaria cases per year occurred in Kunduz 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 reemerged rapidly in Kunduz, with cases peaking during 2002 and then declining independently of each other. Control

⁷ SNC. 2013. Lower Kokcha Irrigation Project Feasibility Study.

⁸ Huttly, 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>

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 Kunduz, 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 largescale larval mosquito eradication, needed to continue.³⁴ By 2011, anti-malarial control interventions had reduced the confirmed malaria case rate in Kunduz and Takhar provinces to <1 per 1000 population⁹.

178. **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.
179. Based on the field survey there are three health center (clinic) in the project area, and there is no any hospital in the district, the list of health centers is listed in table 19.

Table 19: list of health centers in the project influence area.

SN	Health Center Name	Location/ village
1	Clinic Jama Sihi Chardara	Center of Chardara district
2	Clinic Basoos	Chardar, Bassoos
3	Clinic Jama Bazar	Chardara, Jama Bazar

180. Based on the report and record of the above mentioned health center the main type of diseases is diarrhea, heat stroke, cold, cough and flu, while serous disease are instructed to Kunduz center.

4.3.2.5. Agriculture and Livestock

181. Kunduz is also regarded as one of the most suitable place for agriculture and 128,000 households owned different kinds of agriculture land in 2011. 48,000 households owned the irrigated land in the province. Wheat and rice are the main crops. Cotton is also grown these days. Fodder crops like alfalfa, maize, barley and triticale and vegetables are also grown in the province. Forest and cottage fruit production is also found in the province. 47% of households own some kind of livestock.

4.3.2.6. Employment

182. 41.8% of working age population are in the group of labor force participation while the unemployment rate is 7.7% as per NRVA-2011/12. Of the employed population 28% are day-laborer, 12.7% are salaried worker, 57.6% are own account worker, 1% are employer, and 0.5% are unpaid family worker.
183. Agriculture is the major economic activity in the project area and providing about 93 % of all employment for their income earning. Traditionally, men are involved in bulk of the income earning activities. Especially, in almost all cases of agricultural activities men are involved. However, significant women involvement was visible in livestock rearing. It has been understood

⁹ WHO. 2015. Afghanistan Country Profile, World Malaria Report.

http://apps.who.int/iris/bitstream/10665/200018/1/9789241565158_eng.pdf?ua=1

that women in most cases are involved in cattle feeding and watering. Livestock is another significant income earning source for the households. Some of the APs in the AHs were found to be engaged in more than one profession.

4.3.2.7. Access to Energy

184. Only 56% of households in 2011 had access to some sort of electricity including solar. Main source of energy for cooking and heating is fuel wood and animal dung. Households in urban areas are using wood and LPG for cooking and the trend is increasing.
185. Based on the field survey around 90% household has access to public electricity and the rest 10% use solar panel. Households in urban areas are using wood and LPG for cooking and the trend is increasing.

4.3.2.8. Water Sanitation and Hygiene

186. Only 27% of population had access to safe drinking water in the province in 2011 far below to national level of 46%. As per the field survey, majority of households have dug well. Piped water as well as other water sources are not treated.
187. Based on the field survey most households have access to ground water such as dug-well and shallow-well, there is no public water supply in the project area.

4.3.3. Culturally and Socially Significant Sites

188. There is no any cultural and socially significant site in the project area except some mosques, graveyards, and shrines.

4.3.4. Current Traditional Resource Use by Indigenous Peoples

189. A vulnerable group present in the studied area that meets some of ADB's criteria for indigeneness is the kuchi (nomad pastoralist) people. As of 2009, kuchi were estimated to have accounted for over 70 per cent of Afghanistan's IDPs. Kuchi livelihoods depend on timely, consistent access to traditional migration routes, summer grazing areas, and overwintering areas. The project area is famous for nomad pastoralist's people.

4.3.5. Mineral, Oil and Gas, and Large Industrial Development

190. No operating mines, wells, or industries are present in the project area.

4.3.6. Tourism

191. There are no conventional tourist facilities or sites in the project area. Individuals do however move in and out of the area for business and personal reasons, including migrant workers, traders, returnees, government staff, development workers, journalists, researchers, security and military staff, etc. These individuals use transportation facilities (flights in and out of Kunduz, driving on the road network, car hire), public and private short-term accommodation (hotels, guest houses), and purchase local goods and services (food, fuel, security, etc.).

5. ANALYSIS OF ALTERNATIVES

5.1. No-Project Alternative

192. In the no-project alternative, Chardara canal would likely be rehabilitated and upgraded by NWARA with funding from other sources in much the same manner. This is believed to be the case because (i) the NWARA 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).

5.2. Design Alternative

193. The Chardara canal involves rehabilitation of existing irrigation infrastructure and the technologies involved are fairly simple with few available options. The rehabilitation essentially puts the existing irrigation systems back into its full operational potential and the structural improvements will be optimized during detailed design.
194. 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.
- Alternative 1: Rehabilitate and upgrade Chardara headwork's and the structures along the canal.
 - Alternative 2: Rehabilitate and upgrade Chardara headwork's and reshaping of canal.

5.3. Key indicators for Alternative

- Agricultural benefits and impacts – identical
- Chardara headwork's will be rehabilitated and upgraded, including upgrading of gates and bank protection from river erosion
- Water user facilities – Facilities will be provided for water uses and users other than agriculture and farmers, such as livestock watering and domestic supply
- Improvement to the secondary and tertiary water distribution system in upstream and downstream.
- Improved On-farm water management (OFWM) and catchment protection – pilot OFWM and catchment protection.
- Capacity building of supporting institutions - RBA/SBA/WUA/IA and farmers will be trained in improved water resource management and agricultural practices.
- Main Canals, Water Control Structures, Bridges, Etc.
- Alternative 1: Rehabilitate and upgrade Chardara headwork's and the structures along the canal.
- Concept. Rehabilitate and upgrading of Chardara headwork's and structures along the canal.
- Key aspects include:
- Chardara headwork is fully rehabilitated to fully irrigate Chardara canal command area.
- Associated water control and other structures are rehabilitated and upgraded.

- The vulnerable area is lined to avoid wasting of water and carry the water to the downstream.
- Canal will have drop structures installed to reduce velocity of flow – cum-scouring
- Adjustments to main canal alignments are minimal

Alternative 2: Rehabilitate and upgrade Chardara headworks and reshaping of canal.

- Concept. Rehabilitate and upgrade Chardara intake and re-shaping of canal. Key aspects include:
- Chardara intake is fully rehabilitated.
- Associated water control and other structures are rehabilitated and upgraded.
- Canal will have drop structures installed to reduce velocity of flow – cum-scouring
- Unlined earthen sections are used.
- Canal will be reshaped and widened to convey the flow of (48 m³/s).
- Offtakes and additional cross-regulators are designed to maintain water levels to operate satisfactorily at low capacity and high capacity flows.
- All bridges and other structures are designed for high capacity.

195. Based on above it is mentionable that alternative 1 will have less environmental impacts which will be less significant than those envisaged for alternative 2. Hence, alternative 1 is more environmentally viable option.

6. Anticipated Environmental and Social Impacts and Mitigation Measures

6.1. Impact assessment methodology

196. Impacts are initially classified according to their nature, either negative or positive, their type and their degree of reversibility. Type refers to whether an impact is direct, indirect, secondary or cumulative. The degree of reversibility refers to the capacity of returning an impacted resource/receptor to its pre-impact state. Ideally, all impacts associated with the Project are reversible.
197. Predicted impacts magnitude are defined and assessed in terms of a number of variables. This would comprise an assessment into the scale, duration and intensity of an impact. These variables collectively determine an impact's magnitude. Expert judgment and prior experience of the IEE team has ensured a reasonable degree of consensus on the value placed on an impact variable.

6.1.1. Pre-Construction Phase Impacts and Mitigation Measures

6.1.1.1. Impact on Land Acquisition and Land ownership

198. The project implementation will not cause any impact on land as the project will be implemented in the existing ROW and there is no need for Land Acquisition.

6.1.1.2. Impact on Housing and Other Structures:

199. There is no any structure or houses to be affected due to project implementation.

6.1.1.3. Impact on Loss of Trees, Vegetation, biodiversity and Ecosystem services

200. Chardara canal rehabilitation and improvement works will result in loss of 1081 trees (121 saplings, 669 pole size and 291 trees size). The number of affected trees determined based on the engineering design. Forest Management Act makes the government forest, community forest and the city forest as protected forest area.
201. This law also gives highest priority for the protection of the river bank forests and trees along the canal alignment. In terms of biodiversity, the species are commonly found in project area. None of the species are amongst the plant species protected in Afghanistan neither they are in the IUCN red list nor in CITES Appendixes of endangered species.
202. Forests provide a broad range of ecological services including the maintenance of soil quality and the provisions of organic materials through leaf and branch fall, limiting of the erosion and protection of soil, modulating climate and habitat for other species.
203. Many people have strong cultural and spiritual attachments to the forests, and forest destruction undermines the capacities of these people to survive economically, culturally and spiritually. In the project area, one of the main services vegetation are providing is in maintaining good air quality as well as shelter to farmers working in the nearby fields in dry days. They are the main sources for animal food and fuel wood and some species as timber.
204. During the consultation with the people utilizing the services of trees along the canal line, they claim the ownership of the trees but do not claim the land along the canals where the trees are grown. Removal of trees will directly impact the affected people in the loss of source of fodder and fuel wood as well as fruits.

Figure 8: Vegetation to be removed along the Canal Line

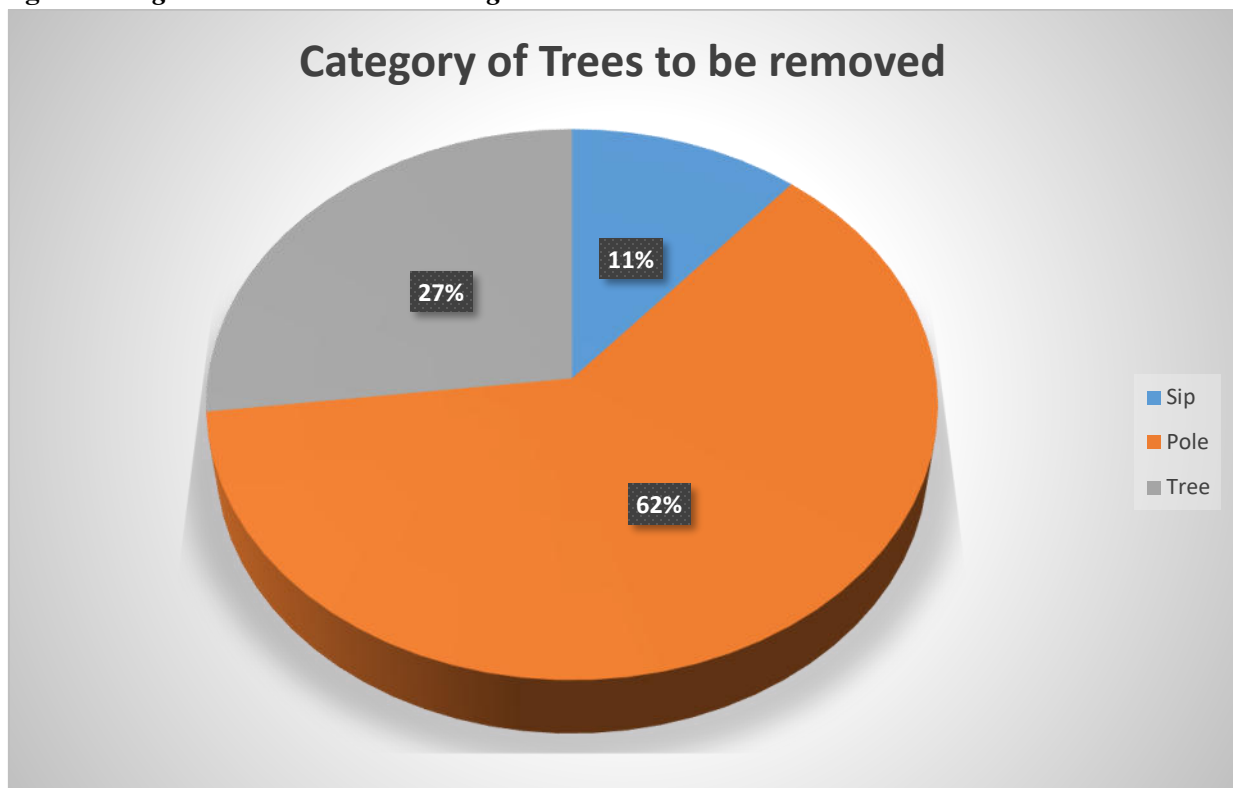
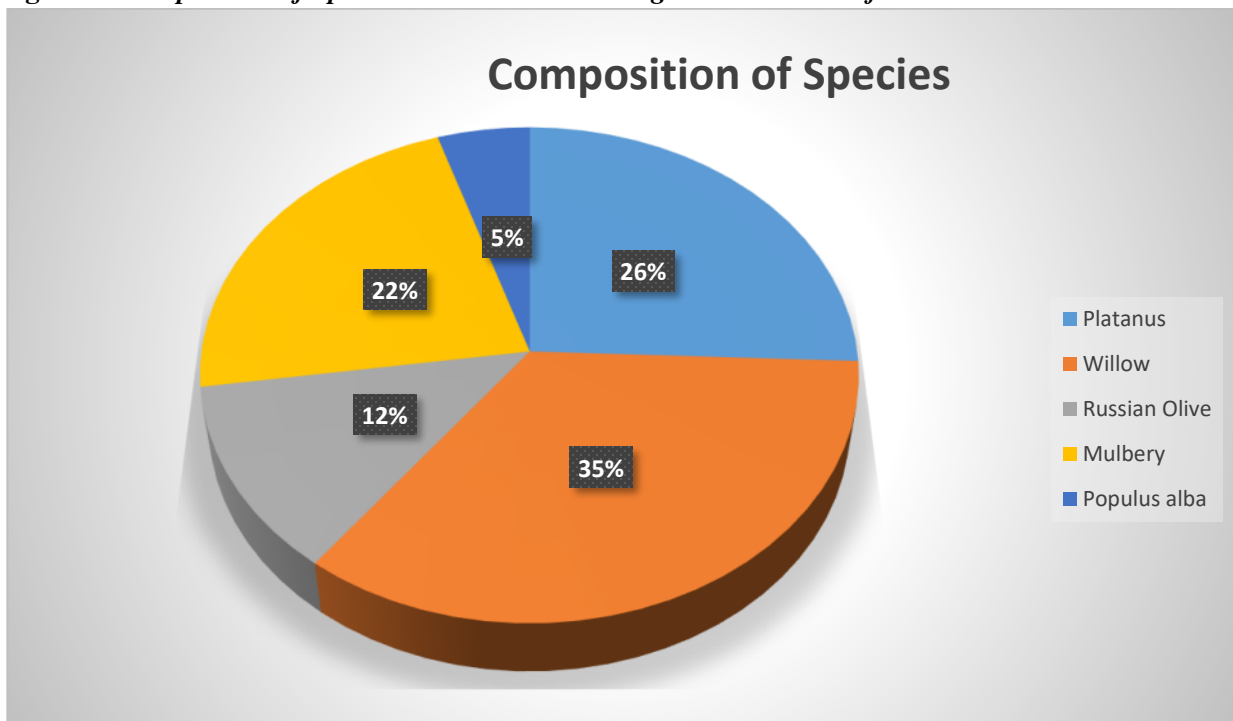


Figure 9: Composition of Species to be removed during Rehabilitation of Canals



6.1.1.4. Mitigation Measures

205. 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.
206. Tree Replacement or Re-plantation: 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 re-plantation ratio, but they emphasize that 1:10 should be implemented and MAIL also follow this ratio.
207. Based on survey out of 1081 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 re-plantation of 10810 trees will be replanted. Concern and suggestion of the government considered during consultation meeting, and they will cooperate in selection of suitable site. The tree management plan for management of trees provided and attached as Annex 20.

6.1.2. Construction Phase Impacts and Mitigation Measures

6.1.2.1. Soil erosion

208. Structure construction activities due to excavation works, vegetation clearing, dumping of spoils will result in soil erosion. As the Chardara 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 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.

6.1.2.2. Mitigation Measures:

209. 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

6.1.2.3. Impact Significance:

210. 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.

211. 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.

212.

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

6.1.2.4. Residual Effects

213. 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 effects will be low in magnitude. Therefore, residual effects are expected to be not significant.

6.1.2.5. Impact on Water Quality

214. There will be construction activities and movement and operation of construction machineries in the water bodies in order to make the intake structures- side intake. 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.

6.1.2.6. Mitigation Measures

215. 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. 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:

- Definition of elements to be included in construction work camps.
- 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.
- Specific management requirements for construction of components of the work camps, and management of camp operation.

6.1.2.7. Impact Significance:

216. 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

6.1.2.8. Residual Effects

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

6.1.2.9. Impact on Air Quality

218. 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.

219. High concentration of particulates will directly impact the health of the people living nearby to the dusty roads and construction sites causing respiratory diseases, eye irritation, and throat irritation. High level of particulates/dust will corrode metals and masonry, soil structures and motor vehicles; incurs huge costs for cleaning of clothes, windows, floors, repainting, etc.; create pressure on other resources like water and soaps for cleaning; and dust the leaf surfaces of crops, trees and shrubs, which may injure or inhibit the growth of these valuable plants. Heavy equipment and trucks and vehicles will also emit some toxic gaseous pollutants like CO (carbon monoxide), oxides of nitrogen, oxides of sulfur, and very fine particles like PM2.5 of great health concern. However, 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.

6.1.2.10. Mitigation Measures

220. Following are the mitigation measures recommended for the prevention and control of Particulate Pollution (TSP and PM10/PM2.5) during the construction phase of the project:

- Use of Water Sprays - Regularly spray the water on the construction site and also on dusty village roads to minimize the impact on workforce and local communities living in the area.
- Limit the truck and other vehicle speed below 20 km/hour to minimize the suspension of dust in the unpaved road. Speed bumps are commonly used to ensure speed reduction. Care should be taken to keep all material storages (spoil, aggregates, sands, etc.) adequately covered and contained to

prevent the emission of dusts due to winds on site. Also, trucks carrying the spoils or other construction materials are covered properly.

- Ensure that the heavy machineries and construction equipment comply with the national standard and fully maintained as per the manufacturer's specifications. Stone crushers to be used in the burrow pits, must comply with the guideline for dust emission control.

6.1.2.11. Impact Significance:

221. 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

6.1.2.12. Residual Effects

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

6.1.2.13. Mitigation and Monitoring of residual impacts:

223. To minimize the effects of air quality on community, animal and birds during construction of the project, the following mitigation will be further applied as required

- Demolition and construction dust will be controlled through the application of best practice dust minimization procedures.
- The impact of construction traffic to be minimized through vehicle cleaning, covering of loads, compliance with emissions standards, switching off of engines when not in use, and minimization of construction traffic movement around the Site

6.1.2.14. Impact on Noise

224. 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.

6.1.2.15. Mitigation Measures

225. 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.

6.1.2.16. Impact Significance:

226. 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

6.1.2.17. Residual Effects

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

6.1.2.18. Mitigation and Monitoring of residual impacts:

228. To minimize the effects 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.

6.1.2.19. Impacts due to Waste Generation

229. 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.

230. Hazardous Waste: Construction activities in major infrastructure projects like irrigation projects, 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, the impact can be significantly adverse with long-term consequences.

6.1.2.20. Mitigation Measures

231. 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.
232. Disposal of Waste: Waste materials, including but not restricted to refuse, garbage, sanitary wastes, industrial wastes and oil and other petroleum products, shall be disposed of by the Contractor. Disposal of waste material shall be by burying, where burial of such materials is approved by the Engineer, by burning, where burning of such materials is approved by the Engineer/NEPA, or by removal from the construction area.
233. The Contractor shall at all times take special precautions to prevent fire from spreading beyond the piles being burned and shall be liable for any damage caused by his burning operations.
234. The waste materials to be disposed of by removal from the construction area shall be disposed of prior to the completion of the work under these Specifications. All waste materials removed except trees, shall become the property of the Contractor. Waste materials to be disposed of by dumping shall be hauled to an approved dumpsite. It shall be the responsibility of the Contractor to make any necessary arrangements. No overhauling payment will be considered.

6.1.2.21. Impact Significance:

235. 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

6.1.2.22. Residual Effects

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

6.1.2.23. Mitigation and Monitoring of residual impacts:

237. To minimize the effects 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.

6.1.2.24. Impacts on Flora and Fauna (Terrestrial and aquatic life)

6.1.2.25. Impact on Protected Area:

238. There is no any protected area in the project influence area to be affected due to project implementation.

6.1.2.26. Impact on Terrestrial and aquatic wildlife:

239. *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.). Based on the field survey and local people report the aquatic environment of the irrigation canals has no fish while there is some amphibians etc

6.1.2.27. Impact on Protected Specie

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

6.1.2.28. Mitigation Measures

241. Possible impacts on wildlife will be reduced through the following measures:

242. The construction contractor shall avoid excessive destruction of wildlife habitats and illegal hunting;

243. Posting appropriate signs in the important wildlife areas and applying speed limits for sections passing through those areas;
244. Strict prohibition of illegal hunting by the workforce and killing of wild animals due to reluctances of drivers like over speeding of vehicles; and
245. 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.

6.1.2.29. Impact on Vegetation:

246. 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. The total vegetation that have to be removed by the project are already mentioned above. All these species are local species and none of them are in the protected species.

6.1.2.30. Impact on Aquatic Life

247. Kunduz River has a limit types of fishes, also there is a minimum construction work in the intake and for short time there will be 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.

6.1.2.31. Mitigation Measures

248. As farmers will have to remove the trees prior to the start of the construction activities.
249. 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.to avoid impact due to waste generation or leakage, waste management plan will be prepared as part of SSEMP.

6.1.2.32. Impact Significance:

250. 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

6.1.2.33. Residual Effects

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

6.1.2.34. Impacts on Occupational and Community Health , Safety and socioeconomic

252. 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 re-suspension 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.

6.1.2.35. Mitigation Measures

253. 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.

6.1.2.36. Coronavirus Disease 2019 (COVID-19):

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

6.1.2.37. Mitigation Measures

255. Potential sources of exposure include having close contact with a co-worker or member of the public who is affected by the 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 face mask, 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. Washing hands frequently and use sanitizer
- 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.

6.1.2.38. Impact Significance:

256. 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

6.1.2.39. Residual Effects

257. 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.

258. Provided the proposed mitigative measures are implemented, the environmental effects will:

- be low in magnitude;
- Will be intermittent and short term.

259. Therefore, the significance of the environmental effects is expected to be not significant

6.1.2.40. Damage to Community Property and Crops:

260. The canals go along the agriculture land, orchard land and residential land and the movement of equipment's and transport vehicles in the field will damage the crops adjacent to the project site also. Dust will also impact the structures of the building (corrosion of metals, paintings, etc.), and will incur additional cost to people for more water, more soap/detergents and frequent cleaning activities.

6.1.2.41. Impact on Agricultural Productivity

261. Although the main objective of the project is to enhance the agricultural productivity in the area but during the construction phase, there will be disturbances in the availability of water through these existing canals while carrying out the rehabilitation and structural improvement works.

6.1.2.42. Mitigation Measures

262. As per the "Bidding Document, Part II, Section 6, Employers Requirement, heading 1.7- Temporary Works for maintaining irrigation water during construction", "the contractor is responsible to all necessary channels, diversions and other temporary works needed to ensure that normal irrigation water supplies are not interrupted during rehabilitation/construction works". And the cost of all such Temporary Works and all other charges arising from compliance with this Clause shall be deemed to be included in the unit rates unless otherwise specified in the BOQ.

263. As per this there should not be any disturbances in the supply of water for irrigation. However, completing rehabilitation/construction works in time without any disruption of water supply in the same canals to be rehabilitated looks impractical. Even if the canal is diverted for some time to complete the works, it will result in loss of agriculture crops and also need extra cost for making the diversion canal. In order to complete the works in time with minimum impact on agricultural productivity, there is the need to have good coordination between water users' associations, irrigation associations, DAIL, contractors, and the project management. As the project aims to enhance the current agricultural productivity which is below national level by more than 10% immediately after coming into full operation, early completion of the project and enhanced productivity will minimize the impact on productivity and income loss to farmers. In addition, there is also the clause that the local people should be employed in the non-skill jobs during the construction period, it is recommended that the contractor organizes the skill enhancing training in the beginning to local farmers to involved them in semi-skilled type of jobs as well.

6.1.2.43. Impacts on Physical Cultural Resources

264. As mentioned above there is no any significant cultural resources except some mosque, graveyard and shrine, the mitigation measure for grave yards and shrines are as follow:

265. The construction work will be stopped at the time of the funeral and burial at the grave yard. Construction staff will be trained and informed on identifying the evidence of archaeological/historic remains; In case evidence of archaeological remains is found during construction activities, the actions listed below will be undertaken. Excavation work in the vicinity of the find will be stopped; Assistance will be sought from the nearest office of the Department of Archaeology and Museums to identify the remains; If the department decides to salvage the find,

PMD will provide assistance. Detailed procedure for Archaeological Chance Finds included in Annexure 16.

6.1.2.44. Impact Significance:

266. 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

6.1.2.45. Residual Effects

267. No significant adverse residual environmental effects on physical and cultural resource are likely to occur.

6.1.2.46. Employment and Business Opportunities

268. The project implementation will create employment opportunities to local people. As per the estimate by the detailed design team, approximately 450 to 650 people will be employed for one to three years. Also the project will create business opportunities for some people and good price for the agricultural products for farmers. To avoid any job, conflict all workers will be hired from local except the technical team who won't be available in the project area.

6.1.2.47. Impact on Current Traditional Resource Use by Indigenous Peoples

269. A vulnerable group present in the studied area that meets some of ADB's criteria such as customary cultural, economic, social or political institution that are separate from those of the dominant society and culture for indigenes is the Kuchi (nomad pastoralist) people. As of 2009, Kuchi were estimated to have accounted for over 70 per cent of Afghanistan's IDPs. Kuchi livelihoods depend on timely, consistent access to traditional migration routes, summer grazing areas, and overwintering areas. These don't meet ADB criteria for indigenous people, in the same time these people are located around 15 km away from project area. So we can conclude that these people are not indigenous people.

6.1.2.48. Mitigation Measures

270. To avoid any impact on these vulnerable groups, consultation meeting conducted with WUAs, CDCs and that community representative which include the representative of nomad pastoralist. And these communities will be involved in the project implementation, the labor should be hired from them, even from their materials should be utilized, such as meat etc. Also to reduce the adverse impact on community Local communities should be invited to events, such as opening ceremonies etc., some facilities will be considered for local people e.g. bridges, water access point, Develop and implement a procurement process that promotes suppliers from the local community and develop a cultural awareness-training program and require employees and contractors to complete the training.

6.1.3. Operation Phase Impacts

6.1.3.1. Impact on Hydrologic changes

271. changes in magnitude and timing of water abstraction, irrigation flows, flooding, drainage, erosion, and sedimentation. While such changes could potentially be negative, it is more likely that there will be a positive impact through improved availability of water for environmental flows. The impact on groundwater quantity will be negligible, or in fact positive, due to the construction of check dams and other structures to slow down water velocity on hillsides which will increase water infiltration.

6.1.3.2. Mitigation Measures

272. Irrigation works are well-designed and constructed; irrigation and water user associations and river sub-basin / basin agencies are supported to achieve intended benefits while mitigating adverse impacts.

6.1.3.3. Impacts on Water Quality

273. 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.

6.1.3.4. Mitigation Measures

274. To prevent the water quality pollution, following measures are recommended:

- Maximize the use of organic fertilizer and minimize the use of chemical fertilizer, and minimum use of insecticides and pesticides in the area
- Training to farmers on the proper use of pesticides, appropriate dose and timing of use.
- Regular monitoring of the water quality including the hill streams and ponds, ground water to understand the problem and take adequate measures.

6.1.3.5. Knock-on impacts of increased agricultural production

275. Knock-on impacts of increased agricultural production due to improved water availability – on soil and water (including groundwater) quality due to increased use of fertilizers and pesticides.

6.1.3.6. Mitigation Measures

276. Under output 2, training will be provided to farmers by DAILs on improved agronomic practices including correct application of fertilizers and pesticides, so as to mitigate any negative impact.

6.1.3.7. Impacts on Soil Quality

277. 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.

6.1.3.8. Mitigation Measures

278. 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.

6.1.3.9. Natural disasters, climate change and impact on infrastructures

279. 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:
280. 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;
281. 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;
282. 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
283. '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;
284. Projections for maximum 1- and 5-day rainfall indicate small increases in every season but March through May;
285. And because of these changes in the climatic system, the projected impacts of the climate change in Afghanistan are:
286. 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);
287. 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;
288. 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.

6.1.3.10. Mitigation Measures

289. 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.

6.1.3.11. Public Health

290. CHARDARA aims to irrigate about 15,904 hectares of land, and this will help to increase the agriculture productivity in the area creating conducive conditions that favor good health: food security, an improved infrastructure allowing better access to and by health services and economic progress which permits rural households a greater purchasing power for drugs and health services. Further, supply of water can also serve the purpose of drinking water supply and sanitation and as more water becomes available at the household level, the incidence of water washed diseases (several skin and eye diseases) will be reduced. Safe water supply, preferably in combination with adequate sanitary facilities, will reduce the risk of water-borne diseases dramatically.
291. On the other hand, with irrigation facilities and diversification of cropping patters, there will be more use of chemical fertilizers, insecticides and pesticides with possibility of direct impact on health of communities. The biggest concerns are due to inappropriate practices like use at the wrong time, in the wrong strength, and against the wrong pests; products are often mixed, creating more dangerous chemical cocktails; use without protective clothing; and use of even children in spraying. Health impact of pesticide poisoning during the spraying includes chest pains, night sweats, dizziness, vomiting, and loss of consciousness, chronic joint pain, dizziness and skin complaints. Further, the pesticides most commonly used are known to be capable of disrupting nervous system function, inducing cancer or killing outright. Although there lacks sufficient data on residue of pesticides in the product, the concerns on pesticide residue on vegetables, particularly leafy vegetables in Kabul and other major cities is being often discussed with possible health problems even on the consumers of the products. As mentioned in the above heading, there will be incidences of increased climate related diseases in the area. Further, ecological changes resulting from the introduction of irrigation may create new or more favorable habitats for disease vectors for example situations ideal for mosquito growth and the mosquitoes are responsible for the spread of Malaria, Yellow fever, river blindness and encephalitis.

6.1.3.12. Mitigation Measures

292. There is the need to create awareness amongst the farmers about the health concerns of overuse and exposure to chemical fertilizers, insecticides and pesticides. In addition, a legal system to control the import, production, storage, and use these chemicals is recommended. Emergency response plan will be prepared by contractor to avoid any risk in cause of canal breach based on Emergency Response framework (Annex 14). Foot bridges considered in the project design, and after a regular interval bridges will be constructed. To reduce the spread of diseases due to mosquito bite, personally it includes the use of mosquito bed nets (preferably insecticide-treated nets), the wearing of clothes that cover most of the body, and use of insect repellent on exposed skin. Type and concentration of repellents depend on age and status. And reduction of the contact between mosquitoes and humans, the destruction of larvae by environmental management and the use of

larvicides or mosquito larvae predators, and destruction of adult mosquitoes by indoor residual spraying and insecticide-treated bed nets.

6.1.4. Beneficial Impacts

293. Chardara 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. Chardara Project will have the following beneficial impacts:
294. Chardara Project, once in operation after rehabilitation and infrastructure improvement will supply uninterrupted water in the cultivable command area of 15409 ha with gross command area of 17528 ha.
295. LKIP is estimated to increase the cropping intensity by 02% and crop yield will be increased by 4-13% for different crops post project.
296. There will be more area under vegetation cover by increasing the Fodders area by 1624 ha, which will enhance the carbon sequestration capacity in the project area.
297. About 39.1% of population in Afghanistan are living below the national poverty line and people living below the national poverty line in Kunduz is below the national average, and because of almost 87,074 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.
298. 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.
299. 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.
300. During the construction phase, local communities will have the opportunities of job and also small business opportunities to meet the demand of labor forces.

7. Information Disclosure, Consultation, and Participation

7.1. Public Consultation Methodology and Locations

301. The following methodologies for information disclosure, consultation and participation adopted:
- Detailed focus group discussions at village levels in the presence of the village head and villagers
 - Household questionnaire survey for 13 households and 13 villages.
 - Walk-through surveys along the entire canal alignment by men and women research monitors,
 - Interviews with district and provincial level authorities in Kunduz provinces and with central authorities in Kabul.
302. Local stakeholders contacted included members of shura e mahli (village council), village heads, farming communities, traders and businessmen, daily wage earners including agricultural and non-agricultural laborers, members canal irrigation management groups, women, teachers, nomads, gold collectors, poor and landless people, and fishermen.
303. Both individual and group discussions were held. Photographs were taken (annex 11). The details are provided in Annex 9. The date, location and number of participant provided in table 20:

Table 20: Consultation meeting Date, location and number.

Date	Location of meeting		Number of participant	Gender
	District	Village		
15 June 2020	Chardara	Chardara village	(13) Head canal area	Men
18 June 2020	Chardara	Yar Baqal	(10) Mid canal area	Men
25 June 2020	Chardara	Pul Kamar	(14) Tail canal area	Men
25 June 2020	Chardara	Chardara	(17) Tail canal area	Women
		Total	54	

7.2. Summary of Consultation

7.2.1. Focus Group Responses Related to Project area:

304. Information on project benefits should be made available to all villagers
305. Project should ensure sufficient availability of water for crops and increased production
306. There are no major water sharing conflicts between villages at present
307. The Project should employ local people, who are willing to participate in the Project and in O&M
308. Communities in general are willing to participate and enthusiastic about the project
309. Project should organize farmer training on high yield seeds, fertilizers, and soil improvement techniques
310. Women cannot participate in irrigation O&M because it will not be accepted by their society

- 311. People want the project to start as early as possible and they will extend their support for the timely completion of the project;
- 312. All the trees along the canal line are grown by the farmers that own the land joining to the canal but understand that the canal belongs to government;
- 313. Maximum precaution from the contractors need to avoid damage to crops along the construction line and if damaged the contractor should compensate the farmers;
- 314. All the cleared vegetation along the canal should be provided to the farmers owning the land joining the canal;
- 315. As this vegetation meet the demand of fodder and fuel wood of majority of people in the area, farmers need support in re-vegetation in the area after the rehabilitation works;
- 316. Water in canals is also used by some residents as drinking water and farmers have observed that change in color of canal water and water quality is very poor for drinking purposes, and therefore there should be some water access point along the canal line as well as preventive and control measures to maintain the water quality for drinking;
- 317. Government need to encourage investors to invest on agro-based industries in the area. Farmers need support in the cultivation of cotton which can encourage investors to invest in cotton processing industries in the area;
- 318. Local people particularly the people affected by the project including by the removal of trees along the canal should be given priority for the jobs during the construction phase. There should also be the provisions for training to farmers to the semi-skilled jobs. Also contractors should give priority to local vehicle owners in hiring vehicles for transportation of materials; and

7.3. Outcome of Consultation Meeting at NAWARA:

- 319. National Water Affair Regulation authority has brought the Regulation on Bed and Right of Way of Water Resources in Afghanistan in 2014 which requires all the canals to maintain the right of way as per the discharge of the canals;
- 320. Compensation to loss of vegetation grown along the canals should not be given because they are grown in the government property and if given it can establish wrong precedence and encourages people for illegal encroachment of right of way;
- 321. But as the project donor is ADB, so NAWARA accepted the compensation payment to Aps due to tree removal.

7.4. The Grievance Redress Mechanism

7.4.1. Purpose of GRM

- 322. The grievance redress mechanism (GRM) shall be established to ensure:
- 323. the basic rights and interests of every person affected by poor environmental performance of the project are protected; and
- 324. Their concerns arising from the poor environmental performance of the project during the conduct of pre-construction, construction and operation activities are effectively and timely addressed.

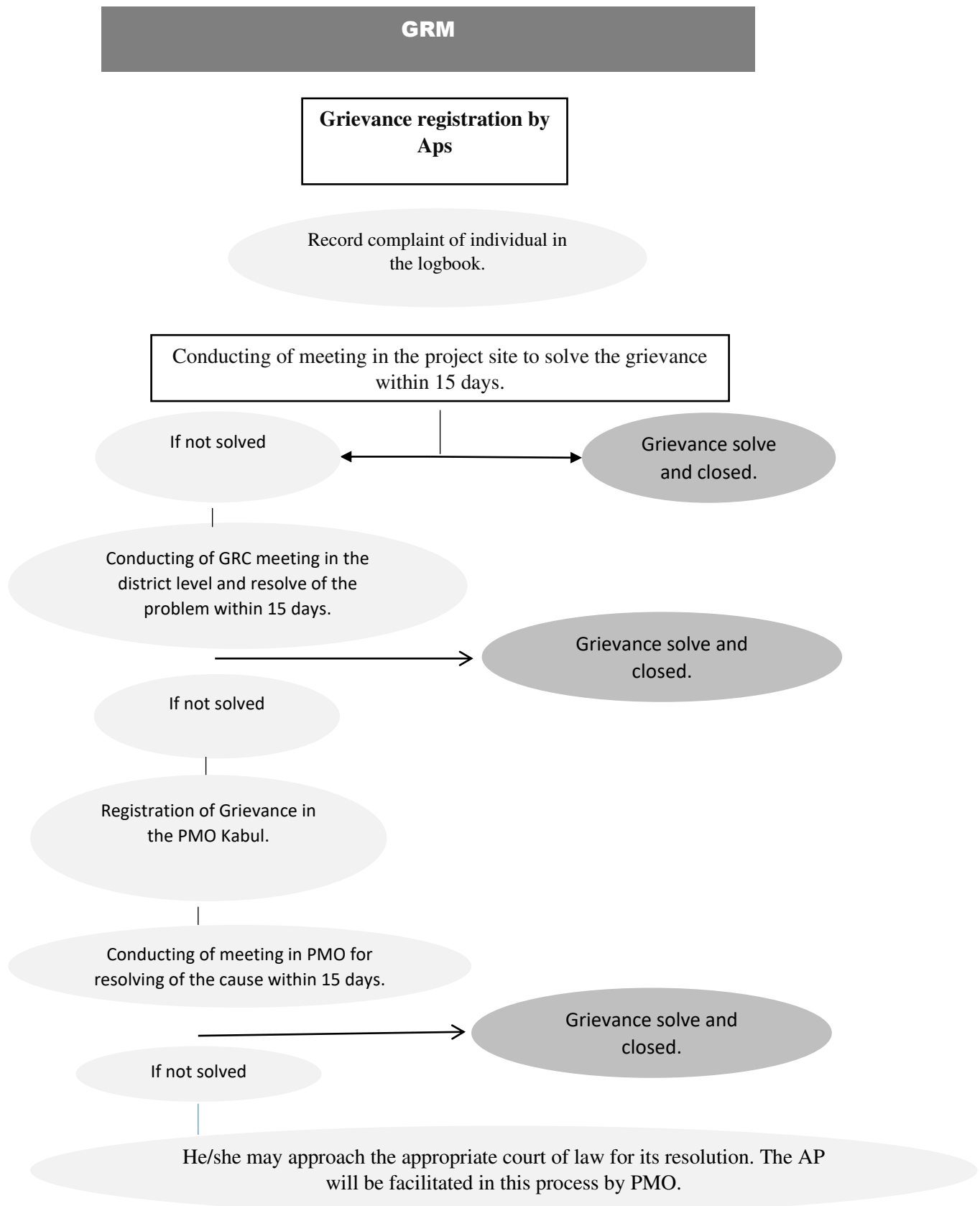
7.4.1.1. The Grievance Redress Mechanism

325. GRM is proposed to be simple, transparent and responsive. GRM will address only the concerns arising due to the project implementation activities, mainly during construction stage. It will be a three-tier mechanism with scope for availing Afghanistan's legal system which can be availed at any time irrespective of lodging any concerns in the first and second tier of GRM.
326. The Project Implementation Office (PIO) at the provinces will also be responsible for the implementation of the EMP of Chardara which will assign a technical officer as an environmental liaison officer. Complaints Forms will be delivered by Environmental Liaison Officer to all Shuras in the Project Area. Households or Groups of households desiring to complain about the effects of construction works on their property, production system, economic well-being, spiritual life, quality of surface and ground water, quality of air and noise, health, safety, welfare, or any other assets of their lives shall make their complaint using these Complaints forms. All APs will be made fully aware of their rights, and the detailed grievance redress procedures will be publicized through an effective public information brochure. GRM is accessible without cost or retribution.
327. National Water Affair Regulation Authority shall authorize the existing Sub River Basin Complaints Handling Committee in Kunduz also to work as Complaint Handling Committee for Chardara EMP implementation. This will help in timely and satisfactory resolution of the complaints if they could not be solved at the project level. The grievance redress process includes four stages.
328. Step 1: Affected People (APs) will present their complaints and Grievance verbally or in writing to Raise Shura (Chief, Community Development Committee). The receiving agent will be obliged to provide immediate written confirmation of receiving the complaint and forward to Liaison Officer for Environment (Name and Contact Number:). If after 05 days the aggrieved AP does not hear from the Shura chiefs, or if he/she is not satisfied with the decision taken in the first stage, the complaint may be brought to the Central Project Management office.
329. Step 2: The Central Project Management office will have the Environment Specialists (national and international) to solve the problem within 05 days. If the complaint cannot be solved at this stage, the CPMO will bring the case to Provincial Grievance Redress Committee.
330. Step 3: The Provincial Grievance Redress Committee with technical support from CPMO has to resolve the situation within 15 days.
331. Step 4: If the aggrieved AP does not hear from the Provincial Grievance Redress Committee or is not satisfied, he/she will bring the case to National Environmental Protection Agency. As per the Environment Law of Afghanistan, APs can contact the concerned NEPA provincial offices or central office for their complaints or grievances directly without going through the process.

For further queries and suggestions, APs can contact at:

- Central Project Management office:
- Mujeebullah Ahmadzai
- Senior Safeguard Manager
- National Water Affair Regulation Authority (NWARA)
- Mobile:(+93)766-388-242
- Email: mahmadzai@cpmo-nwara.org

Figure 10: GRM organogram



8. Environmental Management and Monitoring Plan

8.1. Environmental Monitoring Plan

333. In order to ensure the compliance with the national requirements or environmental quality standards of Islamic Republic of Afghanistan and ADB safeguard Policy statement, the monitoring plan is developed divided into two phases- the Construction Phase Monitoring Plan and Operational Phase Monitoring Plan.

8.1.1. Construction Phase Monitoring Plan

334. As there are no known sources of air pollution in the area, monitoring of ambient air quality parameters mentioned in the National Ambient Air Quality is generally not done in project areas in rural areas.

- Observe and if possible instrumental monitoring of air quality particularly dust (TSP) in the construction sites and black smokes from construction equipment's and vehicles regularly
- Noise Quality (dB (A)) at the same site as air quality, same methodology as above
- Surface Water quality monitoring (as per the national standard for drinking water and irrigation water), once prior to start of construction work and every six months in Chardara canal and Kunduz River and will be analyzed and reported through biannual monitoring report.
- Monitoring of ground water and stream water quality in the project area.
- Inspection on the loss of property and crops nearby sites
- Inspection on solid waste and hazardous waste collection and management, regularly that is include segregation of waste such as recyclable and non-recyclable, handling and final disposal.
- Vibration monitoring in the construction site where required.

8.1.2. Operation Phase Monitoring Program

335. *Canal water quality monitoring:* (as per the national standard), once every year),

336. *Biological Environment:* Monitoring in the status on vegetation cover changes in the area

337. *Public Health:* monitoring of pesticides poisoning, vector borne diseases and water borne diseases in the area, once in a year

338. The monitoring plan is presented in table 24 with parameters of monitoring, frequency of monitoring, responsibility and the estimated cost. The basis for cost estimate is presented in Annex 12.

8.2. REPORTING

339. CPMO/PIO, supported by the environmental specialist of Implementation support consultant (ISC) will supervise the implementation of the EMP and prepare monthly monitoring report and submit to the CPMO for review. Semi-annual monitoring report will be submitted to ADB for review, clearance and disclosure through CPMO office.

8.3. PREPARATION OF SITE SPECIFIC ENVIRONMENTAL MANAGEMENT PLAN (SSEMP)

340. The implementation of environmental mitigation plan will be the responsibility of the contractor. The preparation environmental mitigation plan and site specific environmental mitigation plan (SSEMP) is the responsibility of contractor who will provide and will be submitted to CPMO for review and approval.

8.4. Environmental Management Plan

341. Environmental Management Plan is developed to ensure the compliance with the recommended mitigation measures to avoid, minimize or compensate the adverse environmental impacts of the project for all three phases (pre-construction, construction and operation) on physical, biological and socio-economic environments. The basis for cost estimate is presented in annex 12.

8.5. Institutional Arrangement and Grievance Redress Mechanism

8.5.1. Institutional Arrangement

342. National Water Affair Regulation authority (NWARA) is the leading organization of Government of Islamic Republic of Afghanistan responsible for overall planning and execution of the plans for the overall development of water sector in Afghanistan. Ministry of Agriculture, Irrigation and Livestock of GoIRA is the leading ministry with overall responsibility for the development of the agriculture, livestock and forest sector in Afghanistan. Both these ministries responsible for the water security, energy security and food security in Afghanistan are the implementing agency of this Panj Amu River Basin Project and shall have the overall responsibility of ensuring the compliance to environmental and social safeguard policies and the implementation of the EMP of this project.
343. NWARA which is implementing the sub-output 1 of PARB-P (Main Irrigation System Infrastructure Improvement and Rehabilitation) shall coordinate with National Environmental Protection Agency of Afghanistan (NEPA), Ministry of Agriculture, Irrigation and Livestock (MAIL) and River Basin Authority (RBA) for their active participation in the implementation of Environmental Management Plan (EMP) and Land Acquisition and Resettlement Plan (LARP). Central Project Management office (CPMO) at NWARA and MAIL with Project Implementation Offices (PIOs) in Kunduz will provide all the technical support including the service of international and national experts for compliance with both ADB and GoIRA environmental and social safeguards during the pre-construction phase and construction phase of the project. MAIL which will be implementing the PARB-P sub-output II (Water Management Improvement and Institutional Strengthening) will coordinate with NWARA, RBA and NEPA for the compliance with EMP and long-term sustainability and enhancement of the benefits of the project. NEPA central and provincial offices shall ensure the implementation of the EMP by undertaking environmental monitoring and auditing during construction and O&M of the project.
344. Panj-Amu River Basin Authority (PARBA) and sub- basin authorities within its umbrella will form Water Users' Group in the Project Area for participatory water management at the main system level. Similarly, Department of Agriculture, Irrigation and Livestock (DAIL) at provincial level will form Irrigation Associations to facilitate the participatory water management at secondary and tertiary system level. Both these Water Users' Association and Irrigation Associations with support in their capacity enhancement from the PARB-P sub-output II will ensure peoples participation in the compliance of environmental requirements. Contractor shall have the full responsibilities to

ensure the compliance with EMP during the construction period and also reporting as per the schedule in monitoring plan. CPMO will coordinate with RBA/DAIL and Contractor to prepare monthly, quarterly and annual reports to be submitted to ADB and NEPA and also provide technical support to overcome any technical difficulties during the implementation of the project. Institutions with their roles and responsibilities in EMP implementation of CHARDARA are summed up in Table 21.

Table 21: Institutional Roles and Responsibilities in EMP Implementation

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.

345. NWARA: National Water Affair Regulation Authority, MAIL: Ministry of Agriculture, Irrigation and Livestock, NEPA: National Environmental Protection Agency of Afghanistan, DAIL: Department of Agriculture, Irrigation and Livestock, RBA: River Basin Authority, WUA: Water Users' Association, IA: Irrigation Associations, CPMO: Central Project Management office, PIO: Project Implementation Office.
346. **EMP Cost:** Cost estimates for mitigation measures, environmental monitoring, public consultations, and capacity buildings are summarized in Table 22 and the budget for tree management plan presented in table 23, the compliance monitoring costs will be borne by the implementing agency as part of their implementation functions.
347. Internal monitoring costs will be borne by the contractors and the implementing agency. Independent monitoring costs will be from the CPMO consultancy budget.

Table 22: Estimated budget for environmental management plan

Construction phase					
Trainings (Environmental awareness, water resource management, use of fertilizer, Grievance redress mechanism, health and safety, Covid 19 mitigation measure etc), for 60 person (including materials, logistics, venue)	No	1	5000		\$ 5,000.00
Ground Water Quality test	No	3	1220		\$ 3,660.00
River and Stream Water Quality	No	3	1220		\$ 3,660.00
Sub-Total (A)					\$ 12,320.00
Operation Phase					
Ground Water Quality test	No	3	1220		\$ 3,660.00
River and Stream Water Quality	No	3	1220		\$ 3,660.00
Sub-Total (B)					\$ 7,320.00
Total (A+B)					\$ 19,640.00
Contingency cost 10%					\$ 1,964.00
Grand Total					\$ 21,604.00

Table 23: Estimated budget for Tree management plan

Items/Activities	Unit	Total	Cost/unit (\$)	Person Month	Cost \$	Remarks
Mobilization	No.	1	1400		1,400.00	As per Typical cost for vegetation works under PARBP (per ha) calculated by MAIL attached as annex 12
Hole for plant/sapling	No.	10800	0.5		5,400.00	
Sapling	No.	10800	1.8		19,440.00	
Transportation saplings to the site	Truck	24	100		2,400.00	
Labor (Plantation, watering)	Man-day	144	5		720.00	
Fertilizer (DAP) 0.1 kg/plant	Kg	1080	1		1,080.00	
Maintenance	Month	24	700.00		16,800.00	
Transportation of Fertilizer	Truck	15	60		900.00	
Technical Supervisions (Horticulturist) 24 person/month	Month	2	300	24	14,400.00	
Total					61,140.00	

Table 24: Environmental Monitoring Programme of Chardara subproject

Env. Issue	Quality/	Methodology/ Scope	Parameter	Location	Frequency	Responsibility	Cost (US\$)
Construction Phase							
Air Quality		Compliance monitoring	Dust and Smoke inspection(PM10, PM2.5, CO NO2, SO2)	Construction sites	regularly (once before construction work and after that every six month)	Environmental Contact Person	-
Noise Quality		Compliance monitoring	Inspection of Noise Generating Equipment's	Construction sites	regularly (once before construction work and after that every six month)	Environmental Contact Person	
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	
Waste/hazardous waste Management		Compliance monitoring	General observation	Camp site and construction sites	Once in a month or in once a week	Environmental Contact Person	-
River Water Quality		Compliance monitoring	Drinking/Irrigation Water Quality Standards	In the intake of Chardara canal	every six month	Contractor and PIO	
Ground Water		Compliance	Drinking Water Quality	In the project area	every six	Contractor and PIO	

Quality	monitoring	Standards		month		
OHS issues	Compliance monitoring	As per guidelines	Work site	Daily	Environmental Contact Person	
<i>Operation and Maintenance Phase</i>						
River and Stream Water Quality	Impact monitoring	Drinking/Irrigation Standards	Chardara intake and canal	Once in every two year	RBA/SBA, DAIL	
Ground Water Quality	Impact monitoring	Drinking/Irrigation Standards	In the project area	Once in every two year	RBA/SBA, DAIL	

RBA: River Basin Authority; SBA: Sub-Basin Authority; DAIL: Department of Agriculture, Irrigation and Livestock;

CPMO: Central Project Management office; PIO: Project Implementation Office

Table 25: Environmental Management Plan of Chardara subproject

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 CPMO ,
Land Acquisition	- There won't be need for land acquisition.	NA		- In case there is LA, land acquisition and resettlement plan will be provided and compensation will be paid to Aps.		NWARA CPMO ,
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
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)	CPMO /PIO
Downstream impacts (Water	- Increased irrigation could cause decrease in available water for	Low	Short	- As part of the environmental monitoring plan, water availability monitoring will be conducted in downstream	Project cost (capacity building &	CPMO /PIO/

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
Quantity)	downstream farmers but this project is CSA water management irrigation so risk is not likely to be significant.			villages during the wet and dry seasons to minimize any adverse impacts and take any necessary remedial measures in a timely manner if necessary.	FWUC Package)	WUAs Monitor by: CPMO /PIO
2. Impacts during Construction						
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/CPMO
Water pollution	- Currently, use of agricultural chemicals is available in the project area. The primary objective of the Project is to 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.	Low	Long Term	- Educational program on the fertilizer uses and 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. - The frequency of monitoring will be added in the monitoring plan.	Training budget; monitoring budget	DOA Monitor by: CPMO

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
Dust from material transportation and construction and	- Impact from dust could occur during the construction thru improper construction management. .	Low	Short Term	<ul style="list-style-type: none"> - Water shall be sprayed during construction if activity is located close 50 m to villages to ensure that dust is minimized in construction zones. - Dry material handling and transport generate large amounts of dust thus: <ul style="list-style-type: none"> ▪ The Contractor shall prepare a dust control program. ▪ Water shall be sprayed where dry materials are handled, crushed and transported. ▪ Vehicles transporting materials are to be covered to reduce spills and dust. ▪ Monitoring of air quality in regular basis 	Costed into Construction contract (and requirement in contract docs)	Contractor Monitor: PIO/CPMO
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 100m of a village or town is to be limited to times agreed with community. - Monitoring of noise and vibration if any in regular basis. 	Costed into Construction contract (and in contract docs)	Contractor Monitor: PIO/CPMO
Impact from waste and sewage waste within and across the site	- Contractor activity will generate waste and will require management.	Medium	Short term	- On site need for Solid Waste Management (SWM) plan.	Contractor obliged to manage.	
Human waste from	- An adverse impact	Low	Short	- Provision of sanitary facilities	Costed into	Contractor

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
construction	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.		Term	(latrines, burying, etc.) with proper waste disposal will be provided by contractors for the entire period of the on-site construction period. -	Construction contract (and in contract docs)	Monitor: PIO/CPMO
Solid waste generation from construction, work sites and workers.	- Solid waste can create nuisance and bad odor, and encourage disease vectors. - Solid Waste Management (SWM) is recognized as an important indicator for contract success.	Low	Short Term	- 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 moving to a new sites, Data record should be maintained.	Costed into Construction contract (and in contract docs)	Contractor Monitor: PIO/CPMO
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	- 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 handled and disposal as per national and international standards and good practice.	Costed into Construction contract (and requirement in contract docs)	Contractor Monitor: PIO/CPMO
Mature tree	- During construction,	Medium	Medium	-	Contractor	Contractor,

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
removal and general vegetation clearance	there may be a need to remove existing vegetation and excavate existing soil profiles. Such activity will incur loss of view-shed, habitat, amenity, fuel wood 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 1:5 - Specific species, location and period of maintenance for establishment will be agreed with in collaboration with DAIL, Irrigation Association, Water user Association, community members, concern govt. authorities and NEPA. 	<p>shall absorb the costs of such activities into contract.</p> <p>Costs for specific tree specimens & planting to be included in contract</p>	PIO
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	<ul style="list-style-type: none"> - 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 CPMO Environmentalist. - For amphibians 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, CPMO
Worker safety and health	- Some workers will be recruited for construction activities and workers' camp will be constructed. These will include non-skilled workers,	Low	Short Term	<ul style="list-style-type: none"> - 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 	Costed into Construction contract (and requirement in contract	Contractor Monitor: PIO/CPMO

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
	operators and drivers as well as surveyors and construction supervisors. Since the works 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>during construction. Manager 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> <p>-Ensure existence of first aid kit in the construction comp and construction site.</p> <p>-Adequate segregation facilities</p> <p>-No dumping in public places and river banks</p> <p>-Movable toilets in construction sites.</p> <p>-Composting of organic wastes in camps</p> <p>Proper collection and disposal of hazardous materials</p>	docs)	
Covid-19	- 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 toilets. Clean and disinfect frequently touched surfaces periodically throughout the shift but also: - At the beginning and end of every shift 		Contractor , PIO, CPMO

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
				<ul style="list-style-type: none"> - After anyone uses your vehicle, tools, or workstation - Limit tool sharing if possible. - Practice proper hand hygiene. - Conducting awareness program for workers and community. 		
Confusion and anger by community regarding scope and size of construction activity.	- Lessons learnt from other projects indicate ignorance by farming community of size, scope and temporary impact from project activities.	Low	Short Term	- Communication regards the scope or activity should be shared with the Community using clear photographs, plans and sketches to illustrate works to be done across the site.	PIO and Contractor costs.	
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	<ul style="list-style-type: none"> - 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, CPMO .
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	Low	Long term	<ul style="list-style-type: none"> - 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
	cultural features is not envisaged.			representatives.		
3. Environmental Impacts during Operation						
Surface Water pollution	- Currently, use of agricultural chemicals is available in the project area. The primary objective of the Project is to 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.	Low	Long Term	<ul style="list-style-type: none"> - Educational program on the fertilizer uses and 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. - The frequency of monitoring will be added in the monitoring plan. 	Training budget; monitoring budget	DOA Monitor by: CPMO
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	<ul style="list-style-type: none"> - 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)	CPMO /PIO/PIC

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
Hydrological changes Conflict of water utilization	<ul style="list-style-type: none"> - Change in timing, flows, flooding, drainage, erosion and sedimentation will occur by default with the project. - expected conflict on water use 	Low	N/A	<ul style="list-style-type: none"> - 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 CPMO /PIO WUAs
Ground Water Resources	<ul style="list-style-type: none"> - The groundwater in project command area should benefit from construction. 	Low	N/A	- N/A	N/A	N/A

348. NWARA: National Water Affair Regulation Authority; MAIL: Ministry of Agriculture, Irrigation and Livestock; NEPA: National Environmental Protection Agency; RBA: River Basin Authority; CPMO: Central Project Management office; PIO: Project Implementation Office; SBA: Sub Basin Authorities; DAIL: Department of Agriculture, Irrigation and Livestock; WUA: Water Users Association; IA: Irrigation Association; PARBSP: Panj-Amu River Basin Sub Product; LARP: Land Acquisition and Resettlement Plan; TMP: Tree Management Plan.

9. CONCLUSION AND RECOMMENDATION

9.1. Conclusions

- 350. On the basis of the findings of this IEE study, the rehabilitation of Chardara subproject will bring about a number of significant positive socio-economic and environmental impacts that justify the implementation of the project.
- 351. The potential impacts that will require particular attention and mitigation include traffic safety issues, dust and noise pollution, impacts on adjacent trees and impacts on community water supply sources. Other important issues are soil erosion, sedimentation of water courses, impacts on landscape quality and slope stability (at some spots), soil and water pollution. Nonetheless, most of potential impacts are short-term mainly occurring during the construction phase and can be managed/mitigated to acceptable levels with good engineering measures and other appropriate environmental and social mitigation measures.
- 352. 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.
- 353. Also after implementation of proposed mitigation measures, there won't be any significant residual impact.
- 354. It can therefore be concluded that there are no severe environmental or social impacts that will prevent the proposed Chardara rehabilitation project from proceeding to the implementation stage provided the mitigation measures recommended in this IEE study are properly considered.
- 355. As per survey the total 1081 different size trees will be removed during the project implementation.
- 356. To mitigate the adverse impact of these trees, as offset mitigation measure 10900 trees will be replanted in government own land, tree management plan attached as **annex 20**.

9.2. Recommendations

- 357. 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.
- 358. 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.
- 359. 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.

10. ANNEXES

Annex 1: National Drinking Water Quality Standard of Afghanistan

Table 26: List of Bacteriological Drinking Water Quality Standards

BACTERIOLOGICAL PARAMETERS			
Properties /parameters	Standard values for Afghanistan	WHO guidelines 2011	Remarks
All water intended for drinking (E. Coli or Thermo tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E.coli or thermos tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Most Asian countries also follow WHO standards

Table 27: List of Physical Drinking Water Quality Standards

PHYSICALPARAMETERS			
Properties /parameters	Standard values for Afghanistan	WHO guidelines 2011	Remarks
Color	≤15 TCU	≤15 TCU	Standard for Afghanistan similar to most Asian developing countries
Taste	Non	Non	Standard for

	objectionable/Acceptable	objectionable/Acceptable	Afghanistan similar to most Asian developing countries
Odor	Non objectionable/Acceptable	Non objectionable/Acceptable	Standard for Afghanistan similar to most Asian developing countries
Turbidity	5 NTU	5 NTU	Standard for Afghanistan similar to most Asian developing countries
Total hardness as CaCO ₃	500 mg/l	NGVS	Permissible limit in the absence of alternate water source can rise up to 600 mg/l.
TDS	1000	NGVS	Permissible limit in the absence of alternate water source can rise up to 2000 mg/l.
pH	6.5 – 8.5	6.5 – 8.5	Standard for Afghanistan similar to most Asian developing countries

Table 28: List of essential inorganic Chemical Drinking Water Quality Standards

Properties /parameters	Standard values for Afghanistan	WHO Guidelines 2011	Remarks
ESSENTIALCHEMICAL PARAMETERS			
Essential Inorganic	mg/Liter	mg/Liter	Standard for Afghanistan similar to Asian developing countries
Aluminum (Al)	0.2	0.2	-do-
Antimony (Sb)	0.005	0.02	-do-
Barium (Ba)	0.7	0.7	-do-
Boron (B)	2.4	2.4	-do-
Cadmium (Cd)	0.01	0.003	-do-
Chloride (Cl)	250	NGVS	Permissible limit in the absence of alternate water source can rise up to 1000 mg/l.

Chromium (Cr)	0.05	0.05	Standard for Afghanistan similar to Asian developing countries
Copper (Cu)	2	2	-do-
Iron (Fe)	0.3	0.3	-do-
Potassium	10	NGVS	-do-
Sodium	200	NGVS	-do-
Sulfate	250	NGVS	Permissible limit in the absence of alternate water source can rise up to 400 mg/l.
Magnesium	30	NGVS	Permissible limit in the absence of alternate water source can rise up to 100 mg/l.
Calcium	75	NGVS	Permissible limit in the absence of alternate water source can rise up to 200 mg/l.
Hardness as CaCO ₃	500	NGVS	Permissible limit in the absence of alternate water source can rise up to 600 mg/l.

Table 29: List of toxic inorganic chemical Drinking Water Quality Standards

TOXIC CHEMICAL PARAMETERS			
Properties /parameters	Standard values for Afghanistan	WHO guidelines 2011	Remarks
ToxicInorganic	mg/Liter	mg/Liter	
Cyanide (CN)	0.05	0.07	Standard for Afghanistan similar to Asian developing countries
Arsenic (As)	0.5	0.01	-do-
Fluoride (F)	1.5	1.5	-do-
Lead (Pb)	0.01	0.01	-do-
Manganese(Mn)	0.5	0.5	-do-
Mercury (Hg)	0.001	0.006	-do-
Nickel (Ni)	0.02	0.07	-do-
Nitrate (NO ₃)	50	50	-do-

Nitrite (NO ₂)	3	3	-do-
Nitrate as Nitrogen	11	11	-do-
Selenium (Se)	0.01	0.01	-do-
Residual chlorine	0.2-0.5 for pipe distribution system and 0.5 – 1.0 can use it in emergency situation	0.2-0.5 for pipe distribution system and in emergency situation greater than 0.5	-do-
Zinc (Zn)	3.0	NGVS	-do-

Table 30: Maximum permissible limit for water saltness and efficient factors of production and poisoning of plants

No	Characteristics/specification	Maximum permissible limit
1	Total Dissolved Solids (TDS)	1500 mg/ltr
2*	Sodium (SAR adjusted)	9 (m.mol/ltr) ^{1/2}
3	Chlorine	350 mg/ltr
4	Boron	1 mg/ltr

If the quality of outgoing water from plant/factory which is used for agricultural purpose is higher than the mentioned data in table, then maximum up to that amount outgoing is acceptable.

Table 31: Maximum amount of chemical materials in industrial effluents for irrigation and livestock purposes

No	Type of Chemical Composition	Agricultural irrigation purposes (mg/l)		For livestock purposes (mg/l)
		For all soils	Usage up to 20 years in light soils ¹	
1	Al	5	20	5
2	As	0.1	2	0.2
3	Be	0.1	5	-
4	B	1	2	5
5	Cd	0.01	0.05	0.05
6	Cr	0.1	1	1
7	Co	0.05	5	1
8	Cu	0.2	5	0.5
9	F	1	15	2
10	Fe	5	20	-
11	pb	5	10	0.1
12	Li	2.5	2.5	-
13	Mn	0.2	10	-
14	Mo	0.01	0.05*	-
15	Ni	0.2	2	-
16	Se	0.02	0.02	0.05
17	V	0.1	1	0.1

18	Zn	2	10	0.24
19	Hg	-	-	0.01
20	NO ₃	130	-	-
21	NO ₂	-	-	10

Light soil is a kind of soil which consists of 80% sand and 20% silt and clay

Only for acidic soils

Table 32: Maximum other industrial effluents chemical characteristics/specifications

No	Type of Chemical Composition	Discharge in Surface Waters	Discharge in Underground waters
1	Al	10	5
2	As	0.1	0.1
3	Ba	5	1
4	B	2	1
5	Cd	0.1	0.01
6	Cr ⁺³	2	1
7	Cr ⁺⁶	0.1	1
8	Cl ₂	0.05	1
9	Co	0.5	1
10	Cu	0.5	1
11	Fe: Four out of five samples during 24 hours	2	0.5
12	Ni	3	0.2
13	Hg	0.01	0
14	Zn	2	2
15	Sn (exception in cases where fungi live or exist near effluents)	2	2
16	Ag	0.1	0.05
17	Br ₂	0.1	-
18	CN	0.01	0.02
19	NO ₃	10	1
20	NO ₂	1	1
21	Pb	0.5	1
22	P	1	1
23	SO ₄	300	300
24	S ⁼	0.1	1
25	SO ₃	1	1
26	C	15	-
27	Total Organic Carbon (TOC)	22	-
28	Oil and fatty acids	20	10
29	Total hydrocarbons	10	-
30	Phenols (both types)	0.05	0

		0.05	0
31	F	10	2
32	Se	1	0.01
33	Radioactive materials	0	0
34	A.B.S materials	1.5	0.5

Annex 2: Standards for underground and surface water resources

Table 33: Some main pollution threats to water resources of Afghanistan

No	Resources	Likely pollutants
1	Agricultural activity	Nitrates, ammonium, pesticides, fecal organisms
2	Local sewage	Nitrates, fecal organisms
3	Disposal of sludge	Nitrates, lead, zinc
4	Landfill area	Ammonium, nitrates, salinity, some halogenated hydrocarbons, heavy metals
5	Dry cleanings	Trichloroethylene, tetrachloroethylene
6	Petrol stations, vehicle workshops and old cars dump area	Mineral oil, benzene, other aromatic hydrocarbons, some halogenated hydrocarbons)
7	Leather tanneries	Chromium, phenols
8	Mining industry	Acidity, various heavy metals
9	Agricultural processes (such as: slaughterhouses, sugar and dairy factories)	TDS, TSS, grease, oil
10	Dyes	Zinc, copper, lead

Table 34: Recommended standards for drinking water (underground and surface waters)

No	Parameters	Standard
1	pH Value, mg/L	6-9
2	Conductivity, μ S	1250
3	Fecal coli form organisms (9 in 100m) *	0
4	Total Coli for Organisms (9 in 100m)	5
5	Arsenic, mg/L	0.05
6	Boron, mg/L	1.0
7	Cadmium, mg/L	0.01
8	Chloride (Cl), mg/L	250
9	Copper, mg/L	2.0
10	Fluoride (F), mg/L	1.5
11	Mercury, mg/L	0.001
12	Nitrate (NO ₃), mg/L	50
13	Lead, mg/L	0.05
14	Sulphate (SO ₄), mg/L	500
15	Zinc, mg/L	3.0
16	Odor	No objection
17	Taste	No objection
18	Petroleum products (petrol, diesel)	Imperceptible, without odor
19	Oil or Grease Residue	Imperceptible
20	Disposal of any Waste Materials**	Imperceptible
21	Disposal of livestock or	Imperceptible

	domestic animals **	
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Applicable in watershed or drainage areas for drinking water

** Applicable for surface waters

Table 35: Recommended standards for water resources which are used for irrigation or livestock purposes (underground and surface waters)

No	Parameter	Standard
1	pH Value, mg/L	6-9
2	Conductivity, μ S	1500
3	Aluminum (soluble)	5.0
4	Arsenic, mg/L	0.1
5	Cadmium, mg/L	0.01
6	Copper, mg/L	0.5
7	Manganese, mg/L	0.2
8	Mercury, mg/L	0.01
9	Nickel, mg/L	0.2
10	Lead, mg/L	0.1
11	Zinc, mg/L	2.0

Table 36: Recommended standards for water resources which are used for aquatic life or fish preservation purposes (underground and surface waters).

No	Parameter	Standard
1	pH Value, mg/L	6-9
2	Dissolved Oxygen, mg/L	>5
3	Temperature	In short distance should not exceed 3 Celsius
4	BOD (5 days, 20 Celsius)	5
5	Ammonium (as N)	0.5
6	Phosphorus (total P)	0.5
7	Nitrate (NO ₃), mg/L	50
8	Oil or Grease Residue	Imperceptible
9	Disposal of any Waste Materials	Imperceptible
10	Disposal of livestock or domestic animals	Imperceptible

Annex 3: National Ambient Air Quality Standard for Afghanistan 2017

<i>Parameter</i>	<i>Unit</i>	<i>Time Weighted Average</i>	<i>Concentration in Ambient Air, maximum</i>	<i>Method of Measurement</i>
TSP	µg/m ³	Annual		High Volume Sampling (avg flow ≥ 1.1 m ³ /min)
		24-hour	300	
		8-hour		
PM ₁₀	µg/m ³	Annual	70	Low volume sampler or β- Ray Absorption Method
		24-hour	150	
		8-hour		
PM _{2.5}	µg/m ³	Annual	35	Low volume sampler or β- Ray Absorption Method
		24-hour	75	
		8-hour		
Oxides of Nitrogen (as NO ₂)	µg/m ³	Annual	40	Diffusive Sampling or Gas Phase Chemiluminescence
		24-Hour	80	
		1-Hour		
Sulfur Dioxide (SO ₂)	µg/m ³	Annual		Diffusing Sampling or Ultraviolet Fluorescence method
		24-Hour	50	
		1-Hour		
Ozone (O ₃)	µg/m ³	24-hour		Non dispersive UV absorption method
		8-Hour	100	
		1-Hour		
Carbon Monoxide (CO)	mg/m ³	8-hour	10	Non Dispersive Infra Red (NDIR) method
		1-hour	30	
		30-minute	60	
Lead (Pb)	µg/m ³	Annual	0.5	ASS Method after using EPM 2000 or equivalent filter paper
		24-Hour		
		1-Hour		

Note: Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform intervals

24 hourly values shall be met 95% of the time in a year. 18 days per calendar year the standard may be exceeded but not on two consecutive days.

NEPA will review this standard in 2015 and set new targets.

Table 37: Particulate matter emissions standard table for brick kilns

Bull Trench Kilns			
Category	Capacity (deep trench width in meter)	Maximum permissible density of particulate matter (mg/Nm ³)	Height of funnel/uptake in meter (minimum)
Small	Width <4.5 m	1000	22 meter or ventilation fans with minimum 50mm water pressure and 12 meter funnel height
Medium	4.50 – 6.75 m	750	27 meter or ventilation fans with minimum 50mm water pressure and 15 meter funnel height
Large	Above 6.75	750	30 meter or ventilation fans with minimum 50mm water pressure and 12 meter funnel height
Down Draught Kilns			
Category	Capacity (produced bricks in a day)	Maximum permissible density of particulate matter (mg/Nm ³)	Height of funnel/uptake in meter (minimum)
Small	In 1 to 3 shafts, below 15000	1200	12
Medium	In 4 to 6 shafts 15000 – 30000		15
Large	7 or more, above 30000		18
Vertical Shaft Brick Kilns			
Category	Capacity (Shafts and bricks in a day)	Maximum permissible density of particulate matter (mg/Nm ³)	Height of funnel/uptake in meter (minimum)
Small	In 1 to 3 shafts, below 15000	250	11 meter (minimum 5.5meters from bricks laying area)
Medium	In 4 to 6 shafts 15000 – 30000		14 meter (minimum 7.5meters from bricks laying area)
Large	7 or more, above 30000		16 meter (minimum 8.5meters from bricks laying area)

Table 38: Particulate matter emissions standard table for cement manufacturing plants/factories

Capacity of plant/factory	Pollutants	Emission limit (mg/ Nm ³)
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200 tons or lower in a day (all sections)	Particulate matter	250
Higher than 200 tons in a day (all sections)	Particulate matter	150

Industrial Boilers Emissions Standards

Particulate matter emissions standards table for industrial boilers for all types of fuels with consideration of production capacity

Steam Production Capacity (ton per hour)	Pollutants	Emission limit (mg/ Nm ³)
Lower than 2	Particulate matter	1200*
2 – lower than 10	Particulate matter	800*
10 – lower than 15	Particulate matter	600*
15 and higher	Particulate matter	150**

For standards to be followed and implemented, boiler devices should have cyclone/multi cyclone controlling equipment's.

** For standards to be followed and implemented, bag filter/ESP should be recommended as controlling equipment

Annex 4: National standard for noise pollution in Afghanistan 2017

Maximum Permissible limit in dB(A) Leq		Category of Area/Zone	Area/Zone code
Night time	Day time		
65	75	Industrial	I
60	70	Commercial	C
55	60	Residential	R
45	50	Sensitive(Silence)	S

In areas where the noise pollution scale in the past is higher or at the level of permissible scale are described in below table:

S	For sensitive areas or zones where the noise pollution scale in the past is higher or at the level of permissible scale	Scale of noise pollution measured in the past +3dB(A)
R	For residential areas or zones where the noise pollution scale in the past is higher or at the level of permissible scale	Scale of noise pollution measured in the past +3dB(A)
C	For commercial areas or zones where the noise pollution scale in the past is higher or at the level of permissible scale	Scale of noise pollution measured in the past Day time +5dB(A) Night time +3dB (A)
I	For industrial areas or zones where the noise pollution scale in the past is higher or at the level of permissible scale	Scale of noise pollution measured in the past For day time +5dB(A) For night time +3dB (A)

Maximum permissible noise pollution limit in the areas where there exists noise pollution source, based on Leq for construction activities are as below:

Day Time	Night Time
75	50

Annex 5: List of Protected Species in Afghanistan

Plants				
S.N.	Species Name	Scientific Name	Group	Range
1	Fraxinus sogdiana	Rraxinus sogdiana	Plants	Afghanistan
2	Kashmir Elm	Ulmus wallichiana	Plants	Afghanistan, India, Nepal, Pakistan
3	Malus niedzwetzkyana	Malus niedzwetzkyana	Plants	Afghanistan, China, Kazakhstan, Kyrgyzstan, Uzbekistan
4	Populus pruinosa	Populus pruinosa	Plants	Asia, Europe, Middle East
5	Walnut	Juglans regia	Plants	Afghanistan, China, Kyrgyzstan, Pakistan, Turkmenistan
Birds				
1	Black-tailed Godwit	<i>Limosa limosa</i>	Birds	Africa, Asia, Central America, Europe, Middle East, North America, Oceanic
2	Cinereous Vulture	<i>Aegypius monachus</i>	Birds	Africa, Asia, Europe, Middle East
3	Dalmatian Pelican	<i>Pelecanus crispus</i>	Birds	Africa, Asia, Europe, Middle East
4	Egyptian Vulture	<i>Neophron percnopterus</i>	Birds	Africa, Asia, Europe, Middle East
5	Eurasian Curlew	<i>Numenius arquata</i>	Birds	Africa, Asia, Australia, Central America, Europe, Middle East, North America, Oceanic
6	European Roller	<i>Coracias garrulus</i>	Birds	Asia, Europe, Middle East
7	Ferruginous Duck	<i>Aythya nyroca</i>	Birds	Africa, Asia, Europe, Middle East
8	Great Bustard	<i>Otis tarda</i>	Birds	Africa, Asia, Europe, Middle East
9	Greater Spotted	<i>Aquila clanga</i>	Birds	Africa, Asia, Europe, Middle East
10	Houbara Bustard	<i>Chlamydotis undulata</i>	Birds	Africa, Asia, Europe, Middle East
11	Indian Vulture	<i>Gyps indicus</i>	Birds	Afghanistan, India, Malaysia, Pakistan
12	Laggar Falcon	<i>Falco jugger</i>	Birds	Afghanistan, Bangladesh, India, Iran, Myanmar, Nepal, Pakistan
13	Lesser Flamingo	<i>Phoeniconaias minor</i>	Birds	Africa, Asia, Europe, Middle East, Oceanic
14	Lesser Kestrel	<i>Falco naumanni</i>	Birds	Africa, Asia, Europe,

				Middle East
15	Little Bustard	<i>Tetrax tetrax</i>	Birds	Africa, Asia, Europe, Middle East
16	Marbled Teal	<i>Marmaronetta angustirostris</i>	Birds	Africa, Asia, Europe, Middle East
17	Pale-backed Pigeon	<i>Columba eversmanni</i>	Birds	Afghanistan, China, India, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Takikistan, Turkmenistan, Uzbekistan
18	Pallid Harrier	<i>Circus macrourus</i>	Birds	Africa, Asia, Europe, Middle East
19	Saker Falcon	<i>Falco Cherrug</i>	Birds	Africa, Asia, Europe,
20	Siberian White Crane	<i>Grus leucogeranus</i>	Birds	C.I.S. (Siberia) to India, including Iran and China
21	Sociable Lapwing	<i>Wanellus gregarius</i>	Birds	Africa, Asia, Europe, Middle East
22	Tytler's Leaf-warbler	<i>Phylloscopus tytleri</i>	Birds	Afghanistan, India, Nepal, Pakistan
23	White-headed Duck	<i>Oxyura leucocephala</i>	birds	Africa to Asia
24	White-rumped Vulture	<i>Gyps bengalensis</i>	Birds	Asia, Europe, Middle East
Mammals				
1	Argali	<i>Ovis ammon</i>	Mammals	Afghanistan, China, India, Kazakhstan, Nepal, Pakistan, Uzbekistan
2	Asiatic Black Bear	<i>Ursus thibetanus</i>	Mammals	Afghanistan, Bangladesh, Bhutan, Cambodia, China, India, Iran, Japan, Korea, Laos, Myanmar, Nepal, Pakistan, Russia, Taiwan, Thailand, Vietnam
3	Bechstein's Bat	<i>Myotis bechsteinii</i>	Mammals	Asia, Europe, Middle East
4	Cheetah	<i>Acinonyx jubatus</i>	Mammals	Africa to India
5	Common Bentwing Bat	<i>Miniopterus Schreibersii</i>	Mammals	Africa, Asia, Europe, Middle East
6	Cyprian Wild Sheep	<i>Ovis orientalis</i>	Mammals	Afghanistan, Armenia, Azerbaijan, India, Iran, Kazakhstan, Oman, Pakistan, Tajikistan, Turkey, Turkmenistan, Uzbekistan

7	Eurasian Otter	<i>Lutra lutra</i>	Mammals	Africa, Asia, Europe, Middle East
8	European Marbled	<i>Vormeta</i>	Mammals	Asia, Europe, Middle East
9	Goitered Gazelle	<i>Gazella subgutturosa</i>	Mammals	Asia, Europe, Middle East
10	Himalayan Musk Deer	<i>Moschus leucogaster</i>	Mammals	China (Tibet), Southern slopes of the Himalayas
11	Kashmir Musk Deer	<i>Moschus cupreus</i>	Mammals	Afghanistan, India, Pakistan
12	Markhor	<i>Kapra falconeri</i>	Mammals	Afghanistan, Pakistan
13	Mehely's Horseshoe	<i>Rhinolophus mehelyi</i>	Mammals	Africa, Asia, Europe, Middle East
14	Pallas's Cat	<i>Otocolobus manul</i>	Mammals	Afghanistan, Armenia, Azerbaijan, China. India, Iran, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Turkmenistan, Uzbekistan
15	Red Deer	<i>Cervus elaphus</i>	Mammals	Afghanistan, Algeria, Bhutan, China. France, India, Morocco, Pakistan, Tunisia
16	Snow leopard	<i>Uncia uncia</i>	Mammals	Central Asia, Middle East
Fishes				
1	Luciobarbus capito	<i>Luciobarbus capito</i>	Fishes	Afghanistan, Armenia, Azerbaijan, Georgia, Iran, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkey, Turkmenistan, Uzbekistan
2	Luciobarbus brachycephalus	<i>Luciobarbus brachycephalus</i>	Fishes	Afghanistan, Armenia, Azerbaijan, China, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan
3	Wild Common Carp	<i>Cyprinus carpio</i>	Fishes	Asia, Europe, Middle East
Reptiles				
1	Afghan Tortoise	<i>Testudo horsfieldii</i>	Reptiles	Afghanistan, Armenia, Azerbaijan, China, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Russia,

				Taiikistan, Turkmenistan, Uzbekistan
2	Bengal Monitor	<i>Varanus bengalensis</i>	Reptiles	Afghanistan, Burma, India, Iran, Iraq, Malaysia, Sri Lanka, Thailnad, Vietnam
3	Desert Monitor	<i>Varanus griseus</i>	Reptiles	Asia, Africa, Middle East
Insects				
1	Pamassius autocrator	<i>Pamassius autocrator</i>	Insects	Afghanistan Tajikistan
Amphibians				
1	Afghani Mountain Salamander	<i>Paradactylodon mustersi</i>	Amphibians	Afghanistan

Annex 6: Climate Data

Table 5: Kunduz: Max snow height in Cm during month with date

Year s	Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Au g	Sep	Oct	No v	Dec	Total
2008	19	0	0	0	0	0	0	0	0	0	6	0	25
2009	5	5	0	0	0	0	0	0	0	0	0	0	10
2010	0	15	0	0	0	0	0	0	0	0	0	5	20
2011	8	4	0	0	0	0	0	0	0	0	18	15	45
2012	42	85	15	0	0	0	0	0	0	0	0	20	162
AVG	14.8	21.8	3	0	0	0	0	0	0	0	4.8	8	52.4

Table 6: Kunduz-Max Temperature in °C

Year s	Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Au g	Sep	Oct	No v	Dec	Average
2008	-1.8	2.9	24.5	27	34.7	39	40. 2	38. 1	33. 8	24. 5	14. 6	9.7	23.9
2009	8	13.1	20.1	19.6	30.1	35	39	38	33. 2	24. 9	16. 9	11. 2	24.1
2010	13	11.3	19.6	27.5	32.7	37. 9	40. 3	38. 1	32. 8	29. 4	20. 1	14. 1	26.4
2011	10	10.7	18.6	29.3	36.7	40. 1	10. 4	39. 7	34	26. 2	13. 8	7.1	23.1
2012	6.8	11.6	16.1	27.1	30.4	36	39. 7	38. 9	32. 4	26. 3	17. 2	10. 2	24.4
2013	8.9	14.2	20.2	24.6	32.8	39	40. 5	37. 9	35. 5	26. 7	18. 5	8.8	25.6
AVG	7.48 3	10.6 3	19.8 5	25.8 5	32.9	37. 8	35	38. 5	33. 6	26. 3	16. 9	10. 2	24.6

Table 7 Kunduz Minimum Temperature in °C

Year s	Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Au g	Sep	Oct	No v	Dec	Average
2008	-9	-3	11	15	21	25	26	25	19	13	6	2	13
2009	2	5	10	11	18	22	24	24	19	11	7	3	13
2010	4	1	10	14	18	22	25	25	18	15	6	1	13

2011	0	2	7	14	20	24	25	25	19	14	5	-1	13
2012	-1	3	5	15	17	22	25	24	18	12	7	1	12
2013	-1	5	8	12	17	23	25	24	20	13	6	2	13
AVG	-1	2	8	14	18	23	25	24	19	13	6	1	13

Table 8 Kunduz Precipitation with date in mm Total of

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2008	27	36	19	33	3	0	0	0	0	17	13	20	168
2009	42	79	46	122	33	10	0	0	0	31	71	57	490
2010	4	129	40	31	43	23	0	0	1	0	1	3	273
2011	43	87	45	10	7	0	0	0	0	31	41	27	291
2012	58	108	79	33	52	4	0	0	0	0	6	68	407
2013	38	83	30	65	1	5	0	2	0	8	3	78	313
AVG	35	87	43	49	23	7	0	0	0	15	22	42	324

Annex 7: Evapotranspiration (ET) (mm/day) for Kunduz based on Kunduz climatic parameters

0.8	1.3	2	3.2	5.1	7.4	7.85	7.1	5.4	3.2	1.5	0.8
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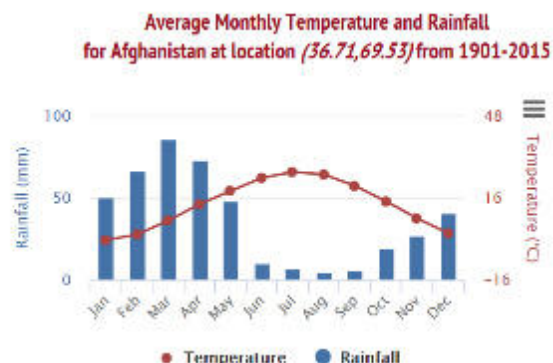
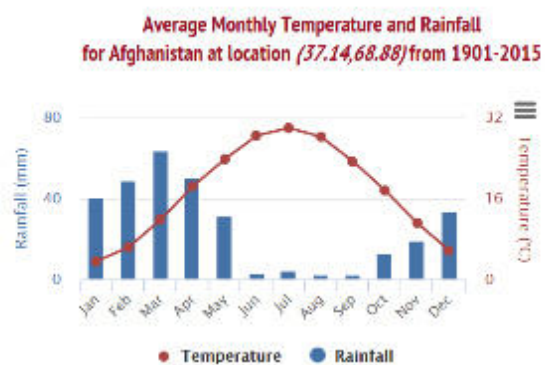


Figure 2: Average monthly temperature and precipitation at Kunduz from 1901 to 2015



Annex 8: Project area Pictures





Annex 9: Details on Public Consultation

PARB Sub-Project Community Consultation and Site Disturbance Data

Chardara 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.

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 understands sketch spatial plan for each site and agreed areas of activities. Bullet-point summary of feedback.

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, Water user Association and irrigation association, and concern government 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 categorise 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.

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

Name of Village: Maghoul ha village (**Head, Mid & Tail**)
2020

Date: 10-July-

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

#	Important issues raised.
1	Consultation conducted in the project area by participation of Water User Association, CDCs and Affected people regarding the project and likely impact of the project on Environment and people. Community people expressed their happens about the project, and pledged that they will cooperate during the project implementation. Based on there saying it is a vital project that will positive impact on their income. People want the project to start as early as possible and they will extend their support for the timely completion of the project;
2	Chardara irrigation scheme is located in an agriculture area that is mostly covered by vegetation, so it is difficult to start the work in the current season. Because there is no access road to be used for the vehicles, but community people will give access road after finishing the cultivation season and collect their crops. They recommended that the construction work should be started on September 2020, to avoid impacts on agriculture.
3	Only private land can be used, there is no public land. The people were emphasizing on rehabilitation of existent canal, and the canal alignment should not be changes.
4	As most of the trees are small trees (sapling) and non-fruit local trees, and they are only used for fuel wood, and community people think that no need for transplanting, but as it explained that trees are very important for the protection of environment and it should have protected and transplanted affected people will provide land for that trees and also there is road for machine. The best season for transplanting and replantation is spring.

Output; Ensure community understands sketch spatial plan for each site and agreed areas of activities.
Bullet-point summary of feedback.

Summary: Consultation conducted in the project area by participation of Water User Association, CDCs and Affected people regarding the project and likely impact of the project on Environment and people. During the consultation community people expressed them happens about the project, and pledged that they will cooperate during the project implementation.

Chardara irrigation scheme is located in an agriculture area that is mostly covered by vegetation, so it is difficult to start the work in the current season. Because there is no access road to be used for the vehicles,

but community people will give access road after finishing the cultivation season and collect their crops. They recommended that the construction work should be started on September 2019, to avoid impacts on agriculture.

Most of the trees are small trees (sapling) and non-fruit local trees, and they are only used for fuel wood, and community people think that no need for transplanting, also these species can grow if they plant a branch of the trees.

For transplantation affected people will provide land in their private land and The best season for

Vegetation Removal and Replacement

#	Important issues raised.
5	The number of trees identified during the survey, and as mentioned most of the trees are small trees and non-fruit. In the project area there is no pasture, actually it is an agricultural area and all the lands are used for agriculture.
6	The list is already prepared and all of the trees are non-fruit trees such as willow and populus alba that are used for fuel wood. These trees are mostly planted in the bank of canal for bank protection.
7	Chardara Subproject area is about 95% covered by vegetation that is included trees and agriculture area.
8	Community people will provide land in their private land for replantation, besides that after rehabilitation of the canal and huge number of trees will be replanted in the ROW of the canal and also adjacent to the existing road. Also based on the agreement of people there is some public places that also we can replant the trees.
9	The number of trees which will replanted in the private land, the land owner will take the responsibility of maintenance, and also the number of trees which will be planted in the public places, CDCs and Forest association will take the responsibility of maintenance in cooperation of villagers.

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

Summary: The number of trees identified during the survey, and as mentioned most of the trees are small and non-fruit trees such as willow and populus alba that are used for fuel wood and trees are mostly planted in the bank of canal for bank protection.

Chardara Subproject area is about 95% covered by vegetation that is included trees and agriculture area. Community people will provide land in their private land for replantation, besides that after rehabilitation of the canal and huge number of trees will be replanted in the ROW of the canal and also adjacent to the existing road. Also based on the agreement of people there is some public places that also we can replant the trees. The number of trees which will replanted in the private land, the land owner will take the responsibility of maintenance, and also the number of trees which will be planted in the public places, CDCs and Forest association will take the responsibility of maintenance in cooperation of villagers.

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

#	Important issues raised.
---	--------------------------

10	Contractor can have access to all project area, but before the starting of any work agreement of PIO engineer and CDCs are very important. So there is no any problem for the contractor.
11	As the project is in agricultural area and there is farm adjacent to the irrigation scheme, so outmost care should be taken to avoid impacts on agriculture. Also before starting of the work contractor should inform the affected people and get their agreement.
12	Top soil will be used by farmers, and also all construction spoil will be used by farmer no-need for storage, but if in some part of the canal there is no need to be used by farmer it will be carried out to some public site.
13	All solid waste should be removed from the construction site to some places that doesn't have any negative impact on the environment. Or to the area that are identified by the municipality.
14	In general people are very happy for the starting of the project, and they will cooperate in resolving of any problem during the project implementation. Also community people suggested that labours should be local. Also they were emphasized that the construction work should not disturb their irrigation system, and in this regard their agreement is very important prior to start of work. People suggested that some water access point should be built in the on canal as people used this water for drinking too, also for animal.

Outputs: Ensure community understand that there will be specific plans where Contractor can protect, operate and store materials. Bullet-point summary of feedback.

Summary:

Contractor can have access to all project area, but as the project is in agricultural area and there is farm adjacent to the irrigation scheme, so outmost care should be taken to avoid impacts on agriculture. Top soil will be used by farmers, and also all construction spoil will be used by farmer no-need for storage, but if in some part of the canal there is no need to be used by farmer it will be carried out to some public site.

Solid waste should be removed from the construction site to some places that doesn't have any negative impact on the environment or to the area that are identified by the municipality. As the cropping season already started, affected people were emphasized that the construction work should not disturb their irrigation system, and in this regard their agreement is very important prior to start of work.

Annex 10: Attendance List of Public Consultation Meetings

Participants List, Social survey

Date: / / 2019

SN	Name (নাম)	Position (পদ)	Organization (সংগঠন)	Contact (যোগাযোগ)	Sign (স্বাক্ষর)
1	Pour Mohammad	Farmer	WUAs	079913294	
2	Ismael	Farmer	WUAs	077117423	
3	Talib Jan	Farmer	WUAs	079320131	
5	Abdullah	Farmer	WUAs	0744559820	
6	Mohammad Aftab	Farmer	WUAs		
7	Habibullah	Farmer	WUAs		
8	Amanullah	Farmer	WUAs	0789113925	
9	M. Akhtar Gul	Farmer	WUAs		
10	Sali Mohammad	Farmer	WUAs	0798257781	
11	Toqson	Farmer	WUAs		
12	Abdul Jahar	Farmer	WUAs		
13	Qari Gul Mohammad	Farmer	WUAs	0778511270	



Date: / / 2019

Participants List, Social survey

SN	Name (اسم)	Position (مقام)	Organization (تنظیم)	Contact (تلفون)	Sign (خط)
1	Gul Mohammad	Farmer	WUAS	07994981296	
2	Ghulam Farooq	Farmer	WUAS	0799846713	
3	Gul Mohammad		WUAS	0787945173	
4	Saifullah			0769486578	
5	Aqsoom			077299376	
6	Akhter Mohammad				
7	Mohamed Zahid			07725194667	
8	Hamidullah			0700776317	
9	Najmuddin	Farmer	WUAS	0796167214	
10	Arif Khan	Farmer	WUAS	0780299972	



Participants List, Social survey

Date: / / 2019

SN	Name (اسم)	Position (شغل)	Organization (الگن مربوطه)	Contact (تلفن)	Sign (شخصت یا امضا)
1	Pair Mohamad	Farmer	WUAs	0799132917	
2	Ismael	Farmer	WUAs	07711 99 23	
3	Talib Jan	Farmer	WUAs	0793201131	
5	Abdullah	Farmer	WUAs	0794559820	
6	Mohamad Aftal	Farmer	WUAs		
7	Habibullah	Farmer	WUAs		
8	Amanullah	Farmer	WUAs	0789113925	
9	M. Akhtar Gul	Farmer	WUAs		
10	Sali Mohammad	Farmer	WUAs	0798257781	
11	Toogsan	Farmer	WUAs		
12	Abdul Jabbar	Farmer	WUAs		
13	Qari Gul Mohamad	Farmer	WUAs	0770511270	

eptisa



فصل - دوم

جلسه مشورتی با دهائین و نمایندگان انال چهارده

اجندا !

① تشریح پروژه در ساختمان های شهرداری

② تاثیرات محیط زیستی و اجتماعی

③ نظر اکثر نمایندگان مجلس در مورد قطع درختان و فعال شدن معبر

④ مسئله اسفنداج مارگلان غیر فنی از محل مار

فصل دوم

جلسه با تدوین چند از قرآن مجید آغاز و در مورد موضوعات زیر بحث گردید:

ساختمان های شهرداری و تأثیرات آن بر محیط زیست و امکان معبر و اجتماعی

به حاضرین مفضل تشریح گردید و موضوعات زیری استند ام مارگلان فنی از محل

و همچنین فعال شدن معبر در جای های مناسب و موافقت گردید که حاضرین

به خطای رای شایع و عده خود و از ارزش پروژه برای منطقه حیاتی دانست و

فصل برای این شهر که در همه موارد با کارهای پروژه راه و جایی برای موارد

ضرورت به ساختمان های انتخاب شده در سطح معماری باشد که در















این زمینه دهائین و اعفانی انجمن با میراث منطقه هم نظر

می باشد هم عود باره تهیه نمودن جای مناسب برای موارد ساختمانی پروژه و

همچنان ساف مناسب که در آن فعال های غیر مدیران هم می باشد هم می باشد

در این باره هیچ کلام مفضل اجتماعی رخ نخواهد داد

در عورت منفرشتن گشت بر زمین دهانین از طوق مکرار داد
 جبر آن خار به برداشته شود و حاضرین از ناراضان زفته شکم می
 نایم که از ناشرین محیط زیستی و هم امور است اجتماعی قبل از آناه
 ساختند که ما در این زمین همکار می باشیم و انشاء الله هیچ کدام خلل یا معطل
 رخ نخواهد تا مانع نایسره شود. مگر در
 نیست حاضرین جلسه ماناال چارره :

- | | | | |
|---|-------------|---|-------------|
|  | ⑦ محمد اکبر |  | ① محمد اله |
|  | ⑧ محمد اسلم |  | ② محمد گل |
|  | ⑨ قدرت اله |  | ③ غلام محمد |
|  | ⑩ امان اله |  | ④ ظفر خان |
|  | ⑪ غلام قادر |  | ⑤ غزن اله |
|  | ⑫ نواب |  | ⑥ محمد عمر |
|  | ⑬ سنگه | | |
|  | ⑭ ذکریا | | |

Annex 11: Photographs of Public Consultation Meetings




Annex 12: Basis for Estimation of Mitigation Cost

Table A2.1 Typical cost for vegetation works under PARBP (per ha)				
Items/Activities	Unit	Total	Cost/unit (\$)	Cost \$
<i>Land Preparation</i>				
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
<i>Planting Materials and Transport</i>				
Sapling	No.	2	450	900
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				1,080
<i>Planting of Saplings</i>				
Labor (Plantation, watering)	Man-day	9	5	45
Water Tanker	Day	1	50	50
Sub total				95
<i>Inputs, Tools, Transport</i>				
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				2,333.7
Provisional Sum 5 %				116.685
Miscellaneous 5 %				116.685
Grand Total				2,567.07

Annex 13: Water Quality and Soil Quality Monitoring

		Karkon Afghan Darwish "WQT Lab" Water Analysis / Quality Testing Laboratory <small>Contact: (0702920487/Email:nnjabid_bahin@yahoo.com)</small>			
Quotation					
Client Name	NR	Case sheet No	WQTL/KA-27-2018		
Company	NR	Date	26/08/2018		
Project Name	NR	Location	Kabul		
A. Mobilization and Demobilization / Field T					
No. 1	Description	Unit	Quantity	Unit Cost \$	Total Amount US\$
1.1	Mobilization / Demobilization of Personal/ Equipment's	L.S	1	100.0	100.0
1.2	Water Sampling	Sample	1	15.0	15.0
1.3	Technician Charges	Per Day	1	100.0	100.0
Sub-Total (A)					\$215.0
B. Lab Testing					
No. 2	Description	Unit	Quantity	Unit Cost \$	Total Amount US\$
Bacteriological Parameters					
1	Coliform	Test	1	50.0	50.0
2	Fecal Coliform	Test	1	50.0	50.0
3	E.Coli	Test	1	50.0	50.0
Physical Parameters					
1	Color	Test	1	20.0	20.0
2	Taste	Test	1	20.0	20.0
3	Odor	Test	1	20.0	20.0
4	Turbidity	Test	1	20.0	20.0
5	Total Hardness as CaCO ₃	Test	1	20.0	20.0
6	TDS	Test	1	20.0	20.0
7	PH	Test	1	20.0	20.0
Essential Chemical Parameters					
1	Aluminum (Al)	Test	1	25.0	25.0
2	Antimony (Sb)	No Facility			
3	Barium (Ba)	Test	1	25.0	25.0
4	Boron (B)	Test	1	25.0	25.0
5	Cadmium (Cd)	No Facility			
6	Chloride (Cl)	Test	1	25.0	25.0
7	Chromium (Cr)	Test	1	25.0	25.0
8	Copper (cu)	Test	1	25.0	25.0
9	Iron (Fe)	Test	1	25.0	25.0
10	Potassium	Test	1	25.0	25.0
11	Sodium	Test	1	25.0	25.0
12	Sulfate	Test	1	25.0	25.0
13	Magnesium	Test	1	25.0	25.0
14	Calcium	Test	1	25.0	25.0
15	Hardness as CaCO ₃	Test	1	25.0	25.0
Toxic Chemical Parameters					
1	Cyanide (Cn)	Test	1	30.0	30.0
2	Arsenic (As)	Test	1	40.0	40.0
3	Fluoride (F)	Test	1	25.0	25.0
4	Lead (Pb)	Test	1	60.0	60.0
5	Manganese	Test	1	25.0	25.0
6	Mercury (Hg)	No Facility			
7	Nickel (Ni)	No Facility			
8	Nitrate (No3)	Test	1	25.0	25.0
9	Nitrite (No2)	Test	1	25.0	25.0
10	Nitrate as Nitrogen	Test	1	25.0	25.0
11	Selenium (Se)	Test	1	40.0	40.0
12	Residual Chlorine	Test	1	30.0	30.0
13	Zinc (Zn)	Test	1	25.0	25.0
Sub-Total (B)					\$1,005.0
Grand Total (A + B)					\$1,220.0

Annex 14: Emergency Response Framework

Islamic Republic of Afghanistan

National Water Affair Regulation Authority

Central Project Management office

Panj Amu River Basin Project

Emergency Response Framework

Purpose

The purpose of this procedure is to describe the emergency response framework that contractor shall use to ensure it identifies, plans for, and responds effectively to emergency situations involving either our people, operations or the environment.

Scope

This 'Emergency Response Framework' applies to all company controlled sites, both operational and corporate offices and includes contractor facilities within principal premises ('facilities').

Actions

General

An emergency plan should be developed and maintained for each facility. The emergency plan should document the requirements and procedures relating to the response and management of emergencies and shall include, but not be limited to, the following;

Emergency preparedness

Emergency process

Training and maintenance

Evacuation strategies for occupants with a disability

Roles and responsibilities of emergency response persons

Identification of Potential Accidents and Emergencies

Contractor shall systematically identify and analyses potential emergencies likely to impact on the site, this shall determine which events require consideration as emergencies in the emergency plan. Site Risk Processes (eg. site risk register) and assessments can be used for this identification and for reference in required prevention, preparedness, and response and recovery capabilities.

This risk identification should be incorporated into the risk review processes. Consideration should be given to the geographic location of potential events, proximity to populated areas and sensitive ecosystems, any concerned stakeholders, available external emergency services and internal and external communication channels.

Potential emergencies that may affect the project site will vary dependent on, the nature of the hazards at the workplace, the nature of the workplace i.e. power station or corporate office, the size and location of the workplace and the number of workers and other persons at the workplace. Potential emergency situations shall be reviewed and identified. These shall include, but not be limited to;

Fires (including equipment, building, bush, explosives, etc.)

Medical treatment, personal injury and assistance

Bomb threats, armed holdups

Security breaches or civil disobedience

Environmental impact

Force Majeure events (including flood, cyclone and seismic)

Vehicle Accidents

Gas / Major chemical, hazmat release or hydrocarbon release

Evacuation

Dam related emergency

Electricity / Electrical

In identifying potential emergencies and developing and maintaining the emergency plan, both the size and complexity of the site and the number and nature of occupants should be taken into consideration

Emergency Response Plan

Each contractor should ensure a current and controlled copy of the Emergency Response Plan has been distributed to appropriate internal and external stakeholders. Each plan shall detail the requirements for operational and area based emergency situations to be implemented in the event of an emergency.

Periodic review (including testing) of the Emergency Response Plan should be conducted to maximize the operation or facility's preparedness for emergency situations and ensure the continued effectiveness of the plan. Taking into account their response capabilities local authorities shall be engaged in the development and testing of Emergency Response Plans (where appropriate).

The site specific emergency response plan should include the below overarching essential elements;

Clear and straightforward instructions

Specific arrangements and means for the appropriate response to each emergency

Recovery, clean up and remediation procedures in particular for materials that pose a significant risk to the health and safety of employees, environment and the community

Internal and external communication channels

The arrangements for alert or alarm situation (who should be notified and how)

Evacuation signs/plans compliant with national and international standard

Planning for emergencies in facilities, and containing as a minimum; o site layout with location and availability of emergency equipment o Emergency contact names and phone numbers (internal and external) o Clear and concise evacuation procedures (what to do in the event...)

Emergency Coordination, Notification & Communication

The Emergency Response Plan shall clearly define the actions required to manage and control significant risk situations, how to notify and activate relevant internal emergency services and how to liaise with other relevant stakeholders in the event of an emergency. In the first instance all internal communications shall be managed through the site specific 'Incident Management Plan' and where relevant the corporate Crisis Leadership Plan and Incident Management process. All external communications i.e. notifying emergency services, media relations or Next of Kin shall be managed through the site specific 'Incident Management Plan' or if relevant the corporate 'Crisis Leadership Plan'.

Emergency Response Personnel

Where identified as being required, Emergency Response Personnel should be trained to a skill level commensurate with the identified operational risks and hazards, and as a minimum adhere to mandated training standards.

Training and Drills

Contractor should test emergency response capability at predetermined and documented intervals and shall include all legislative emergency drill requirements. Where practicable evacuation drills shall be spread across all work areas, dependent on risk outcomes some areas may require more frequent drills than others. These drills ensure nominated emergency response personnel are adequately trained and competent to deploy the capabilities required to manage the diversity of potential emergency situations that may arise and are prepared for these emergency events in real and potentially threatening situations.

Emergency response personnel should be familiar with the locations of emergency equipment, their correct method of use, maintenance and testing requirements. Training should be developed as per the risk profile and include where relevant for the specific site emergency scenarios including;

fire

confined space

hazmat chemical / hydrocarbon release

explosion

vehicle accident

working at heights

bomb threat

security threat

The drills shall be recorded and debriefing at the conclusion of the exercise shall include the review and rectification of corrective actions.

Emergency Equipment Locations

Contractor will ensure required emergency equipment is provided, strategically located and fully maintained, as required by legislation. Emergency equipment should be located in easily accessible locations and within a reasonable distance from the identified source of potential hazard. Such locations shall be sign-posted, including directions from areas where they cannot be seen and clearly marked on current evacuation drawings.

In accordance with legal and regulatory requirements detection, alarm, and warning devices such as lights, sirens, bells, etc., and emergency evacuation lighting should be installed in locations where personnel need to be warned of a hazard or evacuated in the event of an emergency. Appropriate 'muster/assembly' points shall be identified, equipped for use if required, be a sufficient distance from the potential threats and allow for further movement away from the emergency if required.

Inspection and Maintenance

Emergency equipment, alarms, lighting, warning systems, shelters and refuges should be regularly inspected in accordance with a defined schedule and maintained as fit for service. Inspections should be carried out by qualified or competent personnel. Formal records of inspection and testing shall be maintained at all operations.

A formal review of inspection records and testing results should be conducted in accordance with the Regulations and/or apparatus requiring inspection. Deficiencies identified during inspections and maintenance programs should see the apparatus removed from service until verified 'serviceable'.

Post Emergency Activities

To minimize ongoing disruption, protect the environment and resume standard business operations, recovery procedures defined in Emergency Response Plans should be implemented as soon as practicable after emergency events. After any emergency or emergency response exercise a debriefing should be held and report documented. The documented report shall identify all found deficiencies in the processes and recommendations to rectify such occurrences. Rectification may include emergency response plans and procedures being revised and updated, corrective actions shall be raised to manage such rectifications. Learning's shall be communicated to the wider work force as appropriate.

Risk Management

The contractor Risk Processes shall be reviewed on a periodic basis to ensure that the risk controls have achieved, and are continuing to achieve, the intended risk reduction and to ensure all significant risks to people, plant or environment have been taken into account and where possible eliminated and if not able to be eliminated, controlled to as low as reasonably practicable.

Audit and Review

The Emergency Planning Audit contextualizes the mandatory requirements for inclusion in each site specific Emergency Control and Incident Management Plan, forming an integral element. Each plan should be audited at regular intervals.

Occupational Health and Safety Requirements

This procedure conforms to the requirements of the Queensland Work Health and Safety Regulations 2011 Chapter 3 Division 4 Section 43. In accordance with the state WHS Regulations 2011 Section 347 shall keep an up to date, compliant manifest of all dangerous goods stored on project operational site(s); in a place determined in agreement with the primary emergency service organization available for inspection readily accessible to the emergency service organization.

Review and Consultation (Prior to Approval)

This Document shall be reviewed in response to any material changes.

Communication Plan (After Approval)

This procedure will be published and available to all employees. All personnel involved in the response to managing site/operational/office emergencies and process and/or procedure relating to these shall be made aware of the business continuity framework and subsidiary procedures.

Annex 15: W.H.O. DRINKING WATER STANDARDS

PARAMETER	UNIT	LIMIT
Aluminium	mg Al/l	0.2
Arsenic	mg As/l	0.05
Barium	mg Ba/l	0.05
Beryllium	ug Be/l	0.2
Cadmium	ug Cd/l	5.0
Calcium	mg Ca/l	200.0
Chromium	mg Cr/l	0.05
Copper	mg Cu/l	1.0
Iron Total	mg Fe/l	0.3
Lead	mg Pb/l	0.01
Magnesium	mg Mg/l	150.0
Manganese	mg Mn/l	0.1
Mercury	ug Hg/l	1.0
Selenium	mg Se/l	0.01
Sodium	mg Na/l	200.0
Zinc	mg Zn/l	5.0
Chlorides	mg Cl/l	250.0
Cyanide	mg Cn/l	0.1
Fluorides	mg F/l	1.5

Nitrates	mg NO ₃ /l	10.0
Nitrites	mg NO ₂ /l	-
Sulphates	mg SO ₄ /l	400.0
Suphides	mg H ₂ S/l	0
TOTAL "drins"	ug/l	0.03
TOTAL "ddt"	ug/l	1.0
Hydrocarbons	mg/l	0.1
Anionic Detergents	mg/l	0
pH		9.2
Total dissolved solids	mg/l	1500
Total hardness	mg/l	500
Alkalinity	mg/l	500

MICROBIOLOGICAL PARAMETERS

Total Bacteria	Count/ml	100
Coliform	Count/100ml	0
E. Coli	Count/100ml	0
Salmonella	Count/100ml	0

ug = microgram or ppb

mg = milligram or ppm

Annex 16: Chance Find procedures

Chance Find Procedures

Chance find procedures which will be used during this Project are as follows:

Stop the construction activities in the area of the chance find;

Delineate the discovered site or area;

Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the Ministry in charge of Department of Archaeology take over;

Notify the supervisory Engineer who in turn will notify the responsible local authorities and the Ministry immediately (within 24 hours or less);

Responsible local authorities and the Ministry in charge of Department of Archaeology would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archeologists of the Department of Archaeology and Museums (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;

Decisions on how to handle the finding shall be taken by the responsible authorities and the Ministry in charge of Department of Archaeology. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;

Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the Ministry in charge of Department of Archaeology; and

Construction work could resume only after permission is given from the responsible local authorities and the Ministry in charge of Department of Archaeology concerning safeguard of the heritage.

These procedures must be referred to as standard provisions in construction contracts, when applicable. During project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered or observed.

Annex 17: Waste Management/ Guidelines

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites.	<p>The Contractor shall:</p> <p>Develop waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit to WAPDA for approval.</p> <p>Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of disposal site, so as to cause less environmental impact.</p> <p>Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach.</p> <p>Segregate and reuse or recycle all the wastes, wherever practical.</p> <p>Collect and transport non-hazardous wastes to all the approved disposal sites.</p> <p>Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process.</p> <p>Provide refuse containers at each worksite.</p> <p>Request suppliers to minimize packaging where practicable.</p> <p>Place a high emphasis on good housekeeping practices.</p> <p>Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal.</p>
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	<p>The Contractor shall:</p> <p>Collect chemical wastes in 200 liter drums (or similar sealed container), appropriately labeled for</p>

		<p>safe transport to an approved chemical waste depot.</p> <p>Store, transport and handle all chemicals avoiding potential environmental pollution.</p> <p>Store all hazardous wastes appropriately in bunded areas away from water courses.</p> <p>Make available Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction.</p> <p>Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations.</p> <p>Construct concrete or other impermeable flooring to prevent seepage in case of spills</p>
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Annex 18: Fuels and Hazardous Substance Management/ Guidelines

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Fuels and hazardous goods.	Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site, and potential spills from these goods may harm the environment or health of construction workers.	<p>The Contractor shall:</p> <p>Prepare spill control procedures and submit the plan for WAPDA approval.</p> <p>Train the relevant construction personnel in handling of fuels and spill control procedures.</p> <p>Store dangerous goods in bunded areas on a top of a sealed plastic sheet away from watercourses.</p> <p>Refueling should occur only within bunded areas.</p> <p>Make available MSDS for chemicals and dangerous goods on-site.</p> <p>Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site approved by EPA.</p> <p>Provide absorbent and containment material (e.g., absorbent matting) where hazardous material are used and stored and personnel trained in the correct use.</p> <p>Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use.</p> <p>Make sure all containers, drums, and tanks that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur.</p> <p>Store hazardous materials above flood plain level.</p> <p>Put containers and drums in temporary storages in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area should preferably slope or drain to a safe collection area in the event of a spill.</p>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<p>Put containers and drums in permanent storage areas on an impermeable floor that slopes to a safe collection area in the event of a spill or leak.</p> <p>Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution.</p> <p>Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials.</p>

Annex 19: Worker Health and Safety Guideline

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Best practices	<p>Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of</p> <p>(i) biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases etc),</p> <p>(ii) risk factors resulting from human behavior (e.g. STD, HIV etc) and</p> <p>(iii) road accidents from construction traffic.</p>	<p>The Contractor shall:</p> <p>Implement suitable safety standards for all workers and site visitors which should not be less than those laid down on the international standards (e.g. International Labor Office guideline on ‘Safety and Health in Construction; World Bank Group’s ‘Environmental Health and Safety Guidelines’) and contractor’s own national standards or statutory regulations, in addition to complying with the national acts and rules of the Government of Pakistan</p> <p>Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas,</p> <p>Provide personal protection equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones.</p> <p>Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job</p> <p>Appoint an environment, health and safety manager to look after the health and safety of the workers</p> <p>Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters</p>
	Child and pregnant labor	The Contractor shall:

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		not hire children of less than 14 years of age and pregnant women or women who delivered a child within 8 preceding weeks,
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	<p>Provide health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work</p> <p>Document and report occupational accidents, diseases, and incidents.</p> <p>Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice.</p> <p>Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures.</p> <p>Provide awareness to the construction drivers to strictly follow the driving rules</p> <p>Provide adequate lighting in the construction area and along the roads</p>
Construction Camps	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	<p>The Contractor shall provide the following facilities in the campsites to improve health and hygienic conditions:</p> <p>Adequate ventilation facilities</p> <p>Safe and reliable water supply. Water supply from deep tube wells that meets the national standards</p> <p>Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage.</p> <p>Treatment facilities for sewerage of toilet and domestic wastes</p>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<p>Storm water drainage facilities.</p> <p>Recreational and social facilities</p> <p>Safe storage facilities for petroleum and other chemicals.</p> <p>Solid waste collection and disposal system.</p> <p>Arrangement for trainings</p> <p>Security fence at least two m height.</p> <p>Sick bay and first aid facilities</p>
Water and sanitation facilities at the construction sites	Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	<p>The contractor shall provide portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities should be at least six m away from storm drain system and surface waters. These portable toilets should be cleaned once a day and all the sewerage should be pumped from the collection tank once a day and should be brought to the common septic tank for further treatment.</p> <p>Contractor should provide bottled drinking water facilities to the construction workers at all the construction sites.</p>
Trainings	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	<p>The Contractor shall:</p> <p>Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of sexually transmitted infections (STI) HIV/AIDS and COVID-19.</p> <p>Train all construction workers in general health and safety matters, and on the specific hazards of their work Training should consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate.</p> <p>Commence the malaria, HIV/AIDS and STI education campaign before the start of the construction phase and complement it with by a</p>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<p>strong condom marketing, increased access to condoms in the area as well as to voluntary counseling and testing.</p> <p>Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the construction phase on ongoing and regular basis. This should be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.</p>

Annex 20: DRAFT TREE MANAGEMENT PLAN

NEED OF TREE MANAGEMENT PLAN

During the detailed design of the project while conducting the survey it was found that around 1080 trees need to be removed while doing the rehabilitation and infrastructure improvement works in the subproject. As the loss of about 1081 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

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;

METHODOLOGY FOR DEVELOPING TREE MANAGEMENT PLAN

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

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.

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.

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.

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

As stated above “Objectives of Tree Management Plan”, the main objectives of preparing this Tree Management Plan (TMP) to ensure that the Chardara 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

Changing the direction of canal

Tree Replacement or replantation

Tree Transplanting

Promotion of Agroforestry in the Command Area

Proposed Land for Replantation

Public owned Land

Roadside

Rehabilitation of the Degraded Land in the Area

Support for Protected Area Initiatives of NEPA

Basis of Action Plan

PROPOSED MITIGATION PLAN TO MINIMIZE THE ADVERSE IMPACTS ON TREES.

As per the figure 3.4, out of the total 1080 trees, 62% are of pole size, 27% of tree size and rest 11% as siblings. 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

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:

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.

Based on the survey there are 121 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

Following actions are proposed prior to removal of trees:

Getting approval from NEPA;

There are 13 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:

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 1081 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 10810 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

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.

The sites selected should not contain cultural or heritage resources, rare plants, wildlife habitats or nature reserves.

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.

Existing forest with canopy closure over 0.2 should not be selected.

Besides the terraced lands along the ditches and roads, lands with medium and high soil salt content should be selected for project sites.

Government in the project sites provides commitment for maintenance and households are willing to participate in the project.

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

Bushes and grasses burning is forbidden for the site clearing.

For slope lands over 15 degrees, bushes or grasses that hinder the afforestation activities should be removed in patch or strip forms.

Removed bushes or grasses should be piled between such strips or planting holes for natural decomposition.

The original vegetation at hill top, hillside and foot of the hills should be maintained.

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

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.

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.

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

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.

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.

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

Selection of afforestation model

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

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

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.

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

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.

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.

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

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

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

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

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

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

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.

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.

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.

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

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

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 10810 sapling 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:

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

The budget for this TMP covers the re-vegetation of 16.9 hectare (10,800 Sapling) of area and transplantation of 121 sapling size tree. It is set at US\$ 61,140.00 with 10% contingency.

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.	10800	0.5		5,400.00

Sapling	No.	10800	1.8		19,440.00
Transportation saplings to the site	Truck	24	100		2,400.00
Labor (Plantation, watering)	Man-day	144	5		720.00
Fertilizer (DAP) 0.1 kg/plant	Kg	1080	1		1,080.00
Maintenance	Month	24	700.00		16,800.00
Transportation of Fertilizer	Truck	15	60		900.00
Technical Supervisions (Horticulturist) 24 person/month	Month	2	300	24	14,400.00
Total					61,140.00

IMPLEMENTATION STRATEGY OF TMP

Approval of Updated IEE:

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.

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.

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	Kunduz	Chardara	Consultation with DAIL						
			Identification of site						
			Procurement of Sapling						
			Supervising by technical team						

INSTITUTIONAL ARRANGEMENTS FOR TMP IMPLEMENTATION:

TMP is part of IEE and there is institutional arrangement made for the implementation of EMP of CHARDARA 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.

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	Overall responsibility in ensuring the project compliance of safeguard policies and compliance reporting to ADB and NEPA. 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.
NEPA	National authority to approve IEE/EMP and ensure their compliance.
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 PMO, NWARA, MAIL, DAIL
CPMOs	Ensure that the project implementation fully complies with the ADB SPS 2009. Support RBA/DAIL in the design and execution of the institutional strengthening and training programs of sub-output II.
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. 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,
Contractors	Implementation of the recommended mitigation measures during the construction phase of the project.

	<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 IAs	<p>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</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

<i>Action Area</i>	<i>Proposed Actions</i>	<i>Time Frame</i>	<i>Implementation Responsibility</i>	<i>Supervision Responsibility</i>	<i>Estimated Cost (US\$)</i>	<i>Source of Finance</i>
	Providing the IEE and TMP	By July 2020	CPMO	NWARA	PARB-P activities	ADB grant
<i>Removal of Trees and Utilization</i>	Getting approval from NEPA;	By September 2020	CPMO	NWARA	PARB-P activities	ADB grant
	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		
<i>Maintaining the Right of the Way and Vegetation Along the Road</i>	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	ADB grant
	Provide proper care	2 years after	Farmers, WUAs, IAs	DAIL, RBA, SBA		

	for survival of sapling	plantation				
<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	ADB Grant/ Mail consider ed cost for training.
	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.