Initial Environmental Examination

PUBLIC

Project Number: 53120-001
June 2026
Updated Report

Uzbekistan: Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project (R8 Non-core Subproject, Khorezm Region)

Prepared by the Center for Implementation of Foreign Investment Projects in Water Sector for the Ministry of Water Resources of the Republic of Uzbekistan and the Asian Development Bank (ADB).

CURRENCY EQUIVALENTS
(as of 29 June 2026)
Currency unit – Sum (SUM)
SUM1.00 = $0.0000833[1]
$1.00 = SUM12009,29

ABBREVIATIONS

ADB	Asian Development Bank
ASB	Aral Sea Basin
A&M	Approach and Methodology
ACM	Asbestos Containing Materials
CAWRM-ASBSP	Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project
CIFIPWS	Center for Implementation of Foreign Investment Projects in Water Sector
CAF	Central Asian Flyway
CSEE	Center for State Ecological Expertise
EMP	Environmental Management Plan
EARF	Environmental Assessment and Review Framework
E&S	Environment and Social
GDP	Gross Domestic Product
GRM	Grievance Redress Mechanism
IEE	Initial Environmental Examination
ID	Information Dissemination
I&D	Irrigation and drainage
IR	Involuntary Resettlement
IBAT	Integrated Biodiversity Assessment Tool (IBAT)
IUCN	International Union for Conservation of Nature (
LARP	Land Acquisition and Resettlement Plan
MWR	Ministry of Water Resources
PIC	Project Implementation Consultant
PIU	Project Implementation Unit
PAM	Project Administration Manual
SAEMR	Semi Annual Environmental Monitoring Report
SEE	State Environmental Expertise
SCADA	Supervisory Control and Data Acquisition
SSEMP	Site-Specific Environmental Management Plan
SPS	Safeguard Policy Statement
SDDR	Social Due Diligence Report
SDGs	Sustainable Development Goals
TRTA	Transaction Technical Assistance
TASF	Technical Assistance special fund
ToRs	Terms of Reference
VAT	Value Added tax
WMO	Water Management Organizations
WCA	Water consumers' association
WDPA	World Database on Protected Areas

[1] https://cbu.uz/uz

WEIGHTS AND MEASURES

ha	:	Hectare
l/s/ha	:	Liter per second per hectare
m	:	Meter
m^2		Square meter
m^3	:	Cubic meter
m/s	:	Meter per second
km	:	Kilometer
km^2	:	Square kilometer

GLOSSARY

Aksakal - Elderly wise man; Makhalla chairman is also often referred to as *Aksakal.*
Dehkan - *Dehkan* farm consists of homestead lands, allotted to heads of families under inheritable life tenure, producing and selling agricultural products on the basis of the labor of family members.
Committee of Ecology – National Committee on Ecology and Climate Change of the Republic of Uzbekistan. State administration in the field of ecology, environmental protection, rational use and reproduction of natural resources
Hokimiyat - Regional government authority
Kengash - Councils of People's Deputies of *Viloyats* (provinces), tumans (districts), and towns, elected to the *Oliy Majlis* (senate) of the Republic of Uzbekistan and the President of the Republic of Uzbekistan can act on behalf of the people
Khokim - Head of the Public authority in places, carrying out interaction between local communities and the government at regional and national levels. Possesses the highest administrative and legal authority over the local population living in the territory within the jurisdiction.
Kishlak - A rural settlement of peoples of Uzbekistan.
Makhalla - Organization of the community type at local level, officially recognized in Uzbekistan, serving as interface between the government and the community and responsible for provision with the means of social support and cultural interaction of its members. Chairmen of *Makhalla* are elected by local gatherings.
Sanoatgeokontekhnazorat - State body, specially authorized in the field of industrial and radiation safety, the mountain relations, exercising state supervision of observance by all legal entities and physical persons in the territory of the republic of requirements of the legislation and regulating technical documents on industrial and radiation safety, use and protection of subsoil, and also other measures of state regulation in accordance with the established procedure.
Uzhydromet - State governing body specially authorized for the solution of tasks in the field of hydrometeorology in the Republic of Uzbekistan.

NOTE

In this report, "$" refers to US dollars.

This initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the “terms of use” section on ADB’s website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the ADB does not intend to make any judgments as to the legal or other status of any territory or area.

Table of Contents

List of Tables

List of Figures

List of Pictures

1. Executive Summary

1. The Republic of Uzbekistan is a land-locked country located in Central Asia with a total area of 448,900 square kilometer (km^2). The Republic of Uzbekistan is bordered by Kazakhstan to the North and West, by Kyrgyzstan to the East and Tajikistan to the South-east, and by Turkmenistan and Afghanistan to the South.[2]

2. Agriculture holds an important position in Uzbekistan economy from the perspective of rural livelihood, employment, self-sustainability, food security, and exports. The sector contributes more than 25 percent in GDP and employment and consumes around 90% of total water use in the country[3]. According to estimate, around 50% of total population lives in rural areas, and, therefore, country is heavily dependent on agricultural sector and associated livelihoods.

3. The country's total agricultural land constitutes 25.2 million hectares (ha) out of which 4.3 million hectares (ha) are irrigated lands and 23.4 million ha are poor or low-productive pasture land.[4] The irrigated area is located in the basins of Amu Darya and Syr Darya rivers, accounrts for 56% and 44% of the total irrigated area respectively. These two rivers are the main source of water and country receives 52% of the total water available in the region..

4. According to the World Bank report *(Country Climate and Development Report, November 2023)*, water demand for irrigation could increase by 5% by 2030 and by 7–10% by 2050. Water shortages will rise to 7 billion cubic meters a year by 2030 and 15 billion cubic meters by 2050.

5. Due to climate change, by 2050, the same report predicts declines of water resource by in Amu Darya (by 15%t) and Syr Darya (by 5%), both rivers are lifelines for irrigation in Uzbekistan.

6. Pumping water for irrigation purpose consumes 15–20% of the electricity used in Uzbekistan, which is equivalent to more than 3 million tons of CO_2 emissions every year or about 2–3% of the country's total emissions.[5] According to GHG inventory data from 2010 to2016, the agriculture is the second largest source of GHG emissions in Uzbekistan[6] following the energy sector.

7. The major parts of irrigation network were built during the Soviet period during 1960s-1980s, and some were constructed even before. Due to poor condition and aging irrigation and drainage infrastructure, the reported irrigation efficiency is low, at about 40% .[7]

8. In the recent years, the Government of Uzbekistan has placed significant emphasis on improving land and water resources management, including the rehabilitation of drainage and irrigation schemes. Hundreds of such projects are being implemented in this direction. Among all, one such joint initiatives by the government and ADB is "*Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project".*

9. For rehabilitation and modernization I&D system, the government proposed a list of 8 potential subprojects, See Figure1A. The government and ADB jointly selected the two representative 'Core' subprojects in 2019, i.e. (a) Babatag Irrigation system (b) Jondor irrigation system. The detailed investigations, feasibility studies and safeguard requirements such as IEE were prepared for these two core sub-projects. It has also been agreed between the government and ADB to use pre-defined criteria for selecting two 'non-core' subprojects from the list proposed by the government, *See Table 14*.

[2] *https://iea.blob.core.windows.net/assets/0d00581c-dc3c-466f-b0c8-97d25112a6e0/Uzbekistan2022.pdf*
[3] *https://documents1.worldbank.org/curated/en/099111423124532881/pdf/P1790680f452f10ba0a34c06922a1df0003.pdf*
[4] *Asian development bank, TRTA 9782-UZB, Preparing the Climate Adaptive, Water Resources Management in the Aral Sea Basin Project, Inception Report, December 2019*
[5] https://documents1.worldbank.org/curated/en/099111423124532881/pdf/P1790680f452f10ba0a34c06922a1df0003.pdf
[6] Draft Feasibility Report (2024)
[7] *https://documents1.worldbank.org/curated/en/099111423124532881/pdf/P1790680f452f10ba0a34c06922a1df0003.pdf*

•

Figure 1A: Location of the Subprojects

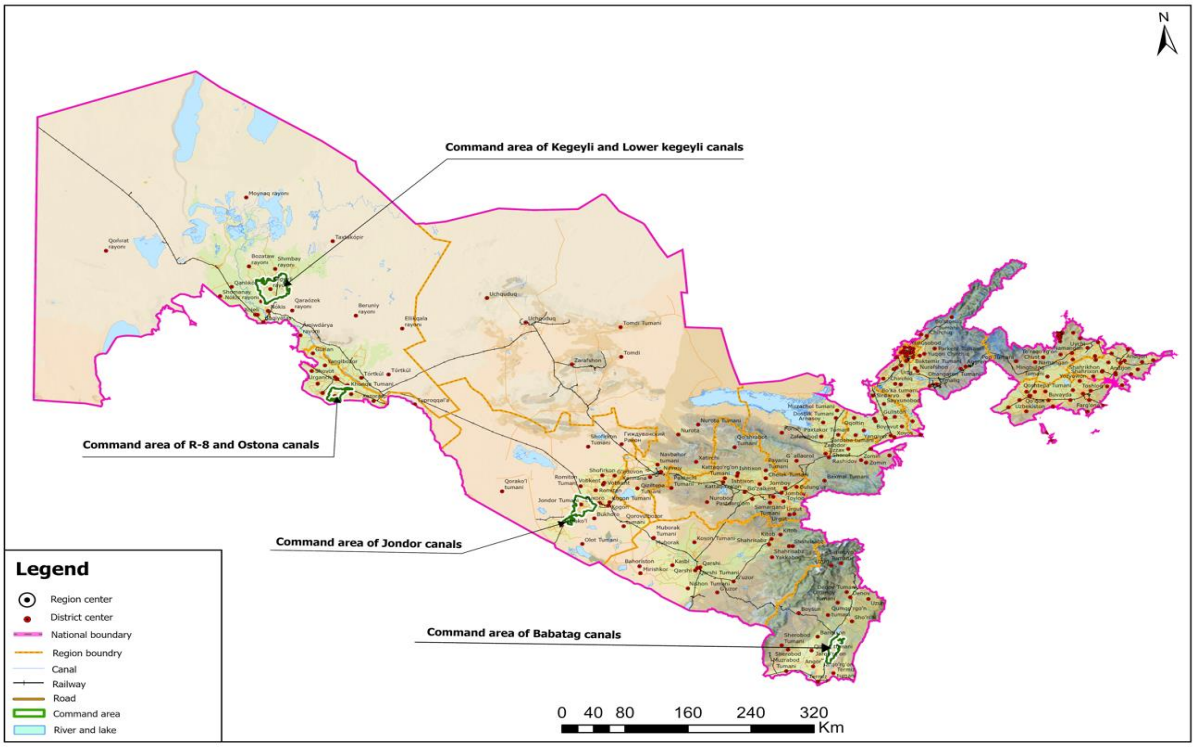
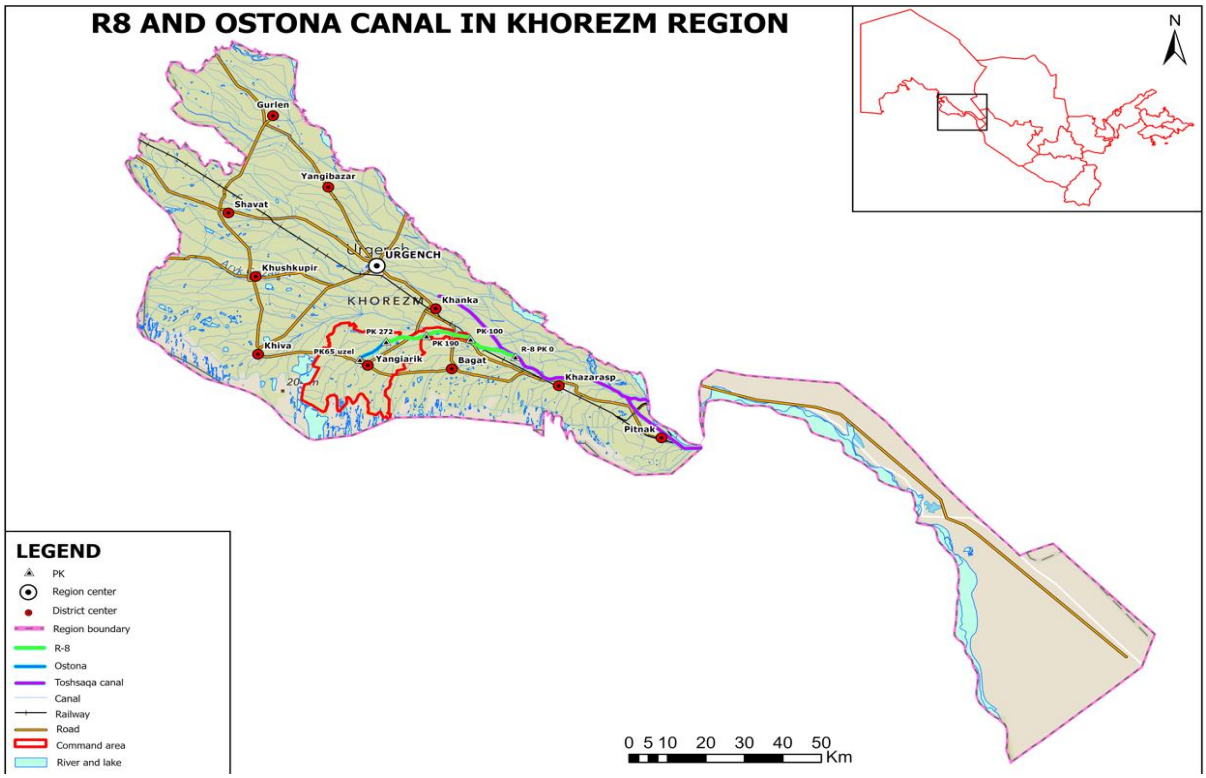


Figure 1B. Location of the non-core subprojects, R8 and Ostona



10. Selection of 'non-core' - Among two non-core sub-projects, the government identified R8 irrigation system in Khorezm region for rehabilitation and modernisation by using pre-defined

Screening Criteria, for detail refer to Table 15 and 16 and refer to Annexure 1. The modernization of R8 irrigation system and inclusion of climate-proofing measures will enhance farm and water use management capacities and boost agricultural productivity and increase farm incomes.

11. The poor condition of the canals, high seepage, lack of command elevations, wear and tear of hydraulic structures, low irrigation efficiency and high operational costs are key factors for selection of R8 canal for modernization. The R8 non-core subproject is an earthen canal and was built in 1940. The R8 subproject is situated in Khorezm province and covers three districts - Bagat, Khanka and Yangiarik districts (mostly Yangiarik) and its total command area is 19992 ha. The soil-based canal has a high level of filtration. The details of R8 irrigation system are summarized in Table 1.

12. Institutional Arrangement - The project executing agency is the Ministry of Water Resources (MWR) for four projects (two' core' and two' non-core' subprojects). The Project Implementation Unit (PIU) under CIFIPWS is responsible for design, construction management and supervision, including environment safeguards compliance. For more details on Roles and responsibilities, refer to *Table 54.*

13. **JV SMEC International Pty Ltd. and Annexure Financial Solutions Ltd.** is appointed as Project Implementation Consultant (PIC) for seven (7) years from 2022 to 2028 to assist the PIU in the preparation of feasibility studies, conducting IEEs for two 'non-core' irrigation subprojects; overall project implementation, including procurement, financial management, construction supervision, safeguards (environmental and social), monitoring and reporting.

Table 1: Brief Details of R8 Sub-project and Secondary Canal

Particulars	**R8 non-core subproject**
Project executing agency	Ministry of Water Resources (MWR)
Project Implementing Agency (PIU)	PIU under Center for Implementation of Foreign Investment Projects in Water Sector (CIFIPWS) is the Project implementing agency
Project Implementing Consultant (PIC)	JV SMEC International Pty Ltd. and Annexure Financial Solutions Ltd. JV is a Project Implementation Consultant (PIC)
Project category	Classified as category B project. For details refer to Table 16
Location of R8	Khorezm province
Year Constructed	1940
Canal type	Earthen canal
Source of water for R8 canal	Source water from the Tashsaka canal at PK293+25, which source water from the Amu Darya River.
Coverage & efficiency of canal	The canal R-8 was built in 1940 and never been rehabilitated ever since. • Canal length: 27.1 km. • Originally designed flow: 60 m^3/sec, actual flows is about 33 m^3/s. • Water loss and canal efficiency – According to an estimate made in the feasibility report (2023), total water losses in 27.1km long canal is around 7.0 m^3/s and canal efficiency is estimated at about 0.72. • The existing water level does not have enough gravity for water intake from the canal. This soil-based canal has high level of filtration. • Overall condition of system is medium to poor.
Scope of modernisation and rehabilitation	The scope of reconstruction of R8 canal consists of two parts.

	a) Main canal - 27.195 km b) Secondary canal (Ostana canal) - 6.415 km
Water withdrawal	• The average annual water withdrawals in last four years is 456 million m^3, average growing season demand is 320.30 million m^3 and withdrawal rate is 135.85 during the non-growing season. • Water extraction from R8 canal higher as compared to planned. In 2019, withdrawal of water was 65% higher than planned Similarly, in 2020, 2021 and 2022, the trend increased by approximately 19%, 24% and 48% respectively. For details, refer to Figures 12 and 13.
Cropping	Cropping includes cotton, winter wheat, rice, orchards (apple, apricot and grape), fodder crops (maize and alfalfa), homestead gardens etc.
Existing utilities	For main canal, see table 25, and for secondary canal see Box 2.
Environment and Social issues	
Environmental impact	Mostly moderate, temporary and site specific.
Trees replanting	Based on preliminary investigation, the number of trees to be affected by the project is 1855 number of. At the IEE developmet stage inventory of trees was like the following: Asiatic Poplar (Turongil) - 1797, Willow (Sourthern) Terak - 124, Elaeagnus angustifolia (Jida) - 58, Salix Wilhelmsiana M.B. (Qoratol) -188.
Biodiversity status	• No KBA were found within 1, 2, and 5 km of the subproject area • No potentially Threatened species found within 10 km of the subproject area • No IUCN Red List of Threatened Species • No notified Ramsar Wetlands • No plant species as listed in the Red Book of the Republic of Uzbekistan has been found • No Protected Areas within 1, 2 and 5 km • Falls in Central Asian Flyway (CAF) hotspot area8 • No presence of any Keystone Species, or those Species, which are crucial to the overall functioning of an ecosystem
Involuntary displacement	• No. • However, it is recommended that social due diligence be undertaken once the canal design is finalized to negate physical and economic displacement
Asbestos containing material (ACM)	No Asbestos containing materials were identified during site survey.
Project beneficiaries	Land users, women headed farmers, household, canal operating agency etc
Project Outcome and outputs	
Project outcome	• Project will enhance • Improve water security through climate resilient and modernized irrigation systems • Agricultural productivity, • Improve degraded land
Project output	• Increase the conveyance efficiency of the main canal from 0.71 to 0.95;

[8] The Central Asian Flyway (CAF), a vast network of migratory routes, plays a pivotal role in the conservation of millions of migratory birds by connecting breeding grounds in the Arctic and sub-Arctic regions with wintering sites in South Asia, the Indian Ocean, and Africa

	• Improve the overall efficiency of the R-8 canal system from 0.56 to 0.80; • Expand the share of canals with concrete lining to 100%; and • Reduce total water consumption from 840.5 million m³ to 667.2 million m³ through improved water use efficiency and reduced losses; • More inclusion and participation of women in project management and women-managed farms.

14. As per ADB pre-defined Screening Criteria, the R8 non-core sub-project is classified as category B project in environmental safegauard. The R8 subproject is also aligned with the government of Uzbekistan's Strategy of Actions on Further Development of Uzbekistan (2017)[9], which stipulates (i) the introduction of water-saving technologies and measures to mitigate the negative impact of climate change and drying of the Aral Sea; (ii) the improvement of irrigated lands and irrigation facilities; and (iii) the modernization of agriculture by supporting the expansion of horticulture and other high-value crop production in the areas of cotton and cereal crops.

•

15. The Initial Environmental Examination (IEE) of the R8 subproject in Khorezm province is prepared under the CAWRM-ASBSP to meet the ADB's Safeguard Policy Statement (SPS) (2009) requirement. The IEE has been prepared by keeping followings objectives;

a) Identify potential direct, indirect, and induced environmental impacts and risks that may emerge due to implementation of R8 subproject;
b) Analyse subprojects' alternatives, provide technical solutions, which is climate inclusive, including "no project" option;
c) Develop Environmental Management Plan (EMP) that will include proposed mitigation, monitoring and reporting measures, institutional and organizational arrangements, and capacity development and training provisions, to be included in subproject design package and further implemented by contractor;
d) Inform potential impacts of a project, summarise the finding of stakeholder's consultations, including grievance redress procedures.

16. Potential environmental impacts of R8 sub-project and its allied activities are not significantly adverse, reversible and mostly site specific. The potential impact during construction of R8 sub-project may include: (i) air pollution due to fugitive emission; (ii) disposal of sediment during canal rehabilitation activities, including disposal of excavated sediments and other materials from irrigation canals and drainage collectors; (iii) disposal of waste from construction camp and labour colony; (iv) soil and water contamination from petroleum products and hazardous materials); (v) noise and vibration; (vi) impact on local hydrology; (vii) impacts on local flora and fauna along the canal alignment; (viii) community health and safety issues including inconvenience; (ix) Occupational health and safety risks to workers and (x) social conflict due to labour influx etc. These potential impacts are typically localized, short-term and small scale, and can be minimized through and EMP/SSEMP and adopting good construction practices.

•

17. R8 subproject does not trigger Involuntary Resettlement (IR). However, based on field survey, some encroachments were noted along the canal and team found cowshed (1 no), abandoned clay structure (1 no), bee keeping (2 no). The social due diligence will be carried out after finalisation of detailed design to confirm IR impacts and any legacy issues.

•

18. The modernization of R8 sub-project will require extensive trees/bush cutting, which are present on both sides of the canal along the alignment. For canal construction, the project will also require a huge amount of sand to be sourced from local areas.

[9] Government of Uzbekistan. 2017. *Presidential Decree of the Republic of Uzbekistan of February 7, 2017 No. UP- 4947, About the strategy of actions for further development of the Republic of Uzbekistan.* Tashkent.

19. Apart from water security and agriculture productivity, the R8 is expected to bring positive cumulative and induced impacts in the Khorezm region such as - strengthening farmers' income capacity, improving gender equality, and enhancing women's participation in land and water management, which in turn impacts the overall socio-economic well-being, including a positive impact on people's health.

20. Stakeholder consultation was conducted at Yangiariq district on 22nd September in the Tuzloq Makhalla building, Khorezm Region. The R8 subproject was presented during the meetings, the IEE process was explained, potential impacts and EMP were discussed, and recommendations, comments, and concerns were collected. Farmers, representatives from Yangiariq, Bogot, Hanqa regions, local Khokimiyats, experts of the Basin Irrigation System Authority, cadastre and others participated in public consultation. Refer to Chapter VII – Public Consultation and Information Disclosure for detailed information.

21. In Khorezm province, agriculture is the main source of employment and income, especially in the rural areas and around 78.1% of the population is engaged in the agricultural sector. Due to the physical deterioration of water management facilities, it becomes challenging for local authorities to ensure a sustainable water supply for irrigation. If the R8 subproject is not implemented, following will be some key impacts;

a) Water supply capacity and efficiency will continue to decline,
b) Water loss and salinity aggravate over time,
c) Agriculture productivity will be suppressed,
d) Capacity for water resources management will not be improved,
e) Infrastructure will not be modernized,
f) Percentage of unused land will increase due to lack of water, and
g) Farm management and water use capacities will not be improved,
h) Overall, farm incomes in the R8 command area will not be improved.

22. Due to above reasons, the **"No Project Alternative" is not considered acceptable**. In addition, the environmental impacts of the R8 subproject, as described in the subsequent chapters, can be avoided or minimized by adopting suitable mitigation measures. The subproject can be made climate-responsive by integrating Fleximat fully or partly into the project design.

Recommendation

23. Inclusion of Climate Adaptive Measures in Designs Stage

a) Integrating physical locking of pumps and sluices followed by centralized monitoring system.

- Wherever tree density is high along the canal alignment, revisit the design to avoid and minimize tree-cutting; option for relocation of trees including shrubs need to be explored rather than cutting. At the meeting with the ADB mission (May 2024), the impact of the project on the trees along the P8 canal was discussed. The PIU, under the Ministry of Water Resources, is dealing with the issue of obtaining permission from the Ministry of Ecology and the Cabinet of Ministers to replant trees along the canal.

b) Explore possibility of integrating concreate mat in main or secondary canal to reduce the overall carbon footprint of a project;

24. Explore possibility of Inclusion of Climate Adaptive design - Shift from flow based to modernized water level flow controlled design

Even after modernization, 40% of outlets will still operate on electricity (pumping). The following recommendations are suggested for reducing carbon footprint:

- If pumping is not avoided, explore options to replace old pumps with energy-efficient pumps to reduce carbon footprint
- Explore inclusion of canal-top and canal-bank solar PV projects; for details refer to point no 335 - Learning from international best practices: installing solar panels on canal banks and at pumping stations.
- Explore possibility to use low carbon embodied materials and local construction materials to reduce carbon footprint

25. Pre-construction and Construction stage

a) Before the construction commences, PMU is required to obtain environmental clearance/approval from the State Committee for Ecology and Environmental Protection.
b) The EMP can be used at the bidding stage to inform contractors about the requirements of the IEE and EMP and PIU must guide contractor in preparing the Site-Specific Environment Management Plan (SSEMP) in align with the EMP
c) PIU/PIC ensure that environmental safeguards requirement shall be included in the bidding documents and contract; contractors include sufficient staffing and budgeting for the implementation of the EMP/SSEMP;
d) Table 63 enumerates the recommendations including accountability of MWR/PMU/PIC for Environmental Safeguards.

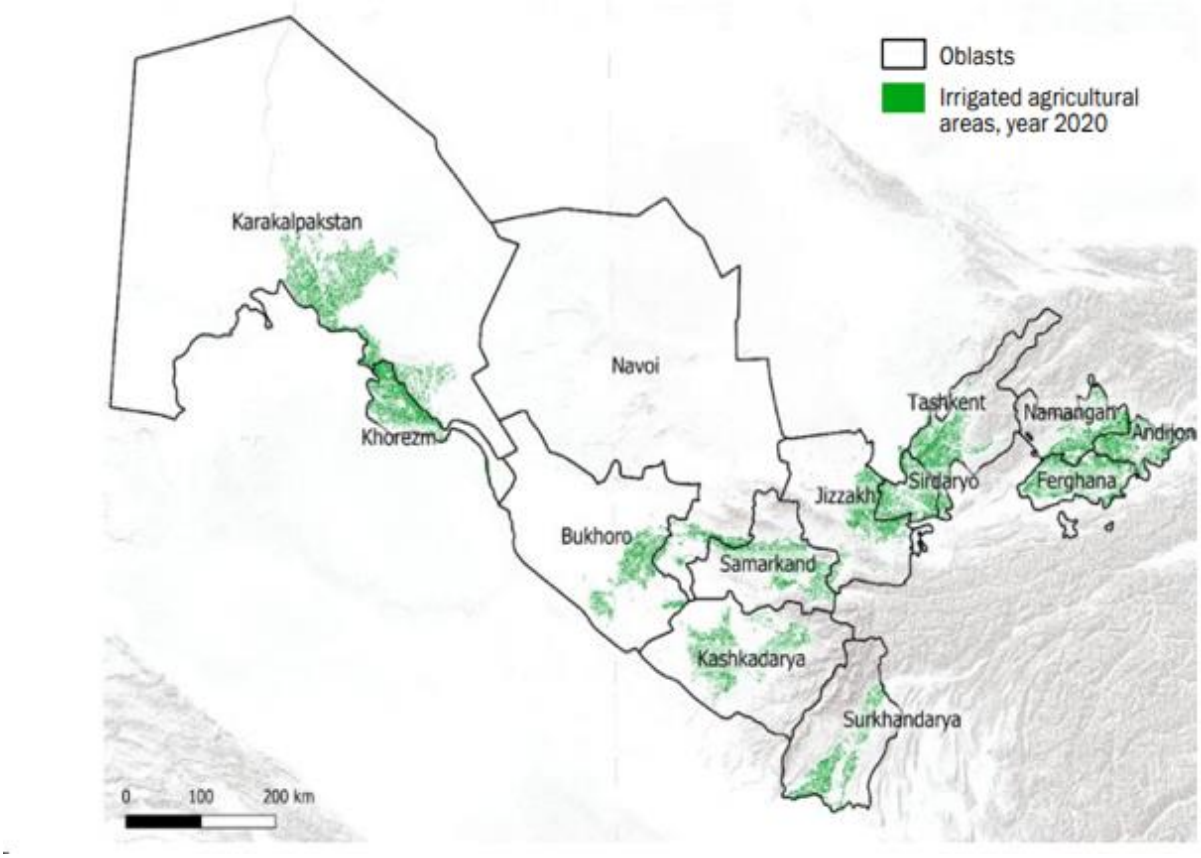
26. Operation stage

a) Ensure a minimum guaranteed amount of water for farmers to increase the acceptance;
b) Incentivize farmers who are practicing or adopting water conservation measures such as drip irrigation and so on.
c) Create awareness on water conservation measures

1. Introduction

27. Around 95% of total crop production is dependent on the country's extensive irrigation and drainage network, which is the largest in Central Asia. Ageing irrigation and drainage infrastructure puts pressure on both surface and groundwater resources, including land resource. Excessive water consumption more than established norms of irrigation, poor water management and inadequate drainage are major contributors to land degradation, which has been impacting yields and land productivity, See figure 2 Irrigated Agricultural Areas in Republic of Uzbekistan.

Figure 2: Irrigated Agricultural Areas in Republic of Uzbekistan[10]



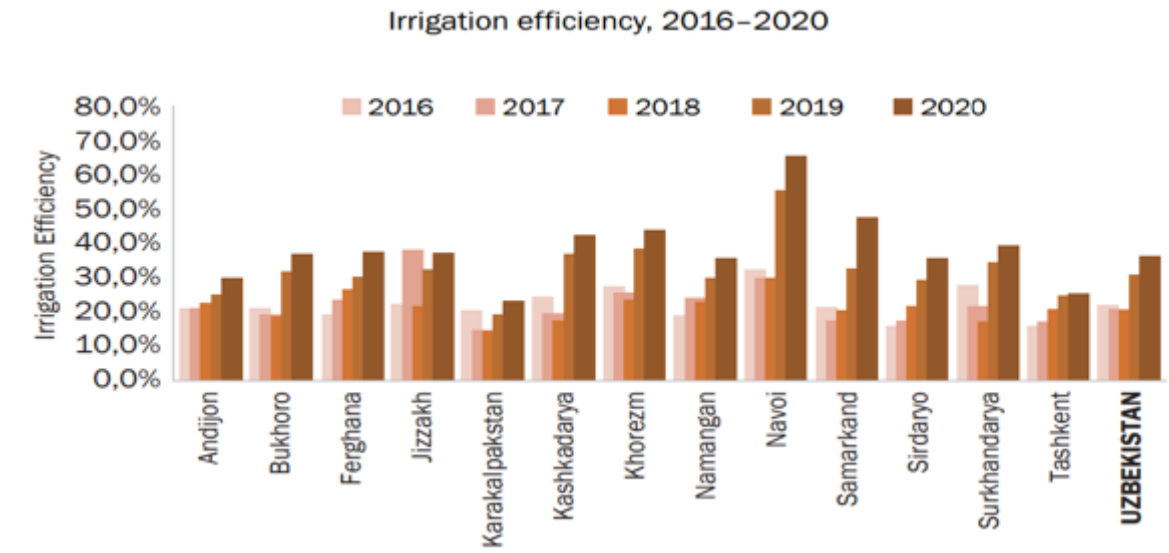
Source: *Uzbekistan, Country Climate and Development Report, November 2023, The World Bank*

28. Due to poor irrigation practices and inadequate drainage systems, more than 500,000 ha of land in the country has already been water-logged and affected by salinity, for details, see Figure 3: Irrigation Efficiency in different Irrigation areas.

29. In 2019, the country used 2.6 million hectares of land for irrigation out of 4.3 million hectares of available land. The reasons were (a) abandonment of agricultural lands due to salinity, (b) infrastructure damage, (c) electricity shortages, and (d) lack of water availability due to increasing competing users such as urban and industrial sectors

Figure 3: Irrigation efficiency from 2016 to 2020 in different irrigated agricultural area

[10] https://documents1.worldbank.org/curated/en/099111423124532881/pdf/P1790680f452f10ba0a34c06922a1df0003.pdf



Source: Uzbekistan, Country Climate and Development Report, November 2023, The World Bank

30. The irrigation efficiency in the Khorezm is around 40 percent (World Bank 2023), higher than the national averarage, see figure 3. According to estimate (The World Bank, 2023) agricultural yields are expected to reduce by 10 percent, if extensive interventions to improve water-use efficiency have not been carried out. The same report estimates, by adopting efficient water management practices and modernization of existing irrigation infrastructure, the agricultural yields would increase by 62 percent.

31. The Asian Development Bank (ADB) is supporting Uzbekistan Government to modernize the outdated irrigation and drainage (I&D) subprojects (SPs) within Amu Darya and (selected reaches of the) Zarafshan River Basins in Uzbekistan.

32. To strengthen irrigation system, the Asian Development Bank (ADB) approved $1.2 million for Transaction Technical Assistant (TRTA) on 7 August 2019 for preparing the Climate Adaptive Water Resources Management in the Aral Sea Basin Project. The funds were provided as a grant from ADB's Technical Assistance special fund (TASF-6) for the feasibility studies.

33. The TRTA identify the requirement for developing a road map for better strategy, policy and institutional alignment for improved water resources management (from the river basin to on-farm) including opportunities for introducing climate resilience new technologies.

-

34. The Government proposed a list of eight potential subprojects, out of these, Babatag and Jondor irrigation system jointly selected, herein referred as a **'core'** subprojects. It has also been agreed between the government and ADB is to identify two more I&D for modernisation, herein referred as **'non-core'** subproject from the list of potential projects proposed by the government, for details, *see Table 13.*

35. The project will improve the agricultural water use productivity through a threefold approach:

a) Climate resilient and modernized I&D infrastructure to improve measurement, control and conveyance within existing systems;

b) Strengthen reliable on-farm water management including capacity building of water consumers' associations (WCAs), physical improvements for land and water management at the farm level and application of modern technologies for increased water productivity; and

c) Policy and institutional strengthening for sustainable water resources management.

-

36. For identification of **'non-core'** sub-project from a list of eight potential subprojects. A pre-defined ADB screening criteria has been used for selecting the "R8" Irrigation System; see Annexure 1; before screening, a reconnaissance survey was conducted to assess the extent of environmental and social risks at the R8 subproject.

37. The R8 irrigation system was built in 1940, some 50 years before the country's independence in 1992. It receives water from the Tashsaka main canal, and Tashsaka receives water from the Amu Darya River. The canal supplies water to three irrigation districts: Khonka, Bogot, and Yangiariq districts (Picture 3). Among all districts, the Yangiarik district is a significant user of irrigation water from the R-8 canal. Eight WCAs of Yangiarik district receive water from R-8 canal and distribute water to 766 water consumers. Major crops in the canal command area are cotton in 5,990 ha (31%), wheat 3,998 ha (21%), fodder 4,175 ha (21%), vegetables 2,358 ha (12%), and horticulture 2,939 ha (15%). The average yield in the region is 2.5 t/ha.

38. The proposed modernization of the R8 Canal is expected to substantially improve the efficiency and sustainability of the irrigation system. Upon completion, the canal will be fully (100%) concrete-lined, increasing the conveyance efficiency from approximately 0.56 to 0.80 and significantly reducing seepage losses. The rehabilitation works will also enhance energy efficiency by reducing dependence on pumped irrigation and increasing the use of gravity-fed water distribution. As a result, annual irrigation water demand is projected to decrease from approximately 840.5 million m³ to 667.2 million m³, contributing to more sustainable water resource management within the project area.

39. The Project is not expected to generate any adverse transboundary environmental or social impacts. The project area is located at a considerable distance from international borders, and all proposed activities are confined within the existing irrigation infrastructure. According to the national feasibility study, the anticipated water savings resulting from improved conveyance efficiency are expected to increase downstream water availability, thereby providing potential environmental benefits for the wider river basin, including enhanced flows towards the Aral Sea.

Based on the field investigations, baseline environmental and social surveys, and the scope of the proposed rehabilitation works, the anticipated environmental and social impacts are considered to be predominantly site-specific, temporary, and reversible. The majority of potential impacts are associated with the construction phase and can be effectively avoided, minimized, or mitigated through the implementation of the Project's Environmental Management Plan (EMP), together with the prescribed monitoring and supervision measures. A comparison of the environmental conditions under the "without project" and "with project" scenarios is presented in Table 2.

40. As per pre-defined ADB screening criteria, the project is categorized as B category project in accordance with the ADB SPS 2009. The finding of environmental and social screening is summarised in Table 15.

41. There is no forest/protected area present in the R8 irrigation area. As per International Union for Conservation of Nature (IUCN) status, the species in the R8 areas belong to least concern category. There are no Rare & Endangered species, Protected, Sensitive sites are reported in the area. Based on the site survey (along canal alignment), the air quality in the project area appears to be generally acceptable due to the rural situation, low traffic movement and lack of industries.

-

Table 2: Impacts on local environmental setting 'With' and 'Without Project'

Sr. No	Impact Areas	Applicability	Without project	With project (Magnitude of Impact due to project intervention)
1	Involuntary displacement	Not applicable	-	-
2	Loss of livelihood	On canal bank, the IEE team found cowshed (1 no), abandoned clay structure (1 no), Bee keeping (2 no)	No impact	+
3	Archaeological and culturally important site nearby	Not applicable	Not applicable	-
4	Presence of KBAs in the project area	Not applicable	Not applicable	-
5	Presence of endangered, threatened or protected species	Not applicable	Not applicable	-
6	Trees cutting	Around 1870 numbers of trees to be affected	No impact	+
7	Community health and safety	Scattered Human settlements were noted on both sides of the canal. The project intervention will pose community health and safety risks due to large-scale civil works, pressure on local resources, and road safety due to increased transportation.	Normal	+++
8	Occupational health and safety	The project will attract many workers; hence, a project of such size will pose workers' occupational health and safety concerns.	No impact	+++
9	Traffic impacts	Due to large-scale civil works, there will be significant pressure on local resources due to increased transportation, triggering air and noise pollution, including community health and safety issues and public inconvenience.	Normal	+++
10	Soil and ground water contamination	A project of such size would use large quantities of petroleum products and hazardous materials and generate solid and liquid waste. Lack of mitigation	Normal	+++

Sr. No	Impact Areas	Applicability	Without project	With project (Magnitude of Impact due to project intervention)
		measures triggers soil and groundwater contamination.		
11	Water pollution	Mainly generated from labour camps, construction camp and mechanical workshops.	Normal	+++
12	Air pollution	Civil works will temporarily impact local air quality primarily through road dust (loose soil) emission due to the movement of vehicles, batching plants and stockpiles of construction materials. However, these impacts should be significant given the scale of the works in the open air.	Normal	+++
13	Noise pollution	Causes inconvenience to people and health impact to workers due to constant exposure..	Limited	+++
14	Influx of worker	Create pressure on local resources, trigger social conflict, and spread communicable diseases by mixing with locals.	Limited	+++
15	Transboundary Impacts	No transboundary impacts are anticipated	No	Environmental impacts are general types, temporary, reversible and mostly site specific
16	**Induced Impacts**	The project would bring number of short-term and long-term induced impacts.	Normal	Improvement in water security will improve their productivity, thus strengthening farmers' income capacity, which in turn impacts the overall socio-economic well-being, including a positive impact on health.

Sr. No	Impact Areas	Applicability	Without project	With project (Magnitude of Impact due to project intervention)
17	**Cumulative impact**	Multiplier effects (slowly)	Normal	Improve road and mobility, gender equality, women's participation in land and water management, climate-resilient infrastructure, and overall socio-economic well-being

Note: Low +, Moderate ++, High +++

Table 3: Comparison of water consumption by canal without the project and with the project

No	Name	System efficiency	Water consumption mln m^3 per year
1	Water consumption without project	0.56	640.9
2	Water consumption with project (canal modernization)	0.8	531.4
3	Decrease/increase in water consumption		109.5

1.1. Purpose of IEE

42. R8 is one of two 'non-core' sub-projects that have been selected from a list of eight sub-projects identified by the government after exhaustive deliberation and after qualifying pre-identified screening criteria

43. The Initial Environmental Examination (IEE) of the R8 subproject in Khorezm province is conducted as a part of preparation of Climate Adaptive Water Resources Management in the Aral Sea Basin Project in order to comply the requirements of ADB's Safeguard Policy Statement (SPS) (2009), as well as to comply with the environmental legislation of the Republic of Uzbekistan.

44. As per the ADB Safeguard Policy Statement, 2009 (SPS), R8 irrigation system is categorized as category B project. The IEE of R8 irrigation system is prepared based on input from feasibility report; field survey, analysis of primary and secondary data, characterization and evaluation of potential impacts; and interviews and discussions with local and other stakeholders.

The IEE has been prepared to:

a) Describe the existing socio-environmental conditions within the subproject area;
b) Identify potential and induced environmental impacts and risks that may emerge due to subprojects implementation;
c) Analyse subprojects based on location, design and technical solutions, including "no project" option;
d) Propose options, which are climate responsive;
e) Predicting and evaluating the potential environmental impacts;
f) Avoid adverse impacts of a project on environment and affected people, wherever possible;
g) Minimize, mitigate, and compensate for adverse project impacts on the environment and affected people when avoidance is impossible;
h) Develop EMP, which includes proposed mitigation measures, monitoring program and reporting requirements, institutional and organizational arrangements, capacity
i) development and training provisions;
j) Describing procedures and establishing grievance redress procedures for subproject, where affected person/aggrieved party can approach and redress his/her grievances.

1.2. Approach and Methodology

45. The IEE has been prepared in accordance with ADB's SPS. The study has been carried out by taking the following activities:

a) Reconnaissance survey.
b) Field visit to the project areas
c) Review of secondary information
d) Review project feasibility study report.
e) Safeguards conditions as stipulated in PAM
f) Screening based on pre-defined criteria
g) Review of IEE report on core sub-projects
h) Public consultations.

i) Review Published reports on geology, groundwater, surface water, soil, climate, flora, fauna, and cultural resources for Khorezm province.
j) Review of additional studies undertaken by international experts for this project

1.3. Project Categorization

46. ADB's Rapid Environmental Assessment Checklist was used together with field visits to propose the category of the Project. Based on the ADB SPS (2009), this Project is classified as Category B for environmental due to the following reasons:

- adverse environmental impacts are less adverse than those of Category A projects;
- these 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.

47. An IEE is required for Category B projects. ADB's category is assigned by most sensitive component of the project – meaning that all subprojects under the Project are also category B. In accordance with the National Government Environmental Impact Assessment (EIA) requirements5F 6 , the Project is classified as Category III project and a national EIA report is required.

48. Therefore, IEE is considered sufficient to meet ADB's environmental safeguard requirements. Pre-construction phase issues are likely to be very limited, as the project does not trigger involuntary resettlement or loss of livelihood.

49. According to the National Legislation (Resolution of the CM 541, 07.09.2020), R8 subproject is categorized as a Category II project, and therefore, EIA is mandatory as per the National Government Environmental Impact Assessment (EIA) Requirements.[11]

1.4. Constraints and Limitations

50. As the project is in the feasibility stage, there are many activities still at the initial stage of development, such as;

(a) Detailed design with final technical decisions on canal types
(b) Sourcing of raw materials,
(c) Location and numbers of borrow pits,
(d) Actual numbers of trees to be cut down
(e) Quarries,
(f) Road construction
(g) Labour requirement and their accommodation and so on

51. All above issues may differ from currently accepted scope of work. In the event that any design details change or technical decisions on above subject gets changed and unanticipated environmental impacts become apparent, as a result, the IEE and EMP will be updated by PIU/PIC.

1.5. Report Structure

52. This report contains ten sections including executive summary. The report is organized to comply with the requirement of ADB SPS (2009):

[1111]Decree of the Cabinet of Ministry No.541 of 7 September 2020 "On further improvement of the environmental impact assessment mechanism" (https://www.lex.uz/docs/4984499)

a) Chapter I: Introduction – The section in hand provides the introductory information for the Project.

b) Chapter II: Legal, Policy and Administrative Framework - This section presents an overview of the national policy/legislative framework including ADB SPS (2009) that will apply.

c) Chapter III: Description of the Project – The section describes the need for the Project. A detailed scope of works is also provided, indicating the type of engineering works required including project alternatives.

d) Chapter IV: Description of the Environment (Baseline data)– This section discusses the regional and local environmental baseline conditions.

e) Chapter V: Anticipated Environmental Impacts and Mitigation Measures – The section outlines the potential environmental impacts and proposes mitigation measures to manage the impacts.

f) Chapter VI: Analysis of Alternatives – This section provides the alternatives to the proposed facility, technology, design and operation - including the no-project alternative

g) Chapter VII: Public Consultation, Information Disclosure– This section provides a summary of all the stakeholder consultation activities undertaken.

h) Chapter VIII: Grievance Redress Mechanism (GRM) – This section provides a detailed framework for grievance mechanism including Information disclosure mechanism.

i) Chapter IX: Environmental Management Plan & Institutional Requirements – This section provides the EMP for the design, construction and operational phases of the Project.

j) Chapter X: Conclusions and Recommendations – The final section of the report provides the report conclusions and any necessary recommendations

•

2. Legal, Policy and Administrative Framework

2.1. Environment Safeguard Requirements – ADB SPS

53. The ADB safeguard policy statement applies to all ADB-financed projects, regardless it is a loan; and/or a grant; and/or other means. ADB will not finance projects that do not comply with its safeguard policy statement, nor will it finance projects that do not comply with the host country's social and environmental laws and regulations, including obligations under international law. ADB SPS (2009) is a cornerstone, which governs the environmental and social safeguards of a project and program operations.

54. ADB's SPS focus on three safeguards areas (i) environmental safeguards, (ii) involuntary resettlement safeguards, and (iii) Indigenous Peoples safeguards and sets out the policy objectives, scope and principles.

55. The objectives of ADB's safeguards are to: (i) avoid adverse impacts of projects on the environment and affected people, where possible; (ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and (iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage [12]environmental and social risks.

56. Based on ADB pre-defined screening criteria, the R8 irrigation project is categorised as a category B project. *Table 3 and Table 4* enumerate applicability and its coverage in IEE against each Policy Principal as stipulated in safeguard requirements i.e.

a) Safeguard Requirements 1: Environment
b) Safeguard Requirements 2: Involuntary Resettlement,
c) Safeguard Requirements 3: Indigenous Peoples

[12] https://www.adb.org/sites/default/files/institutional-document/32056/safeguard-policy-statement-june2009.pdf

•

Table 3: Environment Safeguard Requirements - Applicability and its coverage in IEE

Policy Principal	Description - Environmental Safeguards requirement (ADB SPS)	Applicability and coverage
1	Screening and categorization of project	• Based on the pre-defined ADB screening criteria findings, the project is classified as Category B project.
2	Conduct an environmental assessment	• IEE is conducted to ensure ADB SPS compliance. Potential direct, indirect, cumulative, and induced impacts have been assessed and presented in IEE.
3	Examine alternatives	• Project alternative with and without project has been assessed in IEE report. Among three 'noncore' subprojects, R8 has been selected based on ADB pre-defined screening criteria,
4	Environmental management plan (EMP)	• Detailed mitigation measures have been proposed for the pre-construction and construction phase. Further, a clear recommendation has been suggested on how EMP can be used at the bidding stage in the specification to inform contractors of the required measures and actions to satisfy the requirements of the IEE and EMP.
5	Carry out meaningful consultation with affected people	• A detailed public consultation was conducted on 22nd September 2023 to inform local public about the project, its impacts and mitigation measures. During consultation, public opinions were collected to address their concerns.
6	Disclose a draft environmental assessment (including the EMP)	• After IEE approval, report will be uploaded on the MWR website. The hard copy of IEE in local language will be kept at local authority offices for public reference.
7	Implement the EMP and monitor its effectiveness	• A detailed monitoring plan has been proposed in IEE. To comply with ADB SPS (2009) and PAM - monthly- inspection, quarterly and semi-annual reporting will be undertaken;
8	Critical habitats	• No critical habitat or natural habitat areas or endangered or critically endangered species or cultural heritage sites of national and international significance have been found.
9	Pollution prevention and control technologies	• Detailed mitigation measures have been proposed for pre-construction and construction phase, for detail refer to Chapter V.
10	Ensure Safe and healthy working conditions for worker	• Detailed mitigation measures have been proposed for pre-construction and construction focus on (a) Occupational hetlh and safety (b) traffic

		management plan (c) community health and safety (d) COVID 19 (e) PIU/PIC EHS travel for survey and inspection (f) Labour camp sanitation and safety (g) Communication and information dissemination plan and so on.
11	Chance find	• A detailed procedure has been provided in IEE for change find. Based on field surveys, 1km on both sides of canal, no archaeological or historical site exist

57. Under Indigenous Peoples safeguard requirement, the Policy Principal 1 to 9 is not applicable to the R8 irrigation project.

58. Gender Mainstreaming, Transparency and Accountability - In addition to safeguard compliance, ADB-financed R8 projects, PIU will comply with *Gender and ADB's Development Policy* and *Access to Information Policy*. During implementation of R8 subproject, PIU shall ensure that the gender-related objectives as agreed upon shall be systematically implemented, monitored, complied and reported to assess the achievements and their impact.

2.2. Country Policies and Administrative Framework

59. This section presents Uzbekistan's environmental, social and occupational and health legislation, which will be applicable on this project. This chapter also explains the procedures for conducting an EIA, such as stages, and responsible government bodies who are responsible for compliance with laws and regulations within the framework of this project.

60. Uzbekistan is a sovereign democratic, legal, social, and secular state with a republican form of government based upon the 1992 Constitution (as amended on 28 December 1993, 24 April 2003, 11 April 2007, 18 April 2011, and 1 May 2023). The national environmental and social policy in Uzbekistan is based on the provisions of the country's constitution.

61. The Cabinet of Ministers of Uzbekistan (Uzbek: O'zbekiston Respublikasi Vazirlar Mahkamasi) is the country's executive body, ensuring the effective functioning of the economy, social and spiritual spheres, and the implementation of laws, other decisions of the Oliy Majlis, and presidential decrees and orders. The Cabinet of Ministers operates on the basis of the Law "On the Cabinet of Ministers of the Republic of Uzbekistan" adopted on September 30, 2019 (latest version; the original version was adopted on August 29, 2003). The Cabinet of Ministers of the Republic of Uzbekistan focuses on rational use, management and protection of water resources, coordinates activities of the Ministries, State Committees, Departments, other legal entities in the field of integrated and rational use, management and protection of water resources

2.3. Applicable National Laws, Regulations and Standards

62. The formal legal acts in the Republic of Uzbekistan include the following seven acts presented by their hierarchy level:

a) The Constitution of the Republic of Uzbekistan;
b) Laws of the Republic of Uzbekistan;
c) Resolutions of the chamber of Oliy Majlis (Parliament) of the Republic of Uzbekistan;
d) Decrees and resolutions of the President of the Republic of Uzbekistan;
e) Resolutions of the Cabinet of Ministers of the Republic of Uzbekistan;
f) Orders and resolutions of ministries, state committees and departments;
g) Decisions of local authorities

63. **The Constitution of the Republic of Uzbekistan[13].** On 1st May, the new edition of the Constitution was accepted. The constitution contains special norms on ensuring the environmental rights of citizens, including the right to a comfortable environment, and reliable information about its condition. The State takes measures for improvement, restoration, and

[13] https://lex.uz/docs/6451070#6451459

protection of the environment, maintaining the ecological balance, protection of the ecological system.

64. The Law stipulates (Article 68) that the land, its minerals, waters, flora and fauna, other natural resources shall constitute the national wealth and shall be rationally used and protected by the state With respect to property ownership, Article 41 states “everyone shall have the right to own property”, and Article 44 "any forced labor shall be prohibited, except as punishment under the court decision, or in some other instances specified by law. Any form of child labor that poses a threat to the health, safety, morality, mental and physical development of the child, including those that prevent him or her from getting an education, shall be prohibited."

65. The constitution recognizes the provision of access to the health care system and duties of citizens in protecting the environment. In particular, Article 48 stipulates: “Everyone shall have the right to skilled medical care”, and Article 49 states “Everyone shall have the right to a favorable environment, reliable information about its condition.”

66. The Constitution guarantees grievances, in Article 40 "Everyone shall have the right, both individually and collectively, to submit applications, proposals, and to lodge complaints with competent state bodies and organizations, citizens’ self-governing bodies, officials and public representatives".

67. **Water Code of the Republic of Uzbekistan No. LRU-1076** dated July 30, 2025. Entered into force on October 31, 2025. This Code governs the use and protection of water, water features, water management features and land designated for the water fund.

68. **Chapter 5 of the Water Code of the Republic of Uzbekistan** outlines the powers of competent state bodies in regulating water relations. The key responsibilities of national and regional authorities are summarized below:

- **Cabinet of Ministers** — Implements state policy on the rational and integrated use, management, and protection of water resources and water bodies.
- **Ministry of Water Resources (MWR)** — Oversees the reclamation condition of irrigated lands, monitors the mineralization of surface and groundwater, and inspects the technical condition of collector-drainage networks. The MWR is also responsible for developing and implementing measures to improve these systems.
- **Ministry of Mining and Geology** — Conducts state monitoring of groundwater in cooperation with relevant ministries and local authorities; oversees rational groundwater use; monitors pollution sources; and issues permits for well drilling and groundwater abstraction.
- **Ministry of Ecology, Environmental Protection, and Climate Change (MEEPCC)** — Approves environmental standards for maximum permissible discharges (MPDs) into surface water bodies; issues special water use permits for surface water abstraction; collects environmental compensation payments for water pollution; conducts state environmental assessments; and monitors pollution sources of surface water.
- **Hydrometeorological Service under MEEPCC (Uzhydromet)** — Monitors surface water at hydrological stations; provides data on hydrometeorological conditions, water quality, and climate trends; and issues warnings about hazardous hydrometeorological events.
- **Committee on Sanitary and Epidemiological Welfare and Public Health (under the Ministry of Health)** — Carries out sanitary and hygienic monitoring of water sources and participates in the selection and assessment of sites for drinking and domestic water supply.

69. **Article 126 of the Water Code** defines *water protection zones* and *sanitary protection belts* around drinking and domestic water supply facilities. These zones are established to prevent pollution and maintain the sanitary integrity of water sources (Table 4).

Table 4. Water Protection Zones for Water Bodies

Type of Water Body / Network	Flow Capacity / Depth	Width of Water Protection Zone (m)
Canals, irrigation, and drainage networks used for **irrigation and technical purposes**	Depth 0.75–2 m	≥5
	Depth 2–5 m	6.5–9
	Depth 5–10 m	9.5–12
Reinforced concrete tray irrigation networks and pipelines	Along one side	4.5
	On the opposite side	1.0

70. Environmental regulations of Uzbekistan are governed by several supporting laws and statutes for environmental management. The main ones are presented in Table 5 below and briefly summarized further in this section of the report.

Table 5: List of Key Environmental Laws

Law/regulation	Date of adoption	Date of last amendment	Key provisions
Law On Environmental Expertise, Environmental Impact Assessment and Strategic Environmental Assessment	24.02.2025		The Law came into effect on August 25, 2025. This law mandates that all relevant projects and programs undergo Environmental Expertise, Environmental Impact Assessment, and Strategic Environmental Assessment. It requires early identification of environmental risks, integration of public feedback, obtaining the experts' positive conclusion before implementation, and compliance with environmental standards throughout the project lifecycle.
Law on Nature Protection	09.12.1992	12.10.2021	This law stipulates a legal, economic, and organizational foundation for the conservation of the environment and the rational use of natural resources. Its purpose is to ensure balanced relations between man and nature, to protect the environmental system, and to guarantee the rights of the population to a clean environment. Article 25 of this law states that State Environmental Expertise (SEE) is a mandatory measure for environmental protection, preceding the decision-making process. In addition, article 25 says that the implementation of the project without a positive conclusion of SEE is prohibited.
Law on Atmospheric Air Protection	27.12.1996	28.09.2020	It specifies standards, quality and adverse impact norms, requirements on fuels and lubricants, production and operation of vehicles and other transport means and equipment, ozone layer protection requirements, obligations of enterprises, institutions and organizations toward atmospheric protection, and compensation for damages from atmospheric pollutions. The main purpose of the law provides the legal basis for the production or the use of chemicals, defines their maximum allowable concentrations in the atmosphere, and ensures prevention and reduction of harmful chemical, physical, biological and other impacts on air.

Law/regulation	Date of adoption	Date of last amendment	Key provisions
Law on Subsoil	23.09.1994	12.10.2021	This law aims to ensure sustainable and integrated use of mineral resources to meet the needs of the mineral raw materials and other needs, protection of mineral resources, environment, safety of operations in subsoil use and protection of subsoil users, protection of the interests of individuals, society and state. Geological studies are permitted only after obtaining a positive conclusion of SEE (Article 25).
Law on Waste	05.04.2002	15.11.2019	The principal objective of this law is to prevent the negative effects of solid waste on people's lives and health, as well as on the environment, reduce waste generation, and encourage rational use of waste reduction techniques in household activities. The law regulates the procedures for treating solid waste and defines the authorities of various institutions involved in solid waste management. The law also stipulates trules for transporting solid waste and provides market base incentives for efficient treatment of solid waste The Law specifies that citizens have the right to a safe and healthy environment, to participate in the discussion of projects, and to compensation for damage to their lives, health or property. Dangerous waste that is transported domestically or internationally must pass ecological certification and be moved by special vehicles. The special privileges are given to persons and enterprises that develop and introduce technologies for reducing or recycling waste. Enterprises are responsible for their waste, but, if they recycle, they may be provided with assistance from the state budget
Law on Protection and use of flora	26.12.1997	12.10.2021	It regulates the protection and usage of flora growing in the natural environment, as well as in cultivation and its reproduction and conservation of the gene pool of wild plants. The Cabinet of Ministries of the Republic of Uzbekistan, local government bodies and special authorized agencies implement the law. The Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan (MinEcology) and the Head Department of Forestry under the Ministry for Agricultural and Water Resources Management are the special authorized agencies in flora protection and its usage. The Cabinet of Ministries of the Republic of Uzbekistan, local

Law/regulation	Date of adoption	Date of last amendment	Key provisions
			government bodies, MinEcology and Head Department of Forestry are responsible for implementing on the national level the administration of the law.
Law on Protection and use of fauna	26.12.1997	09.07.2020	It defines the legal relationship aimed at regulating relations in the protection, use, restoration and reproduction of fauna in order to ensure the conditions of its existence, preservation of species diversity, the integrity of natural communities and habitat. The choice of sites for all types of construction, pre-planning, design and project documentation, implementation of which may have an impact on the wildlife or its habitat and projects unit hunting and fishing, projects, work on acclimatization and hybridization of animal protection plants, dangerous to wildlife and its habitat is subject to the state environmental assessment.
Law on Protected Natural Areas	03.12.2004	30.09.2020	It regulates the organization, protection and use of protected territories and management of protected nature reserves or territories. The law establishes the categories and management of protected territories such as integrated (landscape) wildlife preserves, nature parks, state natural objects, areas for protection, conversion and restoration of certain natural and manmade objects and complexes.
Law on Environmental Control	27.12.2013	17.08.2021	The main objectives of environmental control are: (i) prevention, detection and suppression of violation of the requirements of legislation in the field of environmental protection and rational use of natural resources;(ii) monitoring of the state of the environment, identifying situations that can lead to environmental pollution, irrational use of natural resources, create a threat to life and health of citizens; (iii) determination of compliance with the environmental requirements of the planned or ongoing economic and other activities; (iv) ensuring compliance with the rights and legitimate interests of legal entities and individuals, performing their duties in the field of environmental protection and rational use of natural resources.

Law/regulation	Date of adoption	Date of last amendment	Key provisions
Law on Protection and Use of Objects of Cultural Heritage	30.08.2001	19.04.2018	The law regulates the protection and use of cultural and archaeological objects; however, these relate more explicitly to the State measures for preservation, excavation and use of objects of cultural heritage. The law is primarily aimed at the preservation and management of important elements of the built environment, but also addresses the protection of historical, archaeological, aesthetic, ethnological or anthropological territories, as well as natural landscapes connected with a historical event
Criminal Code	22.09.1994	16.02.2022	Section 4. Environmental Crimes It defines the punishment for violation of the norms and requirements of environmental safety, wilful concealment or misrepresentation of environmental pollution, violations in the use of flora and fauna, water, land, subsoil, protected areas.
Administrative Liability Code	01.04.1995	11.04.2025 г.,	Article 85¹ (effective from 5 June 2025) was strengthened and states that construction contractors are legally required to prevent the release of dust and sand particles into the atmosphere at construction sites exceeding 500 m², including adjacent territories and access roads. Exceeding permissible air pollutant emission limits or failing to implement adequate dust suppression measures constitutes an administrative offence. Under this regulation, responsible officials are subject to a fine of ten basic calculation units (BCUs) for non-compliance. Repeated violations within one year of the initial penalty are punishable by an increased fine of fifty BCUs. This requirement underscores the need for strict adherence to dust and emission control measures during all construction activities associated with the Project.
Presidential Resolution No. PF-46	30.12. 2021	02.06.2025	This Resolution indefinitely extends the moratorium on logging valuable trees and shrubs outside the State Forest Fund. It mandates stricter penalties for violations, requires Category I–II enterprises to establish “green belts,” and obliges state agencies and industries to allocate funds for planting and maintaining greenery. The measure

Law/regulation	Date of adoption	Date of last amendment	Key provisions
			supports national greening efforts under the *"Green Spaces"* initiative and aligns with Uzbekistan's Environmental Protection Concept to 2030.
Resolution of the Cabinet of Ministers No. 464	22.08.2022	31.05.2024	In accordance with the Presidential Decree No. PF-46 (December 30, 2021), Uzbekistan has strengthened national regulations governing the planting, maintenance, and protection of trees and shrubs not included in the state forest fund. The moratorium on felling valuable tree and shrub species has been extended indefinitely. For each tree *legally felled*, ten saplings of valuable species must be planted and maintained for at least two years; *for illegally felled trees*, the requirement increases to one hundred saplings maintained for three years. Compensatory planting does not exempt entities from permit or penalty obligations. These requirements support the national "Green Zone" initiative aimed at expanding green cover and improving environmental sustainability across the country.

71. **The Nature Protection Normative Documents related to the project**. Most important nature protection normative documents issued by government.

72. The Project shall comply with the environmental protection, public health, water management, waste management, occupational health and safety, and environmental monitoring requirements of the Republic of Uzbekistan. The key national legal and regulatory documents applicable to the Project include:

a) **SanPiN No. 0211-06** (1 June 2006) – *Hygienic Criteria and Water Quality Control in Centralized Drinking Water Supply Systems of the Republic of Uzbekistan*;

b) **SanPiN RUz No. 0318-15** – *Hygienic and Anti-Epidemic Requirements for the Protection of Surface Water Bodies in the Republic of Uzbekistan*;

c) **Presidential Resolution No. PP-439** (7 December 2022) – *On Additional Measures for the Protection and Rational Use of Groundwater Resources*;

d) **Water Code of the Republic of Uzbekistan** (2025);

e) **Resolution of the Cabinet of Ministers No. 737** (5 September 2019) – *On Improvement of the Environmental Monitoring System in the Republic of Uzbekistan*;

f) **Presidential Decree No. UP-5863** – *On Approval of the Concept of Environmental Protection of the Republic of Uzbekistan until 2030*;

g) **O‘z DSt 1057:2004** – *Vehicles. Safety Requirements for Technical Condition* and **O‘z DSt 1058:2004** – *Vehicles. Technical Inspection. Methods of Control*;

h) **SanR&N No. 0053-23** – *Hygienic Standards: Maximum Permissible Concentrations (MPCs) of Pollutants in Ambient Air of Populated Areas of the Republic of Uzbekistan*;

i) **SanR&N No. 0158-04** – *Sanitary Rules and Requirements for Collection, Transportation, Storage and Disposal of Asbestos-Containing Waste*;

j) **SanR&N No. 0267-09** – *Permissible Noise Levels in Residential Areas and Public Buildings*;

k) **SanR&N No. 0325-16** – *Permissible Occupational Noise Levels at Workplaces*;

l) **SanR&N No. 0202-06** – *Procedures for Issuance of Special Water Use Permits and Development and Approval of Maximum Permissible Discharge (MPD) Standards*;

m) **KMK 2.01.08-19** – *Noise Protection*;

n) **Resolution of the Cabinet of Ministers No. 266** (21 September 2011) – *On the Procedure for Collection, Storage and Disposal of Used Mercury-Containing Lamps*;

o) **SanR&N No. 0233-07** – *Occupational Health and Environmental Protection Requirements for the Production and Use of Asbestos-Containing Materials*.

2.4. Institutional Framework for Environmental Management

73. On 19 November 2025, the Government of Uzbekistan adopted Presidential Decree No. UP-217 and Presidential Resolution No. PP-343, introducing significant reforms to the national environmental governance framework and strengthening the country's focus on environmental protection, climate change, and sustainable natural resource management.

74. As part of these reforms, the former Ministry of Ecology, Environmental Protection and Climate Change was reorganized into the National Committee on Ecology and Climate Change (the “Committee”). Unlike its predecessor, the Committee operates as an independent state authority accountable directly to the President and the Parliament of the Republic of Uzbekistan. This institutional restructuring reflects the Government's commitment to elevating environmental and climate issues within the national policy agenda and strengthening oversight of environmental compliance.

The Committee is responsible for:

- development and implementation of state policy in the fields of environmental protection, climate change, biodiversity conservation, and sustainable use of natural resources;
- environmental permitting, monitoring, and enforcement;
- oversight of environmental impact assessment (EIA) procedures;
- regulation of waste management and pollution prevention activities;
- implementation of national climate change mitigation and adaptation initiatives;
- coordination of state environmental monitoring programs.

75. A notable feature of the reform is the establishment of the Ecological Police under the Committee. The Ecological Police serves as a specialized environmental enforcement authority responsible for identifying, preventing, and responding to violations of environmental legislation, including illegal waste disposal, unauthorized tree cutting, pollution incidents, and other environmental offences.

76. The reform package also introduces strengthened administrative oversight and enforcement mechanisms, enhanced protection of green spaces and trees, and increased opportunities for public participation in environmental decision-making processes. Collectively, these changes reflect a transition towards a more proactive, enforcement-oriented, and participatory environmental governance system in Uzbekistan.

77. For the purposes of this Project, the National Committee on Ecology and Climate Change will remain the principal government authority responsible for environmental regulation, environmental permitting, compliance monitoring, environmental inspections, and oversight of environmental protection requirements throughout project implementation.

2.5. Environmental Assessment Process in Uzbekistan

78. The environmental impact assessment (EIA) system in Uzbekistan is regulated by the **Law of the Republic of Uzbekistan "On Ecological Expertise, Environmental Impact Assessment and Strategic Environmental Assessment" (No. ZRU-1036)**, which entered into force on **25 August 2025**. The Law replaced the former Law "On Ecological Expertise" (No. 73-II of 25 May 2000) and establishes a modernized framework for environmental assessment and environmental decision-making.

79. The EIA process is further regulated by the **Resolution of the Cabinet of Ministers No. 541 "On Further Improvement of the Environmental Impact Assessment Mechanism" dated 7 September 2020 (as amended on 25 November 2024)**, which defines the procedural requirements, documentation, review process, and categorization of projects subject to environmental assessment.

80. The new law regulates legal relations in the fields of:

- State Ecological Expertise (SEE);
- Environmental Impact Assessment (EIA);
- Strategic Environmental Assessment (SEA);
- public participation in environmental decision-making;
- environmental assessment of development plans, programmes, and policies.

81. The Law distinguishes between **State Ecological Expertise** and **Public Ecological Expertise** and expands the range of activities subject to environmental review. Environmental assessment requirements now apply not only to construction projects but also to:

- land allocation decisions for development projects;
- design and technical documentation;

- sectoral development programmes;
- regulatory and methodological documents;
- innovative technologies;
- activities that may affect the environment, public health, or natural resources.

82. A significant innovation introduced by the Law is the formal incorporation of **Strategic Environmental Assessment (SEA)** procedures. SEA is required for selected urban development plans, national and regional programmes, and sectoral strategies that may have long-term environmental implications. The objective of SEA is to integrate environmental considerations into strategic planning and support sustainable development decision-making.

83. Under the legislation, the period for conducting State Ecological Expertise commences on the first business day following full payment of the applicable State Ecological Expertise fee.

2.5.1. State Ecological Expertise System

84. The State Ecological Expertise (SEE) process is administered by the National Committee on Ecology and Climate Change through its specialized environmental review bodies. Depending on the environmental risk category of a proposed activity, environmental assessment documentation is reviewed by one of the following institutions:

a) **Center for State Environmental Expertise (CSEE) under the National Committee on Ecology and Climate Change** – responsible for environmental review of projects classified as Category I and Category II (high and medium environmental risk);

b) **Center for State Environmental Expertise of the Republic of Karakalpakstan** – responsible for environmental review of projects classified as Category III and Category IV (low-risk and local-impact projects) located within the Republic of Karakalpakstan;

c) **Regional Centers for State Environmental Expertise and the Center for State Environmental Expertise of Tashkent City** – responsible for environmental review of projects classified as Category III and Category IV (low-risk and local-impact projects) within their respective jurisdictions.

85. The Center for State Environmental Expertise serves as the authorized state body responsible for reviewing EIA documentation, evaluating environmental risks and mitigation measures, considering public consultation outcomes, and issuing the final State Environmental Expertise Conclusion that determines whether a project may proceed from an environmental compliance perspective.

2.5.2. Project Categorization under National Environmental Legislation

86. Projects are categorized according to their potential environmental impacts and associated environmental risks. The applicable review authority and review period depend on the assigned category.

Table 6. Project Categorization under National Environmental Legislation

Category	Environmental Risk Level	Reviewing Authority	Review Period
Category I	High environmental risk	National Center for State Environmental Expertise	Up to 20 working days
Category II	Medium environmental risk	National Center for State Environmental Expertise	Up to 15 working days
Category III	Low environmental risk	Regional Center for State Environmental Expertise or CSEE of the Republic of Karakalpakstan	Up to 10 working days

Category	Environmental Risk Level	Reviewing Authority	Review Period
Category IV	Local environmental impact	Regional Center for State Environmental Expertise or CSEE of the Republic of Karakalpakstan	Up to 5 working days

2.5.3. Public Consultation Requirements

87. The procedure for public consultations is established under Appendix 3 of Resolution No. 541. Public participation forms an integral component of the environmental assessment process and provides opportunities for affected communities, stakeholders, and interested parties to review and comment on proposed projects and their potential environmental impacts.

2.5.4. Stages of Environmental Impact Assessment

88. Section 24 of Resolution No. 541 defines the content requirements for environmental assessment documentation at each stage of the EIA process. The national EIA procedure consists of three sequential stages.

Table 7. Stages of Environmental Impact Assessment and Expected Outcomes

Stage	Description and Outcome
Stage I – Draft Environmental Impact Statement (PZVOS)	The Draft Environmental Impact Statement (PZVOS) represents the initial stage of environmental assessment and is prepared before a decision is made regarding implementation of a proposed activity. The document is reviewed through the State Ecological Expertise process at either national or regional level, depending on the project category. During this stage, the competent authority confirms the project category, identifies key environmental issues, and determines the scope of further studies and mitigation measures required during subsequent stages and project implementation.
Stage II – Additional Environmental Assessment Studies	This stage is undertaken where the State Ecological Expertise identifies the need for additional investigations, studies, or analyses during Stage I. The supplementary assessment documentation must be submitted to the competent environmental authority prior to approval of the project feasibility study.
Stage III – Statement on Environmental Consequences (ZEP)	The Statement on Environmental Consequences (ZEP) represents the final stage of the environmental assessment process and is prepared prior to project commissioning. The document describes modifications introduced during project development as a result of environmental review findings, public consultation outcomes, applicable environmental requirements, environmental monitoring obligations, and the final environmental conclusions regarding project implementation.

2.5.5. State Environmental Expertise Conclusion

89. The Conclusion of State Environmental Expertise issued by the CSEE is a mandatory regulatory document for obtaining project financing from domestic financial institutions and other lenders, as required under national legislation.

90. The SEE Conclusion remains valid for a period of three years from the date of issuance. Where project implementation has not commenced within this period, the environmental

assessment documentation must be updated and resubmitted for review and approval by the National Committee on Ecology and Climate Change.

91. Following issuance, the SEE Conclusion is transmitted to the relevant regional or city environmental inspection authorities. These authorities are responsible for monitoring compliance with the environmental conditions, mitigation measures, and requirements specified in the SEE Conclusion throughout project implementation and operation.

Box 1: ***According to the National Government Environmental Policy, the R8 subproject falls under Category II, and therefore, a national EIA report is required, and approval must be obtained from the authority***.[14]

2.6. Environmental Standards

92. Uzbekistan has a large set of specific standards that refer to emissions, effluent discharge, and noise standards, as well as standards to handle and dispose of specific waste ranging from wastewater to hazardous waste.

2.6.1. Air Quality Requirements

93. SanR&N 0293-11 with the full title: "Hygienic standards. The list of maximum permissible concentrations (MPC) of pollutants in the ambient air of settlements in the territory of the Republic of Uzbekistan". It applies to all enterprises, institutions, organizations, and individuals in Uzbekistan during the design, construction, reconstruction, and operation of facilities to ensure compliance with air quality standards. The standards list MPC values for approximately 485 different substances, categorized by their hazard class (I to IV). It specifies both single (maximum momentary) and average daily/monthly/annual MPCs, depending on the substance's effect. Below the table is a list of some emissions that can impact human health.

Table 7. Some of National Ambient Air Quality Limits for Human Health (mg/m³)

Air quality parameter	Maximum allowed during 30 min	Maximum allowed average daily	Maximum allowed average monthly	Maximum allowed average yearly
NO2	0.085	0.06	0.15	0.04
NO	0.6	0.25	0.12	0.06
SO2	0.5	0.2	0.1	0.05
CO	5	4	3.5	3
Dust (PM_{10})	0.15-0.5	0.1-0.35	0.08-0.2	0.05-0.15

94. According to the science-based recommendations of the 2005 WHO Air Quality Guidelines, limits have been set for the concentrations of key pollutants (Table 7A), including particulate matter ($PM_{2.5}$ and PM_{10}), ozone (O_3), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2), in order to minimise the health risks associated with air pollution.

[14]Decree of the Cabinet of Ministry No.541 of 7 September 2020 “On further improvement of the environmental impact assessment mechanism” (https://www.lex.uz/docs/4984499)

Table 7A. WHO Air Quality Standards

Air Quality Parameter	Period	Norm (mg/m3)
Sulphur Dioxide (SO2)	24 hours 10 minutes	20 500
Nitrogen Dioxide (NO2)	1 year 1 hour	40 200
Particulate Matter PM10	1 hour 24 hours	50 20
Particulate Matter PM2.5	1 hour 24 hours	25 10

95. The comparison indicates that WHO and national Uzbek air quality standards are largely consistent. Since 2024, Uzbekistan has been actively monitoring air quality levels. During project implementation, the contractor will be required to adhere to applicable national and international air quality standards at the construction site.

96. SanPiN 0350-17 establishes sanitary and epidemiological requirements for ensuring public health and regulating air quality. It applies to all entities involved in the siting, design, construction, and operation of facilities that generate air emissions. Oversight is carried out by the State Sanitary and Epidemiological Service. The regulation mandates the use of low-waste technologies, efficient resource use, and emission control measures. Construction or expansion of facilities in areas exceeding air pollution limits is prohibited unless emissions are reduced to meet maximum permissible emission (MPE) standards.

97. According to SanPin 0350-17, cement production falls under risk category II, and the sanitary protection zone for the facility and residential area should be at least 500 meters.

-

2.6.2. Noise and Vibration Standards

98. Uzbekistan's noise and vibration standards are governed by national sanitary norms and rules (SanPiN), which set maximum permissible levels for residential, public, and workplace environments. Regulatory bodies include the State Sanitary and Epidemiological Supervision Inspectorate and the Uzbek Agency for Technical Regulation (ATR). SanPiN No. 0267-09 establishes permissible noise levels in residential areas, public buildings, and urban areas from external and internal sources (Table 8).

Table 8. Maximum Allowable Noise Level, SanPiN #0267-09

Receptor Location	Time Period	Maximum Allowable Noise Level
Outside residential dwellings	07:00 - 23:00 (Day)	55 dB (decibels)
Outside residential dwellings	23:00 - 07:00 (Night)	45 dB (decibels)

99. According to the IFC EHS Guidelines, noise impacts should not exceed a maximum allowed background level (3dB) at the nearest off-site receptor location, as shown in the Table 8A.

Table 8A. Noise Level Guidelines, IFC EHS

Receiver	General EHS Guidelines	
	Day time (7.00 am – 10.00 pm) (dB)	Night time (10.00 pm – 7.00 am), (dB)
Residential	55	45

Offices, commercial	70	70

100. SanPiN No. 0325-16: Defines permissible noise levels in the workplace. These standards must be taken into account in regulatory and technical documents, building codes and regulations, technical conditions, instructions, methods and so on, which determine the design, technological and production requirements for production facilities and engineering and sanitary equipment. o improve occupational health and safety conditions, it is recommended to reduce permissible sound levels for specific types of work, taking into account the severity and intensity of labor activities, in accordance with Table 8B below.

Table 8B. Optimal Sound Levels in Workplaces by Work Severity and Intensity Category, dB(A)

Work Intensity Category	Work Severity Category			
	Mild I	Moderate II	Severe III	Very Severe IV
Lowly Stressful – I	80	80	75	75
Moderately Stressful – II	70	70	60	60
Severe – III	60	60	-	-
Very Stressful – IV	50	50	-	-

101. **The law, "On Protection of the Population from Harmful Noise Effects,"** was adopted in Uzbekistan in 23.09.2025. This legislation defines new noise standards and strengthens administrative penalties for violations, including specific regulations for construction work hours in apartment buildings. Key provisions include quiet hours to protect public peace. The nighttime restriction period is extended to eight hours, from 11:00 p.m. to 7:00 a.m. on weekdays and from 10:00 p.m. to 9:00 a.m. on weekends and holidays. Violations of these regulations are subject to administrative penalties.

102. During the construction phase, both national and international noise limits are consistent and will be applied, including nighttime standards. For workplace noise, compliance will be ensured in accordance with national sanitary regulations and occupational health guidelines.

103. **SanPiN RUz No. 0326-16** is the "Sanitary norms of general and local vibration in workplaces". The SanPiN establishes sanitary standards for general and local vibration in workplaces affecting workers operating machinery, vehicles, and vibrating hand tools. It applies to seated or standing workers exposed to vibration through supporting surfaces or hand-held equipment.

104. The regulation outlines collective protection measures, including dynamic balancing, vibration damping, isolation, and frequency adjustment to avoid resonance. Project-related vibration sources fall under:

- Category 1 – transport-related vibration from self-propelled or towed machinery (e.g., tractors, rollers, graders, trucks);
- Category 2 – vibration from stationary or limited-mobility machinery operating on prepared surfaces (e.g., concrete pavers, track machines).

105. Personal protective measures include vibration-resistant gloves and footwear, as well as appropriate work–rest schedules to reduce exposure risks.

106. The maximum permissible values of the standardised vibration parameters in octave frequency bands, for a vibration exposure duration of 480 minutes (8 hours), are given in the tables 8C.1 and 8C.2 below.

Table 8C.1. Sanitary standards for general vibration, category 1 – transport

Geometric mean frequencies of octave bands, (Hz)	Permissible values of vibration acceleration and vibration velocity in octave frequency bands							
	vibration acceleration				vibration velocity			
	m/s2		dB		m/s2 · 10-2		dB	
	Zo	Xo, Yo	Zo	Xo, Yo	Zo	Xo, Yo	Zo	Xo, Yo
1.0	1.12	0.4	71	62	20.0	6.3	132	122
2.0	0.8	0.4	68	62	7.1	3.5	123	117
4.0	0.56	0.8	65	68	2.5	3.2	114	116
8.0	0.56	1.6	65	74	1.3	3.2	108	116
16.0	1.12	3.15	71	80	1.1	3.2	107	116
31.5	2.24	6.3	77	86	1.1	3.2	107	116
63.0	4.50	12.50	83	92	1.1	3.2	107	116
Adjusted and equivalent adjusted values and their levels	0.56	0.4	65	62	1.1	3.2	107	116

Table 8C.2 Sanitary standards for general vibration, category 2 – transport and technological

Geometric mean frequencies of octave bands, (Hz)	Permissible values of vibration acceleration and vibration velocity along the axes Zo, Xo, Yo			
	vibration acceleration		vibration velocity	
	m/s2	dB	m/s2 · 10-2	dB
2.0	0.4	62	3.5	117
4.0	0.28	59	1.3	108
8.0	0.28	59	0.63	102
16.0	0.56	65	0.56	101
31.5	1.12	71	0.56	101
63.0	2.25	77	0.56	101
Adjusted and equivalent adjusted values and their levels	0.28	59	0.56	101

107. International requirements for workplace vibration are primarily based on the EU Physical Agents (Vibration) Directive 2002/44/EC and international standards such as ISO 2631 (whole-body vibration) and ISO 5349 (hand-arm vibration).

108. The EU Directive sets harmonized Exposure Action Values (EAVs) and Exposure Limit Values (ELVs), which are widely recognized and adopted globally by various national bodies (e.g., UK HSE, ACGIH, CCOHS) and reflected in the table 8C.3.

- Table 8C.3 EU Directive of Exposure Action Values (EAVs) and Exposure Limit Values (ELVs)

Type of Vibration	Exposure Action Value (EAV) (daily A(8))	Exposure Limit Value (ELV) (daily A(8))
Hand-Arm Vibration (HAV)	2.5 m/s²	5.0 m/s²

Whole-Body Vibration (WBV)	0.5 m/s² (or 9.1 m/s VDV)	1.15 m/s² (or 21 m/s VDV)

109. Employers are required to take specific actions to protect workers' health and safety:

- Assess Risk: Evaluate the vibration risk to workers based on exposure levels, type, duration, and equipment used.
- Implement Control Measures: If EAVs are exceeded, a program of technical and organizational measures must be implemented to reduce exposure to a minimum. This includes using low-vibration equipment, providing vibration-damping seats/handles, maintaining equipment, and implementing appropriate work schedules with rest periods.
- Ensure ELVs Are Not Exceeded: Immediate action must be taken to reduce exposure below the ELV if it is exceeded.
- Provide Information and Training: Workers must receive information on potential risks, exposure limits, and safe working practices.
- Provide Health Surveillance: Regular health checks are required where a risk to health remains, to rapidly diagnose any disorder linked with exposure.

110. The national standards for permissible values of vibration acceleration and vibration velocity on work equipment are outlined above. International standards, meanwhile, define exposure action values (EAVs) and exposure limit values (ELVs). During construction, the contractor must assess the vibration intensity of the equipment and the duration of worker exposure to ensure compliance with the relevant safety limits.

-

2.6.3. Soil Quality Norms

111. **SanPiN No. 0191-05** sets out the maximum and approximate permissible concentrations (MPCs and APCs respectively) of harmful substances in soil. The establishment of enterprises and new workshops associated with soil pollution, as well as the introduction of associated technologies, is permitted only if the relevant hygienic regulations concerning the content of substances in soil and the methods for determining them are in place. The document provides a list of MPCs and APCs of exogenous chemicals and preparations in soil (mg/kg).

112. **SanPiN No. 0272-09** — Sanitary Rules and Norms for Developing Hygienic Justifications for Soil Protection from Pollution in Uzbekistan: establishes key requirements for preparing hygienic justifications in soil protection schemes, outlining the roles and responsibilities of state sanitary supervision bodies in preventing soil contamination.

113. **SanPiN No. 0212-06** — Sanitary Rules and Norms for Hygienic Assessment of Soil Contamination for Various Land Uses: provides a standardized methodology for evaluating soil contamination levels, including a system of hygienic indicators for use in technical regulations, environmental assessments, and pollution monitoring.

-

2.6.4. Waste Management

114. The Law of the Republic of Uzbekistan on Waste, No. 362-II of April 5, 2002, regulates waste management. The primary objectives of this Law are to prevent the harmful impact of waste on the life and health of citizens and the environment, reduce waste generation, and ensure its rational use in economic activities.

115. According to the Law the Cabinet of Ministers of the Republic of Uzbekistan is conducting the waste management and ensure compliance. The authorized bodies for waste management are the Ministry of Ecology, Environmental Protection, and Climate Change; the Ministry of Health of the Republic of Uzbekistan; the Uzbek Agency "Uzkommunkhizmat"; the State Committee for Industrial Safety of the Republic of Uzbekistan.

116. Resolution of the Cabinet Ministries No. 14 of 21 January 2014 defines the procedure for waste generation, inventory, and disposal. Under this resolution, waste passports for each type of sanitary, hygienic, and consumer waste, as well as generation standards, are established following Appendix 14 of this document. The resolution identifies five types of waste. The environmental

hazard of waste is determined using the waste classification based on Appendix 15 of this Regulation.

117. According to SanR&N RUz No. 0297-11, municipal solid waste (MSW) in Uzbekistan typically includes paper, food waste, plastics, wood, metal, glass, textiles, rubber, ash, and yard debris. In local conditions, MSW composition reflects high proportions of organic and packaging materials due to fruit, vegetable, and street waste.

118. The average generation rate of MSW is approximately 1.17 kg per person per day (or 437.7 kg per year). MSW generally contains a high share of biodegradable and combustible components, allowing for safe disposal through landfilling, composting, or bio-fermentation.

119. Hazardous waste management laws aim to prevent environmental and health risks associated with hazardous materials and ensure their safe handling, transportation, and disposal. The order to place hazardous chemicals and hazardous materials in special landfills, their protection and disposal, approved by the State Committee for Nature Protection, the Ministry of Emergency Situations, the Ministry of Finance, the Ministry of Health No. 2438 of March 20, 2013. The provision identifies hazardous chemicals, toxic materials, special landfills and special vehicles. The state organization “Kishlokkime” (Agricultural Chemicals) is responsible for the transportation and disposal of hazardous materials.

120. Transportation of such materials should be carried out in accordance with the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 35 dated February 16, 2011 “On rules of transportation of hazardous materials in the territory of Uzbekistan”. The Ministry of Health and the State Committee for Nature Protection approves proper performance of work

121. The project may generate limited quantities of asbestos-containing waste (ACW) during rehabilitation of existing irrigation and administrative facilities. Management of asbestos waste must comply with SanR&N 0158-04 “Collection, Transportation, and Disposal of Asbestos-Containing Materials”, which requires:

- Controlled removal and secure packaging of asbestos materials;
- Transport to authorized landfills with engineered liners;
- Prohibition of open dumping or burning; and
- Limitation of Class III asbestos waste to 30% of the total solid waste volume.

122. In case asbestos is identified, the Contractor will prepare an Asbestos-Containing Material Management Plan (ACMMP) outlining safety measures, worker protection, and disposal methods.

123. During the project’s construction phase, waste will mainly comprise packaging materials, domestic refuse from workers, and excavated materials. All MSW will be collected in covered containers and transported by licensed service providers to designated municipal disposal sites in compliance with national sanitary standards.

124. All hazardous waste must be transported by licensed carriers with an environmental waste certificate and appropriate permits. The Contractor and PIU are responsible for ensuring compliance with national regulations, maintaining records, and implementing mitigation measures to minimize waste-related impacts during project implementation.

-

2.6.5. Water Quality Standards

125. **The Water Code o**f the Republic of Uzbekistan came into force on 31 October 2025. The document establishes the legal framework for the rational use and protection of water resources, water bodies, hydraulic structures, and land within the national water fund. Under the Code, water is recognized as a national asset subject to rational use and protection by the state. It introduces two types of water use: general and special.

126. Water bodies include both surface and underground waters located within Uzbekistan, as well as transboundary resources crossing its borders. These may be used either individually or jointly. To ensure effective decision-making in water resource management, the Code provides for the creation of Water Councils — advisory and collegial bodies at the national and basin levels, and, where necessary, at the regional level. A Republican Water Council will function under the Cabinet of Ministers.

127. The Code stipulates that water bodies may be granted for permanent or temporary use, including through public-private partnership agreements. Temporary use is set for a period ranging from three to 49 years. General water use includes the extraction of water for personal drinking and domestic needs, bathing, livestock watering, and amateur or sports fishing. These activities are allowed freely and without special permits. Special water use requires official authorization in cases defined by the Code.

128. The Code also introduces the concept of water servitude, which may be established for general use purposes such as pedestrian and vehicle passage, livestock watering and driving, and ensuring free access to coastal areas. Such servitudes may be either public or private. For violations of water use regulations, the Code imposes financial penalties on legal entities. In particular, exceeding water intake limits will result in a fine of 20% of the basic estimated valuefor each 1,000 cubic meters; water extraction without contracts — 30%; without measurement and control equipment — 5%; and without special permits — 40% of the basic estimated valueper the same volume. Repeat violations within one year will result in fines multiplied fivefold.

129. **Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 82** (March 19, 2013) "On Approval of the Regulation on the Procedure for Water Use and Consumption in the Republic of Uzbekistan". This Resolution establishes the regulatory framework for the use and consumption of water resources within the Republic of Uzbekistan. It defines procedures for setting water abstraction limits from surface and groundwater sources, which are determined by water management authorities in coordination with the State Committee for Geology and Mineral Resources.

130. Compliance monitoring is carried out by the Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC) and the Inspectorate for Control over the Safety of Water Management Facilities and Water Use under the Ministry of Water Management. The Inspectorate is responsible for oversight of water abstraction from both natural and artificial water bodies.

131. Violations of water use regulations are subject to administrative liability in accordance with the Administrative Liability Code of the Republic of Uzbekistan. The Resolution ensures the sustainable and efficient use of water resources, emphasizing conservation and legal compliance in all water-related activities.

132. **SanPiN No 0255-08** provides the criteria for hygienic assessment of the level water bodies contamination for health risks to the population in Uzbekistan. The current SanPiN includes 12 of the most priority indicators. These characterise the degree of pollution of surface water bodies. (See Table (9.A.)

Table 9A. Criteria for hygienic assessment of the degree of water pollution in surface water bodies

No.	Indicators	Degree of water pollution			
		acceptable	moderate	strong	very strong
1.	Exceeding the maximum permissible concentration for organoleptic indicators	<1.0	1.1-4.0	4.1-8.0	>8.0
2.	Exceeding the maximum permissible concentration for sanitary and toxicological indicators	<1.0	1.1-3.0	3.1-10.0	>10.0
3.	Mineralization: mg/l (dry residue)	<1000	1001-1500	1501-3000	>3000
4.	Smell, taste (points)	<2.0	2.1-3.0	3.1-4.0	>4.0
5.	BOD total, mgO_2/l (reservoirs of category 1)	<3.0	3.1-5.0	5.1-7.0	>7.0
6.	BOD total, mgO_2/l (reservoirs of category 2)	<6.0	6.1-8.0	8.1-10.0	>10.0

7.	COD mgO $_2$ /l (reservoirs of category 1)	<15.0	15.1-30.0	30.1-40.0	>40.0
8.	COD mgO $_2$ /l (reservoirs of category 2)	<30.0	30.1-40.0	40.1-50.0	>50.0
9.	Solution, oxygen mgO $_2$ /l	>4.0	3.9-3.0	2.9-1.0	<1.0
10.	Permanganate oxidizability, mgC2 $_/$ l	<2.0	2.1-5.0	5.1-10.0	>10.0
11.	Coli index (number of coliform bacteria in 1 l)	$<1\cdot10^4$	$1\cdot10^4$-$1\cdot10^5$	$1\cdot10^5$-$1\cdot10^6$	$>1\cdot10^6$
12.	Percentage of samples with pathogens of intestinal infections	0	0.1-3.0	3.1-5.0	>5.0

133. The organoleptic quality of water in surface water bodies is most often ranked by such indicators as odor and taste, which are expressed in points during a subjective assessment by volunteers. An odor and taste of 2 points is acceptable for the water, when a deterioration in the organoleptic quality of the water is recorded only when the volunteer pays attention to the nature of the change in odor and taste.

134. The table includes two indicators related to the determination of the total biochemical oxygen consumption in the water of surface water bodies of categories 1 and 2, for which the permissible values are 3.0 and 6.0 mgO2 / l, respectively.

135. Taking into account the requirements of the rules for selecting sources of centralized household and drinking water supply for the population in Uzbekistan, the list of key assessment indicators includes permanganate oxidizability of water with an acceptable value of 2.0 mgO2 / l.

136. The coliform index of water, which characterizes the number of coliform bacteria in 1 liter of water, is most often used as a criterion for bacteriological contamination of surface water bodies. Since the water of surface water bodies is subject to disinfection and purification, a value of less than 1 • 10 4 is considered acceptable .

137. As an additional indicator for assessing the level of microbial contamination of water, the indicator of the specific gravity (in %) of water samples with the detection of pathogens of the main intestinal infections has also been proposed.

138. **Decree of the Cabinet of Ministers No. 255** of 31 March 2018 on the approval of certain administrative provisions for the provision of public services in the field of natural resource use (scheme for issuing permits for special water use or consumption), as amended on 15 January 2020.

139. **SanPiN RUz No. 0318-15**. Hygienic and anti-epidemic requirements for the protection of water in reservoirs on the territory of the Republic of Uzbekistan.

140. **Decree of the Cabinet of Ministers No. 981** of 11 December 2019: 'Regulation on the procedure for establishing water protection zones and sanitary protection zones for water bodies on the territory of the Republic of Uzbekistan". The legialtion establishes protection zones for various water sources, including natural bodies of water, artificial wetlands and infrastructure that constitutes water supply systems (i.e. waterworks). The width of the mandated water source protection buffer for rivers is a function of the riverine discharge, as detailed below:

- For rivers with a capacity of more than 100 cubic metres of water per second, the width is 300–500 metres.
- For rivers with a capacity of between 5 and 100 cubic metres per second, the width is between 100 and 300 metres.
- For rivers with a capacity of 2–5 cubic metres per second, the width is 50–100 metres.
- For rivers with a capacity of less than 2 cubic metres per second, the buffer is under 35–50 metres.

141. The riverine buffer is measured from each riverbank (i.e. the mean annual bank position is taken into account). The width of the water protection zones varies along the length of the river, depending on the flow rate of each segment. While the above protections are mandated by law, assessments to determine the riverbanks (from which the protection zones are measured) and the

appropriate protection zone are undertaken on a case-by-case basis for various development projects. This participatory process involves expert input from the Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC), the Ministry of Water Resources and project developers.

2.7. Labour-Related Policis

142. Table 10 enumerates few national policies related to the right of workers, occupational health & safety and social safeguards.

Table 10: Policy Related to Worker Rights, Health and Safety

Law/regulation	Date of adoption	Date of last amendment	Description
Civil Code	29.08.1996	08.11.2022	Civil legislation is based on the recognition of the equality of participants in the relations regulated by it, the inviolability of property, freedom of contract, the inadmissibility of arbitrary interference by anyone in private affairs, the need for the unhindered exercise of civil rights, ensuring the restoration of violated rights, and their judicial protection. Citizens (individuals) and legal entities acquire and exercise their civil rights of their own will and in their own interest. They are free to establish their rights and obligations on the basis of the contract and to determine any terms of the contract that do not contradict the law.
Labor Code	30.04.2023	14.02.2025	Establishes state guarantees for workers' rights, including fair and safe working conditions, freedom of employment choice, and protection from unemployment. It also defines employers' rights in recruitment and labour organization, promotes social partnership, and ensures the effective functioning of the labour market..
Law on Population Employment ZRU#642	20.10.2020	07.02.2025	Regulates employment relationships based on principles of freedom of choice, state support, and non-discrimination. It aims to improve the labor market through government policies, provide support for vulnerable groups, and implement modern systems like the unified national labor system for electronic registration. Key provisions include state subsidies to employers for training, encouraging the employment of people with disabilities, and promoting family entrepreneurship.
Law on Public Health	29.08.1996	21.01.2023	Deal with protection of public health - ensuring guarantees of citizens' rights to health protection by the state; formation of a healthy lifestyle of citizens; legal regulation of the activities of government bodies,

Law/regulation	Date of adoption	Date of last amendment	Description
			enterprises, institutions, organizations, public associations in the field of protecting the health of citizens.
Law on Sanitary and Epidemiological Welfare of the Population	26.08.2015	04.11.2022	Deal with sanitary and epidemiological well-being of the population - development and implementation of sanitary, hygienic and anti-epidemic measures and so on
Law on Labor Protection	22.09. 2016		The law establishes a uniform procedure for organizing labor protection, regardless of production methods, forms of ownership, and is aimed at ensuring the health and labor protection of citizens.
Law on Appeals of Individuals and Legal Entities	04.12. 2014	11.09.2017	The law establishes a unified procedure for regulating relations in the field of appeals of individuals and legal entities to government bodies and government agencies

143. **Labor code** and **Law on population employment are the** two main legislations regulating labour relations, provision related to labour protection, their rights and so on. Below table (10.A) briefly provide a summary of the main provisions;

Table 10A: Important Provisions for Labours

Principle of equal labor rights, prohibition of discrimination in the sphere of labor and occupation	Provision of labour rights, prohibit discrimination based on gender, age, race, nationality, language, social origin, property and official status, place of residence, attitude to religion, beliefs etc.
Forced labour is prohibited	Provision for Principle of freedom of labor and the prohibition of forced labor.
Age of employment.	The minimum age of employment in Uzbekistan is 15, with exceptions for light work for those aged 14, and for cultural and entertainment roles for those under 15, provided parental consent is given. Individuals under 18 require written consent from a parent or guardian, and employment for minors is prohibited in hazardous jobs.
Wages and deductions..	The minimum wage is 1.271 million soums, the basic calculation value (BCU) used to determine fees, fines, duties and other fixed payments 412 thousand soums.[15]
Women	Women have equal right for employment, work, weekend, salary. Night work, overtime work, weekend

[15] https://tashkenttimes.uz/national/15721-what-changes-to-regulations-as-of-august-1#:~:text=The%20minimum%20wage%20and%20the,stipends%20will%20rise%20by%2010%25.

	work, provision for pregnant women and women with children under 14,maternity leave etc
Work time.	Provisions for standard workweek including women with children under 3 years of age, remuneration for extra work, leave etc
Vacation	**Provision for** minimum labor leave, vacation for disabled workers (Articles 218), additional annual leave for work in unfavorable conditions etc
Overtime work	(Article 262), it has provision for paid overtime work, additional rest time instead of increased pay against overtime, provision for compensation for overtime work should not be less than 200% of the average monthly employee wages
Labor disputes.	Provision for guaranteed protection of labor rights, labor disputes can be heard by labor dispute commissions/unions. An employee can also file a complaint about violation of labor rights through the portal of the President's Office.

144. **Law on Labor Protection**, dated 22.09.2016. - The law is aimed at labour protection - Specifies rights and obligations of an employee and an employer, includes provisions for certification of workplaces according to working conditions, mandatory medical examinations, investigation and registration of accidents at work and occupational diseases, state supervision and control over compliance with labor protection, rights of trade unions.

145. **Law on Appeals of Individuals and Legal Entities** dated 04.12. 2014 № ZRU-378 dated 03.12.2013 (new edition № ZRU-445 dated 11.09.2017). Any aggrieved individual can appeals to state bodies and state institutions (hereinafter referred to as state bodies), as well as to their officials. Article 5 specifies the applications, suggestions and complaints as the types of appeals that can be submitted in verbal, written or electronic forms. An appeal received by a state body, organization or their official is subject to registration on the same day, and in case of receipt after the end of working hours, on the next business day. Refusal to register an appeal is not allowed. Article 18 states that the application or complaint is considered within fifteen days from the date of receipt by the state body, organization or their official, and within one month in case the additional study and (or) verification is required (in the latter care the information is provided to the individual or legal entity that submitted the appeal within ten days).

-

2.8.Climate Inclusion in National Policy

-

146. The Government has adopted number of documents related to regulating actions and implementing measures in the field of climate change and enacted policy related to climate change such as The Law “On the Use of Renewable Energy Sources” of 21.05.2019. To boost climate action, the government has mainstream climate actions and measures sectoral development strategies: such as the Strategy for Solid Waste Management (2019-2028), the Strategy for the Conservation of Biological Diversity until 2028, the Concept of Environmental Protection until 2030, including established measures to improve energy efficiency and reduce greenhouse gas

emissions and so on. The Presidential Decree of 04.10.2019 approved the Strategy for the transition of the Republic of Uzbekistan to a “green” economy for the period 2019-2030 years.

147. The Climate Council under the President of the Republic of Uzbekistan was established according to the **Decree of the President of the Republic of Uzbekistan dated 23 July 2024, No. UP-106**. The Climate Council serves as the highest advisory body to the President of the Republic of Uzbekistan on climate change mitigation and adaptation. One of the main tasks of the Climate Council will be to monitor Uzbekistan's fulfillment of its obligations under the United Nations Framework Convention on Climate Change and the Paris Agreemen.

148. **Law No. 1073, adopted on July 7, 2025 “On Limiting Greenhouse Gas Emissions”**, establishes a framework for systematically reducing emissions, regulating the carbon balance, and promoting green initiatives. Effective January 9, 2026, the law defines the core principles of Uzbekistan’s climate policy, including sustainable economic growth with lower emissions, priority use of renewable energy, transparent reporting, and fulfillment of international commitments.

149. It authorizes public and private entities to implement emission reduction and climate adaptation projects, with verified results recorded in the national carbon registry. Revenues from domestic carbon credit trading will be directed toward climate adaptation, circular economy development, and other environmental priorities.

150. The Cabinet of Ministers of the Republic of Uzbekistan is responsible for implementing national policies on climate change mitigation and greenhouse gas (GHG) reduction. It oversees the development of state programs, ensures integration of emission reduction principles into national planning, and promotes international cooperation through intergovernmental agreements.

151. The Ministry of Ecology, Environmental Protection, and Climate Change (MEEPCC) serves as the key implementing body for climate policy. It coordinates national and regional GHG reduction programs, develops and monitors the National Climate Strategy, and maintains the national GHG inventory. Together with the Ministry of Economy and Finance, it conducts GHG emission inventories, develops quantification methodologies, and prepares official reports for submission under the UNFCCC framework.

152. **Resolution of the President of the Republic of Uzbekistan dated August 15, 2025, No. PP-250.** The program aimed at improving water resources management and developing the irrigation sector in Uzbekistan for the period 2025–2028. Over recent years, Uzbekistan has invested heavily in repairing irrigation infrastructure and adopting water-saving technologies. The newly adopted program sets out ambitious goals to build on these achievements.

153. Key measures include reconstructing 2,551 kilometers of irrigation networks and upgrading pumping stations with energy-efficient equipment, reducing annual electricity consumption from 6.8bn kWh to 6.2bn kWh. Addressing land quality is also central to the plan. The program targets a reduction in poorly irrigated areas—from 424,000 hectares to 276,000 hectares—and aims to lower salinity and problematic groundwater zones. As a result, 460,000 hectares of previously abandoned land are expected to be brought back under cultivation.

154. Water-saving technologies will be extended over an additional 1.4mn hectares, including the introduction of drip irrigation on 293,000 hectares. Modernization of control and measurement systems will take place at 20 major facilities. To minimize human error in water monitoring, digital systems will be installed in 12,000 reclamation observation wells and 1,750 pumps, and 12 large water management facilities will be transitioned to automated digital control.

155. The program also plans to increase the share of concrete-lined canals from 39% to 47%, reducing water loss and improving network quality. It is projected that water savings will reach 10bn cubic meters this year and rise to 14bn cubic meters by 2028.

156. Cabinet of Ministers Resolution No. 783 (November 25, 2024): Mandates the installation of automated stations for monitoring air pollution around high-impact industrial enterprises and the installation/modernization of high-efficiency dust and gas cleaning equipment.

157. Cabinet of Ministers Resolution No. 117 (March 7, 2024): Issued temporary regulations for greenhouse gas emissions trading projects, designating the Ministry of Economy and Finance as the responsible body for the national and international carbon market.

2.9.Biodiversity related Policy in Uzbekistan

158. Uzbekistan has established a comprehensive national policy and legal framework for the conservation and sustainable use of biodiversity. The country's biodiversity policy is anchored in the National Strategy for the Conservation of Biological Diversity and the National Biodiversity Strategy and Action Plan (NBSAP) for the period 2019–2028. These strategic documents are led by the Ministry of Ecology, Environmental Protection and Climate Change and are aligned with the UN Convention on Biological Diversity's Kunming-Montreal Global Biodiversity Framework (GBF)[16].

159. Uzbekistan was the first country in Central Asia to officially publish its updated national biodiversity targets under the GBF. The country has committed to the 30x30 Target (conserving at least 30% of its land, inland waters, and marine areas by 2030) and the restoration of at least 30% of degraded ecosystems, with special focus on the Aral Sea Basin[17].

2.9.1. Key National Laws on Biodiversity

- Law of the Republic of Uzbekistan on Protected Natural Areas (No. 710-II of 3 December 2004, last amended on 14 May 2026);
- Law of the Republic of Uzbekistan on Protection and Use of Flora (No. 543-I of 26 December 1997, last amended in 2024);
- Law of the Republic of Uzbekistan on Protection and Use of Fauna (No. 545-I of 26 December 1997, last amended in 2024);
- Law of the Republic of Uzbekistan on Forestry (No. 770-I of 14 April 1999, last amended on 16 April 2018).

2.9.2. Key Cabinet of Ministers Decrees and Resolutions

- Decree of the Cabinet of Ministers No. 484 dated 11 June 2019 — On Approving the Strategy for the Conservation of Biological Diversity in the Republic of Uzbekistan for 2019–2028;
- Decree of the Cabinet of Ministers No. 290 dated 20 October 2014 (as last amended on 27 May 2019) — On the Settlement of the Use of Biological Resources and Permitting Procedures in the Field of Nature Use;
- Decree of the Cabinet of Ministers No. 4247 dated 20 March 2019 — On Measures to Improve the Public Administration System in the Sphere of Protected Natural Territories;
- Decree of the Cabinet of Ministers No. 1034 dated 19 December 2018 — On the Organization of the Preparation, Edition, and Management of the Red Book of the Republic of Uzbekistan.

160. The Project will ensure full compliance with the above national laws, strategies, and decrees, as well as the requirements of the Asian Development Bank's Safeguard Policy Statement (SPS) 2009, particularly with respect to the conservation of biodiversity, protection of natural habitats, and sustainable management of ecosystems.

2.10.ADB Safeguard Requirements

161. The Asian Development Bank SPS, 2009 provides a comprehensive framework for environmental and social management in all ADB-financed projects. It establishes principles for identifying, assessing, and mitigating environmental impacts; preparing environmental assessment reports; ensuring information disclosure and stakeholder engagement; implementing a Grievance Redress Mechanism (GRM); and maintaining monitoring and reporting systems. The SPS also specifies safeguards related to biodiversity conservation, sustainable use of natural resources, pollution prevention, occupational and community health and safety, and the protection of physical and cultural heritage.

[16] https://www.undp.org/uzbekistan/publications/new-national-biodiversity-conservation-targets
[17] https://www.cop28.com/en/thought-leadership/The-30x30-Biodiversity-Goal-at-COP28

162. ADB ensures compliance through due diligence, review, and regular supervision throughout all phases of project implementation.

- Environment
- Involuntary Resettlement
- Indigenous Peoples
- Special Provisions for Different Financing Modalities

• The table (Table 11) below outlines the safeguards applicable to this project.

Table 11. Applicability of SPS 2009

Component of SPS 2009	Applicability to Project
Environment safeguards	Applicable
- Environmental Assessment	
- Environmental Planning and Management	
- Information Disclosure	
- Consultation and Participation	
- Grievance Redress Mechanism	
- Monitoring and Reporting	
- Unanticipated Environmental Impacts	
- Biodiversity Conservation and Sustainable Natural Resource Management	
- Pollution Prevention and Abatement	
- Health and Safety	
- Physical Cultural Resources	
Involuntary Resettlement	Not Applicable
Indigenous Peoples	Not Applicable

2.10.1.Safeguard Process:

- Screening and Scoping: Early identification of potential issues begins as soon as the project is considered for ADB financing, continuing throughout the project cycle.
- Impact Assessment and Planning: Detailed assessment of environmental and social impacts leads to the creation of safeguard plans, outlining mitigation measures, monitoring systems, and institutional roles.
- Consultation: Ongoing dialogue with affected communities ensures their participation and access to project-related information.
- Disclosure: Safeguard plans are made available to the public, ensuring transparency and accountability at various stages.

2.10.2.Screening and Categorization

163. Each project undergoes an initial screening and categorization process based on the anticipated type, scale, and magnitude of environmental impacts:

- **Category A:** Projects expected to cause significant, diverse, or irreversible impacts require a full Environmental Impact Assessment (EIA) and an Environmental Management Plan (EMP).
- **Category B:** Projects with site-specific, limited, and reversible impacts require an Initial Environmental Examination (IEE) with an EMP.
- **Category C:** Projects expected to have minimal or no adverse impacts require no formal EIA, though environmental implications must still be reviewed.
- **Category FI:** Projects implemented through Financial Intermediaries (FIs) follow environmental and social management procedures defined by ADB.

2.10.3. Sector Policies:

164. Several sector-specific policies incorporate environmental safeguards, notably in water, energy, and forestry. These policies, like the general safeguard framework, aim to ensure sustainable and responsible development practices across sectors.

165. The ADB's safeguard policies emphasize the avoidance, minimization, or mitigation of adverse impacts while prioritizing the protection of the environment, affected people, and Indigenous communities. Through structured processes involving consultation, planning, and disclosure, the ADB ensures that its projects follow sustainable practices while minimizing harm to vulnerable populations and ecosystems.

166. A fundamental principle of ADB's safeguard policies is that the borrower/client is primarily responsible for implementing the provisions of these policies. This responsibility entails several key actions on the part of the borrower/client, including:

- Social and Environmental Assessments: Conducting thorough assessments to understand the impacts of the project.
- Consultations with Affected People: Engaging in meaningful consultations with communities and individuals who may be affected by the project.
- EMP Preparation and Implementation: Preparing and executing environmental monitoring plans to avoid or mitigate negative impacts.
- Monitoring: Continuously monitoring the implementation of the safeguard measures.
- Reporting: Preparing and submitting regular monitoring reports to ADB on the progress of safeguard plan implementation.

2.10.4.ADB's Extended Policies:

167. In addition to the main safeguard policies, other ADB policies relevant to project processing and implementation include:

- ADB Social Protection Strategy (2001): Ensures the inclusion of vulnerable groups and aims to reduce social risks.
- ADB Policy on Gender and Development (2003): Promotes gender equality and women's empowerment in all ADB operations.
- ADB Access to Information Policy (2018): Focuses on ensuring transparency by providing public access to information related to ADB's operations.
- These policies collectively support ADB's goal of ensuring that projects are socially inclusive, environmentally sustainable, and transparent, thereby promoting long-term, responsible development**.**

2.11. International Conventions and Agreements

168. The Republic of Uzbekistan has approved and adopted following (see table 12) international conventions for environmental protections in the country.

Table 12: International Conventions and Treaties

Sr.No	International Conventions and Treaties[18]	Date of coming into force for Uzbekistan
1	UN Framework Convention on Climate Change	21 March 1994
2	Kyoto Protocol to UNFCCC	16 February 2005
3	Montreal Protocol on Substances that Deplete the Ozone Layer (with London, Copenhagen, Montreal amendments)	18 May 1993 London – 08.09.1998; Copenhagen – 08.09.1998l; Montreal – 29.01.2007
4	Vienna Convention on the Protection of Ozone Layer	18 May 1993
5	Ramsar Convention on Wetlands of International Importance Especially as Wildlife Habitat	8 February 2002
6	UN (Rio) Convention on Biological Diversity	17 October 1995
7	Convention on International Trade in Endangered Species of Wild Fauna and Flora	8 October 1997
8	Convention on Migratory Species of Wild Animals	1 September 1998
9	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	7 May 1996
10	United Nations Convention to Combat Desertification	29 January 1996
11	Paris Convention on Protection of the World Cultural and Natural Heritage	15 June 1996
12	The Agreement between the Government of Republic of Kazakhstan, the Government of the Kirghiz Republic, the Government of Republic of Tajikistan, the Government of Turkmenistan and the Government of the Republics Uzbekistan about the status of IFAS and its organizations	9 April 1999
13	Joint Statement of the Heads of the states - founders of the International Fund for saving the Aral Sea	28 April, 2009
14	Committed to implement the 2030 Agenda for Sustainable Development.[19]	2015
15	Joint Communique of the Council of the Heads of the state – founders of the International Fund for Saving of Aral Sea	24 August, 2018
16	Dushanbe Statement of the Heads of Founding States of the International Fund for Saving the Aral Sea	15 September, 2023

-

2.12. Climate Inclusion in National Policy

-

169. The Government has adopted number of documents related to regulating actions and implementing measures in the field of climate change and enacted policy related to climate change

[18] https://www.adb.org/sites/default/files/linked-documents/50063-001-ieeab.pdf
[19] https://sustainabledevelopment.un.org/memberstates/uzbekistan

such as The Law “On the Use of Renewable Energy Sources” of 21.05.2019. To boost climate action, the government has mainstream climate actions and measures sectoral development strategies: such as the Strategy for Solid Waste Management (2019-2028), the Strategy for the Conservation of Biological Diversity until 2028, the Concept of Environmental Protection until 2030, including established measures to improve energy efficiency and reduce greenhouse gas emissions and so on. The Presidential Decree of 04.10.2019 approved the Strategy for the transition of the Republic of Uzbekistan to a “green” economy for the period 2019-2030 years.

170. The Climate Council under the President of the Republic of Uzbekistan was established according to the **Decree of the President of the Republic of Uzbekistan dated 23 July 2024, No. UP-106**. The Climate Council serves as the highest advisory body to the President of the Republic of Uzbekistan on climate change mitigation and adaptation. One of the main tasks of the Climate Council will be to monitor Uzbekistan's fulfillment of its obligations under the United Nations Framework Convention on Climate Change and the Paris Agreemen.

171. **Law No. 1073, adopted on July 7, 2025 “On Limiting Greenhouse Gas Emissions”**, establishes a framework for systematically reducing emissions, regulating the carbon balance, and promoting green initiatives. Effective January 9, 2026, the law defines the core principles of Uzbekistan’s climate policy, including sustainable economic growth with lower emissions, priority use of renewable energy, transparent reporting, and fulfillment of international commitments.

172. It authorizes public and private entities to implement emission reduction and climate adaptation projects, with verified results recorded in the national carbon registry. Revenues from domestic carbon credit trading will be directed toward climate adaptation, circular economy development, and other environmental priorities.

173. The Cabinet of Ministers of the Republic of Uzbekistan is responsible for implementing national policies on climate change mitigation and greenhouse gas (GHG) reduction. It oversees the development of state programs, ensures integration of emission reduction principles into national planning, and promotes international cooperation through intergovernmental agreements.

174. The NCECC serves as the key implementing body for climate policy. It coordinates national and regional GHG reduction programs, develops and monitors the National Climate Strategy, and maintains the national GHG inventory. Together with the Ministry of Economy and Finance, it conducts GHG emission inventories, develops quantification methodologies, and prepares official reports for submission under the UNFCCC framework.

175. **Resolution of the President of the Republic of Uzbekistan dated August 15, 2025, No. PP-250.** The program aimed at improving water resources management and developing the irrigation sector in Uzbekistan for the period 2025–2028. Over recent years, Uzbekistan has invested heavily in repairing irrigation infrastructure and adopting water-saving technologies. The newly adopted program sets out ambitious goals to build on these achievements.

176. Key measures include reconstructing 2,551 kilometers of irrigation networks and upgrading pumping stations with energy-efficient equipment, reducing annual electricity consumption from 6.8bn kWh to 6.2bn kWh. Addressing land quality is also central to the plan. The program targets a reduction in poorly irrigated areas—from 424,000 hectares to 276,000 hectares—and aims to lower salinity and problematic groundwater zones. As a result, 460,000 hectares of previously abandoned land are expected to be brought back under cultivation.

177. Water-saving technologies will be extended over an additional 1.4mn hectares, including the introduction of drip irrigation on 293,000 hectares. Modernization of control and measurement systems will take place at 20 major facilities. To minimize human error in water monitoring, digital systems will be installed in 12,000 reclamation observation wells and 1,750 pumps, and 12 large water management facilities will be transitioned to automated digital control.

178. The program also plans to increase the share of concrete-lined canals from 39% to 47%, reducing water loss and improving network quality. It is projected that water savings will reach 10bn cubic meters this year and rise to 14bn cubic meters by 2028.

179. Cabinet of Ministers Resolution No. 783 (November 25, 2024): Mandates the installation of automated stations for monitoring air pollution around high-impact industrial enterprises and the installation/modernization of high-efficiency dust and gas cleaning equipment.

180. Cabinet of Ministers Resolution No. 117 (March 7, 2024): Issued temporary regulations for greenhouse gas emissions trading projects, designating the Ministry of Economy and Finance as the responsible body for the national and international carbon market.

2.13.International labour - Legal instruments and commitments

181. A **ILO core labor standards -** The Republic of Uzbekistan ratified 18 ILO conventions and 1 Protocol[20] including key labour standards, such as freedom of association, prohibition of child labour, prohibition of discrimination, and prohibition of forced labour. In total all 8 Fundamental and 4 Governance (Priority) Conventions were ratified, as well as 6 of 178 Technical Conventions were ratified. The list of conventions adopted by the Republic of Uzbekistan is provided in Table 13.

Table 13: ILO Conventions Adopted by the Republic of Uzbekistan

Convention	Date	Status
Fundamental		
C029 - Forced Labour Convention, 1930 (No. 29) Protocol of 2014 to the Forced Labour Convention, 1930 ratified on 16 Sep 2019 (In Force)	13 Jul 1992	In Force
C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No.87)	12 Dec 2016	In Force
C098 - Right to Organise and Collective Bargaining Convention, 1949 (No.98)	13 Jul 1992	In Force
C100 - Equal Remuneration Convention, 1951 (No.100)	13 Jul 1992	In Force
C105 - Abolition of Forced Labour Convention, 1957 (No.105)	15 Dec 1997	In Force
C111 - Discrimination (Employment and Occupation) Convention, 1958 (No.111)	13 Jul 1992	In Force
C138 - Minimum Age Convention, 1973 (No. 138)*Minimum age specified: 15 years*	06 Mar 2009	In Force
C182 - Worst Forms of Child Labour Convention, 1999 (No. 182)	24 Jun 2008	In Force
Governance (Priority)		
C081 - Labour Inspection Convention, 1947 (No. 81)	19 Nov 2019	In Force
C122 - Employment Policy Convention, 1964 (No. 122)	13 Jul 1992	In Force
C129 - Labour Inspection (Agriculture) Convention, 1969 (No.129)	19 Nov 2019	In Force
C144 - Tripartite Consultation (International Labour Standards) Convention, 1976 (No. 144)	13 Aug 2019	In Force
Technical		
C047 - Forty-Hour Week Convention, 1935 (No.47)	13 Jul 1992	In Force

[20] Source: International Labor Organization: https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103538

Convention	Date	Status
C052 - Holidays with Pay Convention, 1936 (No.52)	13 Jul 1992	In Force
C103 - Maternity Protection Convention (Revised), 1952 (No.103)	13 Jul 1992	In Force
C135 - Workers' Representatives Convention, 1971 (No.135)	15 Dec 1997	In Force
C154 - Collective Bargaining Convention, 1981 (No.154)	15 Dec 1997	In Force
C187 - Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)	14 Sep 2021	Not in force[21]

[21] The Convention will enter into force for Uzbekistan on 14 Sep 2022.

Table 14: Comparison of ADB and Uzbekistan Legislation Requirements

Sr. No		Aspect ADB	Uzbekistan	Harmonized Framework
1	Environmental Policy and Regulations	ADB's SPS focus on three safeguards areas (i) environmental safeguards, (ii) involuntary resettlement safeguards, and (iii) Indigenous Peoples safeguards. As per ADB SPS (2009), in addition to meeting the national standards, the borrower or client is required to adhere, comply and report on above three safeguards areas	EIA is called SEE in Uzbekistan. SEE is stipulated in Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 541 dated 7 September 2020.	The project follows both ADB SPS (2009) and Resolution No. 541 dated 7 September 2020.
	Screening	Based on ADB pre-defined screening criteria, Kegeyli irrigation project is categorised as category B project	Subproject falls into Category III of the environmental impact with low risk.	This sub-project will adhere and comply the requirement of national policy and ADB SPS
	Alternatives	Examination of financially and technically feasible alternatives to the project location, design, technology and components, their potential Environmental and social impacts.	Alternative assessments are to be carried as per request of the Center for State Ecological Expertise.	Project alternative with and without project has been assessed in IEE. Based on ADB pre-defined screening criteria, this project has been chosen by considering three 'noncore' subprojects; refer to Tables 17 & 18 for details.
	EIA Report	Guidelines and Table of Contents are provided for IEE report in ADB SPS (2009). EMP will include proposed mitigation measures, monitoring and reporting requirements, institutional arrangements, schedules and cost estimates. The report should be in English.	Draft of Concept Statement on Environmental Impact (national acronym PZVOS) requires, Baseline, analysis of alternatives, Pollution prevention plan, Waste storage, and other mitigation. The report should be in Russian or Uzbek.	IEE report will be prepared in English in align with ADB SPS (2009) and national requirements as stipulated in the policy. After that, the IEE report will be translated into Russian and executive summary in Uzbek Uzbek.

	Public Consultations	Meaningful consultation with relevant stakeholders is required for Category B project	Policy stipulate, the public consultations should be held prior to submission of the EIA report to the SEE. The public consultations for Kegeyli will be conducted in align with "Regulations on the procedure for conducting public hearings on projects of EIA" (Appendix 3 of the DCM No. 541 of 2020). Public consultation is mandatory for projects falls in Category II.	A detailed public consultation was conducted on 24th September 2023 to inform local public about the project, its impacts and mitigation measures. During consultation, public opinions were collected to address their concerns.
	Public Disclosure	The borrower/client needs to submit to ADB safeguards documents (IEE, corrective action plan, and environmental monitoring plan) for disclosure on ADB's Website. The borrower/client will provide relevant environmental information, including information in a timely manner, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders.	Public consultation should be announced in the media or by any other means of public relations. The organizer of public hearings is the local authorities of districts and cities. The costs associated with public hearings are funded from the proponent or other sources, not prohibited by law. If the report has confidential contents, one should prohibit disclosure and maintain confidentiality.	Environment Assessment documents such as EARF, IEEs and SAEMRs will be disclosed on MWR website. The document disclosed on MWR website, includes executive summary in Uzbek language and full reports in Russian language. Hard copies of the executive summary translated into Uzbek language and full reports in Russian language will also be made available at the offices of MWR, PIU, PIC and contractors.

3. Description of Project (Non-core subprojects)

3.1. Selection of Non-core subproject - As per ADB Pre-defined Screening Criteria

182. Under this project, the MWR provided a list of eight I&D subprojects for modernization, the name of project and location of theall subprojects is given in Table 13. The government and ADB jointly selected the two **'core'** subprojects in 2019 i.e. (a) Babatag Irrigation system (b) Jondor irrigation system. Detailed investigations, feasibility studies and safeguard requirements such as IEE were prepared for these two projects; It has also been agreed between the government and ADB to use **pre-defined criteria for selecting two 'non-core' subprojects** from the list proposed by the government.

•

Table 13: Subprojects Proposed by the MWR for Modernization

S. No.	Irrigation System	Province
1	Kegeyli	Karakalpakstan
2	R-8	Khorezm
3	Jondor	Bukhara
4	Shokhrud	Bukhara
5	Narpay	Samarkand
6	Mirza	Samarkand
7	Babatag	Surkaandarya
8	Zang	Surkhandarya

183. Based on ADB selection criteria and considering the suggestions from the Khokimiyat of Khorazm Province, the client requested ADB's no-objection to start the development of a feasibility study for R-8 canals. The said canals have been evaluated and selected from among three canals proposed by the Ministry of Water Resources of the Republic of Uzbekistan.

184. In addition, to safeguard criteria, the three non-core subprojects were screened on thematic parameters as specified in ADB Pre-defined Screening Criteria (stipulated in Appendix 1 of the PAM). The selection criteria include a whole-system approach to territorial, technical, water-saving, economic, operational, institutional, etc. Table 14 enumerates the detailed screening procedure followed by three non-core subprojects.

Table 14. ADB Selection Criteria for Screening 'Non-core' subprojects

Selection Criteria	Condition for selection	Subproject 1 R-8	Subproject 2 Kegeyli	Subproject 3 Zey-Yab
Location		Yangiaryk	Karakalpakstan	Koshkopyr
Command area	>10,000 ha	19,429 ha	100,150 ha	7,500 ha
Area Expansion possibility	Yes	Yes by 2450 ha	Yes by 17565 ha	82.4
Pumping head	<100 m	< 50 m	< 50 m	N/A
Climate change	less severe	Yes	Yes	Yes
Whole system approach	Yes	Yes	Yes	Yes
WCA / WUA*	Yes	Yes	Yes	Yes
Modernization of whole system	Yes	Yes	Yes	Yes
O & M tariff on volume	Yes	Yes	Yes	Yes
Water saving, use of sprinkler, drip/micro irrigation, land levelling	Yes	Yes	Yes	Yes
Salinity	Low	Low - 1217 ha, Average - 549 ha High - 322 ha	Low - 56222 ha Average- 27515 ha High - 7897 ha	Low- 4701 ha Average - 3602 ha High- 3334 ha
WCA existent or new Water Services Agencies	Yes	Norvay Pravdali WCA. Quramboy rais WCA. ArafaWCA . Bog'ot Agroklaster Cluster. "XONQA CHORVA NASL" Cluster. «Yangiariq Tex» Cluster.	Boyan-tamir Cluster. Aktuba Aul Cluster.	WBM Qo'shko'pir Cluster

Selection Criteria	Condition for selection	Subproject 1 R-8	Subproject 2 Kegeyli	Subproject 3 Zey-Yab
Economics	IRR > 9%	Estimated > 9%	Estimated >9%	Estimated >9%
ADB safeguard criteria	Category B	Category B	Category B	Category B
Preliminary Results of selection		Meets the selection criteria.	To be further discussed and agreed with Centre/PIU	To be excluded
Reason for rejection				Area less than 10000 ha and high soil salinity, almost 50% of area

- Water Consumers Associations (WCAs)**,** Water Users Associations (WUAs)

185. ADB's Rapid Environmental Assessment Checklist was used together with field visits to propose the category of the Project. Based on the ADB SPS (2009), this Project is classified as Category B for environmental due to the following reasons:

- adverse environmental impacts are less adverse than those of Category A projects;
- these 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.

186. An IEE is required for Category B projects. ADB's category is assigned by most sensitive component of the project – meaning that all subprojects under the Project are also category B. In accordance with the National Government Environmental Impact Assessment (EIA) requirements5F 6 , the Project is classified as Category III project and a national EIA report is required.

187. The finding of environmental screening is summarised in Table 15.

188. Based on the finding of the pre-defined ADB screening criteria, the project is classified as Category B due to the following reasons.

a) Environmental impacts are less significant adverse than those of Category A projects;
b) Majority of impacts are site-specific, few of them are irreversible (such as trees cutting on both sides of canal),
c) In most cases mitigation measures can be designed more readily and potential impacts can be brought within threshold limit,

189. In addition, the development of irrigation, combined with ineffective water resources management, has had a negative impact on the formation of the Amu Darya River runoff and the ongoing degradation of the Aral Sea.

190. Therefore, IEE is considered sufficient to meet ADB's environmental safeguard requirements for R8 subproject. Pre-construction phase issues will likely be minimal, as the project would involve modernisation and rehabilitation of existing systems; no involuntary land acquisition or resettlement is expected.

191. In accordance with the National Government Environmental Impact Assessment (EIA) Requirements, the Project is classified as Category II project, and a national EIA report is required.22 R-8 canal in Khorezm region has been selected for feasibility study based on the survey results (see Table 14 and 15) and in consideration of the recommendations of the Center and MWR.

3.2. About R8 project

192. R8 non-core sub-project is situated in Khorezm province and was built in 1940. It provides water for irrigation to three districts - Bagat, Khanka and Yangiarik districts (mostly Yangiarik). The service life of most water infrastructure facilities exceeds 50 - 60 years; their technical condition has deteriorated over the years. The existing water level does not have enough gravity for water intake from the canal and soil-based canal has a high level of filtration. *The details of R8 irrigation system are summarised in Table 16.*

[2222] *Decree of the Cabinet of Ministry No.541 of 7 September 2020 "On further improvement of the environmental impact assessment mechanism" (https://www.lex.uz/docs/4984499)*

Table 15: Safeguard Screening Criteria for "R8" sub-project

Screening Criteria	Yes/No	Remarks
Activities listed on the ADB Prohibited Investment activities	No	Non-core sub-projects 'R8' in Khorezm region are not listed under prohibited activities.
Sub-projects located inside a legally protected area	No	Site is not inside a legally protected area; during the reconnaissance survey, agricultural lands dominate the canal right of way, at intermediate distance, pockets of human settlements were noted on both sides.
Sub-projects adjacent to or within critical/natural habitat and cause degradation of such sensitive ecosystems	No	As per government records, no such critical/natural habitat is present or cause degradation of such sensitive ecosystems
Sub-projects likely to impact critical habitat or natural habitat areas or that could lead to a reduction in the population of any Endangered (EN) or Critically Endangered (CR) species	No	According to biodiversity assessment, no fragile or ecologically sensitive areas nearby such as **protected and key biodiversity areas,** for detail information, refer to *Table 35 A and 35 B*
Potential Environment and Social Risks		
Air pollution	Yes	Air pollution is expected to increase due to transportation of construction material. Further increase in traffic and improper disposal of canal de-silted material may trigger air pollution.
Noise pollution	Yes	Due to increase in traffic movement and construction equipment's may disturb local communities. Monitoring noise pollution will be included in the EMP.
Human settlement	Yes	On both sides of canal, human settlements were noted in R8 subproject
Accident	Yes	Increase in traffic may trigger road safety and cause annoyance due to civil intervention, road blockage and traffic diversion. A Traffic Safety Plan needs to be developed.
Waste	Yes	Canal desilting material during rainy season may impact local agricultural land and trigger air pollution in summer, including waste from auxiliary activities may cause soil and ground water contamination.
Indigenous people	No	Not applicable

Tree cutting	Yes	In R8 sub-project, lots of trees were noted on both sides of canal. The project will involve extensive trees cutting/moving, counting exact numbers for registry to get a permit, and to develop a replanting and caring plan.
Land acquisition and involuntary resettlement	Yes	Along canal right of way, some encroachments were noted such as in R8 non-core sub-project, the team found cowshed (1 no), abandoned clay structure (1 no), clay structure for bee keeping (2 no), However, more details on property losses can be assessed after obtaining ownership status, current usage of land, canal design alignment etc.
Conflict	Yes	Project is labour intensive, hence may trigger conflict with local population due to labour camp and also trigger other social conflicts

Table 16: Detail of R8 sub-project and secondary canal

Particulars	R8 non-core subproject
Project executing agency	• Ministry of Water Resources (MWR)
Project Implementing Agency (PIU)	• PIU under Center for Implementation of Foreign Investment Projects in Water Sector (CIFIPWS) is the Project implementing agency
Project Implementing Consultant (PIC)	• **JV SMEC International Pty Ltd. and Annexure Financial Solutions Ltd. JV** is a Project Implementation Consultant (PIC)
Project category	• R8 non-core sub-project is classified as category B in environmental safegaurd as per ADB's Safeguards Policy (SPS-2009), *for detail refer to Table 15 & 16 Safeguard Screening of 'non-core' Sub-project Based on Agreed Screening Criteria.*
Location of R8	• Situated in Khorezm province, and extends over parts of Bagat, Khanka and Yangiarik districts, see Figure 5.
Year Constructed	• 1940
Canal type	• Earthen canal
Scope of reconstruction	• The scope of reconstruction of R8 canal consists of two parts; c) Main canal - 27.195 km (concrete lining of the canal bottom and slopes) d) Secondary canal (Ostana canal) - 6.415 km (concrete lining of the canal bottom and slopes), for details, see Box 2
Irrigated area	Main R8 canal • Total irrigated area is 19.992 thousand ha (2023). • For design purposes, the feasibility report has considered 22,442 ha (the existing irrigated area is 19,992 ha). After canal modernization, more water will be available to irrigate additional land of 2,450 ha in Yanyaryksky. Secondary canal For details information on secondary canal, refer Box 2
Source of water for R8 canal	• R8 canal source water from the Tashsaka canal at PK293+25 (see Figure 4), which source water from the Amu Darya River.
Coverage & efficiency of canal	• Canal length: 27.1 km. • Originally designed flow: 60 m^3/sec, actual flows is about 33 m^3/s.

<table>
<tr><td></td><td>

Water loss and canal efficiency – According to an estimate made in the feasibility report (2023), total water losses in 27.1 km long canal is around 7.0 m^3/s, and estimated canal efficiency is 0.72. The existing water level does not have enough gravity for water intake from the canal. This soil-based canal has a high level of filtration.
Overall condition of system is medium to poor.

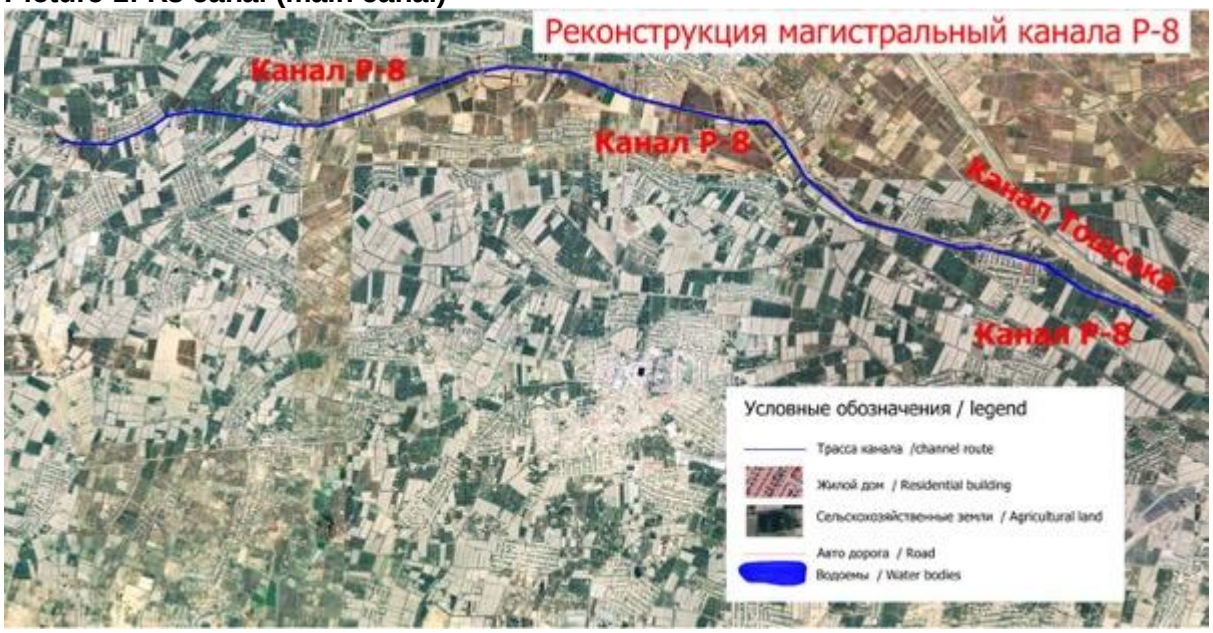
For detail on secondary Ostana canal, refer box 2
</td></tr>
<tr><td>Exiting structure on R8</td><td>For details, refer to Table 20</td></tr>
<tr><td>Water withdrawal</td><td>The average annual water withdrawals in the last four years are 456.15 million m^3, the average growing season demand is 320.30 million m^3, and the withdrawal rate is 135.85 million m^3during the non-growing season.
<table>
<tr><th>Year</th><th>Growing seasons (million m^3)</th><th>Non-growing seasons (million m^3)</th><th>Total (million m^3)</th></tr>
<tr><td>2019</td><td>384.43</td><td>145.38</td><td>529.81</td></tr>
<tr><td>2020</td><td>242.62</td><td>150.54</td><td>393.16</td></tr>
<tr><td>2021</td><td>327.47</td><td>83.11</td><td>410.58</td></tr>
<tr><td>2022</td><td>326.69</td><td>164.37</td><td>491.06</td></tr>
<tr><td>Average</td><td>320.30</td><td>135.85</td><td>456.15</td></tr>
</table>
</td></tr>
<tr><td>Salinity</td><td>For detailed information, refer to Figure 23: Groundwater depth and salinity Khorezm districts and project area</td></tr>
<tr><td>Cropping</td><td>Cropping includes cotton, winter wheat, rice, orchards (apple, apricot and grape), fodder crops (maize and alfalfa) and homestead gardens.</td></tr>
<tr><td>Farms and irrigation method</td><td>Total 101 farms cultivating wheat and cotton each about 100 ha, 86 farms doing horticulture, 37 farms growing fodder crops and 19,200 are practicing homestead gardens[23]</td></tr>
<tr><td>Utility shifting</td><td>For details, refer to table 25. and box 2</td></tr>
<tr><td colspan="2">Environment and Social issues</td></tr>
<tr><td>Environmental impact</td><td>Mostly moderate, temporary and site specific</td></tr>
</table>

[23] *Inception report, 2019, ADB, TRTA 9782-UZB Preparing the Climate Adaptive Water resources management in the Aral Sea Basin Project*

Trees felling	Based on preliminary investigation, around 1870 number of trees felled in main canal + inter-farm secondary Ostona canal - 2,000 trees with diameters: d-16 cm - 350; d-32 cm - 680 and more than d-32 cm - 970.
Biodiversity status	No KBA were found within 1, 2, and 5 km of the subproject area No potentially Threatened species found within 10 km of the subproject areas No IUCN Red List of Threatened Species No notified Ramsar Wetlands No plant species as listed in the Red Book of the Republic of Uzbekistan has been found No Protected Areas within 1, 2 and 5 km Falls in Central Asian Flyway (CAF) hotspot area24 No presence of any Keystone Species, or those Species, which are crucial to the overall functioning of an ecosystem
Involuntary displacement	No, However, it is recommended that social due diligence be undertaken once the canal design is finalized to negate physical and economic displacement
Asbestos containing material (ACM)	No Asbestos containing materials were identified during site survey.
Project beneficiaries	Land users, women headed farmers, household, canal operating agency etc
Project Out come and outputs	
Project outcome	Project will enhance agricultural productivity, improve degraded land and increase water security through climate resilient and modernized irrigation systems which receive water from the Amu Darya River
Project output	• Water security strengthen farmers' incomes, and improves socio-economic status • Strengthen capacity of WMO and WCA on infrastructure management and water use efficiency. • More inclusion and participation of women's in project management and women-managed farms. • Gender equality and enhance women's participation in land and water management. • Climate resilient I&D infrastructure

[24] *The Central Asian Flyway (CAF), a vast network of migratory routes, plays a pivotal role in the conservation of millions of migratory birds by connecting breeding grounds in the Arctic and sub-Arctic regions with wintering sites in South Asia, the Indian Ocean, and Africa*

Picture 1: R8 canal (main canal)



Picture 2: Placement of the Head Structure and R 8 downstream bend

Picture 3: Spread of R8 Canal

3.3. Need for modernization and upgradation of R8 canal

193. In Khorezm province, agriculture is the main source of employment and income, especially in the rural areas and around 78.1% of the population is engaged in the agricultural sector. Due to the physical deterioration of water management facilities, it becomes challenging for local authorities to ensure a sustainable water supply for irrigation. This project's intervention will help provide water and agriculture security in the regions.

-

3.4. Scope of Climate Adaptive Water Resources Management in the Aral Sea Basin Project

194. One key impact of a project titled "**Climate Adaptive Water Resources Management in the Aral Sea Basin Project** " is to ensure and improve water and food security in the Aral Sea Basin in Uzbekistan. The outcome is climate-resilient and modernized irrigation systems established in selected irrigation and drainage (I&D) subprojects in the Amu Darya River Basins, Uzbekistan. The Table 17 enumerates the scope of R8 subproject under different outputs as agreed between the government and ADB.

Table 17: Scope of R8 modernization under different outputs

Output 1: Main Canal Water Supply Systems Modernized	**R8 scope under each outputs/sub-outputs**
a) Re-sectioning and modernization of main canals	Based on feasibility report, the intervention includes; • Earth work (removing sediment and soil; selective raising of embankment, backfilling) • Service Road construction • Concreate lining of 27.2 km canal by using high-density polyethylene (HDPE) membrane
b) Establishment of improved control structures and protective works	• Modernization of three main water distributing structures and 44 outlets and also construction 5 pedestrian bridges
c) Construction of improved measurement and canal control systems	• Repair of 46 hydrometric bridges, upgrading and modernization of 46 gauging stations, installation of supervisory control and data acquisition (SCADA) system for water level and flows monitoring and control.
Output 2: Inter-farm I&D systems and on-farm water management modernized	
(a) Re-sectioning and modernization of inter-farm canals	The Ostana Canal is included in the modernization of inter-farm canals. It is 6.5 km long and has a flow rate of 20.0 m³/s.~~Survey work completed; detailed will be provided in final feasibility report~~
(b) Introduction of innovative climate smart on-farm irrigation technologies	A programme on climate change and energy conservation will be implemented by increasing the number of gravity drainage systems.
(c) Drainage works for salinity improvement	The project's feasibility study does not include plans for drainage works.
Output 3: Policy and institutions strengthened for climate resilient and sustainable water resources management	
(a) Modernized water allocation and use at irrigation system, district, and WCA levels	Not in scope, a separate consultant will be hired.
(b) Establishment of improved asset and management operation and maintenance (MOM) arrangements	Not in scope, a separate consultant will be hired.
(c) Improved salinity and water quality management	Not in scope, a separate consultant will be hired.
(d) Institutional Strengthening of WMOs, WCA and farmers	Not in scope, a separate consultant will be hired.

3.5. Objectives of modernization and upgradation of R8 canal

195. Due to the unsatisfactory technical condition of most of the existing structures, the high sediment content in the canal water, as well as increased siltation and erosion of the canal sections, it is necessary to carry out a modernisation and rehabilitation work to restore the capacity of the canal along its entire length, as well as to ensure the continued reliable operation of existing structures during the operation. The main objectives of modernization of the R-8 channel are:

a) Improve water security and guaranteed supply of water;
b) Shift pumped water intakes from canals to gravity
c) Prevent canal slopes from erosion
d) Reduce water losses i.e. filtration;
e) Improve life of hydraulic and associated structures;
f) Improve operating conditions and reduce canal operating costs
g) Elimination of numerous small water intakes from main canals;
h) Create more favourable conditions for development of private and Dehkan farms, which in turn create more jobs and create conditions for further socio-economic development

196. In order to reduce channel losses and improve canal capacity, the following intervention has been proposed:

a) Cutting of vegetation layer, excavation of sediment and sediment cleaning
b) Concrete lining of the canal
c) Replacement of obsolete gates and lifting mechanisms of regulators and outlets
d) Restoration of concrete hydraulic wherever necessary
e) Construction of new gauging stations (measuring bridges)
f) Installation of equipment for monitoring water flow (SCADA)

197. Canal R-8 is an earthen canal. Its bed is flat, and slopes are washed out; the canal does not have command marks. There are 40 pumping units are installed on the canal for water intake, of which 5 are on the balance sheet of the UNS. Out of total branches, 5 are based on gravity flow. The canal condition is unsatisfactory. According to the estimate (ISA reference), the efficiency of the R-8 canal is 0.71. The existing hydraulic elements is given in Table 18.

Table 18: Existing hydraulic elements of the R-8 canal

CH-CH	Q м3/с	I	N	m	B, м	H , м	V, м/с
CH0+00 – CH100+00	60,0	0,0001	0,0225	1,5	20	3,03	0,8
CH100+00 – CH171+40	56,0	0,0001	0,0225	1,5	20	2,86	0,8
CH171+40 – CH271+40	42,0	0,00015	0,0225	1,5	18	2,34	0,85

198. The final project design reflects the region's specific climatic conditions and incorporates energy-efficient technologies. Key project components will include:

- Reducing pump stations;
- Concrete lining of targeted canal segments;

- Replacing outdated gates and hydraulic lifting mechanisms at water regulators and outlets;
- Repairing or restoring existing concrete hydraulic structures where required;
- Constructing new gauging stations (measuring bridges); and
- Installing real-time flow monitoring and control equipment (using SCADA technology).

199. The canal reconstruction will increase overall canal efficiency from 0.71 to 0.95, and improve the efficiency of the R-8 canal system from 0.56 to 0.80. The project will also ensure 100% concrete lining of the canal. In addition, the number of machine-lift structures will be reduced from 39 to 20, and annual water consumption is expected to decrease from 840.5 million m³ to 667.2 million m³.

200. Tables 19 and 19.1 summarise the total number of outlets along the R-8 canal. The existing R-8 Canal system comprises five gravity-fed branches. Based on the approved reconstruction design, the upgraded system will include a total of 44 branches, of which 19 will operate under gravity flow and 31 will function as pump-fed outlets. These modifications are expected to improve operational efficiency and optimize water distribution across the command area.

201. The table below summarizes the locations of gravity-based offtake points along the R-8 Canal. For each offtake, the corresponding picket (chainage) and pipe diameter are provided. This information identifies where gravity flow will be used for water distribution following the canal's rehabilitation and indicates the hydraulic capacity of each outlet.

202. The Ostona Canal, which was assessed as part of this IEE as a secondary linked canal, will have 14 outlets after reconstruction. Of these, two will operate under gravity conditions and the remaining 12 will rely on pumps for water supply.

Table 19: Branches of the R-8 canal with gravity outlets

No.	PC	Side	Project flow rate (l/ sec)	Diameter pipes D (mm)	Type
1	32+42	to the right	130	400	GP 4
2	42+50	to the left	130	400	GP 4
3	103+66	to the right	280	600	RVT-60
4	143+00	to the left	130	400	GP 4
5	145+00	to the left	130	400	GP 4
6	146+00	to the right	130	400	GP 4
7	153+00	to the left	490	800	RVT-80
8	154+88	to the right	490	800	RVT-80
9	156+46	to the left	280	600	RVT-60
10	163+52	to the left	130	400	GP 4
11	236+32	to the left	490	800	RVT-80
12	242+51	to the left	280	600	RVT-60
13	243+51	to the right	130	400	GP 4
14	250+36	to the right	130	400	GP 4
15	253+10	to the right	280	600	RVT-60
16	263+76	to the right	770	1000	RVT-100
17	267+04	to the right	770	1000	RVT-100
18	268+88	To the left	1500	1200	RVT-1200
19	269+43	to the left	130	400	GP 4

Table 19.1 R-8 Canal Branches with Pumping-Based Outlets

No.	PC	Consumption	Quantity	Name unit
1	4+57	0.2	1	PG200
2	14+44	0.3	1	PG300
3	24+16	0.2	1	PG200
4	25+30	0.3	1	PG300
5	36+55	0.2	1	PG200
6	111+91	0.5	1	
7	112+12	0.5	1	SNPE-500/10
8	124+08	0.5	1	SNPE-500/10
9	132+59	0.7	1	20-NDN
10	157+00	0.5	1	SNPE-500/10
11	174+15	0.5	1	SNPE-500/10
12	176+58	0.5	1	SNPE-500/10
13	193+57	0.5	1	SNPE-500/10
14	197+48	0.5	1	SNPE-500/10
15	200+00	0.3	1	PG300-350
16	209+67	0.5	1	SNPE-500/10
17	216+80	0.3	1	PG300-350
18	220+28	0.3	1	PG300-350
19	227+13	0.3	1	
20	228+03	0.5	1	
21	235+00	0.3	1	PG300-350
22	242+51	0.5	1	SNPE-500/10
23	243+18	0.3	1	PG300-350
24	243+45	0.3	1	PG300-350
25	246+44	0.5	1	SNPE-500/10
26	250+95	0.3	1	SNPE-500/10
27	251+34	0.3	1	SNPE-500/10
28	255+41	0.1	1	
29	261+11	0.2	1	PG300-350
30	263+02	1	1	
31	268+78	0.2	1	

3.6. Existing Structure and their conditions on R8 canal

203. The table (20) below enumerates, list of structures to be replaced, dismantled, repaired and running satisfactory.

Table 20: Complete list of existing structures and their condition

№	Chainage location	Name of structure	Condition
1	CH0+00	Head Structure	Gate, electric actuator, frame – unsatisfactory.
2	Пк2+00	Gauging station	Replacement of the structure, Smart water
3	Пк 42+00	Bridge	Satisfactory
4	Пк42+50	Water outlet	New
5	Пк74+00	Aqueduct D1000	Satisfactory
6	Пк 81+00	Aqueduct D200	Dismantle
7	Пк 90+00	Bridge	Repair
8	Пк105+10	Aqueduct	Dismantle
9	Пк108+50	Aqueduct D1000	Dismantle
10	Пк 109+00	Bridge	Repair
11	Пк 110+00	Water outlet	New
12	Пк 114+50	Water outlet	New
13	Пк137+00	Bridge	Satisfactory
14	Пк 139+00	Water outlet	New
15	Пк142+00	Aqueduct D500	Dismantle
16	Пк 154+00	Aqueduct D1000x5	Dismantle
17	Пк 154+00	Water outlet	New, left and right
18	Пк 155+00	Aqueduct D1000	Dismantle
19	Пк166+00	Pedestrian bridge	Dismantle
20	Пк 171+00	Hydroengineering complex	Repair
21	Пк 173+00	Gauging station	Dismantle
22	Пк 190+00	Pedestrian bridge	Dismantle
23	Пк 202+00	Bridge	Satisfactory
24	CH212+00	Pedestrian bridge	Dismantle
25	CH 219+50	Aqueduct D400	Dismantle
26	CH 238+00	Outlet	New
27	CH 241+30	Outlet	New
28	CH 242+00	Bridge	Repair
29	CH 250+00	Pedestrian bridge	Dismantle
30	CH 253+50	Outlet	New, left and right
31	CH 253+50	Aqueduct D1000	Dismantle
32	CH 258+00	Bridge	Satisfactory
33	CH 260+00	Pedestrian bridge	Dismantle
34	CH 262+00	Aqueduct D1000	Dismantle
35	CH 262+00	Outlet	New, left and right
36	CH 266+00	Aqueduct D1000	Dismantle
37	CH 266+00	Outlet	New, left and right
38	CH 266+00	Bridge	Repair
39	CH 268+00	Aqueduct D1000	Dismantle
40	CH 271+00	Hydroengineering Complex	Repair

204. The table 21 below describes the impacts of modernization on canal efficiency, improvement of water consumption, overall increase in efficiency in the R8 canal system, and increase in gravity flow; in addition, some other impacts are;

a) Increased in water availability for irrigated lands in Khorezm province on the area of 28.921 thousand ha,

b) Impact on cropping pattern in different districts, which are under the influence of R8 canal, see table 22.

c) Improvement in canal operation and maintenance;

d) Economic gain due to production and income in agriculture;

e) Improvement in socio-economic well-being and induced impact such as improvement in health and environmental consequences will be prevented.

Table 21: Impacts of modernization of R8 canal

№	Parameter name	Unit of measurement	Existing	Project
1	Improve canal efficiency		0,71	0,95
2	Increase the efficiency of the R-8 canal system		0,56	0,8
3	Increasing the share of concrete-lined canals	%	0	100
4	Transfer to gravity irrigation	Pcs	39	20
5		ha	4457	2946
6	Reduce water consumption	mln.m^3	840,5	667,2

Table 22: Impact on cropping pattern (perspective)

Agricultural crop	Districts:			Total for the project area	
	Bogot	Khankay	Yangiaryk	Hectare	%
Grain	16	815	2000	2831	9.8
Maize	4	75	1025.2	1104	3.8
Rice		577	4350	4927	17.0
Cotton		1265	4950	6215	21.5
Potatoes		66	246	312	1.1
Vegetables	3	567	980	1550	5.4
Gourds		58	735	793	2.7
Food	23	29	3447	3499	12.1
Gardens	29	155	487	671	2.3
Vineyards			20	20	0.1
Others	379		585	964	3.3
Mulberry		125	401	526	1.8

Orchard			5509	5509	19.0
Total:	**454**	**3732**	**24735.2**	**28921.2**	**100.0**

Figure 5: Schematic Diagram of R8 canal

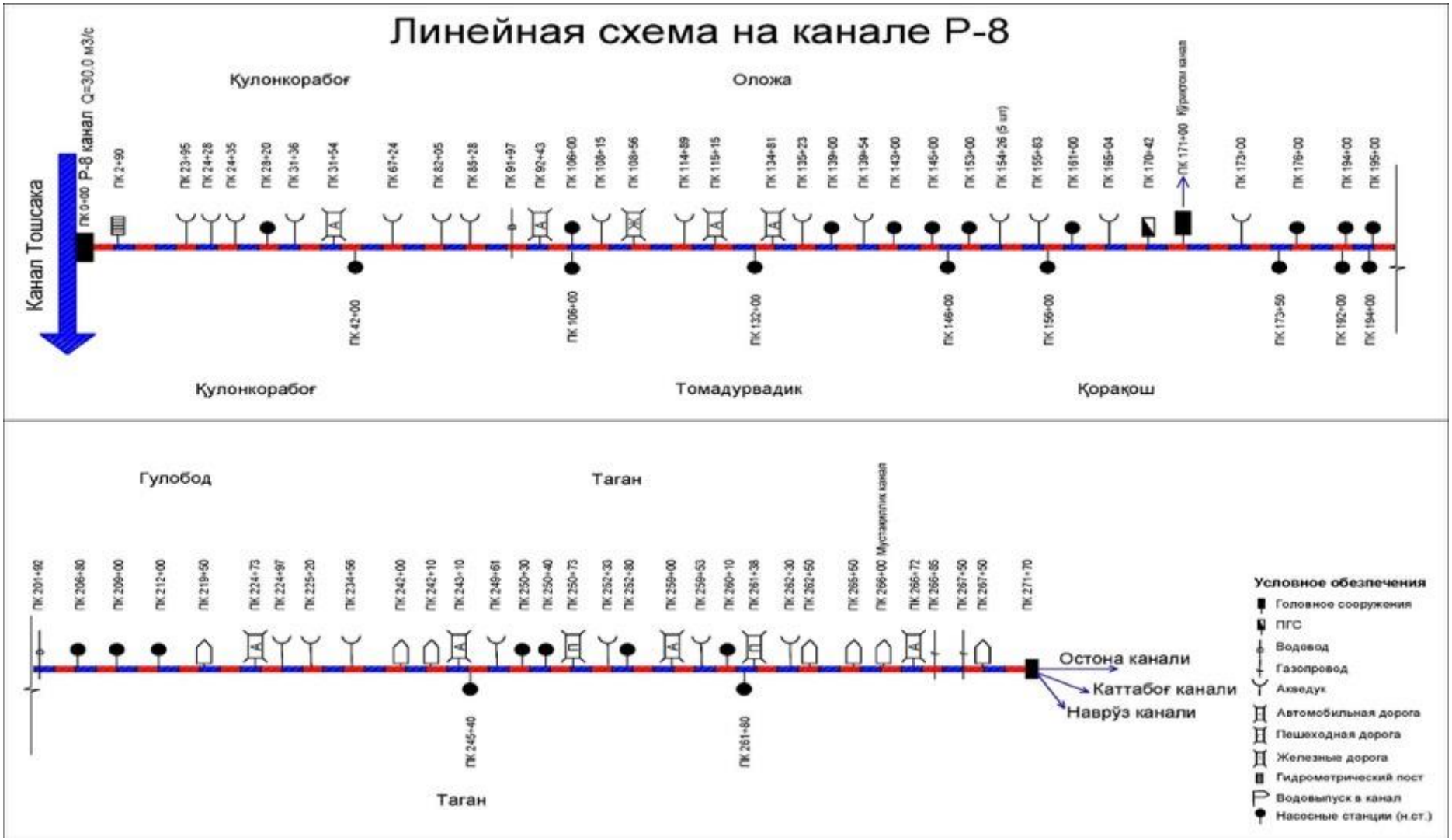
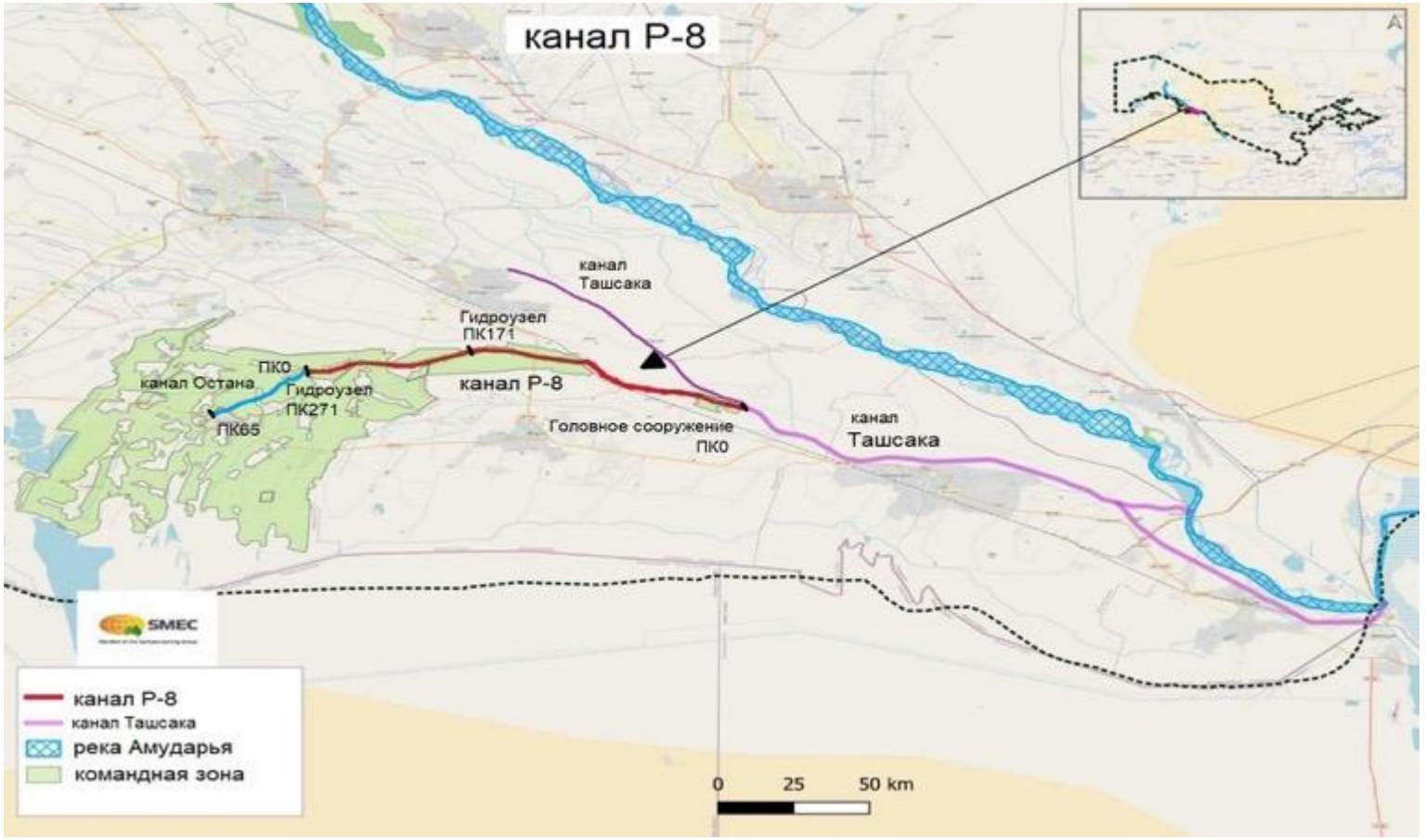


Figure 5.1: Map of the R8 and Ostona Canals



Picture 4: Head structure (PK 0+00)

Picture 5: R8 canal - view from head structure (PK 0+00)

Picture 6: Pedestrian bridge at PK 262+00 (phto dated 04.03.20230

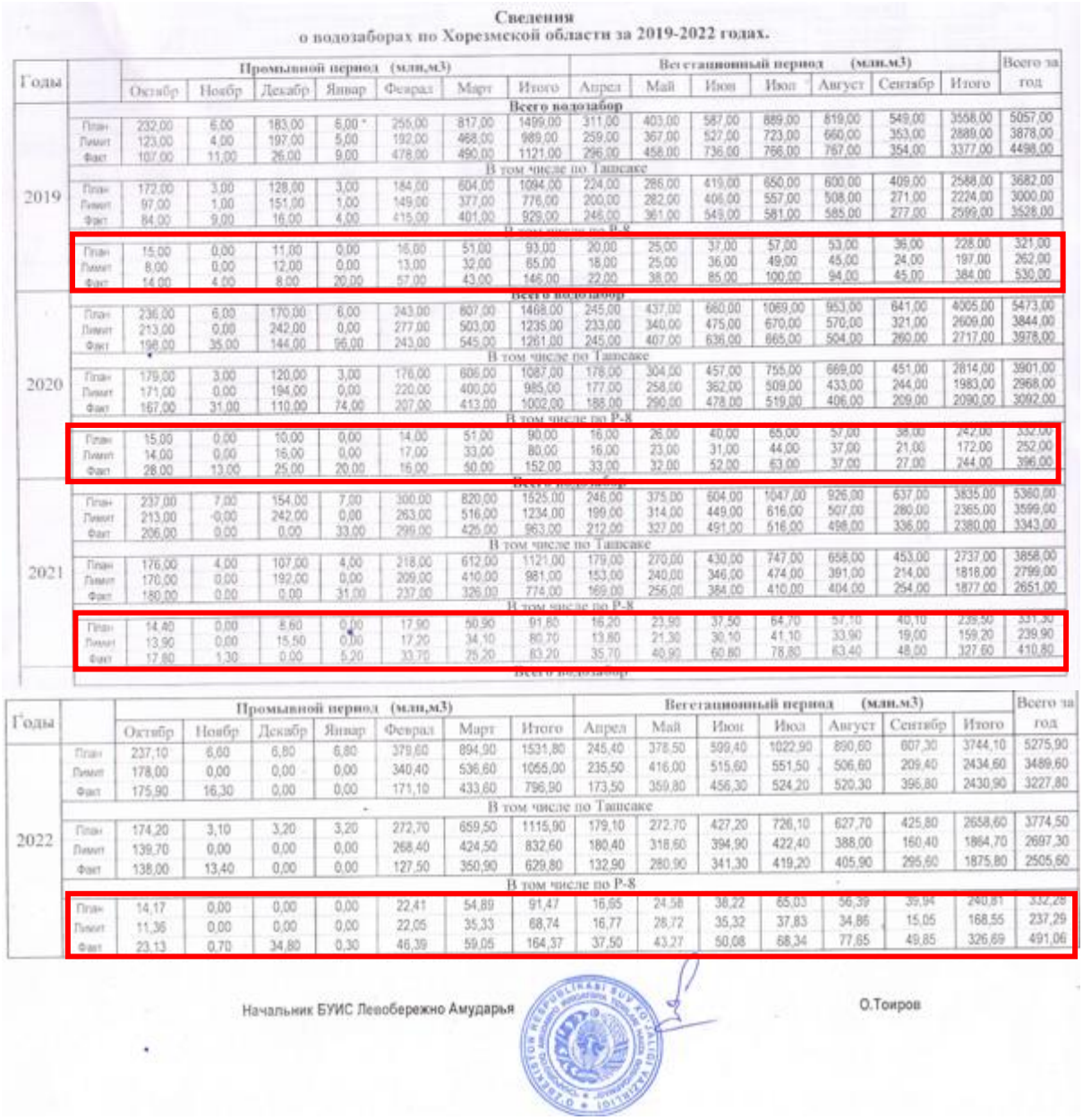
Picture 7: Bridge at PK 32+14

Picture 8: Railway Bridge at PK 109+00

3.7. Water Extraction from R8 canal

205. The last four years' data shows that water extraction from R8 canal was higher than planned. The below figure depicts the over-abstraction of water with respect to planned intake. In 2019, the planned water requirement was 321 million m^3; however, the water withdrawal was 530 million m^3, almost 65% higher than the planned. Similarly, in 2020, 2021 and 2022, the trend was almost higher, 19%, 24% and 48% respectively, see Figure (6 and 7). The year 2020 and 2021 were considered dry year; however, during the same year, excess withdrawal was noted.

Figure 6: R-8 Over Water Abstraction



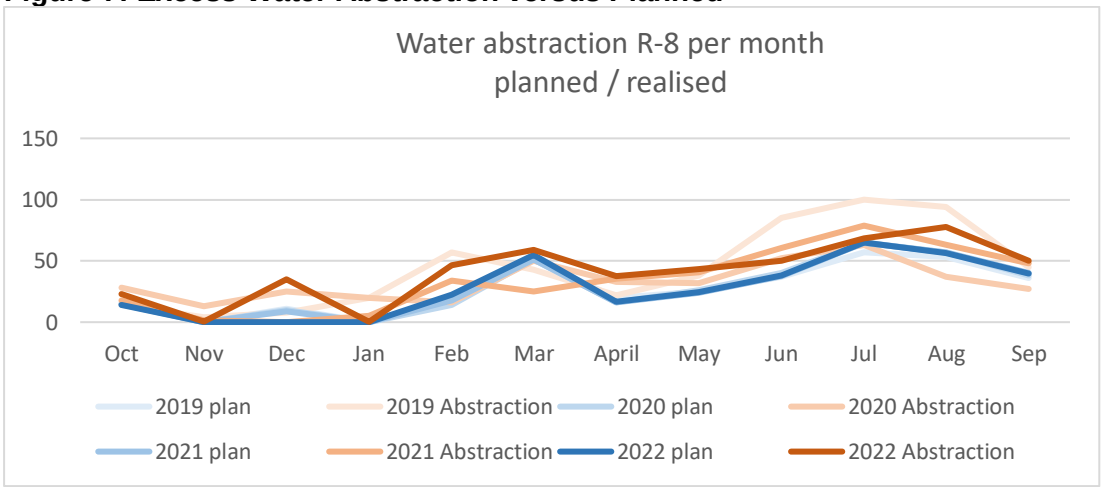
Сведения
о водозаборах по Хорезмской области за 2019-2022 годах.

Годы		Промывной период (млн.м3)							Вегетационный период (млн.м3)							Всего за год
		Октябр	Ноябр	Декабр	Январь	Февраль	Март	Итого	Апрел	Май	Июн	Июл	Август	Сентябр	Итого	
								Всего водозабор								
2019	План	232,00	6,00	183,00	6,00	255,00	817,00	1499,00	311,00	403,00	587,00	889,00	819,00	549,00	3558,00	5057,00
	Лимит	123,00	4,00	197,00	5,00	192,00	468,00	989,00	259,00	367,00	527,00	723,00	660,00	353,00	2889,00	3878,00
	Факт	107,00	11,00	26,00	9,00	478,00	490,00	1121,00	296,00	458,00	736,00	766,00	767,00	354,00	3377,00	4498,00
								В том числе по Ташсаке								
	План	172,00	3,00	128,00	3,00	184,00	604,00	1094,00	224,00	286,00	419,00	650,00	600,00	409,00	2588,00	3682,00
	Лимит	97,00	1,00	151,00	1,00	149,00	377,00	776,00	200,00	282,00	406,00	557,00	508,00	271,00	2224,00	3000,00
	Факт	84,00	9,00	16,00	4,00	415,00	401,00	929,00	246,00	361,00	549,00	581,00	585,00	277,00	2599,00	3528,00
								В том числе по P-8								
	План	15,00	0,00	11,00	0,00	16,00	51,00	93,00	20,00	25,00	37,00	57,00	53,00	36,00	228,00	321,00
	Лимит	8,00	0,00	12,00	0,00	13,00	32,00	65,00	18,00	25,00	36,00	49,00	45,00	24,00	197,00	262,00
	Факт	14,00	4,00	8,00	20,00	57,00	43,00	146,00	22,00	38,00	85,00	100,00	94,00	45,00	384,00	530,00
								Всего водозабор								
2020	План	236,00	6,00	170,00	6,00	243,00	807,00	1468,00	245,00	437,00	660,00	1069,00	953,00	641,00	4005,00	5473,00
	Лимит	213,00	0,00	242,00	0,00	277,00	503,00	1235,00	233,00	340,00	475,00	670,00	570,00	321,00	2609,00	3844,00
	Факт	196,00	35,00	144,00	66,00	243,00	545,00	1261,00	245,00	407,00	636,00	665,00	504,00	260,00	2717,00	3978,00
								В том числе по Ташсаке								
	План	179,00	3,00	120,00	3,00	176,00	606,00	1087,00	178,00	304,00	457,00	755,00	669,00	451,00	2814,00	3901,00
	Лимит	171,00	0,00	194,00	0,00	220,00	400,00	985,00	177,00	258,00	362,00	509,00	433,00	244,00	1983,00	2968,00
	Факт	167,00	31,00	110,00	74,00	207,00	413,00	1002,00	188,00	290,00	478,00	519,00	406,00	209,00	2090,00	3092,00
								В том числе по P-8								
	План	15,00	0,00	10,00	0,00	14,00	51,00	90,00	16,00	26,00	40,00	65,00	57,00	38,00	242,00	332,00
	Лимит	14,00	0,00	16,00	0,00	17,00	33,00	80,00	16,00	23,00	31,00	44,00	37,00	21,00	172,00	252,00
	Факт	28,00	13,00	25,00	20,00	16,00	50,00	152,00	33,00	32,00	52,00	63,00	37,00	27,00	244,00	396,00
								Всего водозабор								
2021	План	237,00	7,00	154,00	7,00	300,00	820,00	1525,00	246,00	375,00	604,00	1047,00	926,00	637,00	3835,00	5360,00
	Лимит	213,00	0,00	242,00	0,00	263,00	516,00	1234,00	199,00	314,00	449,00	616,00	507,00	280,00	2365,00	3599,00
	Факт	206,00	0,00	0,00	33,00	299,00	426,00	963,00	212,00	327,00	491,00	516,00	498,00	336,00	2380,00	3343,00
								В том числе по Ташсаке								
	План	176,00	4,00	107,00	4,00	218,00	612,00	1121,00	179,00	270,00	430,00	747,00	658,00	453,00	2737,00	3858,00
	Лимит	170,00	0,00	192,00	0,00	209,00	410,00	981,00	153,00	240,00	346,00	474,00	391,00	214,00	1818,00	2799,00
	Факт	180,00	0,00	0,00	31,00	237,00	326,00	774,00	169,00	256,00	384,00	410,00	404,00	254,00	1877,00	2651,00
								В том числе по P-8								
	План	14,40	0,00	8,60	0,00	17,90	50,90	91,80	16,20	23,90	37,50	64,70	57,10	40,10	239,50	331,30
	Лимит	13,90	0,00	15,50	0,00	17,20	34,10	80,70	13,80	21,30	30,10	41,10	33,90	19,00	159,20	239,90
	Факт	17,80	1,30	0,00	5,20	33,70	75,20	83,20	35,70	40,90	60,80	78,80	63,40	48,00	327,60	410,80

Годы		Промывной период (млн.м3)							Вегетационный период (млн.м3)							Всего за год
		Октябр	Ноябр	Декабр	Январь	Февраль	Март	Итого	Апрел	Май	Июн	Июл	Август	Сентябр	Итого	
2022	План	237,10	6,60	6,80	6,80	379,60	894,90	1531,80	245,40	378,50	599,40	1022,90	890,60	607,30	3744,10	5275,90
	Лимит	178,00	0,00	0,00	0,00	340,40	536,60	1055,00	235,50	416,00	515,60	551,50	506,60	209,40	2434,60	3489,60
	Факт	175,90	16,30	0,00	0,00	171,10	433,60	796,90	173,50	359,80	456,30	524,20	520,30	396,80	2430,90	3227,80
								В том числе по Ташсаке								
	План	174,20	3,10	3,20	3,20	272,70	659,50	1115,90	179,10	272,70	427,20	726,10	627,70	425,80	2658,60	3774,50
	Лимит	139,70	0,00	0,00	0,00	268,40	424,50	832,60	180,40	318,60	394,90	422,40	388,00	160,40	1864,70	2697,30
	Факт	138,00	13,40	0,00	0,00	127,50	350,90	629,80	132,90	280,90	341,30	419,20	405,90	295,60	1875,80	2505,60
								В том числе по P-8								
	План	14,17	0,00	0,00	0,00	22,41	54,89	91,47	16,65	24,58	38,22	65,03	56,39	39,94	240,81	332,28
	Лимит	11,36	0,00	0,00	0,00	22,05	35,33	68,74	16,77	28,72	35,32	37,83	34,86	15,05	168,55	237,29
	Факт	23,13	0,70	34,80	0,30	46,39	59,05	164,37	37,50	43,27	50,08	68,34	77,65	49,85	326,69	491,06

Начальник БУИС Левобережно Амударья О.Тоиров

Figure 7: Excess Water Abstraction versus Planned



3.8. Design of the R-8 main canal and secondary canal

206. The project aims to reconstruct both the R-8 main canal and the secondary canal. The main canal is 27.195 km long, while the secondary canal is 6.415 km long (Figure 5.1). The project proposes to line the bottom and slopes of both canals with concrete. For details on the secondary inter-farm canal, please refer to Box.2 The project also suggests narrowing the canal by constructing embankments (backfill on both sides of the canal) with separate dams in the canal's cross-section. The average annual water intake for the R-8 Canal over the past four years has been 456.15 million m³, comprising 135.85 million m³ during the non-growing season and 320.30 million m³ during the growing season. Based on the Left Bank-Amu Darya Basin Inspectorate (BUIS) report, the canal's current efficiency is 0.71. In accordance with the established water requirements, the canal has different flow capacities along its entire length. At the head of the canal, the canal flow rate is Q= 44.86 m^3/s.

207. According to the final design, the reconstruction of the P8 Canal will include the following key interventions:

- optimization of hydraulic performance through canal narrowing and reduced reliance on pumps;
- concrete lining of selected canal sections to minimize seepage losses;
- replacement of obsolete gates and lifting mechanisms at regulators and outlets; (iv) rehabilitation of deteriorated concrete hydraulic structures, where required;
- construction of new gauging stations (gauging bridges); and
- installation of SCADA-based flow monitoring and control systems to improve operational efficiency.

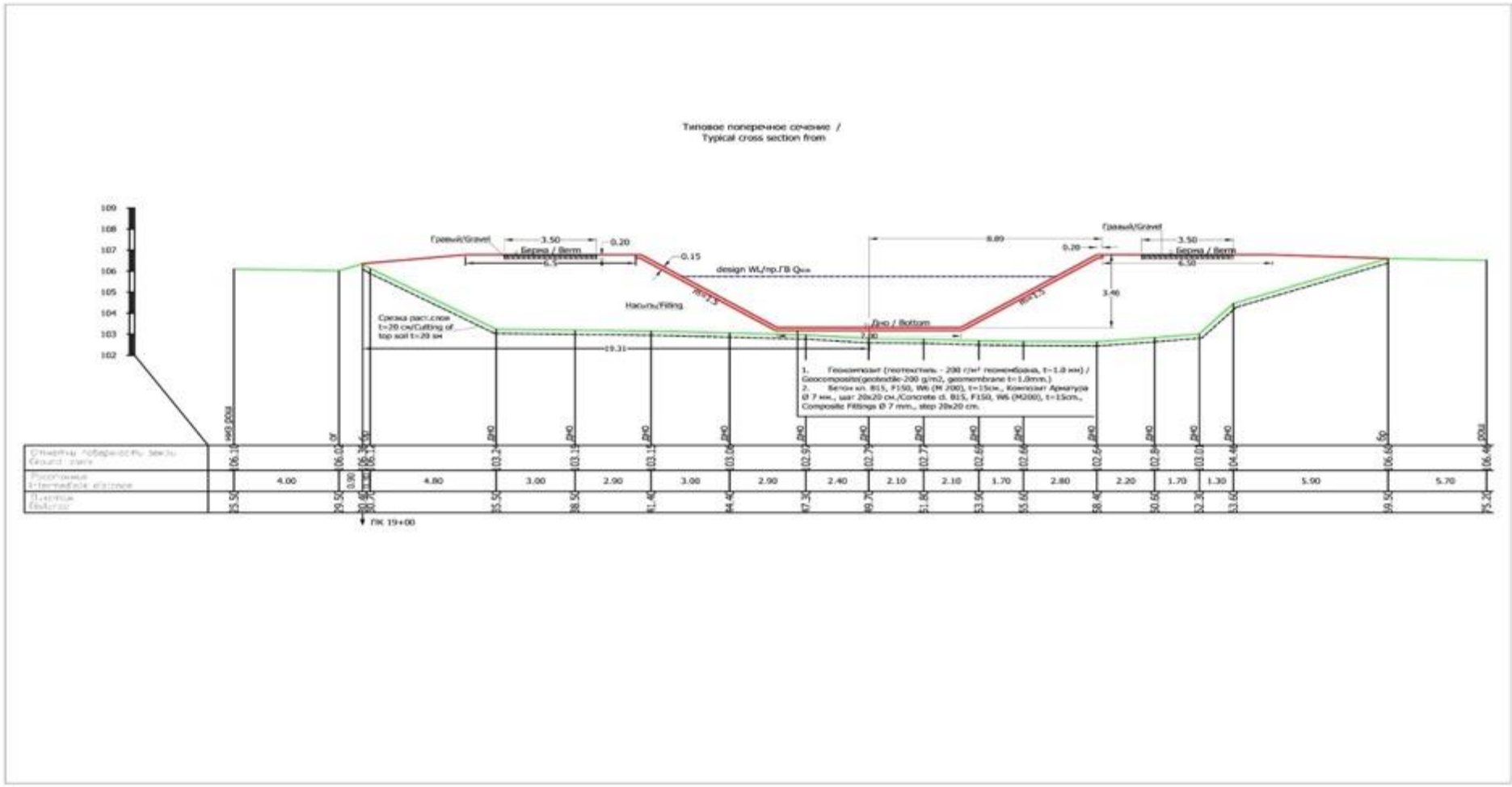
208. The Ostana Canal, as a secondary canal linked to the R-8 system, will also undergo rehabilitation to improve hydraulic efficiency and operational safety. The main objectives of the Ostana Canal reconstruction are to:

- reduce water losses through seepage;
- ensure safe and reliable functioning of hydraulic structures; and
- improve overall operating conditions. Planned works include full or partial concrete lining, reconstruction of hydraulic structures at PK17+00 and PK65+00, and refurbishment of water outlets and intake points.

209. The hydraulic design parameters and flow rates of the Ostana Canal were determined in alignment with the water management calculations developed for the R-8 Canal system, taking into account its command areas and the interlinked operation of both canals.

210. According to the approved design, the canal bottom width ranges from 7 to 9 meters, with a structural height of 3.49–3.56 meters (Figure 8). To optimize the canal cross-section and reduce overall dimensions, side slopes of m = 1.5 have been adopted. This design accounts for the installation of reinforced concrete lining placed over a geomembrane to ensure structural stability and minimize seepage.

Figure 8: Typical cross sections of Proposed R8 canal



Box 2: Reconstruction of the inter-farm secondary canal "Ostona"

1. It's an earthen canal
2. It takes water from R8 canal (PK 272+30),
3. Scope of reconstruction - 6.415 km
4. Objectives for selecting Ostana canal for reconstruction are
   - Reduce filtration water from the canal bed;
   - Promote normal conditions and safe operation of hydraulic structures;
   - Improve operating conditions
5. Type of reconstruction – concrete lining of the canal bottom and slopes
6. Civil intervention or reconstruction involves (a) Head structure (PK0+00), (b) Hydro-engineering complex (PK17+00), (c) Hydro-engineering complex (PK 65+00). The reconstruction of Hydro-engineering complex includes - replacement of mechanical equipment, hydrosystem, replacement of electrical equipment, transformer substation and so on, automation of control systems and monitoring etc.
7. Around 10,360 hectares of irrigated land under the command of the canal.
8. According to BUIS (water resources institution), the canal flow rate is 20 m^3/s, canal efficiency is 0.58.
9. Due to reconstruction, out of 14 outlets, 2 will be gravity based and 12 will be pumps.
10. Complete replacement of mechanical equipment is required.
11. Concrete surfaces of the structures of the whole hydrosystem are partially destroyed
12. Replacement of electrical equipment, transformer substation and so on
13. .Automation of control systems and monitoring is not present
14. Total utilities intersection - Ostana Canal has crossings with power lines (16 points), intersection with water supply (2), intersection with gas supply line (4), bridges (4) cables, for details, see Annexure 2, according to feasibility report, there will be no shifting or relocation of utilities because all civil intervention will be carried out manually with pneumatic rammers.

Picture 9: ПК0+00 Head structure of the Ostana Canal

Picture 10: ПК0+00 of the Ostona Canal

Picture 11: Motor Road Bridge over the Ostona Canal

Picture 12: ПК17+00 control structures on the downstream of Ostona Canal

-

3.9. Proposed Options for R8 Canal Modernization

211. For R8 modernization, engineering and design team suggested two options, the details of proposed intervention and resource requirement for both options is discussed in 24. Table 25 enumerates interventions and resource requirement in Secondary (*Ostona) canal.*

Table 24: Scope of work on the R-8

No	Name	Unit of measurement	R8
1	Length	m	27 215
	Earth works		
2	Topsoil stripping	m^3	161 526.3
3	Excavation	m^3	8 794.88
	Including manual work	m^3	279.05
4	Dam levelling	m^3	0.00
5	Embankment	m^3	1 152 453.65
	Including manual work	m^3	54 268.9
6	Backfill	m^3	42 726.4
7	Slope grading	m^2	338 983.8
8	Bottom levelling	m^2	221 325.0
9	Berm levelling	m^2	176 847.0
10	Construction of an inspection road	m^2	133 975,0
	Concrete works		
11	Concrete class B15, F150, W6 (M 200), t=1.5 cm. bottom slope	m^3	86 464.83

12	Rebar A-III. 10 mm	Тн	472.775
	Other works		
13	Gravel	m³	20 367.78
14	Geotextile 2 layers 1m²= 200 gr	m²	508 332.6
15	Geomembrane t=1.0 mm	m²	1 232.0
16	Geotextile - 1м²=500 гр	m²	1 155.,0
17	Polyethylene pipe 63 mm	Пм	101 636.22
18	Polyisol	m²	137.41
19	Bitumen mastic	m³	266,27

Source: Approved Detailed Designs and Engineer's Estimation

•

Table 25: Scope of work on the Ostona Canal

Sr.No	Name and types of work	Unit of measurement	Quantity
1	Length	km	6290
2	Topsoil cutting	m^3	24533.15
3	Excavation	m^3	315.45
4	Including manual work	m^3	35.10
5	Dam cutting	m^3	0.00
6	Embankment (without Kp-1.15)	m^3	85453.15
7	Including manual work	m^3	8583,15
8	Backfill	m^3	0
9	Slope levelling	m²	66742.22
10	Bottom leveling	m²	25160
11	Berm levelling	m²	41514,0
12	Construction inspector road	m^3	31450.00
	Concrete work		
13	Rebar B15, F150, W6 (M 200), t=15 sm	m^3	11424.40
	Other works		
	Gravel	m^3	9560.80
	Polyizol	m^3	20514,95
	Bitumen mastic	m²	20.901
	Penoplex	m²	53.338
	The Ostona Canal reconstruction is expected to take a total of 12 months, which includes a 2-month preparatory period. To ensure sufficient power supply at the construction site, State Grid and mobile power plants with a capacity of 30 kW will be utilized.		

Source: Approved Detailed Designs and Engineer's Estimation

212. The R8 and Ostona canals have numerous intersections: with power lines, communications lines, cables, water pipelines, gas pipelines, and bridges, including a railway bridge. All these utilities do not interfere with construction work at the site. The table (Table 25.1) below shows the total number of intersections. During the reconstruction of the canals, dispatch control software and hardware will be installed at 17 locations. Further detailed information can be found in the explanatory notes for the R8 and Oston canals.

Table 25.1. List of P8 channel intersections with communication facilities.

Sr.No	Name of the communication facilities	Number of units
1.	Power transmission lines	40
2.	Communication lines	6
3.	Water conduits	6
4.	Gaz pipelines	6
5.	International communication trunk cable	1

6.	Railway brigde	1

213. Based on the above (Tables 24, 25), the project will require light and heavy machinery for civil intervention, the detail of the proposed machinery is summarized in table 26 for R8 canal and 27 for secondary canal.

Table 26: Estimated machinery requirement

№	NAME	Quantity (pcs)
1	Excavator with a buckety of 0.8 m^3 capacity	3
2	Excavator with a buckety of 1.0 m^3 capacity	4
3	Excavator with a buckety of 0.5 m^3 capacity	2
4	Bulldozer of 130 h/p	4
5	8 ton trailed rollers	2
6	Rollers weighing 10 tonnes	2
7	Dumper truck 10.0 tonnes	4
8	Dumper truck with a capacity of 20.0 tonnes	4
9	high-sided truck 6.0 tonnes	4
10	high-sided truck with a capacity of 4.0 tonnes	4
11	Tank truck g / n 3.5 tonnes	3
12	Cement truck g / n 7.0 tonnes	3
13	Fuel truck	2
14	Concrete mixer 4	4
15	Crawler crane g / n 10 tonnes	2
16	Truck crane g / p 6.3 tonnes	3
17	Mobile power station	1
18	Field workshop	2
19	Welding unit	4
20	Deep vibrator	4
21	Surface vibrator	4
22	Mobile dormitory trailers	4

Source: Approved Detailed Designs and Engineer's Estimation

Table 27: Estimated machinery requirement in Secondary Canal (Ostona)

№	Name	Quantity (pcs)
1	Excavator with bucket with capacity of 0.65m3	2
2	Excavator with bucket with capacity of 1.0 m3	2
3	Excavator with bucket with capacity of 0.4 m3	1
4	Bulldozer with power of 130 hp	2
5	Trailed rollers weighing 8 tonnes	2
6	Rollers weighing 16 tonnes	2
7	Dump truck with carrying capacity of 10.0 tonnes	2
8	Dumper truck with carrying capacity of 20.0 tonnes	3
9	Flatbed truck with a load capacity of 6.0 tonnes	2
10	Flatbed truck 4.0 tonnes	2
11	Tanker truck 3.5 tonnes	2
12	Cement truck g / n 7.0 tonnes	2
13	Fuel truck	2
14	Concrete mixer	4
15	Crawler crane g / n 10 tonnes	2

16	Truck crane 6.3 tonnes g / p 6.3 tonnes	3
17	Mobile power station	1
18	Field workshop	2
19	Welding unit	4
20	Internal electric vibrator	4
21	Surface electric vibrator	4
22	Mobile dormitory cars	2

Source: Approved Detailed Designs and Engineer's Estimation

214. **Power requirement** - In order to meet the power demand of the construction site, the project would source 70% of electricity demand from the State Grid, as a power back, the project would need mobile power plants of 30 kW (1 unit).

215. **Cost of R8 canal reconstruction -** The cost of construction and erection work for R-8 canal is estimated around USD **19,638,74** thousand. The item-wise cost under different headings is given in Table 28. Similarly, Table 29 enumerates the Cost of Ostana Canal Reconstruction**.**

•

Table 28: Summary cost of R-8 canal reconstruction

No.	Description of Costs	Cost, (thousand USD)
1	Costs of contractual requirements of the contractor including providing bank securities	253,46
2	Costs of Engineer's requirements (Office Related)	629,54
3	Costs of Engineer's requirements (Survey Instruments & Equipment)	15,05
	Total:	898,05
4	Canal Reconstruction Works	16 929,18
	Total:	**17 827,23**
5	Daywork: Labor	9,8
6	Daywork: Materials	5,5
7	Daywork: Other equipment and machinery of the contractor	13,47
	Total:	**17 856,01**
8	Physical Contingencies	891,36
	Total:	**18 747,38**
9	Price Adjustment	891,36
	Total:	**19 638,74**

Source: Approved Detailed Designs and Engineer's Estimation

Table 29: Summary cost of Ostana Canal Reconstruction

№	Descriptiopn of costs	Cost in (thousands USD)
1	Costs of contractual requirements of the contractor including providing bank securities	15,90
	Total:	**15,90**
2	Canal Reconstruction Works	1 539,08
	Total:	**1 554,98**
3	Tree removal and transplantation	465,80
	Total:	**2 020,78**
4	Daywork: Labor	3,41
5	Daywork: Materials	5,17
6	Daywork: Other equipment and machinery of the contractor	10,83
	Total:	**2 040,18**
7	Physical Contingencies	101,04

	Total:	**2 141,22**
8	Price Adjustment	101,04
	Total:	**2 242,26**

Source: Approved Detailed Designs and Engineer's Estimation

3.10. Comparison between "Concrete mat" and "Concrete ceiling"

216. In accordance with the project Terms of Reference, an international Climate Change expert assessed the condition of the two secondary canals. Based on the survey, the expert recommended to use of concrete mats. The proposed solution was justified by its potential environmental benefits, including improved conditions for aquatic habitats, enhanced support for shoreline vegetation, and reduced risk of damage to the root systems of existing trees and shrubs along the canal banks[25].

217. The suggested concrete mat (fleximat) is an alternative to traditional concrete ceilings. The standard and proposed options for canal ceiling have been considering four sustainability indicators, such as:

a) Environment
b) Social
c) Climate adaptive
d) Economic

- The details of assessment of both options are summarized in Table 30.

[25] The report of the international Climate Change expert

Table 30: Comparison between Concrete mat and proposed options for R8 Canal

Thematic areas	Indicators	Fleximat	Standard concrete lining (raise canal floor)
Environment	Tree ~~cutting~~ replanting	Tree cutting less. In **concrete mat,** the trees strethen the ceiling rather than damaging the solid plate as in case of concrete ceiling	Partual removal of vegetation. As a result of the canal narrowing, some trees located along certain sections of the canal will be affected by the project.
	Energy consumption	Significantly reduce heavy machine requirement as well as transportation of construction materials (sand, cement, metal etc.)	Partly pump and partly gravity irrigation (re-calculation of carbon footprint)
	Material requirement (cement/sand/gravel)	65 - 85 % reduction of raw material (cement, sand and metal, stone).	High
	Traffic	Moderate	Moderate
	Community health and safety	Moderate	Moderate
	Air & noise pollution	Less use of heavy machinery including construction material transportation thus generation of air and noise pollution is less	High
	Greenhouse gas	Less generation of greenhouse gas	High
	Biodiversity	Biodiversity conservation (partly nature-based solution) Option for inclusion of additional biodiversity (i.e. fishing)	The impact on biodiversity will be moderate due to the narrowing of the canal bed.
Social	Involuntary displacement	No	No
	Loss of livelihood	No	No
	Local employment	Create local employment for a construction period	Create local employment for a construction period
	Local energy supply (wood as fuel)	Not affected	The local power grid will provide electricity during the construction period, which will help to keep the site running smoothly.
Climate	Integration of climate adaptive in design	Reduce carbon footprint significantly	The implementation of the project is expected to result in a significant

			reduction in water losses and more efficient use of the region's water resources.
	Carbon offset	Limited	Needed
	Low carbon embodied material	Low	High

Source: Input from International Climate & Environment Specialist

218. **Limitations of Concrete Mat Application under Current Conditions**

a. Concrete mat lining has not previously been applied for canal lining in Uzbekistan; therefore, additional site investigations and pilot implementation would be required, and no local performance data are currently available.
b. Project engineers have greater confidence in conventional construction methods (i.e., reinforced concrete lining), which are well established locally.
c. Limited awareness and experience among engineers and other stakeholders may affect acceptance and effective implementation of this technology.
d. There are currently no established local suppliers of concrete mats.

219. **Way Forward**

a. During the detailed design stage, consider integrating concrete mat technology for canal lining. A pilot application on a limited section of a secondary canal should be undertaken to evaluate its technical performance and suitability under local conditions.
b. Build the capacity of the Project Implementation Unit (PIU) and relevant stakeholders through targeted training and, where feasible, international exposure or knowledge-exchange visits.

3.11. Stages of R8 Canal Development

220. The R8 subproject will be undertaken in several phases, which are summarised in Table 31.

Table 31: Stages of project development

Stage	Status	Important outputs
Screening of non-core subproject based on ADB pre-defined criteria	• Completed (for detail refer to table 15 &16)	• Project is classified as Category B project
Feasibility stage	- Feasibility report completed - IEE based on ADB SPS (2009) completed	• Statement of the Environmental Impact (SEI) to be submitted to the State Environmental Expertise (SEE) to the regional branch of MEEPCC •
Design stage	- Final design not initiated	• Inclusion of Climate adaptive measures in detailed design such as Fleximat • Avoid and minimise trees cutting • EMP developed in the IEEs will be provided to the detailed design team and will be included into design package and bidding documents

		• Environment approval to be obtained
Pre-Construction stage	• Not initiated	• Site -Specific Environmental Management Plan (SSEMP) – SSEMPs will be developed by contractor in align with EMP • No access to the site is allowed until the SSEMP is reviewed by the PIC and approved by the PIUs • Contractors obtain the necessary permissions and approvals under different statutes with PIU's support. If unanticipated environmental impacts become apparent as a result of the detailed design and during implementation, the IEE and EMP will be updated
Construction stage	• Not initiated	• Implementation of SSEMP • Inspection, monitoring and compliance • Reporting of safeguard performance

221. **Associated facility -** Associated facility is the facility whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project. At this stage, camp construction, batching plants, labour camps, mechanical workshops are envisaged at this stage. This needs to be reviewed after finalisation of detailed design.

•

222. **Access Roads -** The civil work at the R8 subproject site involve construction of temporary access roads along the canal alignment. The number and the length of these roads shall be determined during the detailed design which will be carried out by the consultant who is preparing the feasibility report.

•

223. During the construction works, if existing or new access roads are damaged, the contractor is obliged to recover/reinstate these roads and/or other local infrastructure, and agricultural lands.

•

224. **Construction Camps and Laydown Areas -** Location of camp sites will be selected keeping in view the availability of an adequate area for parking of machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity. The final locations of the camps will be selected by the contractor after the approval from the PIC and the PIU Engineer. The location of the camp should not be closer than 100- 250 m to the large water bodies (reservoirs), 50 -100 m to the small rivers and 50-70 m to irrigation canals.[26] The Camp location shall be agreed with PIU and local government authorities.

•

225. The area requirement for construction camps will depend upon the workforce deployed and the type and quantity of machinery mobilized. For example, the camps may include concrete batching facilities. In view of the area required, it will not be possible to locate campsites within the subproject area, and the contractors will acquire land on lease from private landowners. The construction camp will also have facilities for site offices, workshop and storage yard, and other related facilities including fuel storage.

•

[26] *Resolution cabinet of ministers of the republic of Uzbekistan on approval of the regulations on the order of establishment of water protection zones and sanitary protection zones of water bodies in the territory of the republic of Uzbekistan No 981 dated 11.12.19*

226. The contractor will provide the following basic facilities in the construction camps:

a) Safe and reliable water supply
b) Hygienic sanitary facilities and sewerage system
c) Treatment facilities for sewerage of toilet and domestic wastewater
d) Sickroom and first aid facilities
e) Construction of silt and oil trap at vehicle washing area/workshop
f) Designated parking space for heavy and light vehicles
g) Power back up system (i.e. DG set) must have acoustic enclosure
h) Fuel oil stored on lined platforms with embankment all around

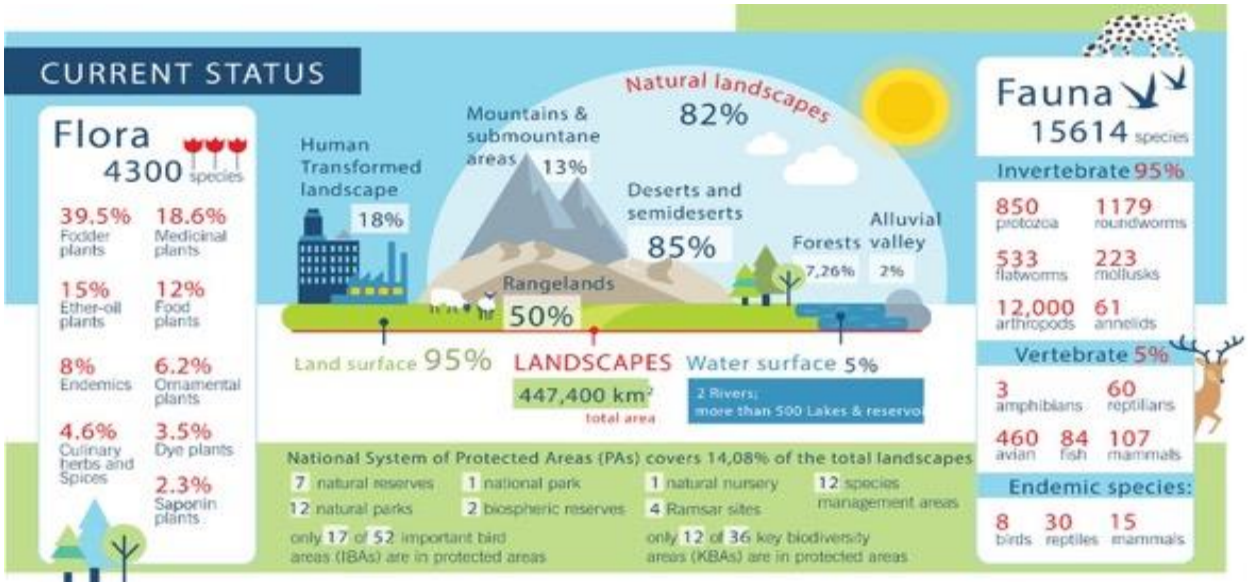
4. Description of Environment (Baseline Data)

4.1. Introduction

227. Uzbekistan lies in the southwest of Central Asia and covers roughly 447,400 km², of which about 95% is land—making it the world's 56th-largest country by area. Its natural landscapes are varied: deserts and semi-deserts dominate, occupying about 85% of the territory, while mountains and foothills take up about 13%; the remainder includes the Aral Sea, numerous rivers, and forested areas. Yet human influence is pervasive—around 82% of these natural landscapes show signs of anthropogenic disturbance, with the other 18% consisting of lands transformed for agriculture, urban development, or industry[27].

228. Water resources are heavily reliant on the two major rivers: the Syrdarya and Amudarya supply about 55% of the country's water, smaller rivers contribute about 33%, groundwater about 10%, and collector-drainage flows roughly 2%. Uzbekistan contains some 17,777 watercourses—mostly shorter than 10 km—and over 500 lakes, most of them under 1 km² (Figure 9).

Figure 9. Status of landscapes and biodiversity in Uzbekistan[28]



[27] https://www.biofin.org/sites/default/files/content/knowledge_products/PIR%20Uzbekistan_ENG_24%20April%202024_LP_TRedited.pdf

[28] The same as 35 reference

229. Uzbekistan's total biodiversity comprises about 27,000 known species[29], spanning invertebrates, vertebrates, and a wide range of plants, fungi, and algae. Official figures break this down as follows:

- Invertebrates: roughly 14,900 species
- Vertebrates: 715 species, including
  - 107 mammals
  - 467 birds
  - 61 reptiles
  - 3 amphibians
  - 77 fish
- Plants, fungi, and algae: about 11,000 species, of which approximately 4,300 are wild higher plants, with about 8% endemicю Among these, 206 animal species and 314 plant species are listed in the Red Book of the Republic of Uzbekistan.

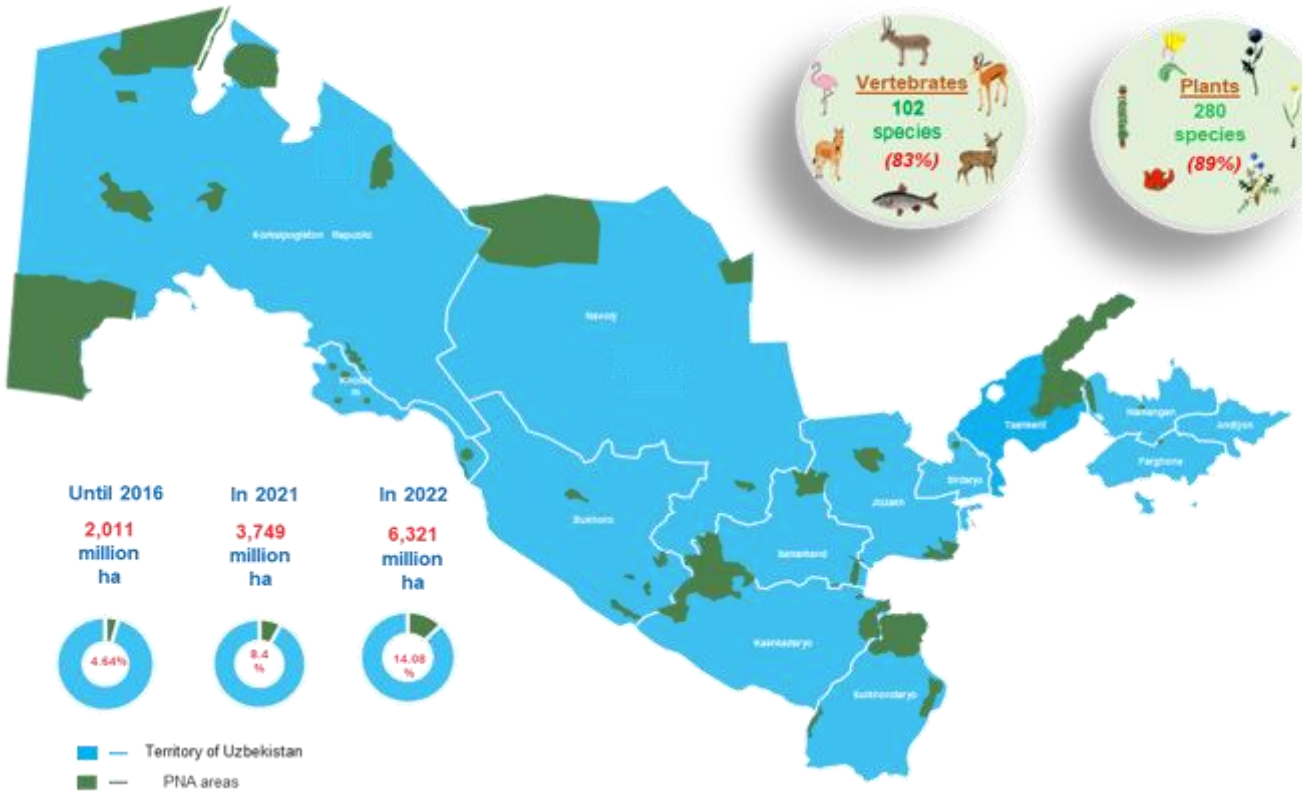
230. Uzbekistan protects its diverse ecosystems through a network of nature reserves, national parks and biosphere reserves covering around 5% of the country. These sites feature the Tien Shan Mountains, the Kyzylkum Desert and the Amu Darya floodplains, as well as important species such as the Bukhara deer and the Zerafshan pheasant. Key sites include the large mountain park of Ugam-Chatkal National Park, the Zaamin and Hissar reserves, and the Lower Amudarya Biosphere Reserve. Recent expansions and projects funded by the UNDP have enhanced conservation efforts, particularly in the Aral Sea region (Figure 9.1). Uzbekistan has an expanding network of protected natural areas including state nature reserves, national parks, biosphere reserves, and sanctuaries.

Figure 9.1. Protected Natural Areas in Uzbekistan [30]

[29] https://old.gov.uz/en/news/view/36798#:~:text=The%20biodiversity%20of%20Uzbekistan%20includes, species%20and%20314%20plant%20species

[30] The same as 35 reference

Protected Natural Areas (PNAs)



Protected Natural Areas (PNAs)

I – category PNAs	
State reserves (ha)	
1. Zaaminsky	26,840
2. Nuratis	17,752
3. Gissarsky	(80,986) 78,986
4. Kyzylkum	10,311
5. Surkhansky	23,802
6. Chatkal biosphere	24,706
7. Aktau-Tamdinsky	40,000
Total	**(224,397) 222,397**

II – category PNAs (ha)	
Complex (landscape) reserves	
"Saiga" KLZ	628,300
Total	**628,300**

III – category PNAs	
National natural parks (ha)	
1. Zaamin	24,110
2. Ugam-Chatkal	506,941
3. Zarafshan	2,426.5
4. Khorezm	21,687.5
5. Kitab geological	3,938
6. "Southern Ustyurt"	1,447,143
7. "Central Kyzylkum"	1,200,000
8. "Aralkum"	1,000,000
9. "Pap"	10,000
10. "Upper Tupalang"	27,851
11. Babatag	12,064
12. "Omankutan"	1,500
Total	**4,257,661**

IV – category PNAs	
Natural monuments (ha)	
1. Vardanzi	124
2. Mingbulak	1,000
3. Chust	96
4. Yazyavan steppes	1,471.5
5. Akbarobod	39.5
6. Zilkha	22.2
7. Bustonbuva	8.5
8. Yangibazaar	470
9. Paykent	30
10. Varakhsha	7
11. Urungach	43
Total	**3,311.7**

State biosphere reserves (ha)	
1. Lower-Amudarya	68,717.8
2. Ugam-Chatkal	42,952.8
Total	**111,670.6**

V – category PNAs	
Wildlife sanctuaries (ha)	
1. Arnasay	63,300
2. Dengizkul	50,000
3. Karakir	30,000
4. Sudochye-Akpetki	280,507
5. Mubarek	264,469
6. Aktau	15,420
7. Karnabchul	25,000
8. Koshrabat	16,500
9. Nurabad	40,000
10. Kumsulton	4,900
11. Khadicha	11,300
12. Barsakelmes (2022)	280,000
Total	**1,081,396**
12. BSP "Djeyran"	16,522
Total for category	**1,097,918**

National parks (ha)	
Durmen	32.4
Total	**32.4**

Today in the republic there are 7 state reserves, 1 complex (landscape) reserve, 12 natural parks, 1 national park, 11 natural monuments, 2 state biosphere reserves, 12 reserves, 1 specialized nursery "Jeyran". Their total area is **6,321,258.21** hectares .

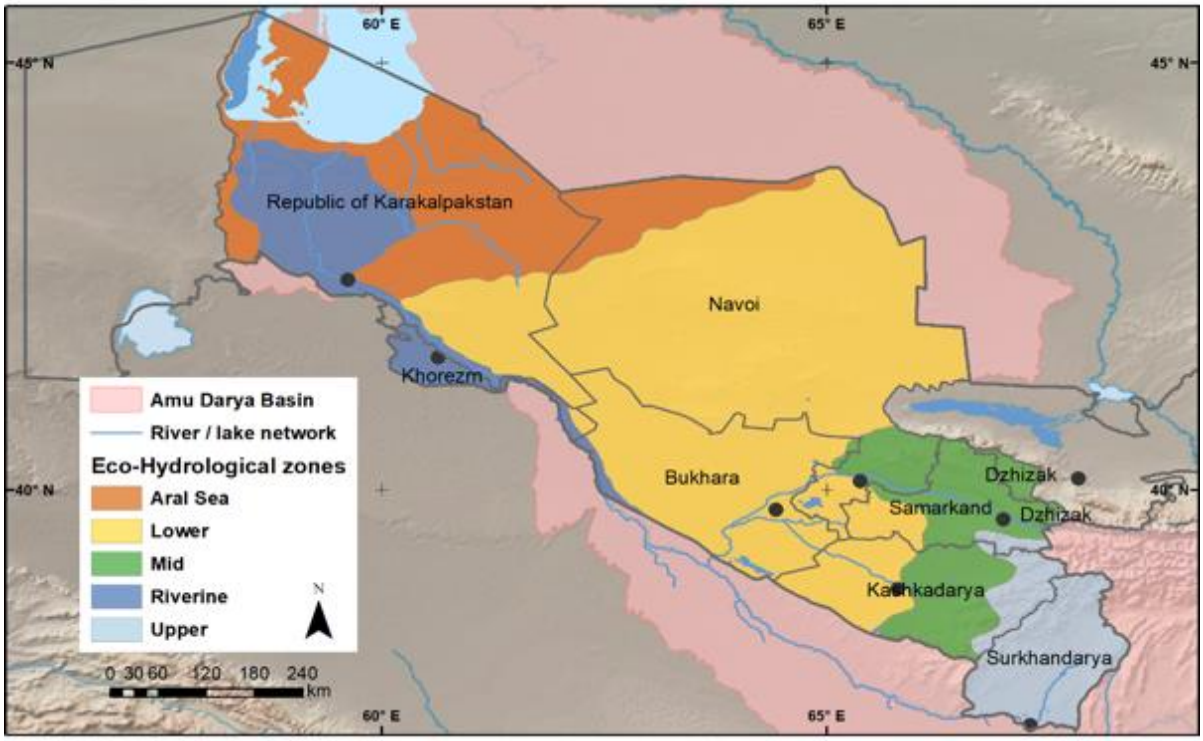
According to the classification of the International Union for Conservation of Nature (IUCN), the area of protected areas of categories I-IV and biosphere reserves is ***6.321*** **million hectares** or ***14.08%*** of the total area of the country .

VII – categoty PNAs	
Territories for management of selected natural resources	11,738,100
Total	**11,738,100**

231. The agricultural output is almost fully dependent on irrigation. Main sources of water are transboundary rivers - Amu Darya and Syr Darya. Uzbekistan receives 52% of the total water available in the region, 92% of which is consumed by the agricultural sector. Total agricultural land constitutes 25.2 million hectares (ha) out of which 4.3 million hectares (ha) are irrigated lands and 23.4 million ha are poor or low-productive pasture land. The irrigated area is located in the basins of Amu Darya and Syr Darya rivers, accounted for 56% and 44% of the total irrigated area respectively.[31]

232. The large-scale irrigation and drainage (I&D) development commenced in 1960s to expand cotton cultivation and strengthen the Soviet Union's economy. I&D systems rely on major flow diversions of Amu Darya and Syr Darya rivers. More than 50% of the irrigated land in Uzbekistan is from pumped irrigation. Amu Darya River is the lifeline for supply of Agricultural water.

Figure 10: Amu Darya Basin



Note: Using the boundaries of the Ecoregions 2017 dataset, the A-D basin was divided into five distinct eco-hydrological Zones: Aral Sea, Lower, Mid, Riverine, and Upper.

4.2. General information of R8 subproject Area

233. Khorezm region is located in the northwestern part of the Republic of Uzbekistan. Its boarder with Turkmenistan in the south and west, Karakalpastan (north, northeast) and Bukhara region (southeast). It covers a total area of 6,060 km^2 (1.4% of the total area of Uzbekistan) with total population 1,959,300 (2023). Of total population around 67% living in rural areas. The population density is 297.8 people per square km[32]. The climate in region is a typically arid continental climate with cold winters and extremely hot and dry summers. The

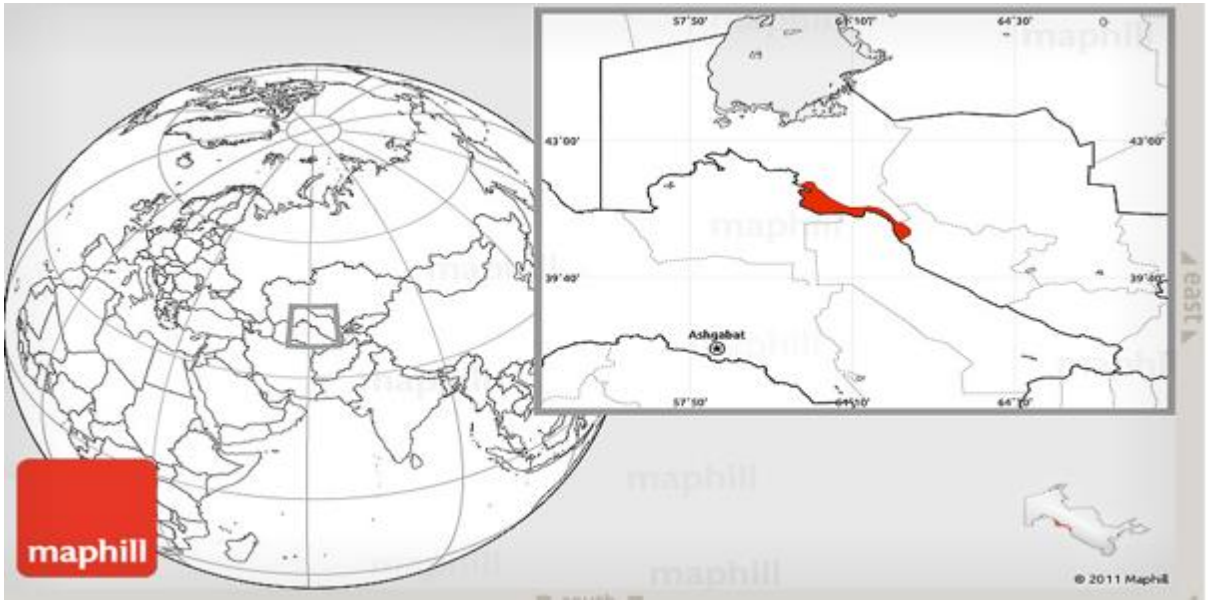
[31] 2019, Inception Report, ADB, TRTA 9782-UZB, Preparing the Climate Adaptive Water Resources Management in the Aral Sea Basin Project

[32] Source: https://invest.gov.uz/

capital Khorezm region is Urgench. The other major towns in Khorezm region are Xonga,Khiva, Shovot and Pitnak.

234. The city of Khiva in Khorezm Region is a UNESCO World Heritage Site with the world-famous architectural monuments and important tourist destinations in the country. The Amudarya River is the only river that runs through the valley. Water is used to irrigate crops through large canals.[33] The main economy in the region is primarily based on cotton.

Figure 10.1: Map of Khorezm region



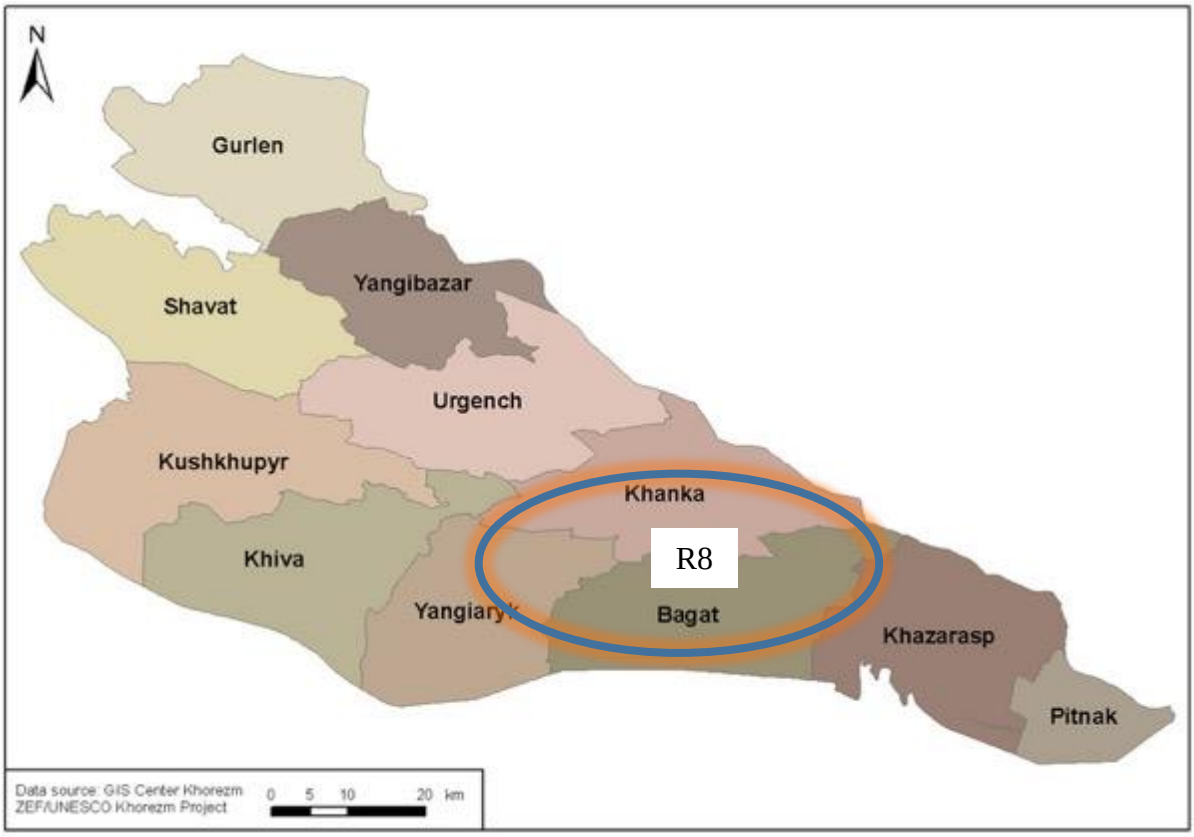
http://www.maphill.com/uzbekistan/khorezm/detailed-maps/terrain-map/
https://invest.gov.uz/regional-map/horezmskaya-oblast/

235. The region is divided into 11 administrative districts: Bagat, Gurlen, Koshkupyr, Urgench, Khazarasp, Khanka, Khiva, Shavat, Yangibazar, Yangiaryk, Tuprakkala. The irrigation canal R8 is spread in three districts and provides water in Bagat, Khanka and Yangiaryk regions, See figure 11 Location of 11 Administrative Districts and R8 project location.

[33] https://www.e3s-conferences.org/articles/e3sconf/pdf/2021/03/e3sconf_gi2021_01002.pdf

236. The source of irrigation is the Amu Darya River. There are 5 main irrigation systems in the Khorezm: Tashsakinskaya, Urgench-Arna canal system, Turanga canal system, Klychbai canal system, Gurlenskaya branch canal system.

Figure 11: Location of 11 Administrative Districts and R8 project location



Source: https://www.zef.de/maps-khorezm.html

237. The largest city of Khorezm is Urgench with a population of over 140,100 people. It is also the administrative center of the province and Urgench district. The second largest in terms of population is the ancient city of Khiva with a population of 89.2 thousand people and Pitnak holds third position with a population of 40.2 thousand people.

238. Agriculture plays an important role in the economy of the region, irrigated agricultural area is 265.9 thousand ha. The total number of farms exceeded 5,000, produced 98% of raw cotton and 65% of grain grown in Khorezm.

239. The region uses water resources of the Amu Darya River. The average volume of water resources used is about 25.2 billion m^3 per year.

4.3. Physical Resources

4.3.1. Land use and land cover

240. Over time, Khorezm Province has experienced notable changes in land use and land cover patterns. Table 27 presents a comparative overview of these changes, including variations in bare land, surface water bodies, and salinity-affected areas across the region.

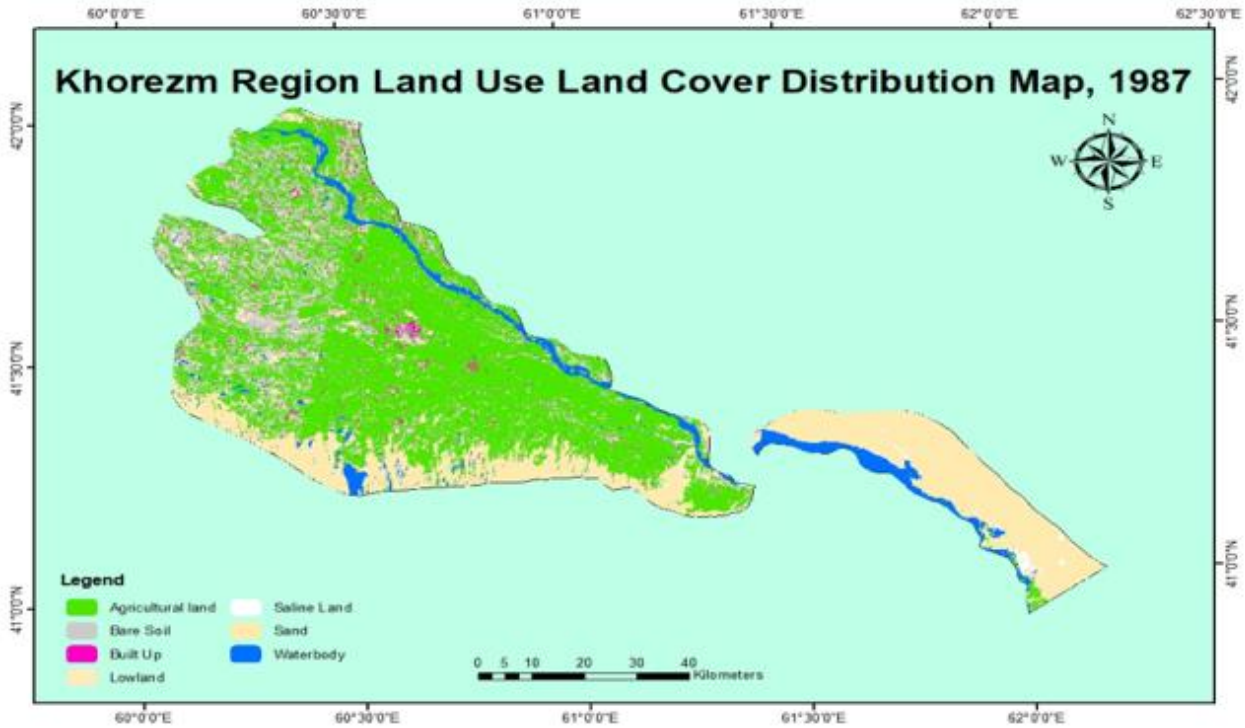
The data provide a basis for understanding recent trends in land cover dynamics in Khorezm[34]. Table 32 A should be reviewed in combination with Figures 12 and 13.

Table 32 A: Land use and land cover change (1987-2019)

#	Land use type	1987		2019	
		ha	%	ha	%
	Agricultural Land	3098,54	51,5	3661,08	60,8
	Built Up	123,86	2,1	610,8	10,1
	Bare Land	746,17	12,4	109,23	1,8
	Lowland	453,79	7,5	23,47	0,4
	Sand	1216,21	20,2	730,06	12,1
	Water	332,47	5,5	288,01	4,8
	Saline Land	50,78	0,8	599,17	9,9
		6021,82	**100,0**	**6021,82**	**100,0**

Source: https://www.e3s-conferences.org/articles/e3sconf/pdf/2021/03/e3sconf_gi2021_01002.pdf

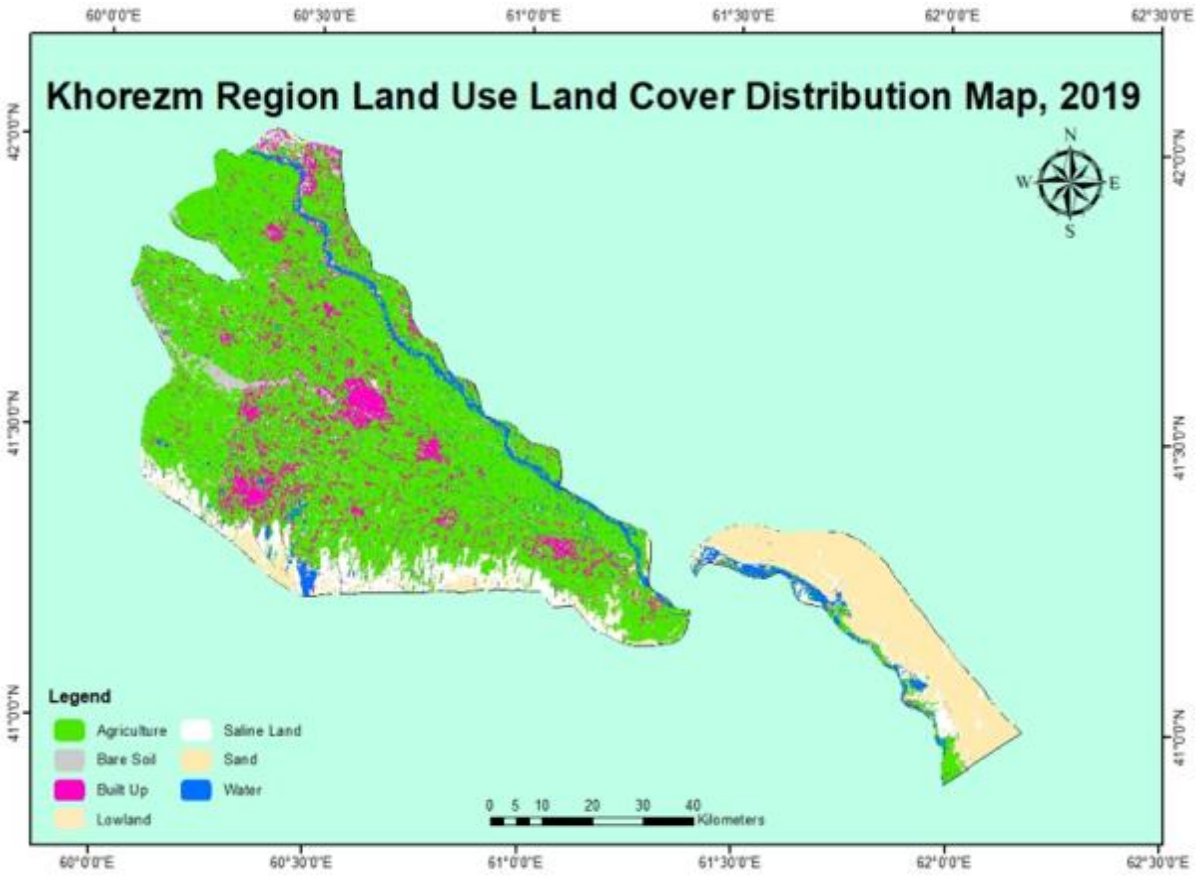
Figure 12: Land use cover distribution map (1987)



Source: https://www.e3s-conferences.org/articles/e3sconf/pdf/2021/03/e3sconf_gi2021_01002.pdf

Figure 13: Land use cover distribution map (2019)

[34] https://www.e3s-conferences.org/articles/e3sconf/pdf/2021/03/e3sconf_gi2021_01002.pdf



Source: https://www.e3s-conferences.org/articles/e3sconf/pdf/2021/03/e3sconf_gi2021_01002.pdf

241. Some key observations noted in land use and land cover between 1987 to 2019 are summarized below;

a) As the population increased by 60% (1991-2017), built up area also increased;
b) Area of agricultural land has increased from 3,098.54 km^2 to 3,661.08 km^2 during 1987-2019 period;
c) Salinized land increased by 11 folds from 50.78 km2 to 599.17 km^2;
d) Bare land reduced from 12.4% to 18% and
e) Water surface area decreased from 5.5% to 4.8% in 2019, thus region is facing water shortage.

4.3.2 Topography

242. The topography of the Khorezm region is characterized by flat slopes with a slight inclination from north-west towards south-east and elevation in range of 90-138 m above sea level[35] *see figure 14 for elevation.* Khorezm region is located on a flat area, adjacent to the Karakum desert in the south-west and south. The region borders Karakalpakstan in the north, Turkmenistan in the south, and Bukhara Region in the south-east.[36]

•

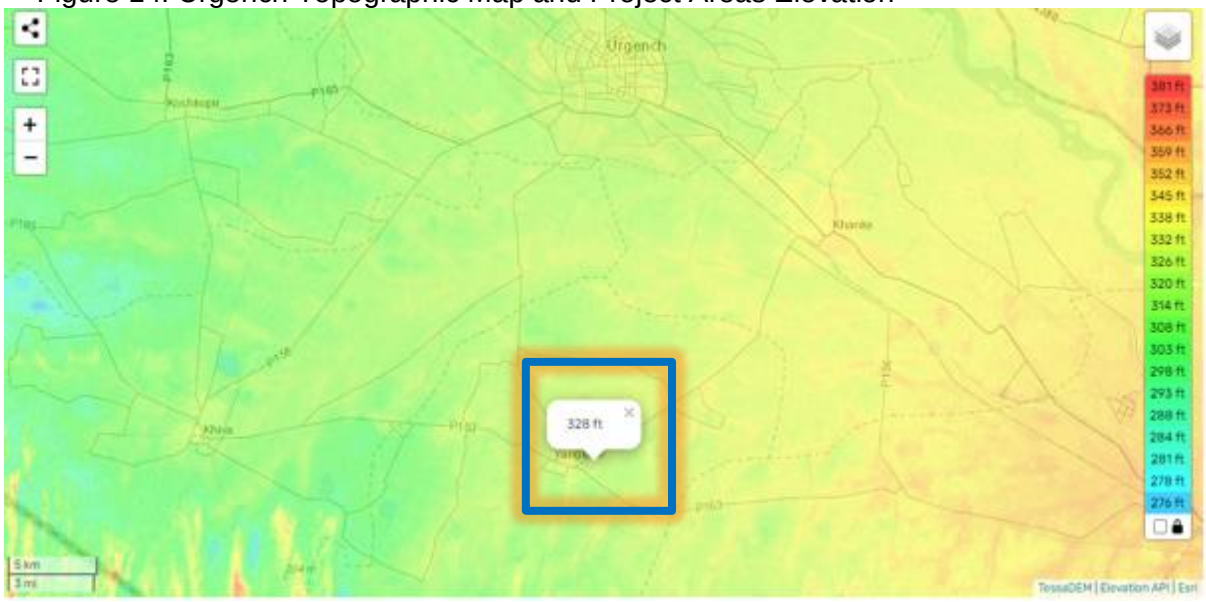
[35] https://mel.cgiar.org/reporting/download/hash/QGX4QLVV
[36] https://uzbekistan.travel/en/r/khorezm-region/

243. The R8 project area is almost flat land with agricultural fields on both sides of the canal. As the R8 spreads in three districts, the elevation of three districts from mean sea level also changes. The elevation of three districts is as follows;

a) Bagat = 337 feet,
b) Khanka = 332 feet,
c) Yangiaryk = 322 feet.

•

• Figure 14: Urgench Topographic Map and Project Areas Elevation



Source: https://en-us.topographic-map.com/map-l3lr4s/Urgench/?zoom=9

4.3.3 Geomorphologic, lithologic structure and hydrogeologic conditions.

244. Khorezm province is located within the right-bank flat and flat-wavy plain of theAmu Darya River. The region is divided into:

a) Floodplain valley stretching along the Amu Darya River;
b) Valleys of old rivers, separated by weakly expressed watersheds;
c) Pitnyak plateau;
d) Remnant small uplands and sand massifs of Zaunguz Kara-Kum.

245. The general slope of the land surface is 0.002-0.0005 and is orientated from south-east to north-west.
246. The geological structure of the territory includes sedimentary and metamorphic rocks of various ages from the Paleogene to the modern Quaternary sediments overlying the Neogene. According to their genesis, Quaternary sediments are divided into alluvial-lake, aeolian and eluvial-deluvial.
247. The lands in the R-8 canal have Quaternary deposits, the most widespread are (a) Old River Daudan deposits (b) Alluvial deposits of the ancient delta of the Amu-Darya river".
248. Alluvial deposits of the ancient delta of the Amu-Darya River with total thickness from 3 m to 30 m are characterised by inconstancy of the section both in vertical and horizontal directions. The lower part of the section is represented by a stratum of grey sand of fine and medium grained, mica, clay, with thickness from 0.5 to 0.25m. The upper part with thickness of 4-5 m is represented by light grey and yellowish grey loams, light and heavy sandy loams, sandy loams with iron stains, layered, with small nests of gypsum, with thin interlayers of grey sand.

249. Geomorphological and lithological structure of the territory of the Khorezm region and artificial irrigation of lands determined the nature and peculiarities of hydrogeological conditions. Lands of Khorezm province are characterised by very weak natural drainability. Groundwater formation occurs due to groundwater inflow from the Amudarya River, filtration losses from irrigation canals, and water infiltration on irrigation fields. The groundwater levels are at depths of 0.5-2.0 metres. The annual and seasonal amplitudes of their fluctuations are 0.5-3.0 m.

250. Groundwater mineralisation varies throughout the territory and varies from 1.0 to 5 g/l, in some places up to 10g/l. Mineralisation type is chloride-sulphate, sodium-calcium, sulphate-chloride in some places.

-

4.3.4 Soils

251. The soil formation in Khorezm region has been influenced by Amu Darya River and the irrigation practices.37 The soils and soil texture in Khorezm are very heterogeneous. Until the 1970s the soils of the major irrigated area were very fertile and high in humus, nitrogen and carbonate content, resulting in a high agricultural potential. 70% of the area was classified as meadow-alluvial loamy soils with very few sand fractions, while the remaining is desert sandy soils consisting of more than 90 % sandy fractions. The strengthening of irrigation in region caused degradation of the soils as they became arid, which has resulted in increase in level of salinity, loss of humus content (by 20%) and thus loss of fertility38. In Khorezm region, the natural fertility of the soils is low and are characterized by a very low organic matter content (0.33-0.6 %) and a high carbonate rock content.[39]

4.3.5. Seismicity

252. The country's central, southern and eastern parts is located in seismically active zones[40]. From 1900 to 2023, the country witnessed more than 60 strong earthquakes of magnitude higher than 5 on the richer scale[41]. According to ThinkHazard, a web-based tool for risk profiling, the country is classified under high risk of earthquake hazard see Figure 15.

-

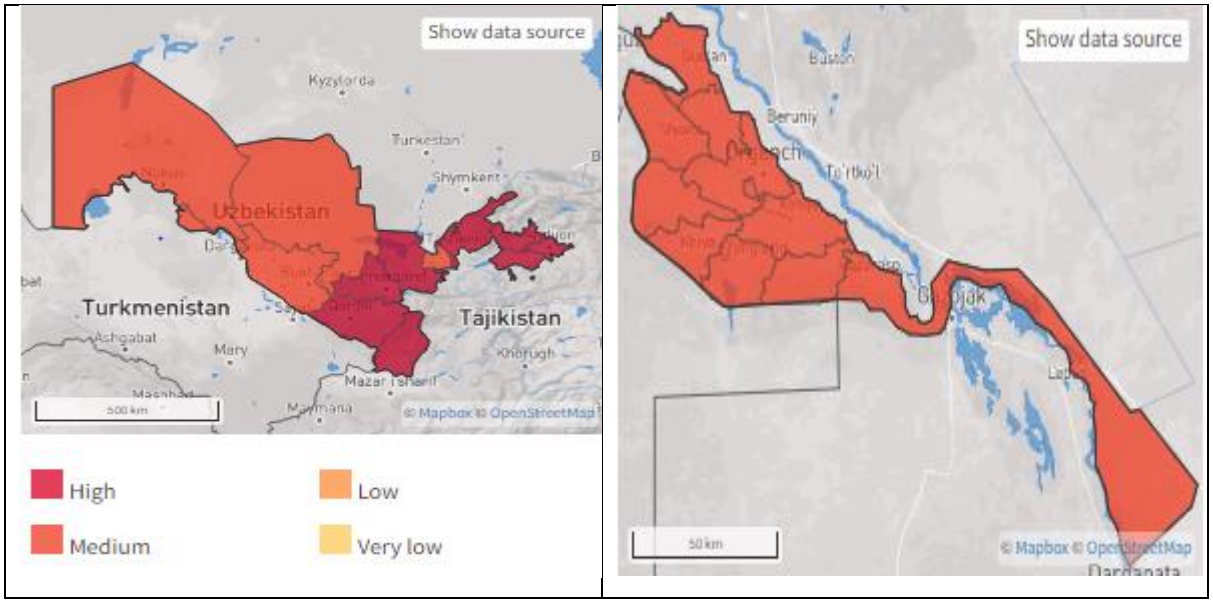
253. The earthquake hazard is classified as medium for Khorezm region, where R8 project is located. This means that there is a 10% chance of potentially-damaging earthquake shaking in the project area in the next 50 years[42].

-

Figure 15: Seismic map of Country and Project Area

Uzbekistan Earthquake Risk level – High	Khorezm region Earthquake Risk level – Medium

[37] https://d-nb.info/1016248849/34
[38] https://d-nb.info/1016248849/34
[39] https://d-nb.info/1016248849/34
[40] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4145339
[41] https://kun.uz/en/news/2023/03/25/magnitude-6-8-earthquakes-struck-uzbekistan-six-times-over-10-years
[42] https://thinkhazard.org/en/report/3289-uzbekistan-khorezm/EQ



https://thinkhazard.org/en/report/261-uzbekistan/EQ

4.3.6. Climate

254. Khorezm region occupies the northern position in the zone of continental subtropical climate and receives large amounts of solar heat (140 kcal/cm^2). In winter,cold northwestern disturbances cause a sharp temperature drop. The summer period is characterized by high temperatures with cloudless skies. The coldest month is January with an average monthly temperature of (-3.7; - 3.9 C).

255. The average temperature in June reaches +26^0 to +28^0 C, and in July and August, temperature can reach +48^0 C. The average rainfall ranges from 80-100 mm per year (mostly during spring and autumn months) but varies according to location.[43]

256. The details of the climate of Urgench (25 to 30 km from R8 canal) and Khiva city is summarized in Table 28. Khorezm typically receives about 7.46 millimeters (0.29 inches) of precipitation and has 21.8 rainy days annually[44]. The number of days with no rain is 343.2 days (94%).

257. The highest values of relative humidity observed in winter months (77-78%). By summer, with increasing temperature, relative humidity gradually decreases and minimum in June-August (37-41%).

258. At the project site, winds of the north and north-west directions prevail in summer and north and north-east directions in winter. The maximum wind speeds are observed in spring season. Mean monthly wind speeds are 3.5-4.2 m/s. The average number of days with strong wind speed (more than 15 m/s) is 12 days.

[43] *Sources*: https://www.meteoblue.com/ru/climate-change/karakalpakstan_Узбекистан_453752 - and - https://www.meteoblue.com/ru climate-change/Urgench_Узбекистан_1512473

[44] https://tcktcktck.org/uzbekistan/khorezm

Table 32B: Mean Annual Meteorological Data

S. no	Meteorological Parameters	Designations	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
m.st. "Urgench" H=100 m.abs.															
1.	Mean monthly air temperature	0^C	-3.9	-2.5	4.8	14.3	21.6	26.3	28.1	25.7	19.4	11.4	3.8	-1.8	12.3
2.	Abs.max.airtemperature		22	26	32	38	41	44	45	42	39	35	28	19	45
3.	Abc. min. air Temperature		-27	-28	-20	-6	3	8	12	10	-3	-8	-20	-26	-28
4.	Mean monthly soil surface temperature		-3	-0.2	7	17	26	32	34	30	22	13	4	-1	15
5.	Humidity Ratio	%	77	73	67	54	41	37	41	45	49	56	66	78	57
6.	Abs.humid.air	Mb	3.8	4.3	5.8	8.4	10.0	12.1	15.0	14.0	10.4	7.2	5.6	4.6	8.4
7.	Precipitation	Mm	7	10	18	16	9	4	2	1	2	4	10	11	94
8.	Average monthly wind speed	m/s	3.6	4.0	4.2	4.1	3.8	3.6	3.2	3.0	2.7	2.7	3.2	3.4	3.5
9	Average number of days with wind speed ≥	15 m/s.	0.9	1.3	1.8	1.5	2.0	1.4	0.5	0.3	0.2	0.6	1.2	0.5	12
m.st. "Khiva" H=95.0 m.abs.															
1.	Mean monthly air temperature	grad.	-3.7	-1.0	5.6	14.7	21.7	26.0	27.6	25.0	19.1	11.8	4.1	-1.6	12.4
2.	Abs.max.air temperature	Hail	21.0	27	33	37	41	44	44	42	39	36	29	19	44
3.	Abc. min. air Temperature	"	-26	-27	-18	-4	3	8	10	8	-3	-8	-18	-26	-27

4.	Mean monthly soil surface temperature	"	-3	0.2	7	17	26	32	34	31	23	13	5	0	16
5.	Humidity Ratio	%	77	73	66	55	43	42	48	53	55	60	68	78	60
6.	Abs.humid.air	Mb	4.0	4.5	6.1	8.8	10.7	13.6	17.2	16.1	11.8	7.9	5.8	4.7	9.3
7.	Precipitation	Mm	9	12	22	15	9	3	3	1	2	5	8	11	100
8.	Average monthly wind speed	m/s	3.1	3.2	3.5	3.4	3.2	2.9	2.3	2.2	2.2	2.4	2.5	2.6	2.8
9	Average number of days with wind speed ≥	15 m/s.	0.3	0.3	0.3	0.4	0.5	0.2	0.1	0.2	0.2	0.1	0.2	0.03	3
10.	Average number of days with wind speed ≥	20 m/s.	0.2	0.3	0.1	0.3	0.1	0.1	-	-	-	-	0.1	-	1
11.	Evaporation	Mm	14	26	54	120	182	223	226	206	156	97	56	26	1386

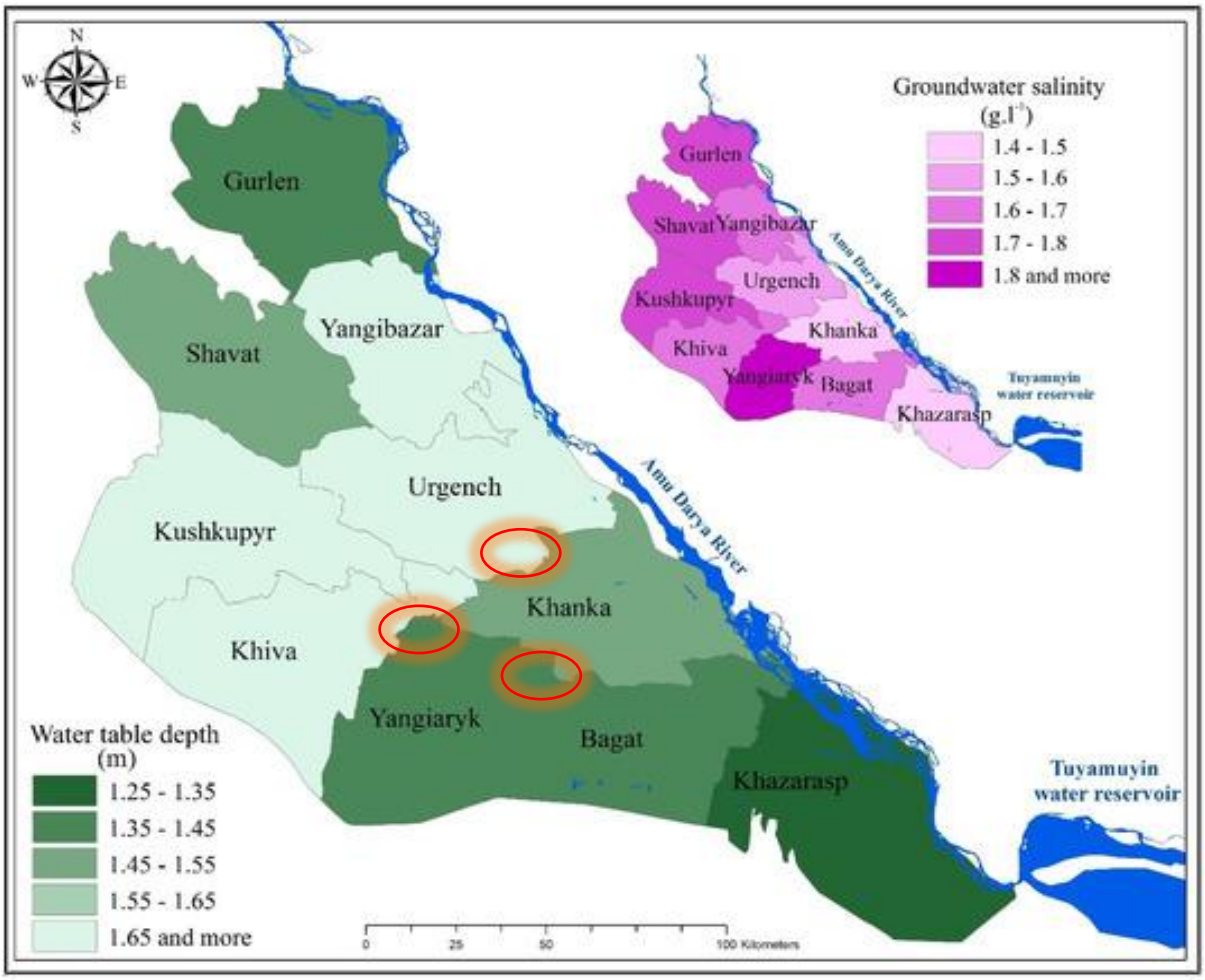
4.3.7. Salinity and Groundwater in R8 command area

259. Slightly saline ground water prevails in Khorezm region, in recent years, an increase of groundwater mineralization was observed in the region with mineralization of 1.4 to 1.8 g/l and more, and covering more than 85% of the irrigated lands. The study titled "Climate Change Risk and Vulnerability Assessment for the Lower Amu Darya Basin" conclude that as a result of climate change, the ground water levels will drop and salinity will increase from 1.6 to 1.85 – 2.1 g/l by 2050-2100 in the Khorezm region. As result, more water will be needed for flushing the soil or better separation of surface and groundwater is required.

•

260. The R-8 canal receives water through the Taschsaka canal from the Tuyamuyun Hydro Complex and from the Lower Amu Darya. Beneficiaries of proposed R8 irrigation system spread in three districts: Boghot, Honqa, and Yangiaryq districts. The Figure below depicts the **Salinity and Ground water table** in different districts of Khorezm P including command area R8 canal, see figure 16.

Figure 16: Groundwater depth and salinity Khorezm districts and project area



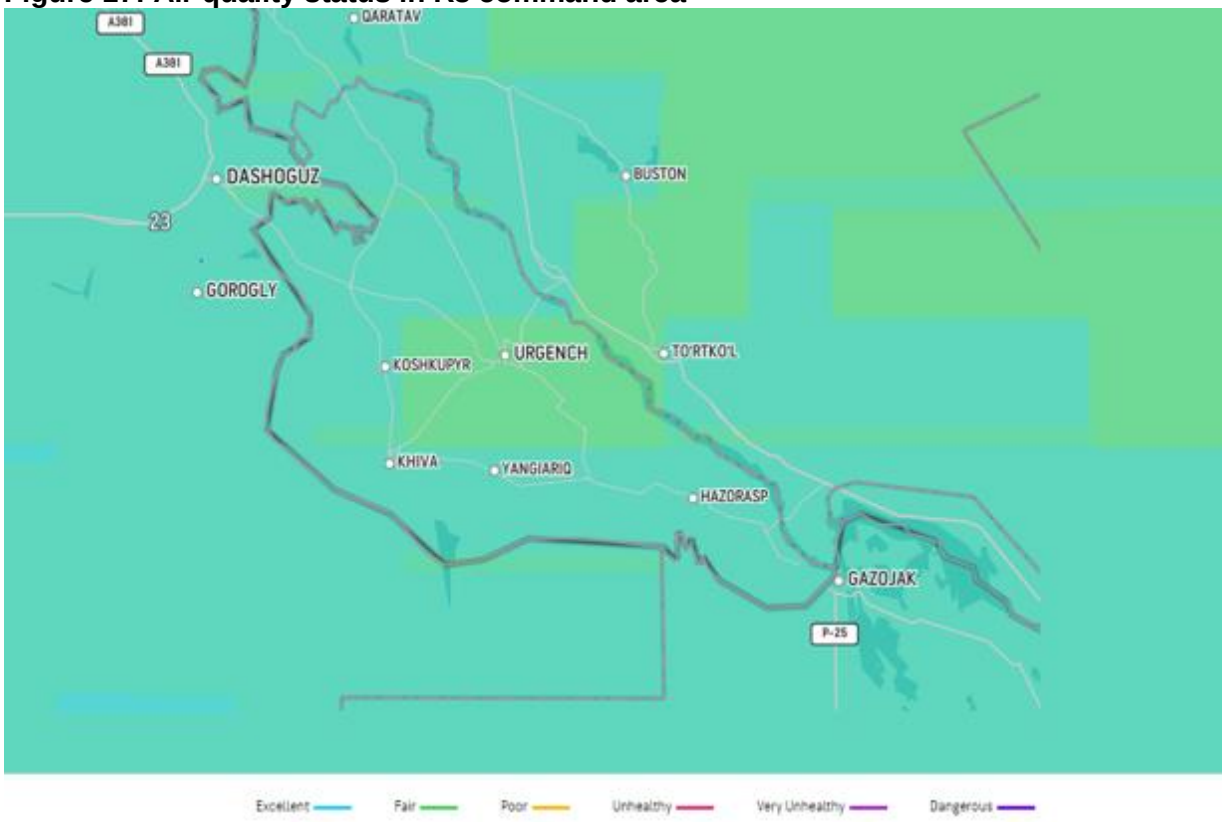
Beneficiaries of R8

4.3.8. Ambient Air quality

261. Nearest air quality station in R8 subproject is situated in Urgench. Based on the observation of daily monitoring data, the air quality in the R8 command area (Boghot, Honqa, and Yangiaryq districts) is excellent due to the rural setting, low traffic and lack of industrial pollution, see Figure 17. During site survey, the IEE team also noted good air quality in the R8 command area.

262. During the construction phase, the civil works will have a minor and temporary impact on local air quality due to emission of surface dust from vehicles transporting materials, batching plant, construction materials stockpiles etc. Therefore, prior to civil intervention, in order to establish baseline air quality, measurements will be made in the pre-construction stage, to assess the background air quality, particularly PM10 and PM 2.5. PIU/PIC ensure that contractor shall conduct air quality monitoring (a) One before civil intervention (for baseline), (b) On weekly basic during the dry season, monthly in other seasons, however, location of monitoring stations shall be decided in consultation with PIU/PIC and monitoring shall be conducted for PM10 and PM2.5. In case of complain or legal intervention, the contractor is required to conduct additional air quality monitoring as recommended by environmental authority.

Figure 17: Air quality status in R8 command area



Source: https://www.accuweather.com/en/uz/urgench/356378/air-quality-index/356378#:~:text=Fair-,22%20AQI,generally%20acceptable%20for%20most%20individuals.

4.3.9. Ambient Noise

263. No noise measurements were taken as part of the IEE study, nor were any available from secondary sources for the project area. However, during the survey of the R8 canal area, it was observed that ambient noise levels were very low due to the limited human settlement,

rural setting, low traffic movement, and lack of industrial sources. Similarly, vibration was not a problem due to the absence of infrastructure development or industrial activities such as mining.

264. During the construction phase, the civil works will have a minor and temporary impact on ambient noise quality due to movement of vehicles transporting materials, batching plant, and operating machine etc.

265. It is recommended to establish the baseline ambient noise quality before civil intervention, measurements will be taken during the pre-construction stage. These measurements will study the noise quality during both day and night, as per the prescribed National Standard. The PIU/PIC will ensure that the contractor conducts ambient noise monitoring twice: (a) before civil intervention for baseline measurements, and (b) monthly monitoring throughout the project. However, the location of monitoring will be decided in consultation with PIU/PIC, and monitoring will be conducted for both day and night. If there are any complaints or legal intervention, the contractor is required to conduct additional ambient monitoring as recommended by the environmental authority.

4.3.10. Water Quality

266. No water measurements were undertaken or available for R8 canal from the secondary sources. During survey, turbidity (by observation) in the canal was high due to high silt content.

267. During the construction phase, the civil works and auxiliary activities are expected to have some impact on canal water quality. In order to establish baseline water quality, PIU/PIC ensure that contractor shall conduct monitoring (atleast one) before civil intervention (for baseline) from the place the the water enter (Taschsaka canal) in R8 canal and second monitoring at the proposed selected areas for canal mordenisation. The analyses should include the basic water quality parameters as per the national standard. The location of monitoring stations and frequency of monitoring shall be decided in consultation with PIU/PIC. Further, PIU/PIC ensure that construction and labour camps have adequate treatment facilities for wastewater treatment.

4.4. Agriculture in Khorezm Region and in R8 Command Area

268. Of total 608,2 thousand hectares of land. The irrigated agricultural area in Khorezm province is 265.9 thousand hectares. Pasture area for livestock is 109,4 thousand hectares.[45] The main crop in the Khorezm region is cotton, which occupied 40 % to 50 % of the total sown area between1998-2003 and approximately 43% in 2003.[46] Currently, total irrigated area under cotton is 32 %, followed by 18% orchard crops, 13% wheat and 17% other respectively. Rice cultivation accounts for 2%, see Table 28.

•

269. The existing farming system in Khorezm consists mainly of Private and Dekhan farms, Dekhan farms cultivate mainly vegetables, and to a lesser extent, maize, wheat and fodder crops. Private farms produce mainly cash crops such as cotton, wheat and rice. Table 33 enumerates details of irrigated areas under Khorezm Province and impact of R8 canal on irrigation.

•

270. R8 canal irrigate 8% (19,429 ha) of total irrigated land in the Khorezm Province (256,825 ha). Out of total irrigated land by R8 canal, 25.91% land under cotton, followed by 18.34 % orchard crops, 10.71% wheat and 20.04 % others respectively,

[45] https://invest.gov.uz/regional-map/horezmskaya-oblast/

[46] https://d-nb.info/1016248849/34

•

Table 33: Information on irrigated areas and required water volumes across Khorezm province and R-8 inter-district canal

No.	Crop	Irrigated area, ha		Irrigation standard per ha on average, m^3/ha	Water requirement, mln m^3	
		Province-wise	of which, R-8 canal		Province-wise	of which, R-8 canal
Main crops – total		**256825**	**19429**		**2849.1**	**196.7**
1	Cotton	82757	5034	4700	666.0	39.0
2	Alfalfa	5774	232	8500	84.0	3.3
3	Corn	3000	114	4800	24.7	0.9
4	Vegetables	15350	1110	8400	220.8	15.4
5	Melons and guards	9472	670	3900	63.3	4.3
6	Perennial crops	13154	960	4300	96.9	6.8
7	Rice	5300	400	26200	237.8	17.3
8	Orchard crops	45076	3563	10200	787.3	60.0
9	Wheat	33200	2080	5300	301.3	18.2
10	Other	43742	3894	4900	367.0	31.5
Double crops – total		**33200**	**2118**		**766.1**	**43.7**
11	Rice	21000	1204	19000	683.2	37.8
12	Vegetables	1780	118	5800	17.7	1.1
13	Melons and guards	830	70	4300	6.1	0.5
14	Other	9590	726	3600	59.1	4.3
Total		**256825**	**19429**		**3615.2**	**240.4**

Source: Approved Detailed Designs and Engineer's Estimation

271. Table 34 below enumerates the water supply by the R8 canal during vegetation seasons and non-vegetation seasons.

Table 34: Actual Data of water supply to the R-8 Canal (in mln.m3)

Years	Vegetation seasons	Non-vegetation seasons	Total
2019	384.43	145.38	529.81
2020	242.62	150.54	393.16
2021	327.47	83.11	410.58
2022	326.69	164.37	491.06
2023	273,8	85,9	359,7
2024	272,4	85,7	358,1

Source: *Source: Approved Detailed Designs and Engineer's Estimation*

Feasibility Report

Figure 18: Main Crops Grows in Khorezm Province

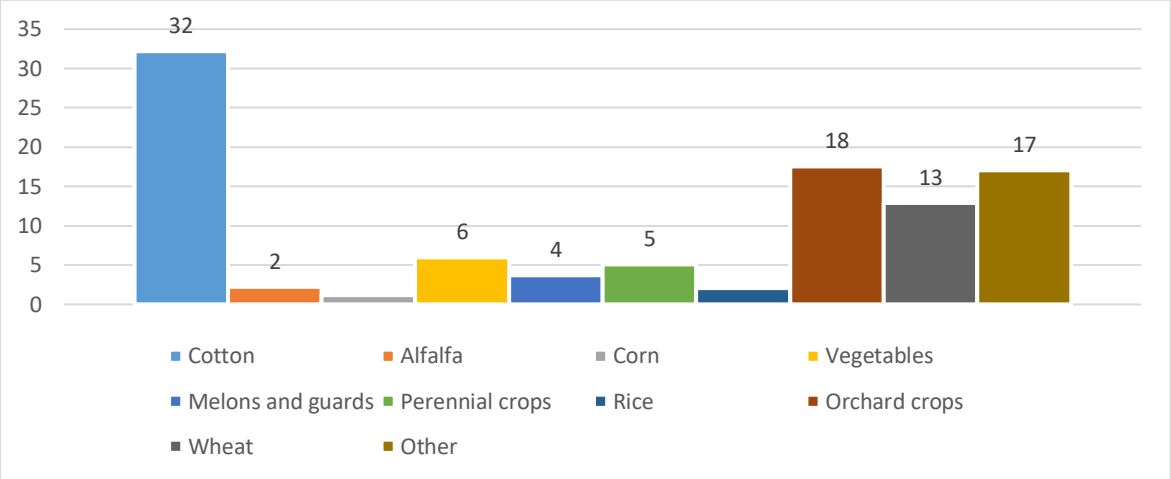
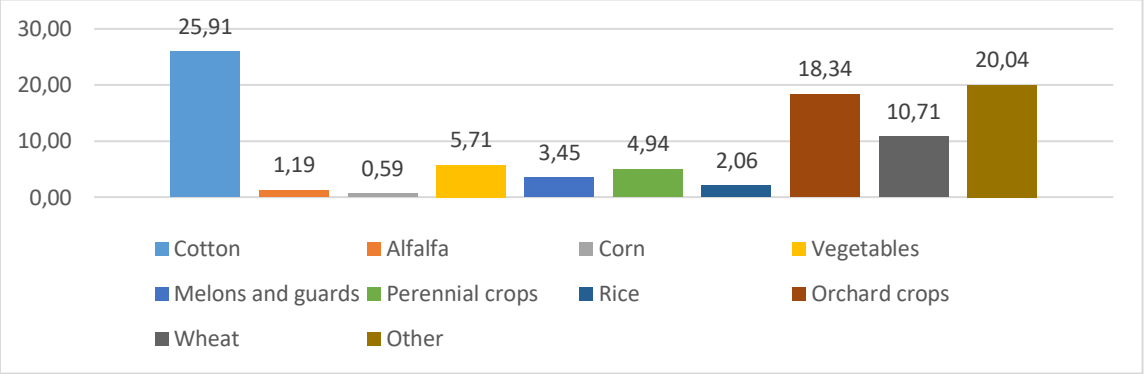


Figure 19: Main Grops Grows in Project R8 Canal Area



272. In Khorezm Province, the total water requirement is 3,615 mln m^3 to irrigate 256,825 ha of land, of which natural loss accounts 42-44%. To irrigate 8% of total irrigated land, R8 canal required 240.5 mln m^3 (6.6% of total water requirement), of which natural water loss accounts fors for 44-45%, for more detail refer to Table 35.

•

Table 35: Water requirement and loss in Khorezm province and project area (R8 canal)

No.	Canal	Total irrigated area, ha	Total water required, mln m^3	Natural water losses, %	of which	
					During maximum period (June, July, August, February, March)	During minimum period (April, May, September, October)
1	Total, province	256,825	3,615.1	42-44	42-44	39-40
2	of which, R-8 canal	19,429	240.4	44-45	44-45	40-42

273. According to feasibility report (2024), the total irrigated area of R8 canal is 19992 ha, which spreads in three districts of Khorezm province. Of total irrigated land, Yangiaryq district

has 87 % irrigated land followed by 11% Khanka and remaining 1% in Bagat district. Hence, R8 canal supply majority of water in Yangiaryq district, see Table 36.

Table 36: Coverage of R8 canal

Sr. no	District	Irrigated area (ha)	In Percentage (%)
1	Bagat	304	2
2	Khanka	2,201	11
3	Yangiaryq	17,486	87
	Total	**19,992**	**100**

Source: Source: Approved Detailed Designs and Engineer's Estimation

274. In same water supply, after canal modernization, more water from Tashaka canal will be available to irrigate additional land (2,450) ha, which accounts for 10% (19,992 ha existing irrigated in three districts), this extra land will be available Yanyarysky area. See Table 37.

Table 37: Impact of modernization of R8 canal in term of irrigated area

Sr. no	District	Irrigated area (ha)	In Percentage (%)
1	Bagat	304	1
2	Khanka	2201	10
3	Yangiaryq	17486	78
4	Yanyarysky	2450	11
	Total	**22442**	**100**

Source: Source: Approved Detailed Designs and Engineer's Estimation

4.5. Utility shifting

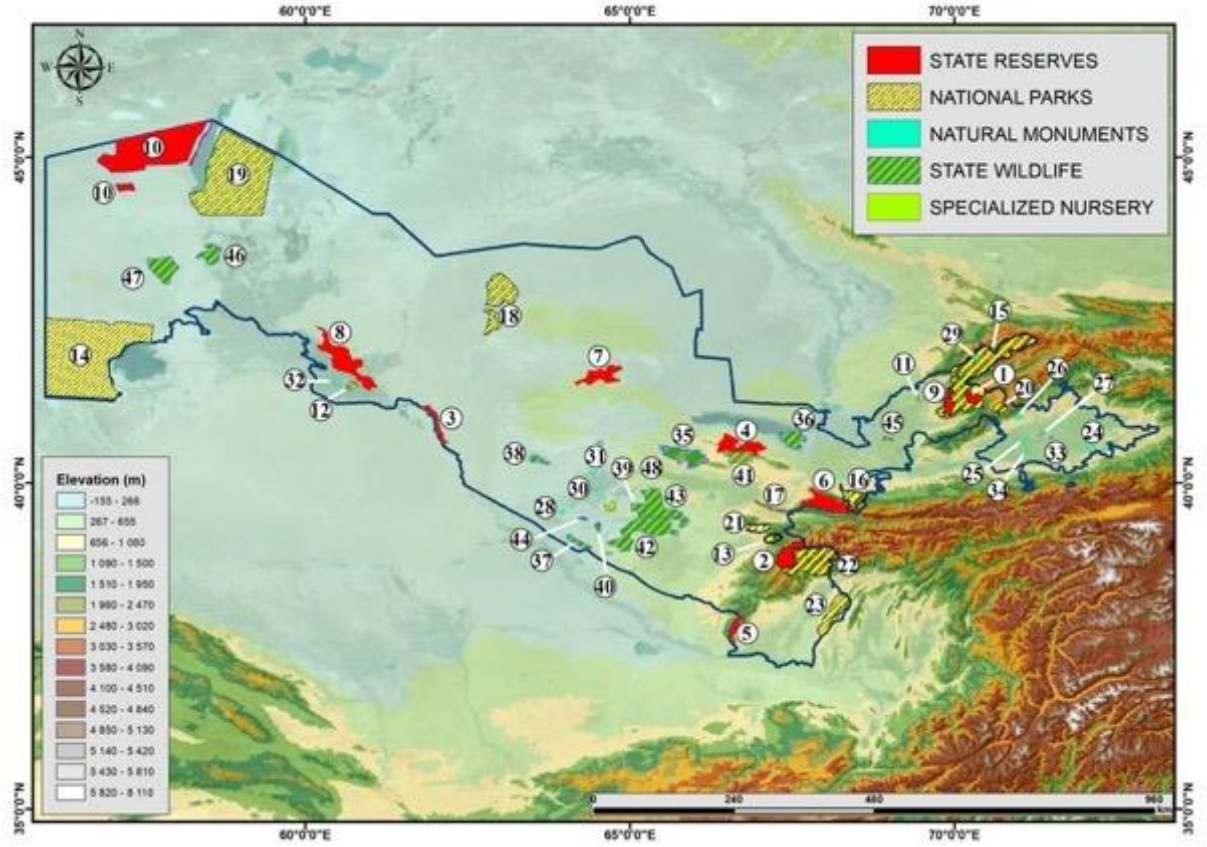
275. Rehabilitation and modernization of the R8 irrigation system will trigger utility shifting. During feasibility study, the team identified several utility crossings; for details, refer to Table 37. To avoid utility shifting, manual and pneumatic works will be carried out at the utility crossing.

276. During pre-construction and construction stage PIU/PIC ensure (a) contractors take all approvals before shifting the utility(b) local community should be informed at least 15 days prior to utility shifting,(c) gas and water pipeline required to be shifted within specified timeline.

4.6. Ecological Resources and Ecological Sensitivity

277. As of May 2023, Uzbekistan has 36 Protected Areas (PAs) reported in the World Database on Protected Areas (WDPA), which cover 5.8% terrestrial (35 protected areas, 25,976.2 km^2) area. Coverage is now 8.4%, with the recent designation of 2 new PAs, covering ~11,900km2. The below figure enumerates the protected area in Uzbekistan.

Figure 20: Protected area in Republic of Uzbekistan[47]



278. Prior to expansion of irrigated agriculture during the Soviet period, natural vegetation in the Amudarya delta was mostly **riparian (*tugai*) forests** with widespread reed communities occurring as narrow belts along the banks of the Amudarya River as it flowed towards the Aral Sea through the Karakum and Kyzylkum deserts.

279. *Tugai* forests are comprised of fast-growing deciduous trees mainly of poplar (*Populus euphratica* and *P. pruinose*) but also Russian olive (*Elaeagnus angustifolia*) and willow (*Salix* spp.) found in the floodplains and river deltas along the Amudarya and other western Uzbekistan rivers.[48] With more than 230 plant species, the *tugai* forest is one of the most diverse vegetation types in the arid regions of Central Asia.[49]

280. The **R8 canal has riparian ecosystems**. A riparian ecosystem is characterized by its proximity to water bodies. Riparian *ecosystems* have a crucial role in supporting flora and fauna. The canals, serving as waterways for irrigation and agricultural purposes, have great ecological significance for habitats in arid, drought-prone environment. The combination of water, vegetation, and relatively abundant food resources makes these riparian habitats highly attractive to a wide range of wildlife. After introduction of canals in region, productivity of cotton, wheat, sesame, grapes, apricots, melons, gourds, and a variety of other crops increased manifold. Rice, an unexpected crop in an arid environment, is grown in some irrigated areas with shallow clay soil.

[47] https://www.researchgate.net/figure/Protected-areas-of-Uzbekistan-the-numbers-in-the-figure-correspond-to-those-in-Table-2_fig1_374509109

[48] *Novikova (2001), pp 263-264 in: Martius, Christopher, Inna Rudenko, John P.A. Lamers, and Paul L.G. Vlek (eds.) (2012). Cotton, Water, Salts, and Soums: Economic and Ecological Restructuring in Khorezm. Springer.*

[49] *Novikova (2001). pp 263-264 in Martius, Christopher, Inna Rudenko, John P.A. Lamers, and Paul L.G. Vlek (eds.) (2012). Cotton, Water, Salts, and Soums: Economic and Ecological Restructuring in Khorezm. Springer.*

Picture 14: Important biodiversity micro-habitants along canal banks and adjacent areas (R-8)

Picture 15: Presence of trees and bushes on both sides of canal

281. The Ecological Assessment was conducted through desk research and site visits. It has two main components (a) background studies (b) primary data collection.

282. At several sites at R8 canal, tree identification and enumeration were made to determine the dominant tree species, using the Drude method[50] in which trees were counted over a riparian transect area (plots 100 m x 8 m) between the channel wall and the channel

[50] *Several scales are used to measure tree species abundance, for example the Gult-Drude scale, often called the Drude scale, is a measure or scale of abundance in phytocenology. Phytocoenology (a branch of geobotany or plant ecology) is the study of plant communities, or phytocoenoses. The scale predicts the number and projective coverage of plant individuals according to selected visual assessment in points. In this table, the approximate percentage of projective coverage is indicated in brackets (for copious=cop): 1) singly (up to 0.16); 2) little - (0.80); 3) quite a lot - (4); 4) many - (20); 5) a lot - (more than 20); 6) abundantly - (up to 100). Scores did not reach above cop 3.*

head, the plant species were identified, based on confirmation from scientific sources.[51] The main or dominant tree species are found is summarised in *Table 38 and 39*. For fauna, opportunistic sightings of reptiles, birds, and mammals were documented and species that may be found in the area were determined from scientific literature and earlier surveys.

Table 38: Abundance of some common tree species and R-8[52]

№	Plant species	English	Russian	Uzbek	Degree of abundance by Drude method	Average distance between individuals, cm
1	Elaeagnus angustifolia	Silver berry, Oleaster, Wild olive	Лох узколистный	Узунбарг жийда	4	20-40
2	Populus euphratica (ariana) Mix with some Populus pruinosa	Euphrates poplar, Desert poplar P. pruinosa (no known English name)	Тополь сизолистный	Туранғил, терак	20	Continuous Cover
3	Ulmus spp. (Ulmus minor?)	Elms U. minor = Field elm, introduced?	Карагач	Қайроғош	0.80	Singly
4	Morus spp. (Morus alba?)	Mulberry M. alba = White mulberry, Common mulberry, Silkworm mulberry, introduced?	Шелковица	Тут	0.80	Singly

283. A main survey regarding flora and fauna, and biodiversity was conducted by the international and national biodiversity experts. Public consultations were also conducted with several stakeholders, including the BUIS, MWR representatives, as well as local hokimiyat and irrigation authorities, to discuss the project's impact and to understand potential environmental and social risks. The Minute of the Meeting is presented in Annex 4.

284. Based on the consultations with Mr. Bekirov Kalandar, Dispatcher of the "R-8" irrigation system department some important finding of survey: since the channel is actively used for irrigation “wild animals” are rarely found, but small waterfowl are found, and species of fish (e.g., carp, silver carp, pike perch, snakehead) are caught along the canal by recreational, non-commercial fishermen.

-

Table 39: Canal landscape profiling at 3 locations along R-8

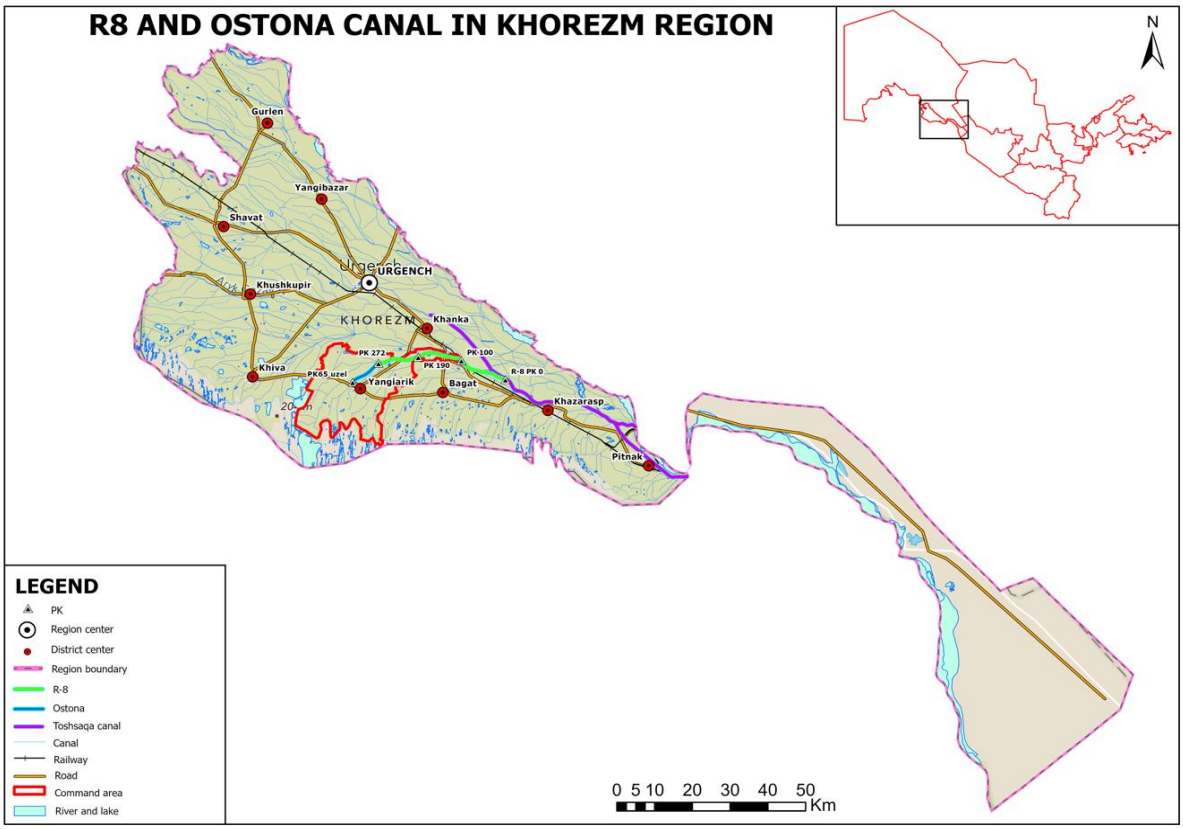
[51] *For example, Korovina, O.N., A. Bakhiev, M.T. Tazhedinov, and B. Sarybaev (1982). Illustrated guide to higher plants of Karakalpakia and Khorezm - Tashkent: Fan, 1982. -216 pp. – and - Khamidov, A. Kh., M. Nabiev, and T. Adilov (1987). Illustrated determinant of plants of Uzbekistan: [Pract. allowance for ped. in-tov] - Tashkent: Ukituvchi, 1987. 327 pp*

[52] *When examining vegetation, tree species were studied by the method of route accounting (counting or inventory).*

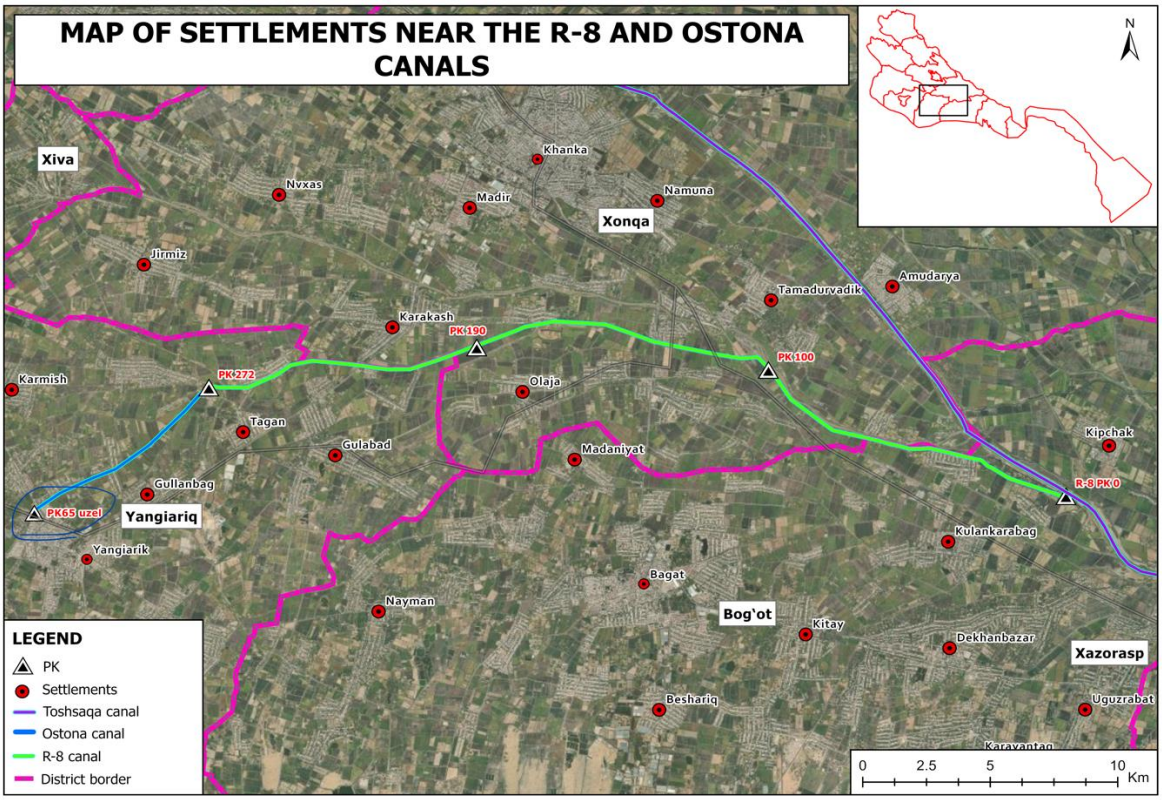
No	Location	Picket	Dominant flora	Land-use
1	Canal R-8, High Structure	00+00	The R-8 channel is very close to the Shavat channel, so plant biodiversity is mainly associated with animal migration. From a tree transect, the dominant species is turgingil (*Poplius diversifolia*) - 100 plants, with jida (*Elaeagnus angustifolia*) - 8 plants; tamarix (*Tamarix hipsida*) - 14 plants; willow (*Salix*) - 2 plants. The tree *Poplius diversifolia* dominates with *P. pruinose*. **Trees:** *Populus diversifoliya, P. pruinosa, Salix songarica, Tamarix hispida, T.laxa, Elaeagnus angustifolia* mulberry *(Morus), Vyaz (Ulmus)* **Grasses:** Licorice *Glycyrrhiza glabra*, Common reed *Phragmites australis*, Mar white *Chenopodium album, Parnolistnik Amudarya, Zygophyllum oxianum*	Agricultural crops are located near the canal, mainly rice, cotton and vegetable crops are planted. In addition, fruit trees, apples, apricot, peaches, cherries
2	Kouprik Tom Canal	171+00	This area is mainly located near settlements. Biodiversity is low due to its close proximity to extensive human housing and agriculture. The trees here include *Populus diversifoliya, P. pruinosa, Salix songarica, Tamarix hispida, T. laxa,* mulberry (*Morus*), *Ulmus* **Grass:** Licorice *Glycyrrhiza glabra*, Common reed *Phragmites australis*, Mar white *Chenopodium album* Parnolistnik amudarya *Zygophyllum oxianum*	Agricultural crops are located near the canal, mainly rice, cotton and vegetable crops are planted. In addition, fruit trees, apples, apricot, peaches, cherries
3	Navrouz Canal, Katta Bogh Canal, Ostona Canal Outlets	270+00	This area is mainly located near settlements. Because of extensive rice paddy fields, there are waterfowl and animals, but there are also limiting anthropogenic factors. The trees here include *Populus diversifoliya, P. pruinosa, Salix songarica, Tamarix hispida, T.laxa*, mulberry (Morus), *Ulmus* **Grass:** Licorice *Glycyrrhiza glabra*, Common reed *Phragmites australis*, Mar white *Chenopodium album, Parnolistnik Amudarya*, *Zygophyllum oxianum*	Agricultural crops are located near the canal, mainly rice, cotton and vegetable crops are planted. In addition, fruit trees, apples, apricot, peaches, cherries

285. Picture 28 shows the area covered by the R8 project and its secondary canal. Picture 28.1 shows the extensive agricultural land and other modified land use alongside the R8 and Ostona canals.

Picture 28: R-8 and Ostona subproject area



Picture 28: R-8 and Ostona subproject area



286. R8 non-core subproject areas are modified, non-critical habitats with no threatened or endangered species, *See Table 40: Ecological Sensitivity of the Project Area (R8).*

a. As R8 non-core subproject areas are comprised of severely modified habitat and neither contains any critical habitat, no Biodiversity Conservation Management Plan (BMP) is needed or recommended.

b. To ensure the health of local biodiversity on both sides of R8 canal, it is important to follow the mitigation and monitoring prescriptions presented in the IEEs, regarding biodiversity conservation and protection of endemic species, including poaching by construction workers. The contractor must prepare a biodiversity protection plan in SSEMP and ensure compliance therewith.

287. Uzbekistan lies within the vast Central Asian Flyway (CAF), a crucial corridor for over 600 migratory bird species moving between Siberia and tropical areas. According to research by Mimi Kessler[53], several endangered migratory bird species, including the Asiatic bustard, pass through Uzbekistan. However, these species typically use wetland and desert stopover habitats such as the Aral Sea Delta and the Kyzylkum Desert, which are located far from the project area (Table 40). Therefore, the implementation of the project is not expected to have any adverse impacts on migratory birds.

53 https://www.researchgate.net/publication/381407106_Preservation_of_major_migratory_populations_of_Asian_Houbara_Chlamydotis_macqueenii_requires_undergrounding_of_Uzbekistan's_Kungrad_powerline

•

Table 40: Ecological Sensitivity of the Project Area (R8).

Measuring parameters	R8 canal
Key Biodiversity Areas (KBAs)	No KBA were found within 1, 2, and 5 km of the subproject area.
IUCN Red List of Threatened Species	No potentially Threatened species found within 10 km of the subproject area
Notified Ramsar Wetlands	No
Critical habitats with threatened or endangered species	Not present
Plant species listed in the Red Book of the Republic of Uzbekistan	In the area of the R-8 canals, these species were not found.
Protected Areas	No Protected Areas were found within buffer distance within 1, 2, and 5 km of the subprojects.
Environmentally Sensitive and Protected Areas	No Environmentally Sensitive and Protected Areas were found within 1, 2, and 5 km of the subproject area.
Presence of any Keystone Species, or those Species, which are crucial to the overall functioning of an ecosystem	Not available
Resident bird species	Such as kingfishers, warblers, and raptors, rely on the canals for nesting, foraging, and breeding. In addition to resident bird species, migratory birds, including herons, ducks, and waders, utilize the canals as stopover points during their long-distance migrations, mostly as part of the Central Asian Flyway
Ecosystem services offered by flora and fauna	Ecosystem services provided by canal functions as part of riparian ecosystems include:[54] • Trap sediment, building and maintaining banks to prevent erosion • Reducing potential flood damage • Extending perennial flows or levels by recharging underground aquifers • Dissipating water flow energy • Promoting high primary production, including forage and shelter values • Maintaining or improving water quality • Filtering and buffering water, both from over-land flow (runoff) and water from within the channel, maintaining biodiversity due to all the above

[54] From: Riparian Ecology and Function, https://cowsandfish.org/ecology-function/

4.6.1. Status of Flora and Fauna

288. R8 sub-project canal banks at most sites were examined and had only moderate diversity of plant species, usually dominated by a few species. The riparian type of ecosystem along the canals is subject to much human disturbance and frequently fluctuating water levels.

289. Tree species such as willows (*Salix* spp.), poplars, including Euphrates poplar (*Populus euphratica*) and tamarisks (*Tamarix* spp.), are dominant. These species are well-adapted to this environment, with deep roots in the water table, and maintain stability that prevents much erosion along canal banks. Their presence creates a complex ecosystem with diverse microhabitats, benefiting a range of other organisms.

Picture 16B: Flora Assessment at R8 canal

Ecology team identifying dominant species	Dominant tress species along canal bank
	

290. *Populus diversifolia* is typically the most common tree among the flora along many stretches of R8 canals, while the second most common species is *Elaeagnus angustifolia*, followed by *Tamarix*, *Halostachys belangeriana Moq* and *Halimodendron.*

291. Native and invasive reeds (e.g., *Phragmites communis*), rushes, cattails, and water lilies are common and found in marshy areas and shallow parts along the canals and play a crucial role in water filtering and purification, preventing sedimentation, providing breeding grounds for aquatic organisms, and offering shelter to a wide range of wildlife. Their presence contributes to the overall health and productivity of the riparian ecosystem. The abundance of species includes *turanga*, willow (5 species), sucker (1 species), comb, *chingil*, clematis, gospel, and licorice. In addition to wild plants, white saxsaul or sand saxsaul (*Haloxylon persicum*) are present. In the cultivated gardens and fields, various leaf oranges (*Populus diversifolia*), poplar (*Populus*), tamarisk, sycamore (*Alhagi persorum*), safora (*Sophora* sp.), short-leaved sedge (*Elaeagnus angustifolia*), wheat (*Elytrígia*), field sedge (*Cynodon dactylon* L.), black sedge (*Halostachys belangeriana* Moq.) *Achnatherum*, reed (*Scírpus*), and gorse (*Scirpus mucronatus*) White wormwood (*Artemisia absinthium* L.), and salsola (*Salsola*) were also seen on the canal banks.

292. According to the State Committee for Ecology and Environmental Protection of the Republic of Uzbekistan and the Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan, the flora of the Khorezm region includes 373 species.[55] Of these, *Eremosparton flaccidum* (*Эремоспартон обвислый*), a legume (*Fabaceae*) are native to Kazakhstan, Uzbekistan, and Turkmenistan, is listed as Threatened in the IUCN Red Book for Uzbekistan.[56] However, this species was not seen within the canal areas, but surveys were brief, so its presence is uncertain.

[55] *Source*: https://academy.uz/uz/news/xorazm-viloyati-florasining-dastlabki-373-turdagi-osimliklar-royxati-shakllantirild
[56] *Red Data Book of the Republic Uzbekistan (Plants) Volume 2, 2019.*

Fauna

293. The term “fauna” refers to the total diversity of all animal species found in a defined area or ecosystem. The riparian (*tugai*) ecosystems of the subproject areas in Khorezm are very similar, if not identical, in their fauna and only differ in some areas due to the degree of disturbance, land use, habitat modification, and proximity to the vast deserts of the region. The combination of water, vegetation, and abundant food sources, attracts and maintains numerous animal species that would otherwise not be able to survive. For detail on list of fauna species, refer Annexure 3.

Fish

294. Native fish species, including carp, rely on the riparian zones for breeding and feeding. Fish populations may be abundant in the canals, contributing to the overall biodiversity of the riparian habitats. In Karakalpakstan and Khorezm, at least 49 fish species have been recorded,[57] but certainly only a relatively small fraction of the total species may be found in the subproject areas. Species include a mix of native and introduced game fish.

295. Common species in the lower Amu Darya River include carp, crucian carp, roach, rudd, asp, pike perch, white and motley silver carp, grass carp, and snakehead. Near the canal there are several residential villages and farms. According to a survey of fishermen, residents of local villages - carp (*Cyprinus carpio*), grass carp (*Ctenopharyngodon idella*), common zander (*Stizostedion lucioperca*), and others are found in canal. Considering the general composition of local ichthyofauna, we concluded that the fish potential in the study areas is about 15 species, including common carp, grass carp, silver carp, Amudarya trout, pike perch, snakehead, and others.

296. At the Khorezm Fish Farm and adjacent lakes IBA near the R-8 canal, there are at least 36 species and subspecies of fish from 9 families were found. For detail on list of fish species, refer Annexure 3.

Amphibians and Reptiles

297. Frogs, toads, lizards, tortoises, and snake species can be found in the vicinity of the riparian zones. These organisms serve as indicators of ecosystem health, contribute to insect control, and play crucial roles in nutrient cycling within the ecosystem. Four amphibian (three toads and a frog) and 57 reptile species (a tortoise, 36 lizards, and 20 snakes) appear confirmed as occurring within the Republic of Uzbekistan.[58] However, the vast majority would not be found in the R8 non-core subproject areas. In Karakalpakstan and Khorezm, at least 33 reptiles and two amphibians have been recorded,[59] but certainly not all these species may be found in the subproject areas. Two species of amphibians may potentially be found in the area but were not seen: the Green Toad (*Bufo viridis*) and Lake Frog (*Rana ridibunda*). Possible reptiles include: Sunwatcher Toadhead Agama (*Phrynocephalus helioscopus*), Lichtenstein's Toadhead Agama (*Phrynocephalus interscapularis*), Round-Headed Reticulated (*Phrynocephalus reticulatus*), Squeaky Gecko (*Alsophylax pipiens*), Caspian Gecko (*Cyrtopodion caspium*), Reticulate Racerunner (*Eremias grammica*), Striped Racerunner (*Eremias lineolata*), Fast Reticulate Racerunner (*Eremias velox*), Sandy Boa Constrictor (*Eryx miliaris*), Four-stripe Snake (*Elaphe quatuorlineata*), and Water Snake (*Natrix tesselata*).

298. No amphibians were seen at R8 subproject site. One reptile (lizard) was observed near the R-8 canal, believed to be a common Striped Racerunner (*Eremias lineolata*).

[57] *Original source? Found in https://karakalpakstan.travel/nature/fauna/*
[58] *Showler, David A. (2016). A Checklist of the Amphibians and Reptiles of the Republic of Uzbekistan with a review and summary of species distribution. (e-mail: dashowler@hotmail.com)*
[59] *Original source? Found in https://karakalpakstan.travel/nature/fauna/*

299. At the Khorezm Fish Farm and adjacent lakes IBA very near to the R-8 canal, there are 2 species of amphibians. Reptilia are represented by 17 species; one of them is included in the NRDB (*Varanus griseus*) and two are on the IUCN Red List (*Varanus griseus* and *Testudo horsfieldi*).[60] For detail on list of amphibian and reptile species species, refer Annexure 3.

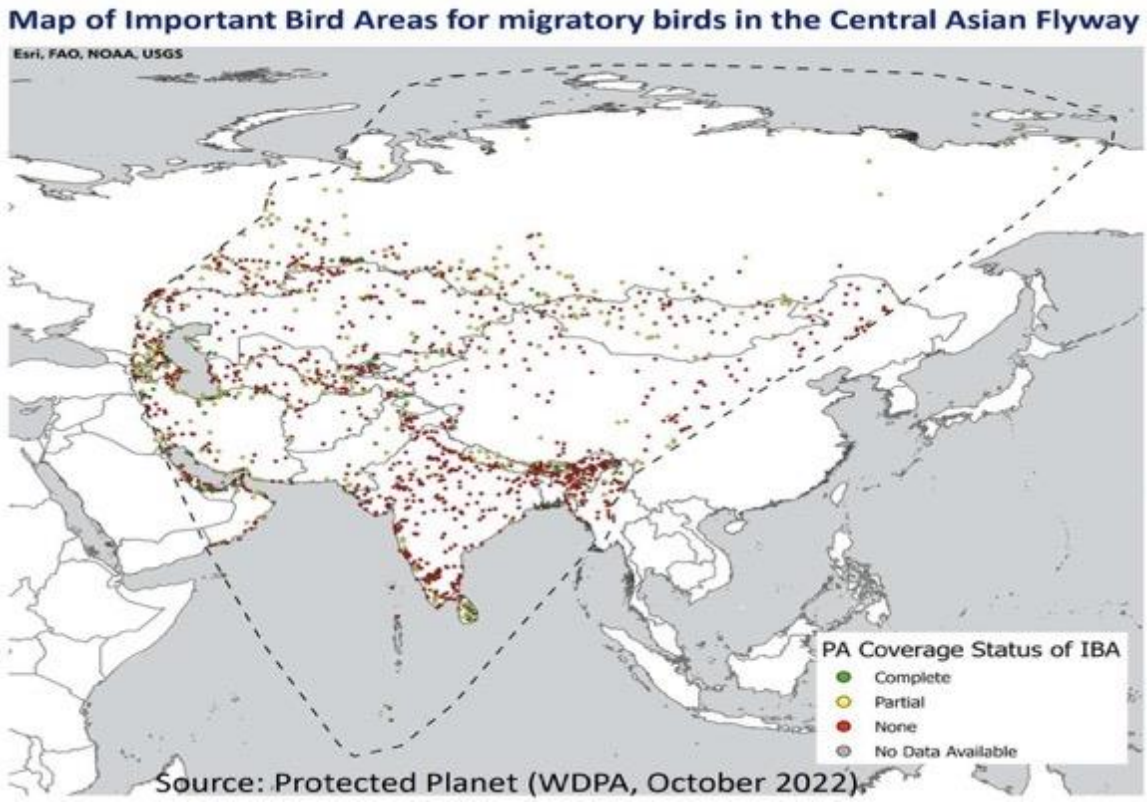
Birds

300. The Avibase Bird Checklists of the World includes all 215 bird species in Khorezm,[61] based on information available in late 2022.

301. Resident bird species, such as kingfishers, warblers, and raptors, rely on the canals for nesting, foraging, and breeding. In addition to resident bird species, migratory birds, including herons, ducks, and waders, utilize the canals as stopover points during their long-distance migrations, mostly as part of the Central Asian Flyway (*Figure 21*).

302. Resident bird species, such as kingfishers, warblers, and raptors, rely on the canals for nesting, foraging, and breeding. In addition to resident bird species, migratory birds, including herons, ducks, and waders, utilize the canals as stopover points during their long-distance migrations, mostly as part of the Central Asian Flyway (*Figure 21*).

Figure 21: Central Asian Flyway – Bird Migration



303. These riparian (*tugai*) ecosystems formed by the canals and irrigated land, are particularly important for migratory waterbirds. At least 13 bird species were observed at the R-8 sites (11/6/23) in Khorezm: Eurasian Roller (*Coracias garrulus*), European Bee-eater?

[60] BirdLife International (2023) *Important Bird Area factsheet: Khorezm Fish Farm and adjacent lakes*. http://datazone.birdlife.org/site/factsheet/22279
[61] Avibase - *Bird Checklists of the World: Khorezm*. https://avibase.bsc-eoc.org/checklist.jsp?region=UZkh

(*Merops apiaster*), Wood Sandpiper? (*Tringa glareola*), Common Sandpiper (*Actitis hypoleucos*), Common Tern? (*Sterna hirundo*), Barn Swallow (*Riparia ripria*), Common Swift (*Apus apus*), Rock Dove (*Columba livia*), Bukharan Great Tit (*Parus bokharensis*), Indian Myna (*Acridotheres tristis*), Eurasian Magpie (*Pica pica*), Marsh Harrier (*Circus aeruginosus*), House Sparrow (*Passer domesticus*), Common Raven (*Corvus corax*). One observed species is listed as "Vulnerable" in the IUCN Red List of Threatened Species, the Marsh Harrier.

304. Khorezm fish farm was created at the end of the 1970s and now its fishponds are an important habitat for waterbirds. The total area of the fish farm is 1,500 hectares. Khorezmskiy fish farm is second in importance for Uzbekistan and plays an essential role in the regional economy. Khorezmskiy fish farm and surrounding lakes are located on a waterbird flyway, particularly Ciconiiformes, Anseriformes and Laridae, migrating between their breeding areas in Russia and Northern Kazakhstan and wintering places in Central and Southern Asia. The role of artificial waterbodies in the lower reaches of the Amudarya river has significantly increased recently as a result of the drying of the Aral Sea and Amudarya delta and birds moved from these lost habitats to water reservoirs, ponds and discharge lakes. 140 species have been recorded since 1994 and 93 of them are hydrophilic. More than 30 species of waterbirds breed."

Figure 22 : The "Khorezm Fish Farm and adjacent lakes" IBA near the R-8 canal (BirdLife International Data Zone)

Project site

305. The IBA's waterbodies serve as regular stopovers during migration. 75 species of birds belonging to 13 orders and 26 families were noted in lower Amu Darya area.[62] Birds are divided into orders, including (with species): Podicipediformes (2), Pelecaniformes (2), Ciconiiforme (5), Anseriformes (9), Falconiformes (3), Gruiformes (1), Galliformes (1), Charadriiformes (4), Columbiformes (3), Strigiformes (1), Coraciiforms (1), Piciformes (1), and Passeriformes (22). Of these, 20 species are resident, 34 are migratory, 25 are migratory and nesting, and 15 are wintering. Species listed in the Red Data Book include the little cormorant (*Phalacrocorax pygmaeus)*, the little egret (*Egretta garzetta)* and the golden eagle (*Aquila chrysaetos)*.[63] For detail on bird species, refer to Annexure 3.

Mammal

306. Mammals, as in most ecosystems, are relatively rare and mostly inconspicuous and nocturnal. Since most of the areas adjacent to the canals are developed and cultivated, native mammal biodiversity is low and most resident mammals are domesticated species (e.g., cattle,

[62] Abdreymov T. *Birds of the tugai and adjacent deserts of the lower reaches of the Amu Darya*. - Tashkent: Fan. - 1981. - 108 p.

[63] *Red Book of the Republic of Uzbekistan*. Part 2. E: "Chinor Enk" 2019*.

goats, dogs). The most common wild mammals are rodents (e.g., vole, house mouse, gray rat, ground squirrel).

307. At the Khorezm Fish Farm and adjacent lakes IBA near the R-8 canal, mammals are represented by 17 species of 6 orders. *Gazella subgutturosa* is included in the National Red Book (2003). *Lynx caracal* and *Gazella subgutturosa* are included on the IUCN Red List. *Ondatra zibethicus, Sus scrofa* and *Lepus tolai* are considered game animals.[64] For detail on mammal species, refer to Annexure 3.

IUCN Red List of Threatened Species

308. The International Union for Conservation of Nature (IUCN) Red List of Threatened Species, also known as the IUCN Red List or Red Data Book is an inventory of the global conservation status and extinction risk of flora and fauna species.[65] Regional (or National) Red Lists are produced by countries and organizations to assess the risk of species extinction within a political management unit.

309. The Integrated Biodiversity Assessment Tool (IBAT) provides a basic risk screening on biodiversity.[66] It draws together information on globally recognized biodiversity information i.e., the *IUCN Red List of Threatened Species*, *Key Biodiversity Areas* (KBAs, priority sites for conservation), and *The World Database on Protected Areas* (covering nationally and internationally recognized sites, including IUCN management categories I-VI, Ramsar Wetlands of International Importance and World Heritage sites). Through an interactive mapping tool, decision-makers can access and use up-to-date information to identify biodiversity risks and opportunities within a project boundary.

310. The most recent edition of the national Red Book in Uzbekistan includes 313 plant species belonging to 48 families. Twelve (12) fish species, 7 reptile species, 45 bird species, and 18 mammal species are listed in *The Red Data Book* of the Republic of Uzbekistan, as well as 8 fish species, 1 reptile species, 45 bird species, and 14 mammal species listed in the IUCN Red List. Note that these species are found somewhere within the country and only a few may be expected in the R8 subproject sites.

311. The project area along the R-8 canal in Khorezm Region lies within a heavily modified irrigated agricultural landscape. The baseline survey and the Red Book of the Republic of Uzbekistan (2019) was conducted by the biodiversity expert. During the survey it was indicated that no critically endangered or strictly protected plant species are present within the direct footprint of the proposed works. However, limited patches of riparian vegetation along canal banks may support species of local conservation significance, such as Euphrates poplar (*Populus euphratica*), tamarisk species (*Tamarix spp.*), and saxaul (Haloxylon aphyllum and H. persicum). These species are afforded protection under national laws on flora and forestry. To minimize potential impacts, the Project will undertake a detailed pre-construction inventory of riparian trees, implement transplantation where technically feasible, and apply compensatory planting at a ratio of 10:1 for any trees that cannot be preserved.

312. IBAT Report on Faunal Attributes and Protected Areas R-8 [67] - No Protected Areas were found within buffer distance within 1, 2, and 5 km of the subprojects.

---

[64] *BirdLife International (2023) Important Bird Area factsheet: Khorezm Fish Farm and adjacent lakes. Downloaded from http://datazone.birdlife.org/site/factsheet/22279*

[65] *"Background & History." The IUCN Red List of Threatened Species. https://www.iucnredlist.org/about/background-history*

[66] *IBAT description from: Initial Environmental Examination. Uzbekistan: Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project - Surkhandarya Province, Babatag Canal Subproject. Prepared by the Ministry of Water Resources of the Republic of Uzbekistan for the Asian Development Bank, August 2021.*

[67] *Data used to generate both reports:*

- *Red Data Book of the Republic Uzbekistan (Plants) Volume 2, 2019*
- *Red Data Book of the Republic Uzbekistan (Animals) Volume 2, 2019*
- *IUCN, 2017.*
- *BirdLife International (2016). Dendrocopos leucopterus. The IUCN Red List of Threatened Species 2016: e.T22681130A92893400. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22681130A92893400.en. Accessed on 19 June 2023.*

313. *Key Biodiversity Areas* (KBAs): No KBA were found within 1, 2, and 5 km of the subproject area.

314. *IUCN Red List of Threatened Species*: Threatened species potentially found within 50 km of the subproject area are found in *Table 41*.

Table 41: IUCN Red List of Threatened Species within 50 km of the non-core subproject sites

No	Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
1	*Pseudoscaphirhynchus kaufmanni*	Amu Darya Great Shovelnose Bat	Actinopterygii	EN	Decreasing	Freshwater
2	*Barbus brachycephalus*	Aral Barbel	Actinopterygii	VU	Decreasing	Freshwater
3	*Agrionemys (Testudo) horsfieldi*	Central Asian Tortoise	Reptilia	VU	Decreasing	Terrestrial
4	*Pelecanus onocrotalus*	Great White Pelican	Aves	VU	Decreasing	Freshwater
5	*Branta ruficollis*	Red-Breasted Goose	Aves	VU	Decreasing	Freshwater
6	*Anser erythropus*	Lesser White Fronted Goose	Aves	VU	Decreasing	Freshwater
7	*Cygnus olor*	Mute Swan	Aves	VU	Decreasing	Freshwater
8	*Cygnus Cygnus*	Whooper Swan	Aves	VU	Decreasing	Freshwater
9	*Phalacrocora pygmaeus*	Pygmy Cormorant	Aves	VU	Decreasing	Freshwater
10	*Anas angustirostris*	Marbled Teal	Aves	VU	Decreasing	Freshwater
11	*Aythya ferina*	Ferruginous Duck	Aves	VU	Decreasing	Freshwater
12	*Oxyura leucocephala*	White Headed Duck	Aves	VU	Decreasing	Freshwater
13	*Pandion haliaetus*	Osprey	Aves	VU	Decreasing	Terrestrial
14	*Haliaeetus leucoryphus*	Pallas Sea Eagle	Aves	VU	Decreasing	Terrestrial
15	*Neophron percnopterus*	Egyptian Vulture	Aves	VU	Decreasing	Terrestrial
16	*Falco cherrug*	Saker Falcon	Aves	VU	Decreasing	Terrestrial
17	*Limodromus semipalmatus*	Asian Dowitcher	Aves	VU	Decreasing	Terrestrial Freshwater
18	*Glareola normanni*	Black-Winged Pratincole	Aves	VU	Decreasing	Terrestrial Freshwater
19	*Steptopelis decaoto*	Collared Dove	Aves	VU	Decreasing	Terrestrial
20	*Columba eversmanni*	Yellow-eyed Pigeon (Stock Dove)	Aves	VU	Decreasing	Terrestrial

No	Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
21	*Petrocles alchata*	Pin-Tailed Sandgrouse	Aves	VU	Decreasing	Terrestrial
22	*Larus ichtihhyaetus*	Great Black-Headed Gull	Aves	VU	Decreasing	Terrestrial
23	*Tetrax tetrax*	Little Bustard	Aves	EN	Decreasing	Terrestrial
24	*Phalacrocorax pygmaeus*	Lesser Cormorant	Aves	VU	Decreasing	Terrestrial Freshwater
25	*Egretta garzetta*	Lesser White Heron	Aves	VU	Decreasing	Terrestrial Freshwater
26	*Circus aeruginosus*	Marsh Harrier	Aves	VU	Decreasing	Terrestrial Freshwater
27	*Accipiter badius*	Shikra	Aves	VU	Decreasing	Terrestrial
28	*Falco tinnunculus*	Common Kestrel	Aves	VU	Decreasing	Terrestrial
29	*Chamydotis undu*	Houbara Bustard, Macqueen's Bustard	Aves	VU	Decreasing	Terrestrial
30	*Dendrocopos leucopterus*	White-Headed Duck	Aves	LC	Decreasing	Terrestrial, Freshwater
31	*Gazella subgutturosa*	Goitered Gazelle	Mammalia	VU	Decreasing	Terrestrial
32	*Ovis ammon*	Kizil Kum Sheep	Mammalia	CR	Unknown	Terrestrial
33	*Cervus elahhus bactrianus*	Bukhara Red Deer	Mammalia	VU	Decreasing	Terrestrial
34	*Vulpes corsac*	Corsac Fox	Mammalia	VU	Decreasing	Terrestrial
35	*Salpiningotus heptneri*	Hepter's Pygmy Jerboa	Mammalia	VU	Decreasing	Terrestrial
(Status: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; LC = Least Concern)						

4.6.2. Environmentally Sensitive and Protected Areas

315. The R8 non-core subproject areas are not located within or near any statutory protected area, and thus there is no potential impact. **There are no Ramsar sites near the R8 non-core subproject.** The table below is the list of Environmentally Sensitive and Protected Areas and their distance from R8 project, see Table 42.

Table 42. Protected Areas and Key Biodiversity Areas in Khorezm

Name	Location		Area (km^2)	IUCN Category	Distance (km) from R-8, Khorezm
	Administrative conformity	Geographical location			
Biosphere Reserves					
The Lower Amudarya State Biosphere	Beruniy and Amudarya Districts	80 km NE from Reserve/ 68 km SE from Reserve	687.8	I	68

Name	Location		Area (km^2)	IUCN Category	Distance (km) from R-8, Khorezm
	Administrative conformity	Geographical location			
Reserve					
Saygachi	Kungrad and Muynak Districts	213 km NW from Kungrad/ 280 km NW from Ustyurt	628.3	II	280
Order Reserves					
Barsakelmes	Kungrad District	184 km .NE from Usturt/ 276 km SE from Usturt	280.0	V	276
Sudochye-Akpetka State Reserve	Kungrad and Muynak Districts	130 km NE from LakeSudoche/ 280 km SE from LakeSudoche	280.5	V	280
Natural Parks					
National Natural Park "Southern Ustyurt"	Kungrad District	183 km NE from Usturt/ 270 km SE from Usturt	14471.4	III	270
Aralkum	MuynakDistricts	148 km NW from Muynak/ 270 km NW from Aral	100.0	III	270
Khorezm National Natural Park	Urgench District	160-180 km NW from Nat.Park/ 14-62 km NE, SE from Park	21,5	III	20
	Khozarsp District	190 km NW from Nat. Park/ 62 km SW, SE from Park	19.5 ha		62
	Khiva District	200 km NW from Nat. Park/ 25 km SW, SE from Park	1100 ha		25
	Yangibazar District	190 km NW from Nat. Park/ 45 km SW, SE from Park	705 ha		45
	Khanka	195 km NW from Nat. Park/ 14 km SW, SE from Park	50 ha		14
National Nature Park Aral	Bozataw District	40 km NE from Kegeyli/ 212 km ES from	196.7	V	212

Name	Location		Area (km^2)	IUCN Category	Distance (km) from R-8, Khorezm
	Administrative conformity	Geographical location			
		Bozataw			
Key Biodiversity Areas (KBAs)					
Floodplain of the Amu Darya (not far from the Kegeyli canal)	Nukus District	Amudarya is located 15 km West of Kegeili canal	10.0	-	12
Dautkul Lake	BozatawDistrict	40 km NE from Kegeyli/ 212 km SE from Kegeyli	4.3	-	212
Khorezm Fish Farm and adjacent lakes IBA / KBA	Yangiarik district	0.2 km from R- 8/ Shur kul 20 km from R-8	22,060 ha	-	20

IUCN PA Categories: I = Strict Nature Reserve, Wilderness Area; II = National Park; IV = Habitat or Species Management Area
IBA = Important Bird and Biodiversity Area, PNA = Protected Natural Area
Sources: State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection[68],
Uzbekistan Society for the Protection of Birds (NGO)[69]

Trees felling

316. Based on the project's final design and the survey conducted by the biodiversity team and Committe of Ecology inspectors, approximately 161 trees will be affected in the R8 main and secondary Ostona canals. During the final design, to reduce impacts to trees, it was decided to narrow the canal banks. However, some trees will be affected. .

4.7. Socio-economic profile in subproject areas

317. The Khorezm region is one of the agrarian-industrial regions of Uzbekistan and play an important role in the economy. The local industry is mainly associated with the processing of agricultural products. There are also enterprises for the production of carpets, building materials and food products. The tourism sector is also developing, in which the services provided to foreign tourists occupy a special place.
318. The local industry is mainly associated with the processing of agricultural products. There are also enterprises for the production of carpets, building materials and food products. The tourism is developing, in which the services provided to foreign tourists occupy a special place.
319. The volume of gross regional product (GRP) of the Khorezm region for 2022 at the current prices is 31,963.1 billion and increased by 5.7% compared to 2021.
320. The volume of gross value added in all sectors of the region's economy amounted to 96.7% of the total GRP. During the reporting period, the share of rural, forest and fish farming accounts 46.0%, industry - 14.4%, construction - 6.9%, services - 32.7% for detail see table 45.

[68] https://www.uznature.uz/en/activity/view?numer=806
[69] http://www.uzspb.uz/index_e.html

Table 45: GRP contribution by different Sector in Khorezm Region, 2022

Index	*Billion UZS*		*Growth rate*
	2021	**2022**	
I. GRP, total	26 464,3	31 963,1	105,7
Including			
Gross added value of industries	25 575,3	30 895,7	105,5
Pure products	889,0	1 067,4	111,3
II. Gross added value of industries	25 575,3	30 895,7	105,5
Agriculture, forestry and fishing	11 789,7	14 212,1	103,3
Industry (including construction)	5 150,7	6 553,8	110,5
Services	3 325,8	4 436,7	115,1
Trade	1 824,9	2 117,1	102,1
public catering services	8 634,9	10 129,8	105,4
Services	1 359,5	1 636,2	106,6
Trade	1 427,0	1 703,6	113,3
Transportation and storage, information and communication	5 848,4	6 790,0	103,2

Source: State Department on Statistics of Khorezm region

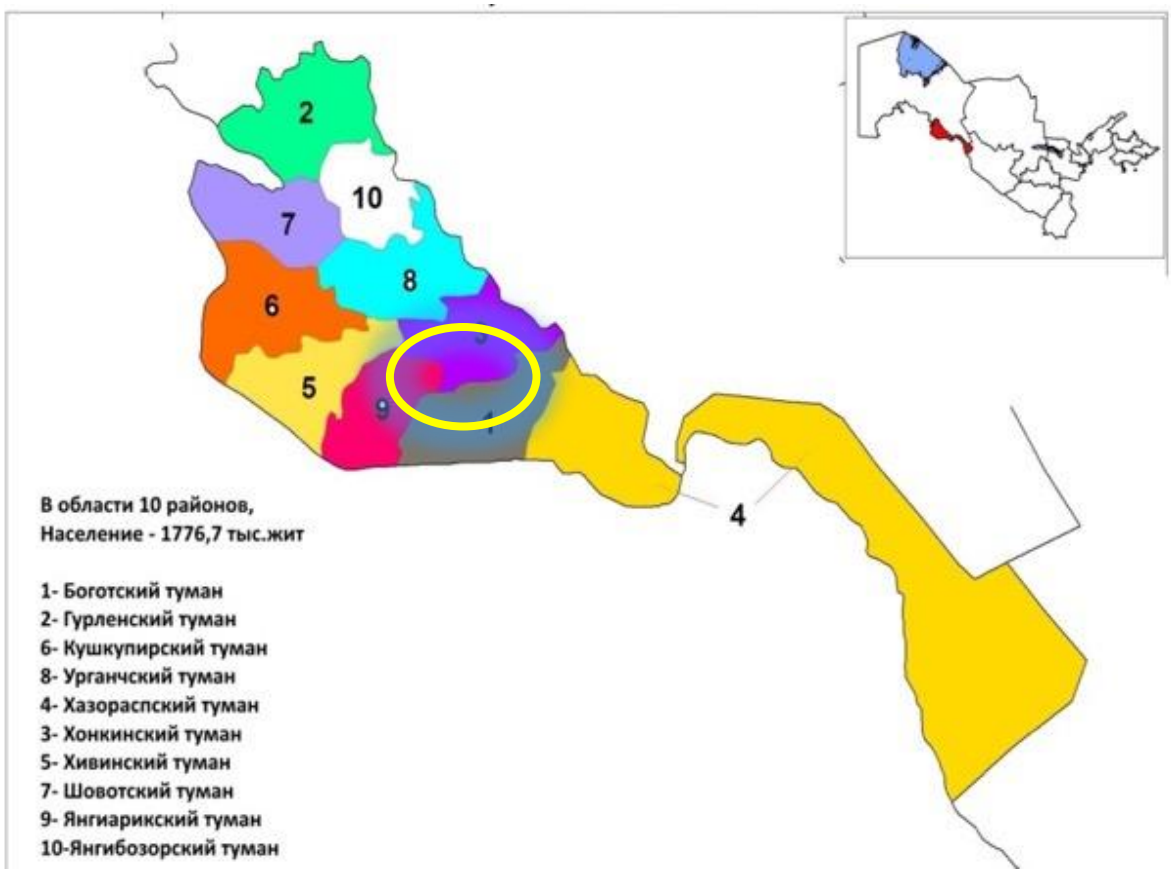
321. Khorezm is a water deficit region. Therefore, measures are being taken to use water - saving technologies in agriculture. Part of the wheat field is irrigated by sprinkling method. Agricultural crops such as carrots, onions, turnips and other crops are grown for sustainable soil conservation and improvement.

322. The total area of irrigated land used by land users engaged in agricultural production is 219.4 thousand hectares. The real area of cultivated land is significantly limited due to insufficient water supply for irrigation purposes. Agricultural production of all categories of farms in 2022 amounted to 431.5 thousand tons of grain products, including 264.2 thousand tons of wheat, also 620.5 thousand tons of vegetables and 130.5 thousand tons of potatoes.

323. The irrigation canal R8 spread in three district and provides water in Bagat, Khanka and Yangiaryk regions, See figure location of three districts. The Khorezm region was established on January 15, 1938. Its total area is 6060 square kilometre[70]. The administrative center is the city of Urgench. The population at the beginning of 2023 is estimated around 1958.2 thousand people, and around 66.9% of the population lives in rural areas. The population density is 323.7 people/km^2. The Khorezm region is divided into 11 administrative areas, including 3 project districts, see Figure (23) R8 canal coverage. There are 56 urban settlements and 550 rural ones in the region.

Figure 23: R8 canal coverage

[70] https://invest.gov.uz/regional-map/horezmskaya-oblast/



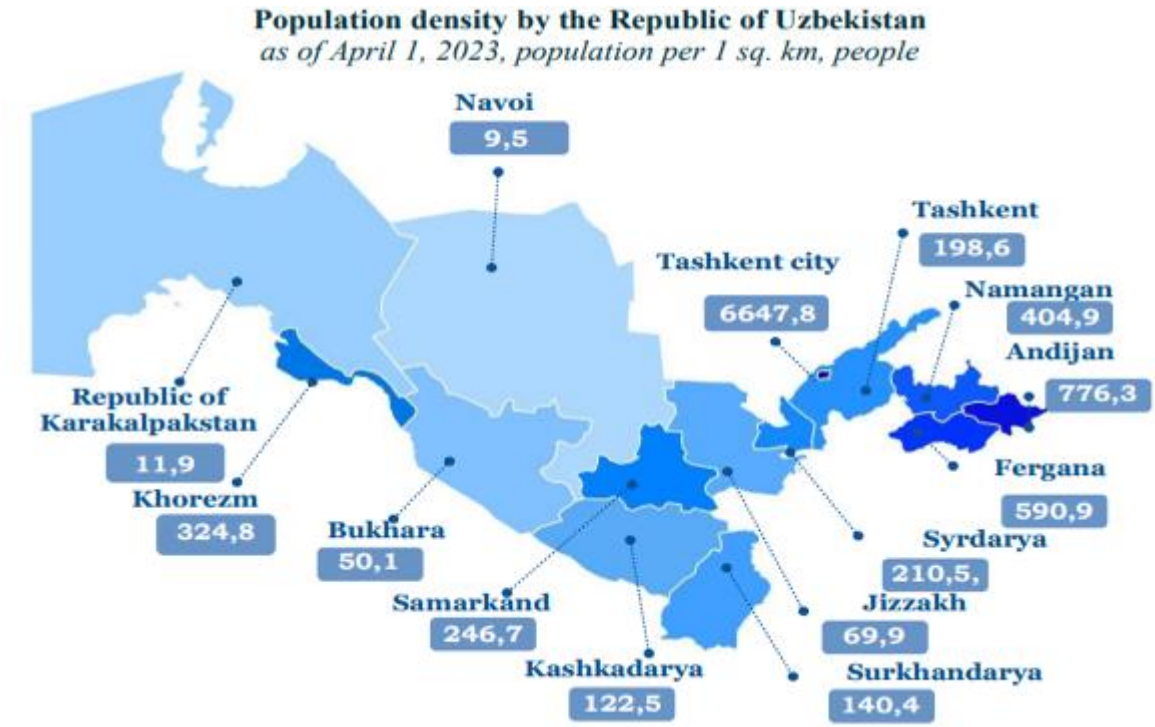
4.7.1. Population and population density

324. The current population of Uzbekistan is 36197,8 thousand (as of April 1, 2023) people[71]. As of April 1, 2023, the population density in the country was 80.6 people per one square kilometer. In terms of region wise, the highest population density in Tashkent city (6 647.8 people), 776.3 – in Andijan region, 590.9 – in Fergana region, 324.8 in Khorezm region. The lowest rates were recorded in Navoi region – 9.5 and the Republic of Karakalpakstan – 11.9 people.[72] See figure 24.

Figure 24: Population Density

[71] https://stat.uz/en/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=414&id=2852&Itemid=1000000000000

[72] https://stat.uz/en/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=414&id=2852&Itemid=1000000000000

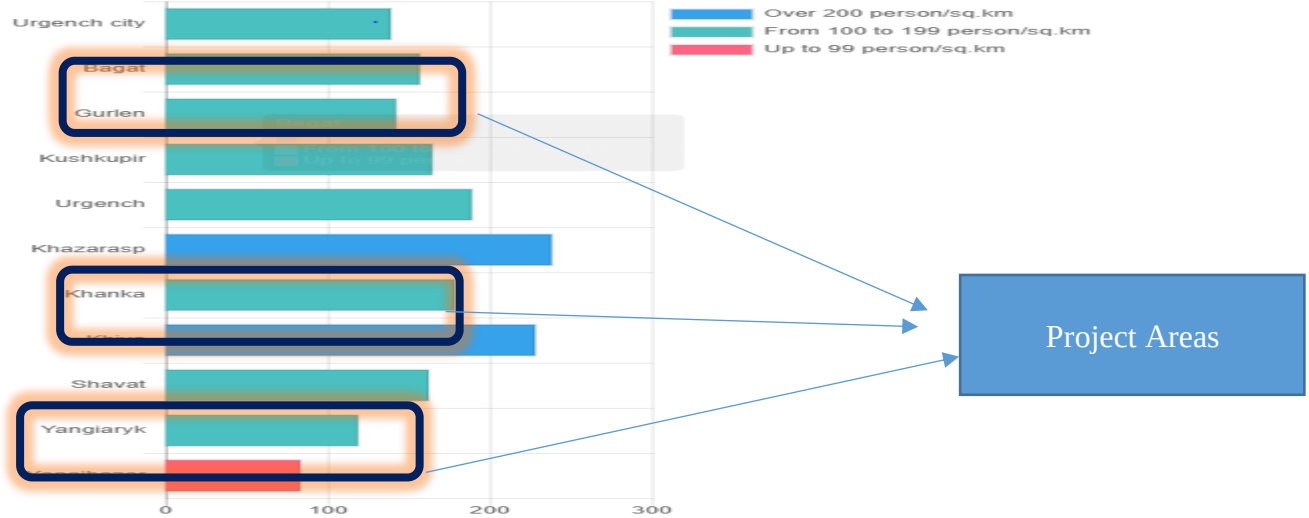


Source: *https://stat.uz/en/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=414&id=2852&Itemid=1000000000000*

4.7.2. Population density in in Khorezm region and Project Area

325. The population density in Khorezm region and R8 subproject command area is summarised in Figure 25. The population density in Yangiaryk is 84 person/sq km, lowest among eleven districts in Khorezm region

Figure 25: Population density in Khorezm region (district wise)



Source: *https://invest.gov.uz/regional-map/horezmskaya-oblast/*

4.7.3. Demographics

326. As of January 1, 2023, the number of permanent residents in Khorezm region is 1958.2 thousand people and increased by 34.0 thousand people (1.8%) compared to 2022. In particular, of total population in the region, the urban population is 647.7 thousand people

(33.1% of the total population), the rural population is 1310.5 thousand people (66.9%). In term of gender, 50.5% of the population are women and 49.5% of the population are men.

327. The three district in which R8 project falls, share 24.9% of the total population of Khorezm region, among which, 74.3% of the population are rural, See Table 44. The average indicator of the number of members of the HHs is 3.7 people.

Table 44: Demographic indicators of project districts, January 1, 2023

Area	Permanent population	including				Population density	Number of HH
		urban population		rural population			
	thousand people	*thousand people*	*%*	*thousand people*	*%*	*people / m ^{2}*	*Unit*
Khorezm region	1958,2	647,8	66,9%	1310,3	33,08%	323,7	3,6
Bagat	172,6	30,3	17,56%	142,3	82,4%	389,3	3,7
Khanka	194,9	66,7	34,22%	128,2	65,8%	450,3	3,8
Yangiaryk	120,9	28,7	23,74%	92,2	76,3%	300,2	3,7
Total	**488,4**	**125,7**	**25,7%**	**362,7**	**74,3%**		

Source: State Department on Statistics of Khorezm region

328. **Bagat district**: The administrative center is Bagat urban settlement. It was established in 1953. In 1959, the district was abolished (its territories were departed by the Khazarsp, Khanka and Yangiaryk districts) and was restored again in 1970. The administrative center of Bagat district was assigned the status of the urban settlement in 2011. The area of the district is 0.44 thousand km². The population of the district is 172.6 thousand people (as of January 1, 2023). The average number of members in HH is 3.7 people. Bagat district is considered one of the highly industrial and industrialised district in Khorezm region. In addition to the main agrarian activity, the textile, sewing and construction industry has been developed over the time. Agriculture still holds a special place in the economic life of the region.

329. **Khanka district**: The administrative center is Khanka urban settlement. Khanka district was formed in the 1920s. In 1938 it became part of Khorezm region. In 1959, part of its territory was abolished and attached to Bagat district. In 1963, the district was abolished, and in 1973 it was restored. The area of the district is 0.43 thousand km². The population of the district is 194.9 thousand people (as of January 1, 2023). The average number of members in HHs is 3.8 people.

330. **Yangiaryk district**: The administrative center is Yangiaryk urban settlement. Yangiaryk district was formed in the 1930s. In 1938, it became a part of Khorezm region. The area of the district is 0.40 thousand km². The population of the district is 120.9 thousand people (as of January 1, 2023). The average number of members in HH is 3.7 people.

331. Around 97% of the ethnic composition of the population are represented by Uzbeks. Other nationalities make up less than 3% of the population.

4.7.4. Education

332. According to State statistics, in the project area, there are 104 preschool educational institutions (23% of the total number of preschool educational institutions of Khorezm region) with 20355 children. The preschool educational establishments cover 43% (47537) of children aged 3 to 7 years living in the project area.

333. Of the 104 preschool organizations in the project districts, 33 units are located in Bagat district, 44 - in Khanka district, 27- in Yangiaryk district.

334. The total number of public and private school in project districts are146 units, which accounts 25% of total school number in Khorezm region. The total number of teaching staff

employed in 146 schools is 8573 teachers. The average number of teachers per school is about 58. There are no higher educational institutions, all the higher educational institutions are located in Urgench city, capital of the region.

335. According to the data disclosed by the State Committee on statistics of Republic of Uzbekistan, adult literacy rate (people ages 15 and above) in Uzbekistan is 99.99%. The literacy rate of male population is 100% and female 99.99% respectively.

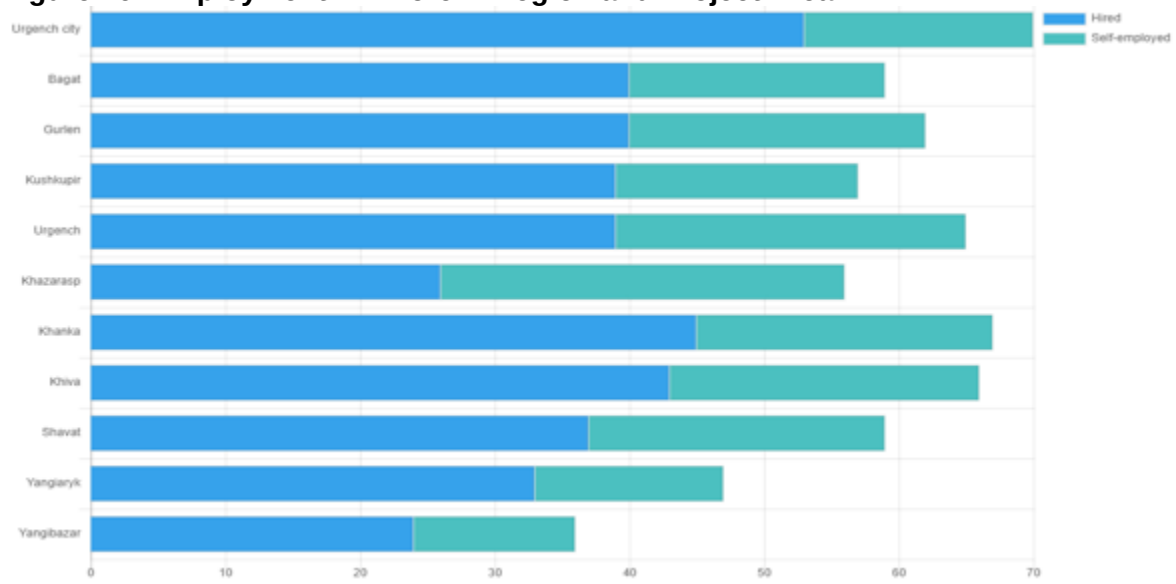
4.7.5. Employment

336. In Khorezm region, of total employed people, the percentage of self-employed is high in rural areas. In the cities areas, hired employed group percentage is high, for instance in Urgench city, hired employed percentage account 53% and self-employed group is 17% respectively, See Figure 26.The employment pattern of employed population in R8 command area are summarized in Table 46.

Table 46: Employed population in R8 command area (districts wise)

District	Percentage
Bagat	Hired – 40%, Self-employed 19%
Khanka	Hired – 45%, Self-employed 22%
Yangiaryk	Hired – 33%, Self-employed 14%

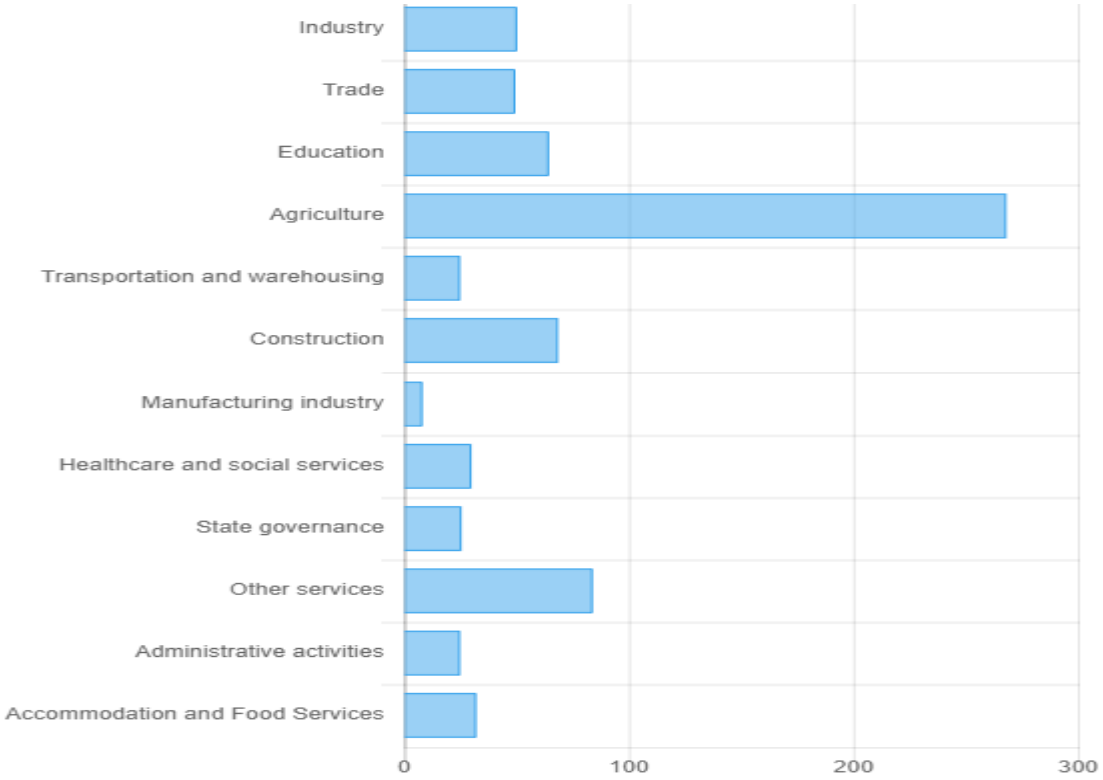
Figure 26: Employment in Khorezm region and Project Area



https://invest.gov.uz/regional-map/horezmskaya-oblast/

337. In term of sector wise employment, the top four sector are agriculture, which has provided employments to 268.2 thousand people in Khorezm region, followed by construction (69.6 thousand), education (64.5 thousand) and industry (50.3 thousand), for detail see Figure 27.

Figure 27: Employment of the population by industry (thousand people)



https://invest.gov.uz/regional-map/horezmskaya-oblast/

4.7.6. Healthcare

338. Region and district wise, the government maintain a good statistic on health. In Khorezm region, disease related to respiratory disorder account 28.9% followed by digestive diseases (17.4%) and pregnancy, childbirth and postnatal periods (9.2%), see Table 47.

339. As of January 01, 2022, in project districts, there are 5 hospitals (7% of the total number of hospitals in Khorezm region) and 87 polyclinics to cater health ailments (account 19% of total polyclinics in Khorezm region). The 5 hospitals all together have total 1000 beds.

Table 47: **Disease statistic in Khorezm region, January 1, 2022**

Diseases	%
Total number of diseases per 100 000 population	100%
Infectious and parasitic diseases	2,0%
Neoplasms	0,3%
Diseases of endocrine system, indigestion and , metabolic disorder	4,0%
Blood diseases, blood-forming organs and certain disorders involving the immune mechanism	8,8%
Mental disorders	0,2%
Incidence of nervous system	5,8%
Incidence of eyes and its adventitious organs	2,2%
Diseases of ear and mastoid bone	3,4%
Incidence of blood circulatory system	6,0%
Incidence of respiratory apparatus	28,9%
Digestive diseases	17,4%
Diseases of the genitourinary system	6,1%
Pregnancy, childbirth and postnatal periods	9,2%
Incidence of skin and hypodermic tissue	3,5%

Incidence of musculoskeletal system and connective tissue	1,8%
Congenital anomaly, deformations and chromosomal anomalies	0,0%
Injury, poisoning and other consequences of external cause	6,5%

Source: State Department on Statistics of Khorezm region

4.7.7. Transport and access infrastructure

340. Urgench, the capital of Khorezm region is well connected with road and road network. At the beginning of 2022, the length of hard-surface public roads in Khorezm region is 2176.0 km.

341. Major roads are;

(a) Urgench city is connected with all major cities with road such as

- Urgench - Tashkent - 1100 km.
- Urgench - Samarkand - 680 km.
- Urgench - Bukhara - 450 km.
- Urgench - Nukus - 146 km.
- Urgench - Khiva - 30 km.
- Urgench - Khazarasp district - 90 km.
- Urgench - Gurlen district - 41 km.

In addition, the project districts is also well connected to Urgench and other districts such as

(b) Bagat district:

- Bagat district - Urgench 39 km
- Bagat district - Gurlen district 118 km

(c) Khanka district:

- Khanka district - Khiva - 38 km.
- Khanka - Yangiaryk district 25 km

(d) Yangiaryk district:

- Yangiaryk District - Khanka District - 25 km
- Yangiaryk district - Urgench district - 32 km.

Box: Growth in Khorezm region between 2017 to 2022

- In 2017-2022, the gross regional product (GRP) of the region increased by 32% to 32.0 trillion sums, amounting to 16.5 million sums per capita.
- Agricultural production increased by 1.7 times – from 9.4 trillion sums up to 24.6 trillion sums.
- Industrial production increased from 4.1 trillion sums up to 18.3 trillion sums and its share in the GRP of the region increased from 16.6% to 21.3%.

At the same time, the population of the region has reached almost 2 million people.[73]

In improve standard of living, significant growth in local infrastructure such as construction of 34.4 km of gas pipeline, water supply networks equivalent to 4,133 km was constructed and construction of 30 km of highways over the past 6 years.

In the reporting period, 5,139 thousand square meters of housing were commissioned in the region, 18.2 thousand places were created in preschool educational institutions, 53.8 thousand places in schools, as well as 1,700 hospital beds were added in the hospitals.

342. The road transport has increased over the years, as it is faster and more reliable, and is also associated with a lower risk of loss or damage to certain types of cargo. Thus, for a number of perishable products and urgent goods, road transport is the only realistic method

[73] https://www.uzbekistan.org.ua/en/news/6527-cerr-socio-economic-development-of-khorezm-region-for-2017-2022.html

of transportation. Automotive transport is preferred means of transporting agricultural products, textiles and other non-raw materials exported from the Khorezm region.

4.8. Cultural Resources in the Project Area

343. Islam is the predominant religion in Uzbekistan, more than 90% of the population of Uzbekistan follows Islam. The civilization of Khorezm is the oldest in Central Asia - arose in the lower classes of the Amu Darya, on the border with the Kyzylkum desert in the middle of the II millennium BC. It was on the territory of the Greater Khorezm that the Holy Book of the Zoroastrians - "Avesta". In total, more than 1000 fortresses were located in the ancient Khorezm, most of which have been studied very weakly today, because they are in hard -to - reach areas, among hot sands and lifeless salt marshes. Basically, large cultural objects of Khorezm region are located in Khiva city that is remote from the project districts.

Figure 28: Location of main cultural heritage objects, Khorezm region

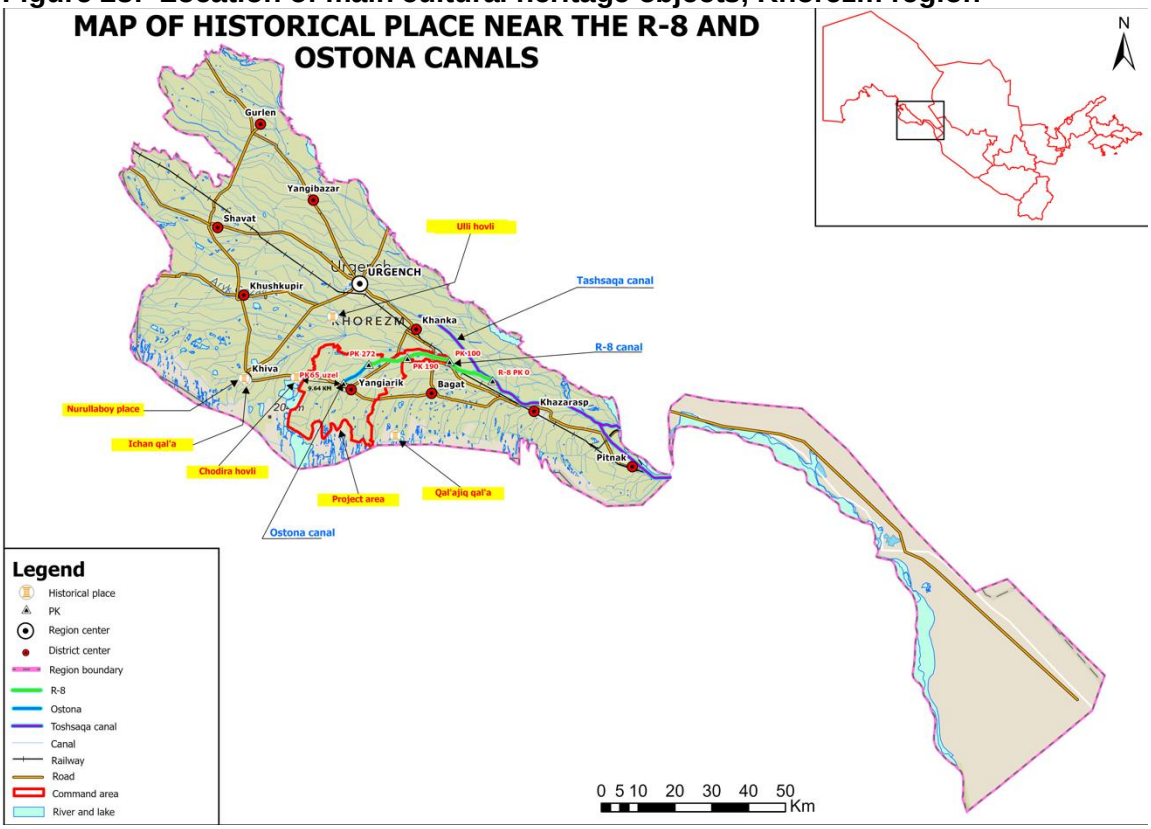


Table 48: Main Cultural heritage sites in Khorezm region[74]

	Ayaz-Kala is an archaeological site in Northern Uzbekistan, built between the 4th century BCE and the 7th century CE. Situated on a hilltop overlooking the Kyzylkum Desert, the site encompasses the ruins of an ancient Khorezm fortress. The fortresses were part of a series of forts at the edge of the Kyzylkum Desert, which provided defence against raids by nomads and the Saka of the Syr Darya delta

[74] Internet sources

	Toprak-Kala, in modern Karakalpakstan, Uzbekistan, was an ancient palace city and the capital of in Chorasmia in the 2nd/3rd century CE, where wall paintings, coins and archives were discovered. Its history covers a period from the 1st to the 5th century CE. It is part of the "Fifty fortresses oasis" in modern-day Uzbekistan. One of the few completely studied monuments of Khorezm in Uzbekistan is one of the oldest cultural places throughout Central Asia and occupies a prominent place among the monuments of the world culture of UNESCO.
	Fortress Kirk-Kyz-Kala. In 1938, during archaeological excavations in Khorezm region, the ancient settlement of Kirk-Kyz-Kala was built in I-VI centuries AD was discovered. “Kirk-Kyz-Kala” literally translates the “Fortress of the Forty Girls”. Many legends and legends throughout Central Asia are associated with these mysterious "forty girls"
	Koi Krylgan Kala is an archaeological site located outside the village of Taza-Kel'timinar in the Ellikqal'a District in the Republic of Karakalpakstan, an autonomous republic of Uzbekistan. In ancient times, it was sited along a canal in the Oxus delta region. There is some relationship between Koi Krylgan Kala and Toprak-Kala, 30 km to the northwest. It is a temple complex of the Chorasmian Dynasty, an Iranian people who ruled the area of Khorezm. It was built in the 4th-3rd century BCE. The Apa-Saka tribe destroyed it 200 BCE, but later it was rebuilt into a settlement, which lasted until c. 400 CE
	The fortress of Giaur-Kala Khojilinskaya. The ancient fortress of Giaur -Kala (IV century BC - IV century BC) in Uzbekistan belongs to the household era, when they worshiped the fire. Despite numerous excavations and significant scientific achievements, the history of Khorezm is still not fully unravelled, it is shrouded in secrets, assumptions, legends, artifacts, legends and beliefs
	Dahma Chilpyk (I -IV centuries BC - IX -XI centuries. N.) In Khorezm - this is the tower of silence, the place of burial of the Zoroastrian. Chilpyk raises particular interest and many questions among historians and archaeologists, since by the characterization of the structure it is singlely in relation to other monuments of the ancient Khorezm of this period. It is partially similar only to Ayaz-Kala.

	The fortress of Dzhanbas -Kala (IV century BC - I century AD) is located in the territory of Karakalpakstan, not far from the village Kukch. Dzhanbas-Kala, the size of which is 200x170 m is a fortress served as the protection of the southeastern border of the ancient Khorezm.
	The fortress of Kyzyl-Kala (I-II centuries, XII-early XIII centuries) is located in Karakalpastan, 27 km from the city of Biruni, not far from another famous ancient fortress of Khorezm - Toprak -Kala. The Kyzyl-Kala fortress was like a guard of the northeastern borders of the ancient Khorezm until the intervention of Chinghis Khan at the beginning of the XIII century. Kyzyl-kala is located on the plain and has an almost square shape-65x63 m. The Kyzyl-Kala fortress was also an agricultural center and a transport hub of caravan roads.

5. Anticipated Environmental Impacts and Mitigation Measures

5.1. Approach and Methodology

344. Like other development projects, the potential impacts of modernization of R8 subproject are not as severe as those of other development projects. The rehabilitation and modernization of the R8 subproject and its allied activities, such as road construction, the establishment of a campsite, batching plant, borrow pits, etc., cause some temporary and local environmental and social impacts.

345. To ensure effective assessment, we have opted for a simple, logical and systematic approach in IEE; we have considered all potential impacts and their interactions. At the same time, we also consider the scope of indirect and cumulative effects. However, rather than negative impacts, the anticipated positive indirect and cumulative effects of a project are significant, such as;

a) Improvement in water security strengthen farmer's incomes, and improves income, health and overall socio-economic wellbeing
b) More inclusion and participation of women's in project management and women-managed farms
c) Gender equality and enhance women's participation in land and water management

346. Impacts assessment is vital for deciding alternatives, planning mitigation measures and developing an EMP. Predicting the magnitude of impacts and evaluating their significance is a cornerstone of the evaluation. Therefore, for assessing the environmental and social issues, the team had considered.

a) The public concern,
b) Specialist opinion,
c) Learning from previous similar project type, project area and similar sites.

347. The assessment of impact magnitude was undertaken by considering the following:

(i) Duration of the impact;

(ii) Spatial extent of the impact;
(iii) Reversibility;

348. The magnitude of impacts were identified according to parameters outlined in Table 49.

Table 49: Impact characterization

Parameter	Significant	Moderate	Small	Negligible
Duration of impact	Long term (more than 15 years)	Medium term Life span (5-15 Years)	Confined only to subproject construction period (less than 5 years)	Temporary with no detectable impact
Spatial extent of impact	Widespread far beyond subproject component site boundaries	Beyond Immediate subproject components, site boundaries or local area	Within subproject components and site boundary	Specific location within subproject component or site boundaries with no detectable impact
Reversibility of Impacts	Impact is effectively legal standards and established professional criteria Likelihood of impacts occurring permanent, requiring considerable intervention to return to baseline	Requires a year or so with some interventions to return to baseline	Baseline returns naturally or with limited intervention within a few months	Baseline remains constant

349. In impact evaluation, the predicted adverse impacts has been assessed based on their significance. The criteria for evaluating the significance of impacts and their effects have been set in advance (see Table 50) based on ADB SPS and national/ local standards, Where local standards are unavailable, acceptable international standards have been used, for instance, ILO, World Health Organisation (WHO), IFC, etc.

Table 50: Impact Evaluation Criteria used in R8 subproject

Sr. no	**Impact evaluation criteria**
1	Trigger national laws and standard
2	Trigger international conventions (Refer to Table 7 and 8)
3	Donor commitment - ADB SPS (2009), conditions of loan agreement and PAM
4	Conservation or protected status of an area, features or species
5	Consistency with local, regional and national policy with reference to - Landscape value - Proximity to dwellings

	- Cultural heritage - Restricted areas
6	Presence of endangered, threatened and protected flora and fauna
7	Trees replanting
8	Project acceptability to local community or general public
9	Comparison with best practices
10	Carrying capacity - Existing environmental and social stress in the area
11	Threat to life
12	Community risks
13	Severity of the impacts (reversible or irreversible)
14	Project benefits
15	SDG commitment

350. In all cases, we use process, which has been robust, defensible and relevant to the local situation. At the same time, during impact assessment, we have also tried to find out the answers to the following three questions:

a) Are there residual environmental impacts?
b) If yes, are these likely to be significant?
c) If yes, are these significant effects likely to occur? Is their probability high, moderate or low?

5.2. Anticipated Environmental Impacts

351. After considering size, nature of impacts and impact evaluation criteria, we conclude that R8 irrigation project will cause moderate impacts, majority of the impacts are temporary, local and reversible and mostly site specific, for detail see Table 51, such as;

a) Site preparation impacts local flora and fauna, and cause air pollution and public inconvenience
b) Construction of access roads, trigger air, and noise pollution and public inconvenience
c) Camp construction, trigger issue of sanitation, health and safety, housekeeping, public inconvenience due to vehicle movement and operation
d) Batching plant cause temporary air and noise pollution including pressure on existing road and people safety
e) Tress felling impacts local biodiversity
f) Civil works cause dust and noise pollution, occupational health and safety issues
g) Influx of construction workers increases pressure on local resources and local conflict
h) Movement of vehicles during civil intervention generate road dust, noise pollution, public inconvenience and community risks

352. In a proposed project rural area the population density is low. However, project may cause public inconvenience and road safety in the areas occupied by human settlements or close to populated locations. Table 51 enumerates the summary of Environment and Social Risks of R8

Table 51: Impact Assessment of R8 subproject.

Sr. no	Project activity	Extent	Magnitude	Period	Need for mitigation	Remarks	Significance
1	Involuntary displacement and Loss of livelihood	Not Applicable (not triggered based on initial investigation)	--	--	--	After finalisation of the design, it is recommended for Social-due diligence to negate the the risk of social impacts.	Trigger national policy
2	Loss of local biodiversity	Local – Impacts are confined along the canal alignment.	Moderate	Short term	Yes	R8 canal has riparian ecosystem, which is characterized by its proximity to water bodies. Riparian *ecosystem* have a crucial role in supporting flora and fauna. The combination of water, vegetation, and relatively abundant food resources makes these riparian habitats highly attractive to a wide range of wildlife including migratory birds.	Trigger national policy
4	Nearness to ecological sensitive area, presence of endangered, threatened or protected species, presence of KBAs and keystone species	Not applicable	Not applicable	Not applicable	No	R8 canal sensitivity: • No KBA were found within 1, 2, and 5 km of the subproject area • No potentially Threatened species found within 10 km of the subproject areax • No IUCN Red List of Threatened Species • No notified Ramsar Wetlands • No plant species as listed in the Red Book of the	Not trigged

						Republic of Uzbekistan has been found • No Protected Areas withien 1, 2 and 5 km • Falls in Central Asian Flyway (CAF) hotspot area75 • No presence of any Keystone Species, or those Species, which are crucial to the overall functioning of an ecosystem	
5	Impact on local utility	Local	Moderate	Short term	Yes	Rehabilitation and modernization of the R8 irrigation system will trigger utility shifting. During feasibility study, there were several utility crossings, which have been identified; for details, refer to Table 25 and Annexure 2. To avoid utility shifting, manual and pneumatic works will be carried out at the utility crossing	Trigger local policy and approval from local authority is mandatory
6	Tree cutting	Local	High	Long term	Yes	Project will involve extensive trees cutting on both side the canal	Trigger national policy
7	Air pollution	Local (site specific)	High	Continue till construction stage	Yes	During the construction phase, the civil works will have temporary impact on local air quality primarily through emission of road dust (loose	Trigger National standard

[75] The Central Asian Flyway (CAF), a vast network of migratory routes, plays a pivotal role in the conservation of millions of migratory birds by connecting breeding grounds in the Arctic and sub-Arctic regions with wintering sites in South Asia, the Indian Ocean, and Africa

						soil) due to movement of vehicles, vehicles exhaust, batching plant as well as from stockpiles of construction materials/excavated earth.	
8	Water pollution	Local	Moderate	Continue till construction stage	Yes	There will some impact on surface and groundwater and will be caused mainly due to auxiliary activities such as leakage from chemical storage area, equipment, poor sanitation at work sites, improper disposal of liquid waste and spills of hazardous liquids and the release of soil where earthworks take place adjacent to water bodies including improper siting of construction camp and labour camp.	Trigger National standard
9	Noise pollution	Local	High	Continue till construction stage	Yes	Impact on air quality due to increased vehicle and equipment operations. Cause disturbance and annoyance to local community and health hazard to worker due to constant exposure	Trigger National standard
10	Use of hazardous chemical and generation of hazardous waste	Local	High	Continue till construction stage	Yes	Potential to cause soil and ground water contamination including health risk or may cause site emergency	Trigger National standard

11	Occupational health and safety	Local	High	Continue till construction stage	Yes	Unsafe act and unsafe condition has potential to cause injury, death, loss of man-days and may cause site emergency	Trigger National standard
12	Community health and safety	Local	High	Continue till construction stage	Yes	Potential to cause conflict, stoppage of work or legal intervention	Impact ADB and client reputation
13	Influx of worker	Local	High	Continue till construction stage	Yes	May cause social conflict with locals, trigger law and order disturbance, spread of transmissible diseases	Trigger ADB safeguard policy
14	Canal desilting	Local	High	Short term	Yes	Potential of air and water pollution also cause public inconvenience	Risk of conflict and public ligation
15	Climate adaptive	Local/national	High	Long term	Yes	Build climate resilience I&D system, improve water and agricultural productivity including gender responsive.	Help in meeting SDGs and NDC commitment
16	GHG emission	National	High	Long term	Yes	Proposed concreate ceiling and pump supply will increase GHG emissions	Look for alternatives, which are less carbon intensive
17	Transboundary Impacts	Only local	Except few impacts, most of the impacts general, reversible, temporary and mostly site specific		Yes	No transboundary impacts are anticipated	Need Site Specific Environment management Plan, GRM, and sound Information dissemination Plan
18	Induced Impacts	Project would bring number of short-term and long-term induced impacts	High	Long term	--	Improvement in water security will improve their productivity, thus strengthening farmers' income capacity, which in turn impacts the overall socio-	Help in meeting government and ADB commitments

						economic well-being, including a positive impact on health.	
19	Cumulative impact	Influence both local and national	High	Long term	-	Project will not only strengthen local water and food security, it will also influence the overall economic wellbeing of the project areas and also contribute in local and national GDP.	Help in meeting government and ADB commitments

353. To avoid repetition, the detailed mitigation measures and monitoring for all activities in the EMP are conveniently linked and listed in the EMP (Table 52). The EMP can be used at the bidding stage in the specification to inform the contractors of the required measure and actions to satisfy the requirements of the IEE and EMP and to guide the preparation of SSEMP in due course.

5.3. Environment Safeguards Consideration during Design and Pre-Construction Stage

354. Inclusion of climate adaptation measures in designs Stage.

a) Integrating physical locking of pumps and sluices followed by centralized monitoring system.
b) Wherever tree density is high along the canal alignment, revisit the design to avoid and minimize tree-cutting; option for relocation of tress needs to be explored rather than cutting.
c) Explore possibility of integrating concreate mat in main or secondary canal to reduce the overall carbon footprint of a project;
d) Explore inclusion of canal-top and canal-bank solar installations, for detail, refer to point no 297.
e) Replace old pumps with energy efficient pump to reduce carbon footprint.
f) Explore possibility of using low carbon embodied materials and local construction material to reduce carbon footprint.

355. Pre-Construction Stage - Pre-construction impacts of R8 irrigation project are usually moderate mainly associated with the preparatory works to facilitate construction phase, see Box. During pre-construction stage PIC/PIG will need to ensure;

a) Inclusion of climate mitigation and adaptation measures in the R8 designs;
b) Obtain environmental approval under national laws before tendering is announced
c) Obtain approval/permission for utility shifting, trees cutting etc.
d) Disclosure of the IEE report and environment approval letter issued under national law
e) IEE/EMP requirement shall be included in bidding document and contract;
f) Contractors include sufficient staffing and budgeting for EMP implementation; and PIU/PIC shall ensure for the same.

Training of contractors, engineers, workers and foremen on EMP requirements.

356. PIU/PIC will ensure that the contractors is well-informed and instructed on the need to prepare an SSEMP in align with EMP for the management of construction stage impacts (for detail refer to tentative Framework for Preparing Site Specific Environment Management Plan (SSEMP) and shall be part of bid and contract documentation. For avoidance of doubt and for purposes of the eventual contracts, SSEMP means “contractors site specific EMP*”.*
357. The contractor will prepare a Site-Specific Environmental Management Plan (SSEMP) based on the EMP before starting the construction works. The SSEMP will outline how the contractor will implement the mitigation measures specified in the EMP. It will also identify legitimate material sources and the proposed methods of rehabilitating borrow pits that will supply construction material.
358. The SSEMP will demonstrate the manner (location, responsibilities, schedule/timeframe, budget, etc.) in which the contractor will implement the mitigation measures specified in the EMP.

The SSEMP will be updated as necessary to respond to any unanticipated impacts that may arise as the project is implemented.

359. The SSEMP will be agreed in advance with PIU /PIC in the project pre-construction. The approval from State Committee for Ecology and Environmental Protection shall be obtained by PIU before the bids are invited for civil interventions.

360. The contractors will ensure that the SSEMP is prepared in reference to national EHS Guidelines and ADB SPS requirement and submitted to the PIC and MWR/PIU for review at least 10 days before taking possession of any work site. Construction works cannot commence until the SSEMP is approved by the PIC and MWR/PIU. No access to the sites will be allowed until the SSEMP is reviewed and approved by the PIU. The detail framework for SSEMP is given in good practices section.

361. The requirements in the construction contract agreement will include full implementation of the agreed SSEMP based on the EMP. PIU will ensure that the selected contractor have capable and trained staff and / or site agent to take responsibility for routine inspection of environmental, health and safety. A qualified and full-time Environmental Safeguards Officer (ESO) will cover general environmental safeguards matters for the contractor and environmental management at the working level, while a qualified and full-time Health and Safety Officer (HSO) will cover occupational and public health and safety matters. A Community Liaison Officer (CLO) will interact and liaise between the local authorities and PIU. One month before construction commences, the contractor will demonstrate to PIU that the SSEMP will be properly resourced, and a qualified/experienced ESO, HSO, and CLO have been identified by the Contractor as per the tender agreement.

362. The PIU/PIC safeguard team will audit the effectiveness of the implementation of the SSEMP for the construction phase (once in a month) and review mitigation measures as agreed in SSEMP and submit the report, which will act as a resource for quarterly and Semi-annual Environmental Monitoring report

363. In addition, PIU/PIC checks the material supplies as proposed by the contractor - PIG shall check the legitimacy of material supplies proposed by contractor in the SSEMP and that the proposed material sources comply with ADB requirements, best practice and material suppliers are fit for purpose.

5.4. Safeguards Consideration during R8 Construction Phase

364. During the process of surveying, demarcating and clearing the project areas, some low to moderate impacts on terrestrial habitats and flora are expected. The surveying and demarcation will cause minor degradation of the localized regions by removing small fragments of vegetation. However, the major concern will be the extensive removal of trees and bushes on both sides of the canal during civil intervention.

365. Based on the initial investigation, it appears that the R8 canal will not cause involuntary resettlement or loss of livelihood for the affected communities. However, if any social issues arise during the finalization of the canal's design, a Land Acquisition and Resettlement Plan (LARP) will be developed. This plan will set out policies and procedures for compensating farmers or landowners who may be impacted by the construction and installation of the canal. Such compensation will cover the disturbance of any crop vegetation or productive areas that will be affected by the project.

5.5. Site clearance and Excavation

366. There is likely risk that digging and excavation activities undertaken during pre-construction or construction might un-earth physical cultural resources including archaeological and grave sites. However, in the event this occurs, work will cease immediately, and the relevant authorities, including ADB team will be informed. The PIU will be responsible for complying with the requirements of the authorities and monitor them throughout the construction stages.

367. Work will not re-commence in the affected location until agreement has been reached between the authorities and PIU as to any required mitigation measures, which may include structured excavation. Activities will not re-commence until the authorities have signed-off that the site/resources have been dealt with appropriately and that work may continue. The contractor will include a section on “chance finds” in the SSEMP.
368. Health and Safety Training - To avoid poor attention to Health and Safety requirements, PIU/PIC ensure that training shall take place as soon as practicable during mobilization and include training on HIV/AIDS and transmission of STD, and transmission and prevention of COVID-19 with risk to workers and public. Training on all health and safety, communicable diseases, and risk of accidents and injuries (especially children) and all matters in the EMP will be carried out at the beginning of the mobilization phase.

5.6. Mobilization of the Contractor and Construction Camp

369. Impact: Establishment of site office, works yard and work sites, labour camp may bring interaction between local people and construction workers. Provisions must be made for the protection of the environment and to the general public in the vicinity of the work site and camps including advance notice of commencement of works as required by villagers, installing safety barriers and signage or segregation of the work areas.
370. Impacts may result from encroachment on village communal land or access to it. Noise and dust from the camps may affect local villages, construction traffic and impacts to road safety. Competition for potable water and water for hygienic sanitation facilities must be balanced with local village needs.

Measures:

371. Prior to contractor mobilization to the site, the contractor will identify one member of their staff as Community Liaison Officer (CLO), to be the liaison between the local authorities and PIU. PMU will work with the contractor and their Community Liaison Officer (CLO) to establish the communications protocol between the project and communities as per the Project’s communications plan.
372. A camps will ideally be located within the R8 irrigation system area but at least 500m away from local populated areas.
373. Prior to contractor mobilization to the site, PIU-ES will work with the contractor to establish the communications protocol between the project constructor and communities to be summarized in a communications plan.
374. Local employment - The contractor will hire and train as many local workers as possible by using labor from local villages as the work proceeds.
375. PIU/PIC ensure that construction camp management plan in align with World Bank Workers' Accommodation: Processes and Standards[76]. The contractors will adopt good management practices to ensure that fuels and chemicals, raw sewage, wastewater effluent, and construction debris, excavated and other material are stored and disposed of in controlled conditions to reduce the risk of contamination. Effluent from construction and labour camp , workshops and equipment washing-yards will go through wastewater treatment facility (including septic tanks for domestic wastewater and oil-water separator to remove oil and grease) provided by the contractor. The oil and grease from the oil-water separator will be treated as hazardous waste. Wastewater which does not meet the national standards will not be discharged to the environment.

5.7. Management of Impacts to improve Air quality

376. Impact: During field survey, it has been found that air quality of the R8 is generally good due to (a) lack of industry (b) rural setting (c) low traffic pressure. During the construction phase, the civil works will have temporary impact on local air quality primarily through emission of road dust (loose soil) due to movement of vehicles, vehicles exhaust, batching plant as well as from

[76] A guidance note by IFC and the EBRD Workers' Accommodation: Processes and Standards (ifc.org) (August 2009)

stockpiles of construction materials. However, these impacts should be significant given the scale of the works in the open air.

377. Measures: Prior to construction phase PIU and PIC ensure than contractor must address the Air Quality Management Plan in SSEMP based on the assessment of the potential sources of air pollution.

378. PIU/PIC ensure that contractor shall conduct air quality monitoring (a) One before civil intervention (for baseline) (b) once in six month during civil interventions, however, location of monitoring shall be decided in consultation with PIU/PIC and monitoring shall be conducted for PM10 and PM2.5. In case of complain or legal intervention, the contractor is required to conduct additional air quality monitoring as recommended by environmental authority. The contractor is required to address all possible measures in SSEMP for maintaining the air quality during construction phase such as:

a) Maintain setback distance (buffer areas) between construction site and village and other sensitive receptors such as school, mosque etc.
b) Restricting construction work in day time, if unavoidable, inform PIU and local community regarding duration.
c) Water spray on access roads, batching plant area, material storage area minimum thrice a day during summer, in other season, the frequency water spray as prescribed by PIU/PIC
d) Restricting speed of vehicles to reduce surface dust (20 -25 Km/hr)
e) Covering trucks to avoid spillage of construction material
f) Provide personnel protective equipment (PPE)
g) Contractor shall maintain proper housekeeping at the site and store raw materials at a designated area with appropriate labeling and ensures that dust suppression measure (like water spray) is implemented

5.8. Noise Impacts and its Management during project Construction

379. Impact: In R8 non-core subproject, the noise impact will be there througout the constrction phase, however, it may be short lived, although can be very intrusive if not controlled properly. Construction noise is generally intermittent, attenuates quickly with distance, and depends on the type of operation, location and function of equipment. During construction, there will be temporary impacts due to the noise of the construction equipment, especially heavy machinery, when construction activities are carried on in the vicinity of human settlement, school, mosque etc, the co-operation between the contractor and the residents is essential and the contractor shall arrange meetings and informed them in advance of work schedules (hours of equipment operation etc), such commication shall recorded, doumented and shared with PIU/PIC in quaterly progress report.

380. Measures: Noise Management Plan shall be developed as part of the SSEMPs prior to the start of the construction works. Some of measures need to be addressed by the contractor in SSEMP while making action plan for noise attenuation;

(i) Aggregate processing is one of the noisiest activities, contractor make sure and maintain setback distance at least 500 m away from the nearest sensitive receptors.

381. PIU ensure that contractor shall conduct noise monitoring (a) One before civil intervention for baseline (b) semi-annually throughout the construction, however, the location of monitoring shall be decided in consultation with PIU/PIC and monitoring shall be conducted for day and night. In case of complain or legal intervention, the contractor is required to conduct additional noise monitoring as recommended by environmental authority. If the noise level exceed the national standard, the contractor is required to prepare action plan and submit to PIU for approval.

(ii) Construction activities will be strictly prohibited between 9 PM and 7 AM in the residential areas. When operating close to sensitive areas such as medical facilities

and schools, the contractor's hours of working will be limited to 8 AM to 6 PM;

(iii) Noise generating equipment will be located at least 300 m from any sensitive areas.

(iv) Use temporary noise barriers while working in sensitive locations in case exceedance of allowable limits is expected. Placing the barrier close to the source proves to be effective.

(v) Measures will be taken to reduce any noise disturbance to community, including giving notice on timing of noisy activities as early as possible to sensitive receptors for periods of noisier works such as excavation. Describe the activities and how long they are expected to take. Keep affected neighbors informed of progress and aware locals on redressal of complaints through GRM

(vi) For workplace noise, the contractor shall provide ear-plug or ear-muff depending on noise level

(vii) DG set for power back up shall be fitted with acoustic enclosure

(viii) Fit all pneumatic tools with an effective silencer on their air exhaust port.

(ix) All vehicular movements to and from the site to only occur during the scheduled normal working hours unless approval has been granted by the PIG/PIC.

382. All construction workers will be provided with Personal Protective Equipment (PPE) such as ear plug, earmuff. The workers must use them against high noise and/ or lengthy exposure. Any other measures as suggested by PIU/PIC after site inspection

5.9. Protection of Physical Cultural Resources

383. Impacts: During field investigation 100 meter on both side of canal alignment, no historical monuments or cultural resources have been identified in the R8. Further, the works will be carried out within the existing alignment of the irrigation canal and existing hydraulic structures, no impact on cultural resources (such as graveyards) is anticipated. However, chance finds during temporary excavation works are possible.

384. Mitigation: No mitigation is required except for preparation and implementation of chance find procedure. If any paleontological fossils, archaeological finds or other important objects (including human bones) are encountered during construction, all activities at that location will stop and local authorities will be notified; the works can restart only after fulfillment of prescribed measures and permission received to resume works. In this regard PIU/PIC shall arrange a training program for workers exclusively on "chance finding"

5.10. Hazardous Materials Management – Project Construction

385. Impact: Potential source of surface, soil and ground water contamination including health risks

386. Mitigation. The contactor shall identify and maintain inventory of Hazardous Material which are (a) Flammable (b) Corrosive (c) Reactive or explosive (d) Toxic & Poisons (e) Substances or wastes liable to spontaneous combustion

(i) The contractor shall develop Management Procedures for safe storage, handling, and use of Hazardous Material in SSEMP.

(ii) The contractor must ensure that MSDS should be readily available at the site and its abstract shall be displayed in Russian/local language/English, where the chemicals are stored.

(iii) Create awareness among workers on MSDS including safe handing, storage and disposal and maintain training records for inspection and verification

5.11. Waste Management to Ensure Safe working Conditions

387. Impacts: R8 non-core subproject construction activities are likely to generate both solid and liquid waste, which have the potential to contaminate soil and groundwater, cause health risks and public nuisance due to littering. The proposed site will generate different types of construction wastes, ranging from construction and demolition waste to removing silt from canal beds, spoil materials, and other debris. Spoil and other construction waste will also be produced during concrete laying. Household wastes or kitchen also generated by contractor's workforce throughout the construction period. In addition, domestic and workshop wastewater (liquid waste) will also generated, R8 rehabilitation and modernisation work also generates hazardous waste like acids and alkaline solutions, waste oils and oily sludge, batteries, and bitumen including biomedical or clinical waste.

388. Mitigation - In align with EMP, the contractor must prepare 'Waste and Spoil Management Plan' in SSEMP, the contractor must consider followings in SSEMP;

a) Contractor must do item wise waste inventory and do waste segregation, including recording, documentation and reporting to PIU in monthly progress report

b) Waste must be collected and disposed off by a licensed waste management contractor. The contractor must maintain and keep a record of the waste volumes and types of waste removed including waste management company's licenses for inspection and verification.

c) To ensure waste management is adequately controlled during the construction phase, the contractor will be responsible for ensuring that the waste hierarchy is followed including prevention, minimization, reuse and recycling.

d) The contractor will be responsible for the following measures:

i. Preparation and implementation of the Waste and Spoil Management Plan – The Waste and Spoil Management Plan will be developed for handling, storage and disposal of construction and demolition waste, household wastes, silt removed from canal beds, and other waste. The Waste and Spoil Management Plan shall also include items relating to the safe handling and management of hazardous and non-hazardous wastes, e.g., plastic, metal, wood, liquid wastes, among others. The Waste and Spoil Management Plan will indicate approved spoil disposal sites in consultation with PIU/PIC, which will not be on slopes or near pasture/agriculture lands and also describe plans for rehabilitation once the construction is over.

ii. Recycling and Reuse – Where possible, recyclable materials will be reused or recycled – this will include wood, plastic, metal and glass. A plan for the recycling of materials will be included in the Waste and Spoil Management Plan.

iii. Storage of Hazardous Wastes – Oils, fuels and chemicals stored properly in correctly labelled containers at construction areas. Oil and fuel kept in small quantities onsite and stored on line platform, preferably RCC with bunds or embankment to contain spillage (the bund will be able to contain at least 110% of the volume of the largest storage tank within the bund). The contractor will also prepare, as part of its SSEMP, a Spill Response Plan for the management of any spills over 10 liters and provide spill kits at all work sites.

iv. Biomedical or clinical waste – mainly generated from the onsite health facility, it shall be disposed off safely as per law of Uzbekistan, in case local standard is not available, the contractor shall follow international standard.

v. Municipal waste – contractor shall avoid disposal of solid wastes near habitats, forests, water bodies, religious places, or any other area which can lead to inconvenience to the community. The site shall provide adequate number of bins for dry and wet waste collection and segregation (site office & labour hutments or camp), ensure wet waste is used for compositing and segregated plastic waste/recyclable material sold to recycler

vi. Waste Disposal – No wastes will be burned throughout the implementation period. Waste, both hazardous and non-hazardous collected and disposed of by a licensed waste management contractor.

vii. Labour camps should not be sited near the water resources. In such cases, the contractor provide a detailed design of each labour camp including infrastructure planning (water supply, electricity supply, waste management, wastewater treatment and disposal). Workers will be trained how to behave and to handle waste and wastewater according to national environmental management requirements and international good practices.

5.12. Protection Surface/Ground Water Sources

389. Impacts: The construction R8 irrigation system likely to cause some impact on surface and groundwater and it will be mainly caused due to auxiliary activities such as leakage from chemical storage area, equipment, poor sanitation at work sites, improper disposal of liquid waste and spills of hazardous liquids and the release of soil where earthworks take place adjacent to water bodies including improper siting of construction camp and labour camp.

390. Mitigation: No construction camp and labor camp, permanent or temporary, will be located within protection zone of any river, canal or reservoir. The contractor will also be responsible for the preparation of a Spill Response Plan and a Construction Camp Site Plan which will form part of the SSEMP. The plan will indicate the system proposed and the locations of related facilities in the site such as latrines, holding areas, and septic tanks. The contractor will ensure the following conditions are met within the Plan:

a) No equipment washing is allowed in any surface water bodies throughout the subproject implementation period.

b) When excavating canals, silt curtains, water diversion structure, and/or settling ponds will be provided as a comprehensive system to prevent sediment transport in the water courses.

c) No wastewater will be dumped into any water bodies. Wastewater generated from the site treated must be treated and use for dust suppression.

• .

d) Lubricating oil shall be collected and sold to authorised recycler

e) (Lubricating and fuel oil spills will be cleaned up immediately and spill cleanup materials will be maintained (including spill kits) across the contractor's construction camp.

f) (Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters. Wastewater from labor camps and construction sites will be canalized- into septic tanks without contacting ground. Septic tanks will be timely emptied by a hired septic truck and transported to legally approved treatment facility or dumpsite.

g) Discharge of sediment-laden construction water directly into surface watercourses or wetlands will be prohibited. Sediment -laden construction water will be discharged only after settling of solid into settling lagoons or tanks prior to final discharge or used for dust suppression.

h) Fueling operations will occur only within containment areas. Fuel storage, equipment maintenance and repair workshops, and vehicle washing areas will be stationed at least 500 m away from any water body.

i) All fuel and chemical storage (if any) will be sited on an impervious base within a bund and secured by fencing. The storage area will be located away from any watercourse. The base and bund walls will be impermeable and of sufficient capacity to contain 110% of the volume of the largest storage tank / container in the bund.

j) The contents of any tank or drum will be clearly marked. Measures will be taken to ensure that no contaminated discharges enter any drain or watercourses.

k) Immediately clean-up any accidental spills, and all cleanup materials stored in a secure area for disposal. Disposal of such will be undertaken by a waste management company contracted by the contractor. While disposing any hazardous waste, contractor should follows a waste transfer manifests system

5.13. Site clearance and rehabilitation after civil works completion

391. Impacts: Construction activities including camp construction, batching plant, storage area, borrow pits, workshop etc can cause temporary change in land use.

392. Mitigation: After completion construction/quarrying activities, all sites to be rehabilitated to restore initial conditions by ploughing and plantation. All disturbed sites prior to project completion and commissioning will be reinstated at least to pre-project conditions by (i) cleaning the by removing wastes or debris, (ii) levelling of ground or mechanical remediation and (iii) biological revegetation with native plants. (Iv) or as agreed by land landowner

5.14. EHS Risk during Survey/ Site Inspections

393. Impacts PIU/PIC staff including ADB team, while visiting site must follow Environment, Health and Safety (EHS) Travel Plan for undertaking surveys, field Investigations and site inspections. PIC/PIU expert's staff are constantly being exposed to physical, environmental, health and safety risks, such as (a) travel/road risks (b) theft (c) extreme weather (d) stomach upset/vomiting, (d) Insects bite including the risk of downing in canal and so on.

394. Mitigation - The detail mitigation measures and management plan related to Environment, health and Safety (EHS) Travel Plan for undertaking surveys, field Investigations or site inspection are given in good practices section.

5.15. Sexual Harassment of Women at Workplace

395. Contractor shall;

a) develop a policy for sexual harassment and abuse and nominate a dedicated person/form a committee to review an allegation/incident

b) Workers engaged by contractor shall receive induction training on "what constitutes

sexual harassment and GBVH" including punishment

c) Ensure sufficient hiring of women workers to maintain gender balance

d) Ensure proper working conditions for women and ensure separate toilets, bathrooms and resting place

e) Contractor shall not allow any workers or any employee, or anyone engaged directly or indirectly to work at site under the influence of alcohol or drugs.

f) Any aggrieved women working at site may in writing or verbally make complaint of sexual harassment to any of the concerned persons (Contractor/Site Supervisor/Project Manager). Site management will deal with such complaint or allegations immediately and ensure zero tolerance and maintain confidentiality. If allegations/incidents found correct then the site should handover such person to local police.

5.16. Gender Equality

396. For gender equality followings measures shall be taken;

a) Ensure fair treatment, non-discrimination and equal opportunity to encourage and promote female workers
b) PIU/PIC ensure that all the women staff engaged by contractor shall get minimum wages as per the national laws
c) Ensure safeguards for women from sexual harassment and sexual exploitation;
d) Create awareness through local NGOs among women working at the site and project affected communities on health, sanitation, family planning including prevention of transmission of sexually transmitted diseases (STDs), and HIV/AIDS.
e) Ensure & provide provisions related to gender equality as mentioned in national laws, if local standard is not available, the contractor shall follows international standard
f) Ensure complaints/grievances related to GBVH shall be taken on priority
g) Provide female worker and community access to sexual and reproductive health information and assistance under the programs

5.17. Site Security

397. Contractor shall;

a) Prevent unauthorised entry of workers and locals, who does not have valid ID.[77]
b) Install active site surveillance, including the installation of CCTVs (closed-circuit televisions), sufficient night lights, and undertaking periodic site patrols
c) Install radio communication systems throughout the site to allow communications between security workers, site managers and other workers on the project site
d) Employ two female security staff and to manage grievances and/or complaints on gender-related, GBVH, or child labour grievances
e) Protect materials, equipment, machinery, buildings, and other physical assets at the project site.

5.18. Soil erosion and protection

398. It is possible, that without adequate protection measures soil erosion could occur on canals. It is also possible, that stockpiles of soil located close to surface waters could infiltrate the water courses during heavy rainfall and cause siltation of the rivers.

399. Mitigation:

[77] Workers and visitors entering the site shall have valid identification (ID) and access card or badge, which shall be prominently displayed on each person at all times

During construction, the contractor will both be responsible for ensuring that embankments are monitored continuously during construction for signs of erosion.

Any deep excavations in unstable soils will be shored by the contractor, an excavation deeper than 2 meters, the pit shall be guarded by rails or barriers.

Topsoil shall be preserved, stockpiled and reuse in plantation

Surface soils will be temporarily graded-to-drain and protected as necessary to reduce erosion and sediment runoff.

The contractor shall restrict or minimize the excavation activities during monsoon or intense rainfall. Use temporary bunding, wherever applicable, to reduce the risk of sediment to the receiving waters and to prevent any water accumulation and accidents

PIU/PIC ensure that contractor must take adequate measure for erosion by preventing or minimizing removal of trees and green cover vegetation. Revegetation measures will be applied, where appropriate

PIU/PIC ensure that nature-based solutions for slope stabilization are applied to prevent spoil loss, improve water retention and biodiversity. For plantation and nature-based solutions for slope stabilization, the contractor should encourage the contractor should encourage the application of native species, erosion-control vegetation, and other nature-based engineering measures appropriate to local site conditions.

i. Only native species for planation
ii. Select species which grows successfully and match with local environment.
iii. For plantation in construction camp, both fruit bearing, flowers plant and creepers shall be encouraged so that it attracts biodiversity
iv. Planting should be site-specific taking into account the type of soil, features of the planting site e.g., for saline and alkaline soils and water-logged area, will require special attention and the species suitable for these areas will be planted.
v. Encourage and engage local community for slope stabilisation and increasing green covers, it serves two purposes (a) create livelihood (b) build confidence among locals and participation in project development

5.19. Impact on Ecological Resources

400. Impact: The R8 rehabilitation works of existing infrastructure will not have a significant adverse impact on the local ecological resources since they are in areas that have already been affected by human activities for a long period. Construction activities are expected to impact only a narrow band of vegetation adjacent to the existing canals in the form of trees and bushes. The project will involve substantial tree cutting of trees.

401. Mitigation:

If any trees need to be removed, the same species of the tree will be planted at the ratio of 1:10 (i.e., 10 saplings planted for each tree felled). Locations for tree planting are near the locations where tree losses occur. All compensatory plantings will be subject to a three-year maintenance and survival monitoring program, ensuring successful establishment and ecological functionality.

PIC/PIU ensure that for setting up concrete batching plants, construction camps, labor camps, and other ancillary features does not involve tree-cutting.
To secure compliance, the Contractor will provide a tree-replacement and aftercare bond, determined by the PIU, guaranteeing full implementation of transplanting, replanting, and

maintenance obligations. Required documentation includes a Transplant Plan, Compensatory Planting Plan, Maintenance Schedule, and Performance Bond.

In addition, the contractor will be responsible for supplying appropriate and adequate fuel in construction camps to prevent fuel-wood collection.

- Monitoring of transplanted and compensatory plantings will occur monthly during the first six months and quarterly thereafter for up to three years. Monitoring will assess survival rates, pest and disease presence, and canopy development. Reports will include geo-referenced photographs and a summary of corrective actions. Unauthorized tree removal will trigger defined penalties, including higher replacement ratios, fines, and restoration obligations aligned with national administrative requirements.

A public complaints mechanism will be established to enable community reporting of illegal cutting or ecological damage. The PIU will investigate any complaints within 48 hours and document follow-up measures.

5.20. Community health and safety

402. Impact: The civil works and influx of workers may have some negative impacts like social conflict, spread of communicable diseases, temporary disturbance to local settlement due to air pollution from batching plant and vehicle movement, utility shifting, reduced access to their house during road construction, road safety, inefficient disposal of solid waste and improper sanitary conditions generated by the construction workers at the labour camps may cause pollution of the surrounding environment and affect the health of local people.

403. Mitigation: During the construction phase, the following mitigation measures will be taken:

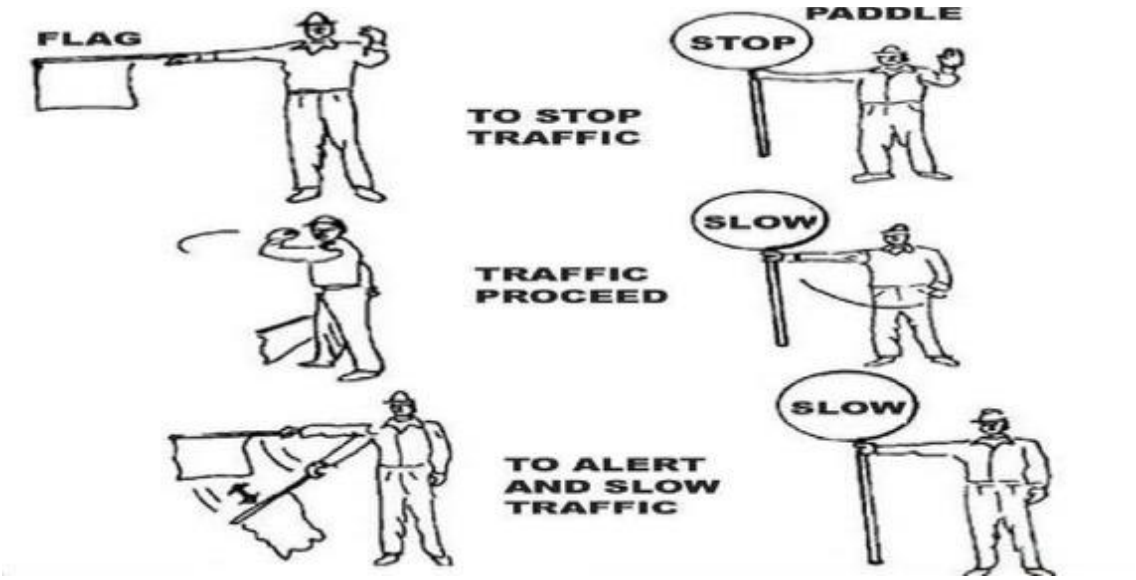
a) The contractor will identify and use appropriate access routes, fix speed limits and timing, identify appropriate materials and material storage areas to ensure least possible disturbance.
b) Avoid transportation of construction materials through heavily populated areas.
c) Identify possible utility services in the area prior to starting work to ensure that they are not damaged due to any construction work and in case of damage repair/shift, them immediately prior to civil interventions
d) If damage to infrastructure occurs, plan for any maintenance that may be required. Restore work sites after completion of the works.
e) Carry out regular awareness campaigns among work staff, including specific hazards associated with the spread of HIV/AIDS.
f) Construction sites (especially near the settlements) must be properly lightened and fenced;
g) Prior to SSEMP, contractor shall take local inputs for Traffic Management Plan and assess the sensitive hotspots such as schools, local market and other busy areas, including traffic volume to know if their operations are being impacted by the road closure or due to raw material transportation. In Traffic Management Plan, the contractor should provide specify the routes of vehicles' movements, placement signage board, schedule transportation activities to avoid public inconvenience;

404. Do not overload vehicles beyond limits. In populated areas or sensitive areas, contractor must ensure and designate flaggers for diverging the traffic. All the personnel must equipped with reflective jackets and traffic control batons.

h) Training and capacity building, The contractor shall;
i) Tool box meeting (10 min daily)
j) Routine training (weekly)

k) First Aid & CPR Training Course (monthly)
l) Fire Fighting Training & Drill (quarterly)
m) Drill (emergency response), quarterly

Figure 29: [Sample] Traffic control in project area



5.21. Traffic Management

405. Contractor shall

a) Consult nearby residents, businesses and local authorities and road department regrading best mitigation measures for road diversion, if applicable
b) In case of traffic diversion, inform local public about anticipated works about one week prior to change in traffic conditions, target different groups for awareness such as children, adults (male/female) and vulnerable group, prepare and distribute brochures for detailed information
c) Inform the public about approachable persons/departments and contact details for any kind of information
d) Provide clear instructions and guidance to all the drivers on dos and don'ts
e) Make proper arrangements for diversion and alternate routes prior to the commencement of work
f) For roads having heavy traffic and inadequate alternate routes, make arrangements for closure on weekends instead of permanent closure or alternatives such as nigh transportation of raw materials.
g) Collaborate with local communities and responsible authorities to improve signage, visibility and overall safety of roads near the project site, particularly near schools or other locations where sensitive receptors may be present.

Table 52: [Sample] Road Signage

Signage	Description
	Two-way traffic is prohibited due to traffic diversion plan

	
	Left Turn is prohibited due to road works

Diversion that is lawfully to be taken on account of work zone management plan and the traffic to move in shown direction

	Stop sign is used in road works as per temporary traffic management plan where traffic is required to stop

	
Men / Machineries are working on the road or adjacent to it.	Sudden dip in road profile to road work area

Temporary Traffic diversion and can be installed in the advance warning area	Slow Traffic is ahead due to road works and can be installed in the advance warning sign
	
Closer of road is 500m ahead	Signage board for speed limit

5.22. Management of worker's camps

406. Impact: Without implementing suitable mitigation measures, issues of poor living conditions, including inadequate water supply, sanitation and energy, poor security arrangements of the camp, conflicts of local camp labours could arise.

407. Mitigation: The contractor will prepare the Labour Camp Management plan in align with the World Bank (ESF), and IFC guidance note 78 on Workers' accommodation: processes and standards (2009). The contractor will provide living accommodation for its staff and including all services such as water supply, sanitation and energy. The camp consideration will take into account all national sanitary laws and other laws and regulations. The contractor will be responsible for and provide all necessary fencing and security to these areas. Camp construction will not involve use of any hazardous materials. The camp location will be agreed with PIU and local government authorities. The camp location will avoid densely populated areas and will take into account the opinion of local population. The location of the camp will not be closer than 100-250 m to the large water bodies (reservoirs), 50 -100 m to the small rivers and 50-70 m to irrigation canals.

Management of Occupational Health and Safety (OHS) Risk

408. Impact: Workers' rights, including OHS, will be considered to avoid accidents and injuries, loss of man-hours, and labour abuses and to ensure fair treatment, remuneration and safe working conditions. R8 construction activities will pose potential hazards to workers and the public. Hazards include Injuries from incorrect lifting of heavy objects and falls from height, drowning (in some cases, the workforce will have to work near canals or other deep-water courses), hazards triggered by unsafe acts/working conditions and poor housekeeping, movement of traffic, risk of spread of transmissible disease, and including lack of staff, poor communication and training etc. The workforce must be aware of the risks of falling, especially drowning, where work is near deep or fast-flowing water. Another hazard may result if a trench (excavated for access to irrigation or drainage pipes) should accidentally become filled with water, either from rain flooding, natural drainage or accidental leakage or discharge from another part of the irrigation or drainage system.

409. The R8 construction/civil works will attract large work force, together with suppliers and supporting functions and services. The work force may comprise workers from national, regional, and local labour markets. They may need to live in on-site accommodation, lodge within communities close to work sites or return to their homes after work. In addition, there may be different sub-contractors permanently present on-site, carrying out different activities, each with their own dedicated workers. Hence, the influx of workforce will add pressure on local resource, spread communicable diseases including social conflicts. Hence, it is imperative that R8 project

[78] Workers' Accommodation: Processes and Standards (ifc.org)

must also exercise appropriate precautions against introducing the infection to local communities through

a) Labour camp siting
b) Establishing communication plan
c) Creating awareness
d) Maintaining sanitation at labour camp
e) Establishing GRM
f) Do's and don'ts for workers

410. Occupational health and safety in Uzbekistan are generally governed by the various regulations and codes covering mechanical safety, hygiene and sanitation and road safety. These encompass the fundamental principles of health and safety in the workplace and are legal requirements in Uzbekistan. The contractor's SSEMP will address these requirements and describe how worker health and safety will be established by the contractor using routine safety measures for all physical hazards from lifting, falls from height, welding, and other hot work, as required by the labour codes and by good engineering practice.

411. Mitigation: An OCHS Plan including COVID-19 Health and Safety Management Plan and Emergency Response Plan, will be prepared by the Contractor as part of the SSEMPs to manage risks/hazard on-site during the construction phase. Contractor will allocate sufficient budget for OHS measures.

412. A full-time health and safety officer will be hired by the contractor to develop, implement, and supervise the OCHS Plan subject to approval by the PIU/PIC.

413. The health and safety officer will conduct initial and regular refresher training for all workers on labour rights, OHS matters, ensure provision and distribution of PPE, and keep record and report any health and safety incidents.

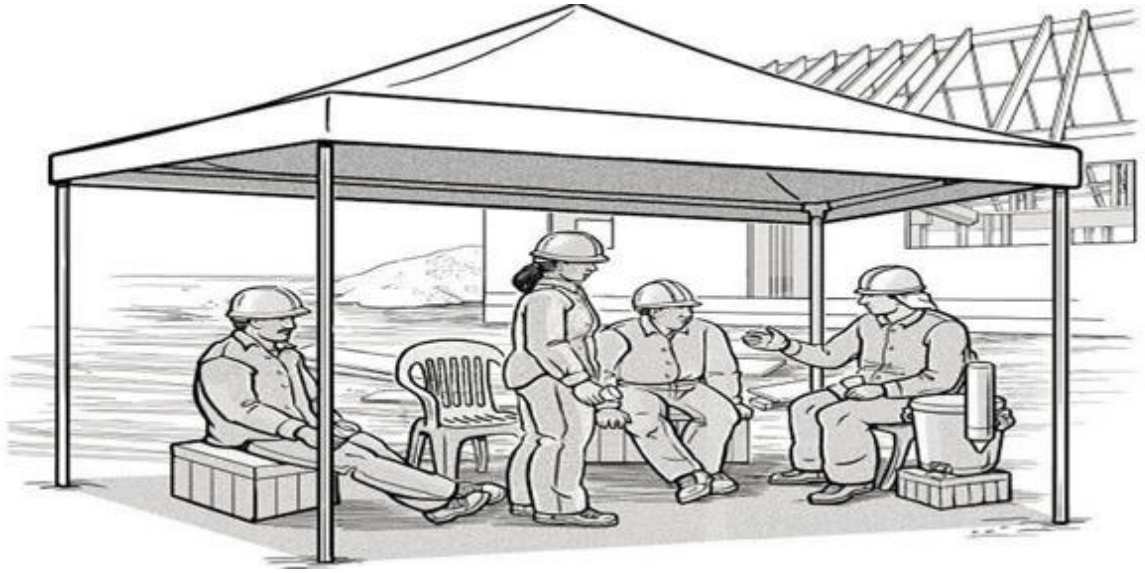
414. OHS Plan will follow national legislation requirements including donor commitment as specified in loan agreement or ADB SPS (2009), some of keys aspects include:

- Norms on provision of fresh water at all sites;
- Adequate hygienic and sanitation facilities;
- Labelling, warning, storage, and handling procedures;
- Emergency response procedures;
- Records of occupational accidents, diseases, and incidents;

415. Safeguard measures for working in open such as heat stroke, the contractor shall ensure following while working in open during the summer;

- Provide drinking water
- Establish tents for rest breaks, see figure
- Schedule most strenuous work to cooler times of the day
- Use machines to reduce physical demands of work
- Provide temporary shed, wherever appropriate
- Create awareness to workers on heat stokes preventive measures

Figure 30: Shelter room to protest from heat stoke



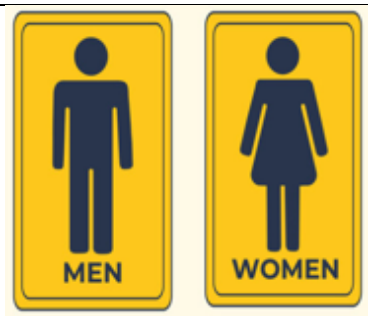
416. OHS publications, such as brochures, leaflets, posters and signage board at strategic locations in Uzbek and Russian languages at relevant construction sites, few samples are given in table;

Table 53 A: [Sample] Signage for Creating Awareness

• Singage for First Aid Room	• Sinage for deep excavation
• 	• 

No Smoking		Fire Alarm	
Caution – Electricity		Caution, Danger of falling	

Emergency Assembly Point		Caution – Low Headroom	
Mandatory PPE Signage		Overhead Hazard	
Lifting material		Falling object	
		Electrical danger	
First Aid Box Location		Wear Safety Harness	
Fire Extinguisher location			

Awareness on use of PPEs at the site			
Construction area/Do not enter			
Drinking water		Toilets for Female and male	
Water conservation		No parking	
Assembly Point		Unauthorised Entry	

417. Monthly reporting on labour profile, including information on workers' place of origin, gender, ethnicity, type of contract (full-time/ part-time, unskilled/ semi-skilled/ skilled, management, administration)

418. Ensure all workers have officially signed the contracts, receive timely payment, no excessive use of overtime.

419. Personal Protective Equipment (PPE) aims to protect employees & workers from exposure to workplace hazards and injury. The contractor shall provide standard approved PPEs to workers and maintain records for inspection and verification. The contractor shall ensure and maintain a minimum of 10% spare PPEs and safety appliances, for detail see PPEs 53B.

Table 53B: [Sample] PPEs for Jobs Works

Provide electrical resistant rubber hand gloves [approved] while work with electrical circuits/equipment.	
Provide leather hand gloves while working in welding and gas cutting operation.	
Provide cotton hand gloves while at rigging work or during winter	

Contractor shall provide Gumboot shoes to workers engaged in work involving concrete and muddy areas.	
Safety shoes with steel toe must be worn at all times by all personnel at work. Safety shoe should be comply the government of Uzbekistan standard	
To work at heights, the site shall provide government approved Full Body Harness. These harnesses must be stored securely when not in use and checked/ inspected before every use.	

All workers, supervisors and site engineers shall be provided a reflected vest to maintain visibility when working at the site. Nobody should be allowed without wearing a Reflecting Vest at the construction site/area.	

420. Contractor shall arranging first aid facilities at all strategic location, readily available trained paramedical personnel, and emergency transport to the nearest hospital with accident and emergency facilities, and allocation of responsibility for ensuring that these arrangements are continually in place.

421. Ensuring plant and vehicle operators are properly licensed and trained. Arranging for regular safety checks of vehicles and material, and allocation of responsibility for this

422. All civil works will be designed and operated in accordance with environmentally sound engineering practices and governed by the relevant environmental standards. The works will require the use of heavy machinery (i.e., excavators, bulldozers) PIU/PIC ensure that will not take place on lands already under agricultural use.

423. Movable sanitary facilities will be provided at the work site and kept clean, ensure adequate water, free of odors and usable.

424.

425. Currently, COVID 19 restriction has been removed by the Government of Uzbekistan. However, in case of increase of COVID cases or government order. The contractor shall adhere, the Temporary Sanitarian Norms and Rules (SanN&R) #0372-2079 or any guidelines issued by the government related to COVID 19. The SanN&R provides general requirements and specific requirements for different sectors: pharmacy, public transport, markets, and construction sites, among others. All managers/existing worker and new workers must undergo introductory training.

426. In accordance with SanN&R #0372-20, all works will be organized in order to ensure:

a) Preventing the introduction of infection into the organization;
b) Taking measures to prevent the spread of coronavirus infection (COVID-19) in teams in organizations;
c) Implementing organizational and technical measures to prevent infection of workers;
d) Proper recording and reporting of any cases of infection and undertaken actions;
e) Other organizational measures to prevent infection of workers.

5.23. Impacts from excavation of trenches for infrastructure or foundations.

427. Impact: Deep trenches (>1.5 meters) or greater, in weak or difficult soils may be prone to collapse and require a protective system to shore up the trench sides (unless the excavation is made entirely in stable rock). Excavated materials stored near the trench may slip back into the trench.

428. Measures: Engineering controls for shoring applications will be provided giving assurance that work in difficult soils is safely planned. This will be developed (in principle on how conduct work

[79] Government of Uzbekistan has adopted the special procedure on acting in conditions of pandemic - the Temporary Sanitarian Norms and Rules (SanN&R) #0372-20 “On organization of performance of state agencies and other organizations, commercial entities in limited measures condition due to pandemic COVID-19”.

in difficult soils) by the PIC in the detailed design stage and included in the contract. A shoring plan will be included by the Contractor in SSEMP in the pre-construction stage to provide details of how the contractor will protect worker safety while conducting work in weak soils. The details of the protective system will be a requirement of the contract and included in the contractors shoring plan in the SSEMP. Provide shoring for deep trenches (>1.2m or greater unless the excavation is made entirely in stable rock);

429. Prior to excavations, the necessary information and interaction with the local community should be taken. Compensation for the disturbance must be paid before the works commence. The SSEMP shall include measures to control physical impacts. Most materials will need to be reused as backfill but careful stockpiling and reuse of any surplus soil or subsoil as covering or fill for other project works will be required. Practices to ensure that any impacts generated during excavation are mitigated and included in the SSEMP.

5.24. Damage to existing services, utilities, and infrastructure

430. Impact: Disruption to existing potable water supply pipes, gas line, electrical power lines etc may be necessary to complete the works, but the locations and scale of this will only become evident at the detailed design stage.

431. Measures:

(a) Inform relevant authorities, and seek approval as per national/local statutes
(b) Information community about utility shifting and number of days it will impact the local settlement
(c) Ensure alternatives, wherever possible and restore operation within specified timeline.

5.25. Borrow and quarry, sourcing of construction materials

432. Impact: Opening and operating of borrow pits can result in multiple environmental and social impacts, including degradation of production soils, flora and habitat, impacts to air quality, elevated noise levels, etc. No specific quarry sites have yet been identified or sourcing of construction material for this project.

433. Measures: The volumes of required material will be estimated after the detailed design. Sources of construction materials (gravel, sand aggregate etc.) for the Project will be agreed with the local authorities prior to commencement of works. The contractor will be required to identify sources and prepare a sustainable extraction plan, for all sources of material that will be used in Project works from quarries and borrow sites acceptable to PIU/PIC and licensed and authorized by the relevant authority.

434. To mitigate the impacts from extraction sites, in addition to the preparation of the site specific extraction plan by the contractor, the bid and contract documents will specifically require contractors to: (i) balance cut and fill requirements to minimize impacts from extraction of aggregates; (ii) prioritize use of existing quarry sites with suitable materials and update the list of quarries and borrow pits monthly and report to PIU and minimize impacts on other local resources; (iii) procure materials only from quarries and borrow sites acceptable to environment authority or licensed and authorized by environment authority; (iv) required environmental clearance from environment authority if required shall be secured prior to operation of quarry/borrow areas; and (v) borrow/quarry sites will not be located in productive land or forested areas.

435. Borrow pits will be refilled as required by environment authority using inert surplus spoil material. Upon completion of construction, borrow areas will be backfilled or temporarily fenced, awaiting backfilling, to prevent and reduce wind and water erosion, and generation of dust. The contractor will ensure borrow pits are left in a tidy state with stable side slopes and proper drainage to avoid creation of water bodies favorable for mosquito breeding. The excavation and restoration of sites and borrow areas, as well as their immediate surroundings, will be undertaken in an environmentally sound manner to the satisfaction of the PIU / PIC.

6. Analysis of Alternatives

436. Feasibility Study has considered two alternatives from technical standpoint: - the earth bed canals vs. lined with concrete.

6.1. Lined vs. unlined canals alternatives

437. The Feasibility Study considered two technical alternatives for modernization and rehabilitation of existing canals: (i) unlined earth bed canals vs (ii) lined with concrete and geo-membrane. During meetings and discussions with feasibility study designer team and MWR, it was decided that concrete lining (two side & bottom will be implemented), for the 27.2 km long R8 main canal.

6.2. Earth Bed Canals

438. Earth bed canals' advantages are:

a) Low cost of works;
b) Old technology requires less capital investment

439. Earth bed canals' disadvantages are:

a) Gradual erosion and siltation
b) Overgrowth with weeds and bushes
c) Gradual deterioration of canal cross-section that lead to insufficient delivery of water to the fields and potential yield losses, and inefficient water use per ha of irrigated land
d) Infiltration and percolation lead to larger water losses, thus decreasing efficiency of water delivery
e) Increase water intake from the source per ha of irrigated land,
f) Increase in groundwater seepage, potentially leading to rising of water table, waterlogging and subsequent salinization of soils, which finally may make land unusable for cultivation

6.3. Concrete-lined Bed Canals

440. Concrete-lined bed canals' advantages are:

a) Significant reduction of infiltration and percolation rates, thus reduce water loss, reduce waterlogging and salinization of soils;
b) Smaller cross-section area of canal with higher water flow velocity;
c) Higher efficiency in water delivery;
d) Longer life span of up to 50 years with guaranteed water supply to the fields

441. Concrete-lined bed canals' disadvantages in R8 canal are:

a) Tree cutting and loss of local flora and fauna
b) Concreate lined canals are more "sterile" to biological habitats compared to unlined;
c) Construction costs are around twice as compared to unlined canals.
d) Use of high carbon embodied material (cement, metal etc).
e) Concrete cealing of the canal has a high carbon footprint, according to estimate, 1 ton CO_2 is released by using a ton of cement

6.4. Option of Concrete Mat versus Concreate lining

442. To make the entire project climate responsive, the feasibility team deliberated the third option, “Concrete Mat", available in the market by different names such as “Fleximat” 80 and others. However, consensus, limitations, feasibility and acceptance were discussed, see box. Applying concrete mat fully or partly as a canal ceiling material can reduce the carbon footprint significantly. Based on the percentage of lining, see figure 31 and 32 [sample], the carbon footprint can be reduced by around 60 - 80% or more.

Figure 31: [Sample]: Full Concrete mat ceiling with geomembrane

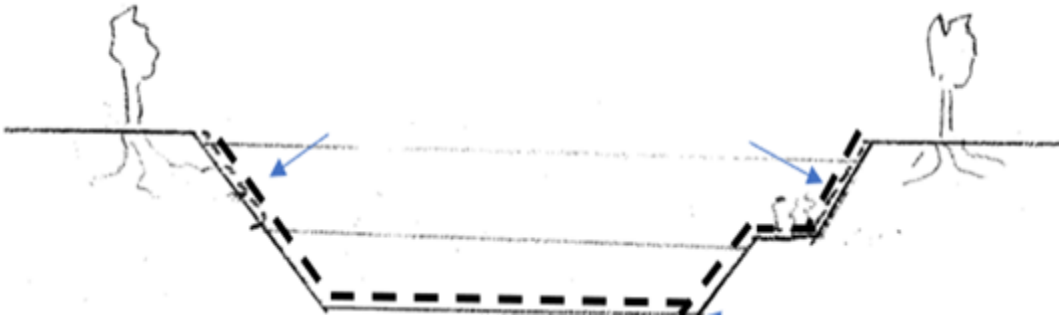
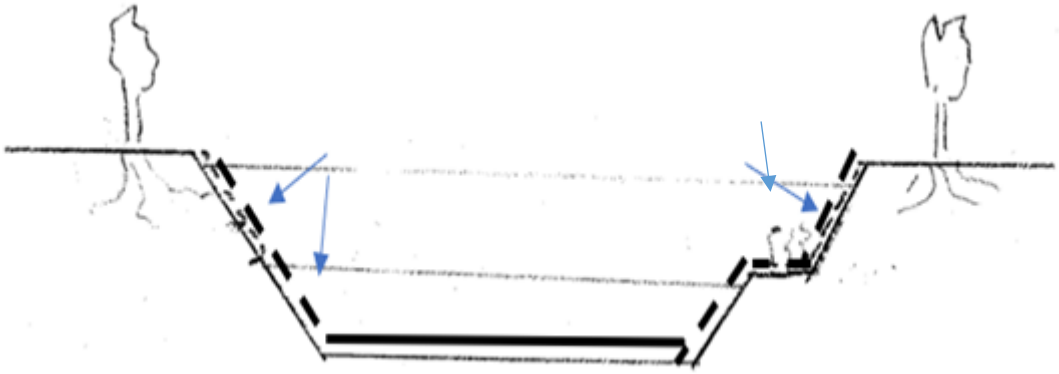


Figure 32: [Sample]: Partly Concrete mat Ceiling (embankment protection and bottom solid concrete ceiling)



Note: 40 - 50% carbon footprint reduction. Other advantages like tree saving, local energy supply, biodiversity

Benefit of concrete mat versus concrete ceiling

443. The table 30 enumerates environmental and carbon footprints comparison between concrete mat versus concrete ceiling. For details, refer to section 122 and 123 for limitation and way forward.

6.5. Inclusion of Climate Adaptive design - Shift from flow based to modernized water level flow controlled design,

444. During the design stage, explore the possibility of a modernized water level flow-controlled design instead of flow-based design for detail. See box 3 for details.

[80] https://www.flexamat.com/shoreline-erosion-control

Box 3: The Amu Darya river's flow is naturally variable. However, climate change and the sedimentation of the Tuyamuyun Hydro Complex have further increased this variability for the lower Amu Darya. A feasibility study was conducted to investigate the flow-based design's limits, revealing that it can be pushed to a maximum of 60% of the design flow.

It has been identified that the current canal design is not adequate for long-term climate change resilience. Even if the canal's capacity is reduced, the existing safety margins will still not be enough to handle the potential changes in water flow. By 2050, the flow rate could range from 505 Mm3 (with a safety margin) to a minimum of 291 Mm3, and by 2080, it could be as low as 235 Mm3. In both cases, the minimal functionality margin of 60% will not be met, which means that some parts of the irrigation system will only be fully functional for certain farmers.

Therefore, an adapted modernized water level flow-based design approach will be necessary. A characteristic of this design approach is that besides water flow , it concentrates on guaranteed water level by additional water level regulators. In this approach each canal segment is viewed at as a virtual reservoir, with regulated water level for sustainable abstraction, also by low canal flows.

Compensation for additional water level regulators minimizes the need to narrow the size of the canal. This results in the canal being more adaptable to the local situation and earthworks can be reduced. The adaptable design also offers more options for increasing secondary functions such as biodiversity, for example, by including a wet berm or fish farming.

The modernized water level and water flow design can be adjusted to the local situation within certain margins, thus reducing the cost. This design approach allows for functionality margins of 20-100% to be achieved, matching the expected variation in flow under climate change

6.6. “No-project” alternative

445. Not implementing the R8 subproject will have positive as well as negative consequences. Positive consequences include:

446. Environmental conditions will remain the same in the subproject area and there will be no impacts, such as:

a) Grown trees will remain intact
b) No disturbance and loss of topsoil for access roads and construction sites;
c) Temporary and local impacts of subproject such as air, noise, surface and ground water contamination can be avoided ;
d) No inconvenience to people due to utility shifting and road blockage
e) Infiltration loss and other losses will further aggravate with time
f) Potential water table rising, waterlogging, and subsequent salinization of soils due to improper drainage of water,

447. For detail, refer Table 4 Impacts on local environmental setting ‘With’ and ‘Without Project’

448. If the R8 subproject is not implemented,

a) Water supply capacity and efficiency will continue to decline.
b) Water loss and salinity aggravate over the time
c) Agriculture productivity will be suppressed,
d) Capacity for water resources management will not be improved,
e) Infrastructure will not be modernized,

f) Percentage of unused lands will increase over the time due to lack of water and

g) Farm management and water use capacities will not be improved.

h) Overall, farm incomes in the R8 command area will not be improved.

449. For above reasons, the "No Project Alternative" is not considered acceptable. In addition, the environmental impacts of R8 subproject, as listed in the previous chapter can be avoided or minimized if correct mitigations are employed. The subproject can be made climate responsive and acceptable by integrating Fleximat fully and/or partly in the project design.

7. Public Consultation and Information Disclosure

7.1. Public Consultations

450. In any society, local people expect to be consulted about development activities or projects which will have a direct or indirect impact on their lives, their livelihoods, their health, and their social structures.

451. If the project proponent fails to consult them, it can lead to conflicts, thereby delaying the project unnecessarily. Therefore, stakeholder consultation and participation make the project more acceptable to the people as well as to the government and the concerned authorities. When locals are kept informed about the impacts including the benefits of a project, their anxiety and concerns related to the project tend to get reduced. It also gives a chance to persuade them about the project in a positive manner, in terms of creating a sense of ownership. It is to be that noted that local people can come up with very good suggestions on how to avoid or minimise adverse impacts, if locals are consulted timely.

452. Stakeholder engagement since the beginning of a project also contributes to spreading awareness about various alternatives and mitigation measures and helps in preventing and reducing conflict through early identification of controversial issues.

453. One of the main goals of the IEE is to facilitate the participation of all stakeholders and local communities at all stages of the project cycle. In these regards, public consultations was conducted in subproject district (Tuzloq makhalla building, Yangiariq district, Khorezm Region) to capture the stakeholders' opinions about the subproject.

454. To comply with the requirements of ADB, an official letter was sent to the local authority to inform the communities in the subproject area about the upcoming consultations. PIU also informed all the district water management staff involved in the subproject.

455. On September 22, 2023, stakeholder consultations were conducted at the Tuzloq Makhalla building located in the Yangiariq district of Khorezm Region. The discussions were centered around the R8 subproject, specifically where the subproject canal passes through. During the meetings, experts provided information about the project and its potential impacts and benefits. They also collected recommendations, comments, and concerns from the attendees, which are listed in Table 50. At the public consultation, some participants also raised questions about the local employment potential. A list of all the attendees and their details who participated in the public consultation can be found in Annexure 4.

456. During public consultations, experts presented the information about the R8 subproject, planning activities under the subproject, anticipated environmental impacts and GRM. The presentations were followed by discussions with meetings' participants, questions and answers sessions, See Annexure 4.

457. Brief information on questions raised by participants during the public consultations is presented in Table 55. During public consultations, experts presented the information about the R8 subproject - Project description and its components; potential planning project activities, national environmental, social legislation and relevant ADB SPS's (2009) requirement, identified social and environmental risks and mitigation measures, components of IEE/EMP, the role of each stakeholders; occupation, health and labor requirements and risks associated with it, the resources necessary to address labor issues. GRM; assistance to vulnerable and rural households involved to the project.

458. As part of the efforts to understand the challenges faced during the construction of the canal, the IEE team had a meeting with Mr. Odilbek Toirov, who is the head of Basin Administration. He informed the team that the main environmental issues with R8 include burrow pits and tree cutting. However, he also reported that the rest of the environmental impacts are local in nature and can be manageable. Additionally, during the reconnaissance survey, the team also consulted with the sluice gate operator at the head structure, who expressed concern about the heavy silt load in the Tashsakin canal. See Figure 23.

459. The team also consulted with Mr. Timur Masharipov, the officer from Basin Administration, he mentioned that canal modernization will prevent water loss, economize water usage, and additional land will available for irrigation. He also mentioned that the project will require road strengthening to facilitate sand transportation and other construction materials.

Picture 23 : Heavy silt load in *Tashsakin* canal/ R8 canal

7.2. Information Disclosure

460. Environment Assessment documents such as EARF and IEEs and Semi-Annual Environmental Monitoring Report (SAEMRs) will be available on MWR website and ADB website within two weeks after ADB's clearance of each document. For the document disclosed on MWR website, executive summaries will be available in Uzbek language and full reports in Russian language. Hard copies of the executive summary translated into Uzbek language and full reports in Russian language will also be made available at the offices of MWR, PIU, Project Implementation Consultant (PIC) and contractors. There will also be a notice on MWR's website displaying the documents stating where the hard copies are available.

8. Grievance Redress Mechanism (GRM)

461. Grievance redress needs to be considered for the purpose of ensuring that any unintended consequences, or violations of planned actions and activities are brought to the notice of the authorities to ensure compliance and resolution of problems and issues faced by the local population. The GRM must:

a) Be an understandable and transparent process that is gender responsive, culturally appropriate readily accessible to all segments of the affected people at no costs and without fear of retribution.

b) Be accessible to the local population and therefore will be present close to the area where project activities are under implementation.

c) Ensure fairness and transparency in any grievance system planned. This could include making information on project activities available at the impacted areas itself, keeping a register of complaints and a system to identify progress of complaint and resolution undertaken, providing for a higher-level authority for problem resolution, ensure that contact information on the existing GRM is available at project implementation/construction sites.

d) Ensure that time limits are set for solving all issues at each level of the system and adhered to.

e) If any adverse impact is identified by the local population, they need to be immediately addressed and the GRM will be able to include any such complaints into project design.

f) Records on how grievances are addressed will be maintained at a central place where the public could access these records.

g) It must be a dynamic process that is able to help correct any adverse impact that may occur due to project activities.

-

8.1. Framework for GRM

462. The following paragraphs describes the flow of the GRM of the project. Every affected person shall have three options to get the grievance redressed.

a) Project level GRM is established under the Project;
b) Regional level is accessing through the country's legal system, and
c) Lender lavel is for the affected person to access through the ADB Accountability Mechanism.

8.2. Project level GRM

463. Project-level GRM shall consist of the following stages:

a) First Stage: At the first stage, the person with any form of grievance would approach the contractor (proposed as the agency responsible for implementation of the EMP). A copy of the grievance may also be provided by the affected person to the PIU. A Grievance Redress Register must be maintained by the contractor and PIU for all such complaints. The contractor shall register the complaint and make efforts to resolve the grievance within 1-5 working days at that level in a consultative manner.

-

b) Second Stage: If the affected person is not satisfied or the grievance is not redressed within 5 working days, the contractor will be responsible for assisting the concerned person for getting the grievance registered with the Canal-Level Grievance Redress Committee (CL-GRC) who shall comprise representatives from the contractor, PIU, Irrigation System Authority (ISA) and Basin Irrigation System Authority (BISA). The CLGRC shall make efforts to resolve the grievance of the complainant within 5-7 working

days after the matter is brought to the Committee notice. A Grievance Redress Register shall be maintained by the contractor for all complaints. The contractor shall share the information on such complaints with the executing agency on a monthly basis.

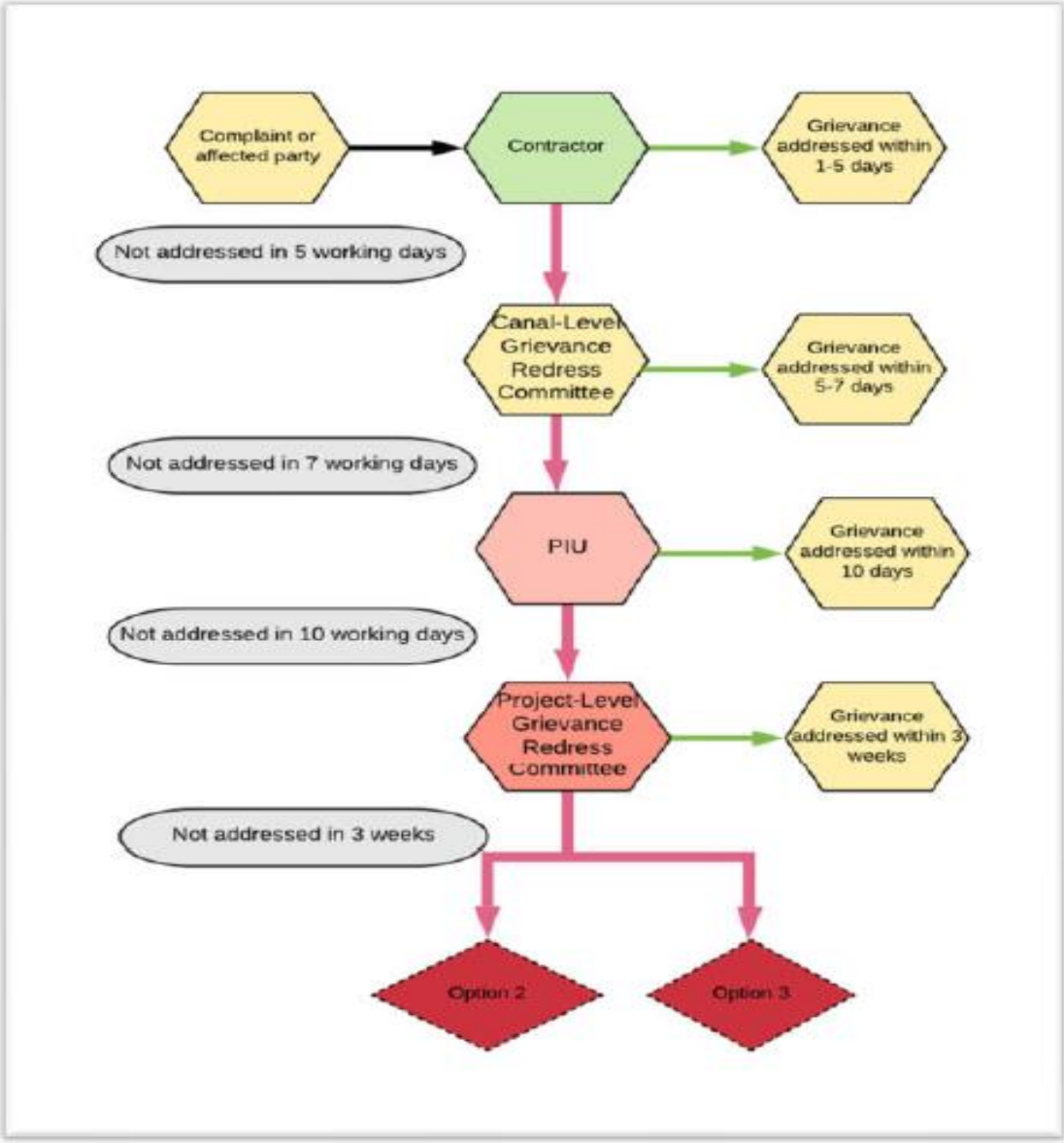
464. Additionally, the PIU shall be instructed to maintain a Complaint Register.

c) Third Stage: If the affected person is not satisfied or the grievance is not redressed within 7 working days, the contractor shall assist the affected person to register the complaint with the Project Manager at the PIU. At the third stage, the Project Manager will ensure that the aggrieved person is heard, and the grievance redressed in the best possible manner and in a consultative manner within 10 working days from the date of registering the grievance.

d) Fourth Stage: If the affected person is not satisfied or the grievance is not redressed within 10 working days, the Project Manager will be responsible for getting the grievance registered for the hearing by the Project-Level Grievance Redress Committee (PLGRC). The PL-GRC comprises PIU Chief Engineer as Chairman, one member from the MWR, a representative of BISA, contractor, a representative from ISA, members and representatives of affected persons, including women and vulnerable people. The PLGRC will conduct a hearing on the grievance within 3 weeks from the date of registration of grievance. Other than disputes relating to ownership rights under the court of law, the PL-GRC will review grievances involving all environmental and social impacts arising from the project implementation. All costs incurred in resolving the complaints will be borne by the Project. A comprehensive record will be maintained by executing agency for all grievance proceedings organized at different stages and reported within the Safeguard Monitoring report, submitted to ADB.

465. The flow chart of the Project level GRM process is provided in Figure 33.

Figure 33: Flow chart of the GRM process



8.3. Regional level:

466. An aggrieved person is free to access the country's legal system and that this is not conditional upon the perceived unsatisfactory outcome of the CL- or PL-GRM.

8.4. Lender level:

467. In the event that the established GRM is not in a position to resolve the issue, the affected person can also use the ADB Accountability Mechanism by directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB Uzbekistan Resident Mission (URM) or ADB headquarters . The complaint can be submitted in any of the official languages of ADB's developing member countries. Before submitting a complaint to the Accountability Mechanism, it is required that affected people make a good faith effort to resolve their problems by working with the concerned ADB operations department (in this case, URM).

64 Oloy Bozori Berk Street, Tashkent 100000, Uzbekistan	6 ADB Avenue, Mandaluyong City 1550, Metro Manila, Philippines,

Office Hours: 9:00 a.m. to 6:00 p.m. (Monday to Friday) Tel +998 78 1401920 Fax +998 78 1401976 E-mail ADBUzbekistan	www.adb.org.

468. After doing that, and if they are still dissatisfied, they could approach the Accountability Mechanism. ADB Accountability Mechanism information will be included in the project relevant information booklet to be distributed to the affected communities, as part of the project GRM.

8.5. Record Keeping

469. Records of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, status and agreed corrective actions will be kept by the contractor. PIU (with the support of PIC) will collect the data from the contractor and submit to MWR (state level). This information will be reported to ADB by the MWR through the Semi-annual environmental monitoring reports (SAEMRs).

470. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PIU offices. Contractors must display details of the CL-GRM on their notice board at every site.

8.6. Periodic Review and Documentation of Lessons Learned

471. The PIU will periodically 1 per week review the functioning of the GRM and record information on the effectiveness of the mechanism, especially on the PIU's ability to prevent and address grievances.

472. Costs - All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the respective PIU.

8.7. Proposed Framework for Information Dissemination (ID)

473. For smooth project implementation and optimum performance output, PIC will design and develop Standard Operating Procedures (SOPs) for information dissemination in consultation with PIU. The structure SOPs for ID include;

a) Thematic areas for ID
b) Frequency of ID
c) Communication mode (public meeting, consultation, training, workshop, bill boards, pamphlet/ audio/video etc.)
d) Roles and responsibilities, budget requirement & monitoring

474. Who will be the Potential Target Stakeholders (PIC will include all Potential Stakeholders in SOPs)

a) Project-affected people, including vulnerables and women,
b) Water consumers associations,
c) Ministry of Water Resources, local government, environment authority, other relevant departments, etc.
d) Contactors, sub-contractor,
e) Contractor's Labours,
f) NGOs
g) Local truck driver
h) Other stakeholders

475. Few key thematic Areas for ID

a) National statutes/ADB Safeguard Policy Statement (2009) etc.
b) Project activities, potential impacts & safeguards measures (e.g SSEHSMP)
c) Compensation & resettlement and rehabilitation package, if any
d) Implementation of gender action initiatives
e) Social Impacts and overall project benefits on the following indicators (a) water security & agricultural productivity (b) Health Education © Livelihood (d) Water connectivity (f) Sanitation (g) Livelihood opportunity etc.
f) On GRM - Grievance redressal location, concerned person, and place of registering of Grievance/ complain. A grievance can be submitted by email, phone number, verbally, or anonymous
g) Training & skill development
h) Awareness of COVID-19 / HIV and other communicable diseases
i) Occupational health and safety issues
j) Community safety issues (i.e. traffic diversion)
k) Disclosure - Inspection report & corrective action plan, environmental monitoring plan
l) Disclosure on MWR website : Environment Assessment documents such as EARF and IEEs and Semi-Annual Environmental Monitoring Report (SAEMRs) etc

476. Tools for ID - Depending on type of stakeholder, PIU/PIC can adopt any method for ID.

Table 57: Tools for Information Dissemination

Tools	Description
Developing IEC material	Pamphlets, handouts, flyers, project summary, banners, etc.
Focus Group Discussions (FGDs)	Checklist
Public Consultation (Formal/Informal)	Checklist
Meeting/public hearing	Based on main key issues
Government/relevant government authority	One-on-one meeting, presentation
Website	Putting all safeguard report in public domain

477. In case of planning ID for GRM, the process will also provide details on whom to contact and when, where/ how to register grievance, various stages of grievance redress process, time likely to be taken for redress of minor and major grievances, etc. PIU/PIC/contractor at project level will ensure that the poor, vulnerable (such as farmers and women) and others are made aware of grievance redress procedures. Grievances received and responses provided will be documented and reported back to the affected persons. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PIU offices as well as reported in the SAEMRs. The cost of IDs will be borne by PIU.

9. Environmental Management Plan & Institutional Requirements

9.1. EMP Objectives

478. An Environment Management Plan is a framework for the implementation and execution of mitigation measures and alternatives. The objectives for developing R8 EMP are:

a) To ensure that mitigation measures are properly implemented.
b) To establish a scheme and procedures.
c) To monitor how effective are the mitigation measures.

d) To ensure that proposed mitigation measures comply with environmental laws and regulations.
e) An adequate action when unexpected impacts occur.

479. If case if, unanticipated environmental impacts during detailed design or subproject implementation identified, the IEE and EMP will be updated or a new IEE and EMP will be prepared to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts. The final IEE and EMP will be disclosed on ADB's website and MWR's website.

9.2. Environment Management Plan

480. The below table (58) is a detailed Environment Management Plan along with role and responsibility including monitoring indicators for performance assessment.

Table 58: Environment Management Plan of R8 Subproject

Issue/Subject	Potential Issues/ Important Factors/ Impacts	Mitigation Measures	Institutional Responsibility	Supervision Responsibility	Monitoring Indicators
A. Pre-Construction Stage					
Pre-construction arrangements	IEE and EMP requirements	1. Include EMP obligations in tender documents and specifications, referencing to the subproject IEE and EMP. Ensure the sufficient budget is considered for EMP implementation	Consultant	PIU-EPO	Bidding documents approved by MWR and ADB
	Contractor's Staffing	2. Contractor will hire a full-time environmental officer and a full-time health and safety officer with relevant background and sufficient experience to (i) prepare SSEMPs in align with EMP and reference to EHS Guidelines and (ii) ensure compliance with all applicable national laws and regulations, obtain all necessary environmental licenses and permits, especially on tree relocating and felling, borrow pit and approval of SSEMP prior to commencement of construction works and implement SSEMP requirements	Contractor	PIC/PIU-EPO	Environmental and health and safety officer hired by the contractor All licenses and permitsobtained
	Roles and responsibilities	3. Assign roles and responsibilities related to Environmental Monitoring and Reporting System	PIU-EPO	PIU-EPO	Assign Roles and responsibility
	Environmental Protection	4. Conduct environmental protection training on	PIC	PIU-EPO	Training delivered

	Training	implementation and supervision of subproject's environmental mitigation measures for MWR, PIU-EPO and Contractor			
	SSEMP	5. Prior to commencement of any construction works, prepare SSEMPs for construction site based on requirements set forth in bidding documents, design package IEE/ EMP actual on-site conditions and decisions on work arrangements.	Contractor	PIU-EPO	SSEMPs will be approved by PIC and MWR/PIU-EPO
	Obtain clearance of national environmental assessment (OVOS/ZVOS)	6. Review, (update if necessary), and ensure incorporation of this IEE and measures defined in current EMP into subproject and national EIA (OVOS/ZVOS) process.	Contractor	PIU-EPO	Obtain environmental approval from State Environmental Expertise
Non-compliance with national environmental regulation	Non-compliance with national environmental regulation	7. Obtain necessary permission on the use of spoil area. 8. Make contract with licensed waste collection/transportation/ disposal facilities.	Contractor	PIU-EPO	Necessary permissions obtained Necessary contracts made
Baseline monitoring	Baseline monitoring	9. Conduct initial baseline monitoring of air quality and noise level prior to commencement of construction works, to track changes due to consequent subproject implementation.	Contractor	PIU-EPO	Baseline monitoring results to be included in the SAEMR

Site Clearance	Vegetation clearance	10. Avoid cutting more trees than permitted. 11. If possible, consider transplanting of tree to be removed. 12. The falling of trees will be carried out in accordance with the DCM No.464 dated 22.08.2022, and No. 255 dated 31 March 2018. 13. For all trees to be cut/removed, plantation will be at 10 trees for every tree cut under the permit. 14. All plantation activities will consist of appropriate species for the area to be planted, in consultation with the forest department and also after understanding the local ecological needs. 15. Ensure minimum damage to site as detailed design stage itself where possible identify appropriate re-plantation	Contractor and PIC	PIU-EPO/PIC	All work sites Trees removed only after PNPC approval obtained. Verify the adherence to recommendations in sites where clearance is performed

		activities with appropriate species. 16. Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live or nest, such as vegetated roadside areas, tree belts, inner areas of bridges, canal riparian zones, etc.			
	Accidents among local population due to faulty design and improper construction practices	17. Conduct community awareness / consultation to reduce the risk of accidents or health and safety incident 18. Ensure design has safety measures to reduce accidental falling of children or adults in canal or their getting trapped in.	PIC	PIU-EPO	Detailed designs Plans and bid documents show that required provisions have been included
	Human - animal conflict	19. Ensure design is such that animal's - wild or domestic, do not accidentally fall in and get trapped in the canal.	Contractor	PIU-EPO	Detailed designs Plans and bid documents show that required provisions have been included

	Impact on local fisheries and fish spawning and aquatic fauna	20. Do not undertake any construction/ quarrying activity during the spawning period of the different fish species.	Contractor and PIC	PIU-EPO/PIC	Monitoring report
		21. Discuss with local population before starting any construction activity to ensure minimum disturbance.			Complain records
	Chance finding of an archaeologically or culturally important site	22. Clearly identify all required actions - such as stopping work in case of a chance finding and who to contact are clearly understood by the construction consultants Ensure that the construction company and supervising consultants understand archaeological concerns in the area.	Contractor	PIU-EPO/PIC	Detailed designs Plans and bid documents show that required provisions have been included

	Reduced aesthetics due to quarries on canal bed, hills among others.	23. Rehabilitation of all sites must be undertaken once work is completed and plans developed well in advance of construction activities and will be in the construction company contract to ensure it is taken up and appropriate budget will be made for the activity. 24. Avoid identifying any quarrying work in an aesthetically important/significant place.	Contractor	PIU-EPO/PIC	Material removed from sides of canals. Borrow pits closed. Materials properly stockpiled,
	Reduced access of water for domestic, livestock and other purposes from canal system due to design changes and increased water use efficiencies	25. Identify water needs for different users and in consultation with them develop appropriate design changes to ensure access to identified groups.	Contractor	PIU-EPO/PIC	Detailed designs Plans and bid documents show that required provisions have been included

	Disruption of traffic routes - especially navigation due to sighting of infrastructure	26. Identify any landing and other sites along the planned infrastructure site. Where possible consider design changes to ensure there are no problems faced by the local population. 27. Where not possibly create alternate facilities in consultation with the local population.	Contractor	PIU-EPO/PIC	Detailed designs Plans and bid documents show that required provisions have been included
B. Construction Stage					

Soil erosion /contamination and sediment runoff	Soil erosion	28. Apply nature-based solutions for slope stabilization to prevent spoil loss, improve water \retention and biodiversity and can act as a food source. 29. Any deep excavations in unstable soils will be shored, and below grade construction brought to grade quickly, then excavations closed. 30. Surface soils will be temporarily graded-to- drain and protected as necessary to reduce erosion and sediment runoff. 31. Minimize unnecessary encroachment onto adjacent lands to reduce area of disturbance to vegetation and soil. 32. Fertile topsoil layer will be cut and stockpiled separately from spoil material to be readily available for later use in slope stabilization and land reinstatement works.	Contractor	PIC/PIU-EPO	Visual inspection

		33. Where possible, surplus soil will be used for earth filling works at approved locations. 34. Canal excavation width and depth will be kept to a feasible minimum to reduce extra spoil generation. 35. When excavating canals, silt curtains, water diversion structure, and/or settling ponds will be provided as a comprehensive system to prevent sediment transport in the water courses. 36. Intercepting ditches and drains will be organized to prevent runoff entering construction sites and to divert runoff from sites to existing drainage. 37. Works and material handling will be limited during heavy rains and high winds to minimize soil erosion. 38. Works and material handling will be limited during			

		heavy rains and high winds to minimize soil erosion.			

	Soil contamination	39. Petroleum products, hazardous materials and wastes will be stored covered against precipitation, on an impermeable surface, and secured from acts of vandalism. 40. All fuel and chemical storage (if any) will be sited on an impervious concrete base within a bund and secured by fencing. The storage area will be located at least 500 m away from any watercourse or wetlands. The base and bund walls will be impermeable and of sufficient capacity to contain 110% of the volume of tank (or one tank if more than one tank is located in the bund). 41. Avoid soil contamination with petroleum products, lubricants, or hazardous materials during equipment maintenance and repair, field refueling, and hazardous material handling. 42. Filling and refueling will be strictly controlled and subject to formal procedures. Drip pans	Contractor	PIC/PIU-EPO	Visual inspection Soil quality measurementt result (when necessary)

		will be placed under all filling and fueling areas. Waste oils will be stored and disposed of by a licensed contractor. 43. Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies will be prohibited. 44. Should any accidental spills occur immediate cleanup will be undertaken, and all cleanup materials stored in a secure area for disposal. Disposal of such will be undertaken by a waste management company contracted by the contractor. The waste management company must have the required licenses to transport and dispose of hazardous waste before any such waste is removed from the site. The contractor will keep copies of the company's licenses and provide waste transfer manifests at its camp site for routine inspection by the engineer.			

		45. All valves and trigger guns will be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. 46. The contents of any tank or drum will be clearly indicated. Measures will be taken to ensure that no contaminated discharges enter any soils. 47. No bitumen drums or containers, full or used, will be stored on open ground. They will only be stored on impervious hard standing. 48. Areas using bitumen will be constructed on impervious hard standing to prevent seepage of oils into the soils. 49. The construction camp maintenance yard will be constructed on impervious hard standing with adequate drainage to collect spills. There will be no vehicle maintenance activities on open ground. 50. Organize spill response kit at each construction site for			

		collection and storage of contaminated soil and provide training for workers on use of spill response kit. 51. In case of spillage of waste during transportation, immediate actions should be taken on the measures appropriate to its scale 52. Measure soil quality in case of need (complaint etc.)			
	Compaction of soil/soil erosion for access to various sites and to quarries - such as quarries for gravels and sand mining areas	53. Plan site prior to starting excavation activities, including slope stabilization, identify and developing appropriate slope aspect during excavation and contouring to ensure slope stability after earth borrowing activities are completed. 54. Clear vegetation that must be removed. 55. As far as possible, use already identified roads and routes to access various sites.	Contractor	PIC/PIU-EPO	Visual inspection

	Sediment runoff and deposition near sites or during transportation	56. When excavating canals, silt curtains, water diversion structure, and/or settling ponds will be provided as a comprehensive system to prevent sediment transport in the water courses. 57. Avoid work in high wind condition. 58. During soil excavation, ensure slope aspect is maintained. 59. No driving in canal water. 60. No quarry work in running water of canals and minimize need to work in water. 61. Fence off in-stream work to reduce disturbance.	Contractor	PIC/PIU-EPO	Visual inspection

	Loss of fertile topsoil layer	62. The topsoil will be stored separately and reused for site landscaping and gardening where possible. 63. The contractor will reinstate the field where topsoil is removed. 64. Erosion will be prevented by minimizing any removal of trees and green cover vegetation. 65. Revegetation measures will be applied where appropriate.	Contractor	PIC/PIU-EPO	Visual inspection
Impact on Surface/Ground Water	Surface water contamination		Contractor	PIC/PIU-EPO	Spill Response Plan and Construction Camp Site Plan prepared as part of SSEMP, reviewed byPIC and approved by MWR/PIU-EPO, and implemented by contractor Visual inspection

		66. In addition to the measures against “Soil contamination”; 67. Preparation/implementation of a Spill Response Plan (for the management of any spills over 10 liters and provide spill kits at all work sites) and a Construction Camp Site Plan as part of the SSEMP. The plan will indicate the system proposed and the locations of related facilities in the site, including latrines, holding areas, and septic tanks. 68. No construction camp, permanent or temporary, will be located within 500 m of any river, canal or reservoir. 69. No equipment washing is allowed in any surface water bodies throughout the subproject implementation period. 70. When excavating canals, silt curtains, water diversion structure, and/or settling ponds will be provided as a comprehensive system to			Surface/ground water quality measurement result (when necessary)

		prevent sediment transport in the water courses. 71. No wastewater will be dumped into any ditches or streams. Wastewater arising on the site will be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a way that will cause neither pollution nor nuisance. 72. Liquid material storage containment areas will not drain directly to surface water. 73. Discharge of sediment-laden construction water directly into surface watercourses or wetlands will be forbidden. Sediment-laden construction water will be discharged into settling lagoons or tanks prior to final discharge. 74. Lubricant and fuel oil spills will be cleaned up immediately and spill cleanup materials will be maintained (including spill			

		kits) across the contractor's construction camp. 75. Spill cleanup equipment will be maintained on- site. The following conditions to avoid adverse impacts due to improper fuel and chemical storage. 76. Fueling operations will occur only within containment areas. Fuel storage, equipment maintenance and repair workshops, and vehicle washing areas will be stationed at least 500 m away from any water body. 77. Measure surface/ground water quality in case of need (complaint etc.).			

	Surface water contamination by domestic wastewater	78. There will be no direct discharge of sanitary or wash water to surface water, including the surface water courses identified in the subproject IEE and their tributaries. Disposal of materials such as, but not limited to, lubricating oil and onto the ground or water bodies will be prohibited. 79. Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters. Wastewater from labor camps and construction sites will be canalized into septic tanks without contacting ground. Septic tanks will be timely emptied by a hired septic truck and transported to legally approved treatment facility or dumpsite. Measure surface/ground water quality in case of need (complaint etc.).	Contractor	PIC/PIU-EPO	Visual inspection Surface/ ground water quality measurement result (when necessary)

	Waterlogging from poor site planning and management	80. Ensure proper site planning takes place and site management is adequate - to be put into construction contractor's clauses.	Contractor	PIC/PIU-EPO	Visual inspection

Air pollution	Dust generation caused by transportation of materials and vehicle movement	81. Air Quality Management Plan will be prepared as part of the SSEMPs and implemented by the contractor. 82. Construction materials (sand, gravel, and rocks) and spoil materials will be transported by trucks covered with tarpaulin or other acceptable type cover (which will be properly secured) to prevent debris and/or materials from falling from or being blown off the vehicle(s). 83. All dust generating lands will be watered to suppress dust formation during movement of vehicles, as frequent as necessary depending on circumstances. During hot dry summer days and active construction works, it is a usual practice to water access roads every two hours. 84. All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) will comply with the national vehicle regulations and	Contractor	PIC/PIU-EPO	Air Quality Management Plan prepared as part of SSEMP, reviewed byPIC and approved by MWR/PIU- EPO, and implemented by contractor Dust related complaints Visual inspection

		international emission standards. Regular exhaust emissions tests will be conducted.			

	Stockpiles of materials and spoil:	85. Air Quality Management Plan will be prepared as part of the SSEMPs and implemented by the contractor. 86. All stockpiles will be managed to reduce dust emissions. 87. Stockpiles will be located downwind of sensitive receptors, such as residential areas, schools, hospitals, kindergartens. 88. If a stockpile is within 300 m of residential area, precautions will be taken to avoid dust generation, including using of a reusable stockpile cover and fencing to form a high barrier to prevent wind lifting and dispersing. 89. The contractor will ensure that material stockpiles will be located in sheltered areas and be covered with tarpaulins or other such suitable covering to prevent material becoming airborne.	Contractor	PIC/PIU-EPO	Air Quality Management Plan prepared as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor Dust related complaints Visual inspection

		90. Stockpiles emitting dust will be sprayed with water prior to moving. 91. Effective use of water sprays will be implemented: carrying out watering for dust control at least three times a day: in the morning, at noon, and in the afternoon during dry weather with temperatures of over 25°C, or in windy weather specifically in or near villages. Avoid overwatering as this may make the surrounding muddy. All water used for controlling dust will be free of odor and pollution			

	Dust generation at construction site	92. Air Quality Management Plan will be prepared as part of the SSEMPs and implemented by the contractor. 93. Water will be sprayed on construction sites and material handling routes, where fugitive dust is generated. 94. No equipment using any fuel that may produce air pollutants, including mobile generators, will be installed without consent of the PIC. 95. Construction equipment will be maintained to a good standard and fitted with pollution control devices which will be regularly monitored by the engineer. 96. Monthly air quality monitoring at sensitive receptors.	Contractor	PIC/PIU-EPO	Air Quality ManagementPlan prepared as part of SSEMP, reviewed byPIC and approved by MWR/PIU- EPO, and implemented by contractor Dust related complaints Visual inspection Air quality measurement result

	Exhaust gases and Emissions	97. Air Quality Management Plan will be prepared as part of the SSEMPs and implemented by the contractor. 98. No burning of any waste is allowed on any construction sites throughout the subproject implementation period. 99. Construction vehicles and machinery will be maintained to a high standard to minimize emissions and will avoid unnecessary idling to save fuel and reduce emissions. 100. Batching plant's locations will be agreed with the PIC and will be downwind and at least 500 m from nearest residential area.	Contractor	PIC/PIU-EPO	Air Quality Management Plan prepared as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor Visual inspection

	Increased particulate matter on transport route of raw material and at quarries	101. Ensure vehicles are properly maintained and pass regular inspection from relevant authority. 102. Reduce blasting and other similar activities that may create dust to the extent possible 103. Use sprinklers to settle dust where needed	Contractor	PIC/PIU-EPO	Air Quality Management Plan prepared as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor Visual inspection

Noise and vibration	Noise	104. Noise Management Plan will be developed as part of the SSEMPs. They will contain procedures and plans to ensure that the mitigation measures and monitoring requirements are implemented during the construction period. All civil works will be designed and implemented in accordance with environmentally sound engineering practices and governed by the relevant environmental standards. 105. Time and activity constraints. In case if construction sites will be within or in proximity to villages, operations will be scheduled to coincide with periods when people would least likely be affected; work hours and workdays will be limited to less noise-sensitive times. Hours-of-work will be approved by the engineer having due regard for possible noise disturbance to the residents or other activities. Construction activities will be strictly prohibited between 9 PM	Contractor	PIC/PIU-EPO	Noise Management Plan prepared as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor Noise related complaints Noise level measurementt result

		and 7 AM in the residential areas. When operating close to sensitive areas such as medical facilities and schools, the contractor's hours of working will be limited from 6 PM to 8 AM. 106. Noise generating equipment will be located at least 300 m from any sensitive areas. 107. Noise generating equipment at construction sites will be isolated and, where possible, will be faced away from most sensitive directions. 108. Use temporary noise barriers while working in sensitive locations in case exceedance of allowable limits is expected and in case of relevant complaints. Placing the barrier close to the source proves to be effective. 109. Measures will be taken to reduce any noise disturbance to community, including giving notice on timing of noisy activities as early as possible to			

		sensitive receptors for periods of noisier works such as excavation. Describe the activities and how long they are expected to take. Keep affected neighbors informed of progress and seek suggestions from community members to reduce noise annoyance, and dissemination of procedure on handling complaints through GRM. 110. Within normal working hours, where it is reasonable to do so: 111. Schedule noisy activities for less sensitive times. 112. Provide periods of respite from noisier works. 113. The weekend/evening periods are important for community rest and recreation and provide respite when noisy work has been conducted throughout the week. Accordingly, work will not usually be scheduled during these times.			

		114. All mechanical plant is to be silenced by the best practical means using current technology. Mechanical plant, including noise- suppression devices, will be maintained to the manufacturer's specifications. Internal combustion engines are to be fitted with a suitable muffler in good repair. 115. Fit all pneumatic tools with an effective silencer on their air exhaust port. 116. Install less noisy movement/reversing warning systems for equipment and vehicles that will operate for extended periods, during sensitive times or proximity to sensitive sites. OHS requirements for use of warning systems must be followed. 117. All vehicular movements to and from the site to only occur during the scheduled normal working hours unless approval has been granted by the PIC.			

		118. Where possible, no truck associated with the work will be left standing with its engine operating in a street adjacent to a residential area. 119. All construction workers will be provided with PPE such as ear plug, earmuff. The workers must use them against high noise and/ or lengthy exposure. 120. Monthly noise level monitoring when construction works are implemented at sensitive receptors			
	Vibration	121. Subproject area and vehicle movement routes will be inspected for sensitive structures. 122. Pictures and precautions will be taken to avoid vibration impacts on sensitive structures near subproject sites and roads, prone to cracking and breaking caused by vibration from construction activities.	Contractor	PIC/PIU-EPO	Vibration related complaints

Impact on Ecological Resources	Impacts on flora and fauna, reduction of habitat	123. Acquire tree cutting permit from local department of environment inpection for any trees to be cut under the subproject. 124. For any tree cut or valuable grassland area disturbed for subproject needs, replant the same species trees or re-vegetate areas at other approved locations; according to DCM No. 464 dated 22.08.2022, ten trees planted for one cut (i.e., 10 saplings planted for each tree felled). 125. Use only native plants for re-vegetation of disturbed areas. 126. Ensures adequate budget is considered in the BOQ for tree related activities 127. Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live, such as vegetated roadside areas, tree	Contractor	PIC/PIU-EPO	Visual inspection

		belts, inner areas of bridges, and canal riparian zones. 128. Strictly prohibit poaching of wildlife and damaging plants. 129. Ensure that canal rehabilitation activities such as concrete batching plants, construction camps, labor camps and other ancillary features are properly sited. 130. Supply appropriate and adequate fuel in construction camps to prevent fuel-wood collection.			

Disturbance on local community	Disturbance to local population	131. Identify appropriate access routes, speed limits and timings with community. 132. Identify appropriate material storage areas to ensure least possible disturbance. Provide signage, demarcate and cordoning of areas to reduce access to construction site and to avoid accidents. Ensure appropriate site drainage. 133. Restore areas after work is over. 134. Minimize transportation of material through heavily populated areas. 135. GRM boxes should be on the site, at local mahala building. Boxes should be checked each week. All complaints should be recorded in the logbook.	Contractor	PIC/PIU-EPO	Monitoring report Complain records

	Damage to utilities	136. Identify potential utilities in the area prior to starting work to ensure that they are not damaged due to any construction work. 137. In case of damage, repair them immediately.	Contractor	PIC/PIU-EPO	Monitoring report Complain record
	Reduced access to sites for local population, construction sites or material procurement sites	138. Identify alternate routes for subproject construction activities where possible. 139. If not possible, in consultation with the local population, identify appropriate alternatives for them and provide required facilities.	Contractor	PIC/PIU-EPO	Monitoring Reports Complain record
	Damage to infrastructure	140. Vehicles will take pre-identified routes. 141. Do not overload vehicles beyond limits. 142. If damage to infrastructure occurs, plan for any maintenance that maybe required.	Contractor	PIC/PIU-EPO	Monitoring Reports Complain record

Impact from the operation of worker's camps	Workers/labor camps and facilities	143. Construct and maintain a camp/camps following IFC and the EBRD's guidance note on Workers' accommodation: processes and standards (2009).8133 144. Provide appropriate shelter and other facility for any labor brought from outside. 145. Do not use hazardous materials like asbestos for construction of shelters or temporary housing. 146. Ensure no conflict with local population due to labor camp.	Contractor	PIC/PIU-EPO	Monthly Monitoring reports

[81] https://www.ifc.org/content/dam/ifc/doc/mgrt/workers-accomodation.pdf

	Conflict with labor camps on resources	147. Select labor camp sites to ensure least possible conflict with local population - e.g., at a distance from where population density is high. 148. Ensure labor camps have required infrastructure like water supply, sanitation facilities and energy. 149. Develop appropriate waste management system and rehabilitate the site after construction is over. 150. Labor camps could be located close to settlement areas but not near sensitive water resources. In such cases, the contractor will provide a detailed design of each labor camp including infrastructure planning (water supply, electricity supply, waste management, wastewater treatment and disposal). Workers will be trained how to behave and to handle waste and wastewater according to national environmental	Contractor	PIC/PIU-EPO	Monthly Monitoring reports

		management requirements and international good practices. 151. Do not develop any construction site - material storage, labor camps etc. without consultation with the local population. Also, where possible do not use grazing lands etc. for labor and material storage.			

Occupational Health and Safety Risk	Occupational Health and Safety	152. An OCHS Plan including COVID-19 Health and Safety Management Plan and Emergency Response Plan will be prepared by the Contractor as part of the SSEMPs to manage worker safety on-site during the construction phase of the Subproject. 153. A full-time health and safety officer will be hired by the contractor to develop, implement, and supervise the OCHS Plan subject to approval by the PIC. 154. The health and safety officer will conduct initial and regular refresher training for all workers on labor rights, occupational health and safety matters, safety precautions, and their responsibilities for the safety of themselves and others. 155. Ensure provision and distribution of PPE including hard hats, and protective footwear, and keep record and	Contractor	PIC/PIU-EPO	OCHS Plan including COVID-19 Health and Safety Plan and Emergency Response Plan prepared as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor

		report any health and safety incidents. 156. OCHS Plan will follow national legislation requirements and include among others requirements to: (i) norms on provision of fresh water at all sites; (ii) adequate hygienic and sanitation facilities; (iii) labeling, warning, storage, and handling procedures for hazardous liquid materials; (iv) emergency response procedures; (v) records of occupational accidents, diseases, and incidents; (vi) OHS publications, such as brochures, leaflets, posters in Uzbek and Russian languages at relevant construction sites; (vii) monthly reporting on labor profile, including information on workers' place of origin, gender, ethnicity, type of contract (full-time/ part-time, unskilled/ semi-skilled/ skilled, management, administration) (viii) ensure all workers have officially signed contracts, correct and timely			

		pay, no excessive use of overtime. 157. All legally required permits will be acquired for construction and/or rehabilitation. 158. Contractor will allocate sufficient budget for OHS measures. 159. Ensuring plant and vehicle operators are properly licensed and trained. 160. Arranging for the provision of first aid facilities, readily available trained paramedical personnel, and emergency transport to the nearest hospital with accident and emergency facilities. Health and safety officer is responsible for ensuring that these arrangements are continually in place. 161. Arranging for regular safety checks of vehicles and material, and allocation of responsibility for this.			

		162. All civil works will be designed and operated in accordance with environmentally sound engineering practices and governed by the relevant environmental standards. The works will require the use of heavy machinery (i.e., excavators, bulldozers) but will be small in scale and will not take place on lands already under agricultural use. 163. Movable sanitary facilities will be provided at each work site and kept clean, free of odors and usable. 164. Carry out the routine inspection of the machinery and equipment for purpose of the trouble shooting and observance of the time of repair, training and instruction of the workers engaged in maintenance of the machinery, tools and equipment on safe methods and techniques of work. 165. Special attention will be paid to welding operations. It is			

		prohibited to distribute the faulty or unchecked tools for work performance as well as to leave off hand the mechanical tools connected to the electrical supply network or compressed air pipelines; to pull up and bend the cables and air hose pipes; to lay cables and hose pipes with their intersection by wire ropes, electric cables, to handle the rotating elements of power-driven hand tools. 166. Child labor is prohibited by national laws with minimum full 16 years of age. 167. Facilities for handling emergencies at site. 168. Restricted access to hazardous materials. 169. Personnel handling hazardous material will be properly trained, licensed and with sufficient experience. 170. Drinking water facilities at construction sites.			

	Risks associated with working near water bodies	171. Workers will not be allowed to enter trenches deeper than waist height unless they are properly shored. 172. Provide rescue equipment such as life buoy, personal flotation device, lifeline, life jackets, adequate boat that is available for a safe and timely rescue, at every construction site near water body. 173. An appropriate number of workers will be trained for rescue operations and designated to perform the rescue tasks 174. Workers are informed about appropriate rescue procedures, and trained in rescue procedures and use of rescue equipment	Contractor	PIC/PIU-EPO	Number or accident near waterbodies

Community Health and Safety Risk	Community Safety	175. Ensure all working areas (including construction camps and labor camps) have safety barricades to prevent access by local population. 176. Provide hazard warning signs around construction sites including access roads, if any. 177. Excavated areas will be fenced and equipped with warning sign. 178. Clear signs will be installed in view of public, warning people of potential dangers, such as moving vehicles and hazardous materials; all dangerous sites will be secured from unauthorized access. 179. Ensure appropriate signage at construction sites. 180. Locally contracted workers will be prioritized for recruitment. 181. The Contractor will prepare and strictly follow its Traffic Management Plan as part of the	Contractor	PIC/PIU-EPO	Traffic Management Plan prepared as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor Visual inspection

		SSEMPs, which will outline haul routes and safety measures. The Traffic Management Plan will also describe the method for provision of access in roads where trenches are being excavated. If any diversions are required, they will be outlined in the Traffic Management Plan. 182. Temporary traffic management and road safety awareness measures will be taken to ensure safety of nearby residents, community and visitors. 183. Traffic management system and staff training, especially for site access and near- site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes. Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public. 184. Adjustment of working hours to local traffic patterns, e.g., avoiding major transport			

		activities during rush hours or times of livestock movement. 185. In case of accident ensure required first aid is given immediately and till the person is transported to the nearest medical facility.			

Impact at dumpsites and impact from stockpiles	Risk of soil erosion from the dumpsites during wet weather, especially during the heavy rains.	186. Waste and Spoil Management Plan will be developed as part of the SSEMP and implemented. 187. Stockpiling separately in designated areas. 188. Spoil randomly compacted to the maximum extent practicable by routing the haulage traffic over the area and will be graded to prevent the ponding of water. 189. Pipe or conduit outlets will be suitably constructed to prevent erosion. When excavating canals, silt curtains, water diversion structure, and/or settling ponds will be provided as a comprehensive system to prevent sediment transport in the water courses. An earth mound will be constructed along the contour immediately below the spoil tip to collect fine material washed off the spoil tip. These collector drains will be regularly maintained until sufficient vegetation has been	Contractor	PIC-EPO	Visual inspection

		established on the spoil tips to prevent the washing out of fine material 190. Most of the spoil will be coarse grained (mostly medium to very fine sand and coarse silt) and is not suitable for deposition on farmers' fields. Spoil disposal will be regulated through specific clauses in standard contract documents. Most areas adjacent to the irrigation scheme, which are not irrigated, are unproductive desert lands, where the spoil can be disposed of without negative environmental impacts. Where large quantities are excavated, and the space near the canal is limited, it is recommended to dispose of the spoil further away from the canals. The specific locations will be determined during the detailed design. All construction sites will be properly cleaned up, leveled and re-planted if required. All corresponding costs are included in the Subproject estimates			

Impact on Physical cultural resources	Impacts on Physical cultural resources	191. Chance find procedure will be prepared as part of the SSEMPs and implemented. 192. If any paleontological fossils, archaeological finds or other important objects (including human bones, which may have criminal background) are encountered during construction, all activities at that location will stop and local authorities will be notified; works can restart only after fulfillment of prescribed measures and permission received to resume works. 193. Stop all work that may be underway or planned in the area and discuss with Regional Department of Ministry of Culture for further action. 194. Ensure that the construction company and the PIC understand archaeological concerns in the area. 195. Ensure that any important archaeological area is well identified and demarcated and	Contractor	PIU-EPO/PIC	Chance find procedure developed as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor .

		required actions are demarcated in a detailed management and mitigation plan so that no damage takes place to it.			

Waste generation	Waste and spoil management	196. Preparation and implementation of the Waste and Spoil Management Plan including Hazardous Waste/Materials Management Plan – The Waste and Spoil Management Plan will be developed for handling, storage and disposal of all kinds of wastes including hazardous waste, construction waste, household waste, and canal sediment spoil based on actual situation at subproject sites and selected dumpsites. The Waste and Spoil Management Plan will indicate approved spoil disposal sites, which will not be on slopes or near pasture lands and will have further plans for rehabilitation. 197. Recycling and Reuse – Where possible, surplus materials will be reused or recycled – this will include wood, plastic, metal and glass. 198. Trees and bushes cut under the subproject works can be provided for use to local households. A plan for the	Contractor	PIU-EPO/PIC	Waste and Spoil Management Plan (including Hazardous Waste/Materials Management Plan) and Spill Response Plan prepared as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor Visual inspection

		recycling of materials will be included in the Waste and Spoil Management Plan. 199. Waste Disposal – No wastes will be burned throughout the subproject implementation period. Waste, both hazardous and non-hazardous, will be collected, transported and disposed of by a licensed waste management contractor, and disposed in a licensed facility. The contractor will keep copies of the waste management company's licenses on file at its site office. The contractor will also keep a record of the waste volumes and types removed from the site and the waste transfer notes provided by the waste management contractor. 200. No dumping in canal, or labor camps/temporary or material storage sites on canal bed. 201. Stockpiling of construction material will be avoided if possible. If not, construction material will be stored within the			

		premise of fenced construction sites and protected from weathering. 202. All construction wastes and debris will be disposed at authorized locations. 203. All household wastes will be segregated by kinds and collected into confined waste containers equipped with covers installed away from sensitive areas. 204. Use waste management hierarchy: (i) avoid waste generation at source; (ii) minimize waste generation, where it is inevitable; (iii) reuse or recycle if possible; (iv) dispose at authorized locations.			

	Hazardous waste management	205. Storage of hazardous wastes – Oils, fuels and chemicals are substances which are hazardous to human health. They will be stored properly in correctly labeled containers within the premise of fenced construction sites. 206. Temporarily storage on-site of all hazardous or toxic substances (including bitumen, bridge deck waterproofing agents) will be in safe leak-proof containers to prevent spillage and leaching, labeled with details of composition, properties and handling information. Oil and fuel will only be kept in small quantities on-site. Oil spot area should meet the following requirments: approved containers, secondary containment (bunds), separation from heat/ignition sources, proper ventilation, grounding, clear labeling, security (locks), impermeable surfaces, fire safety (extinguishers/arresters), and regular checksSecondary			Plan and Spill Response Plan prepared aspart of SSEMP, reviewed byPIC and approved by MWR/PIU- EPO, and implemented by contractor Visual inspection

		containment must be sized to hold 110% of the volume of the largest single container in the storage area, plus additional freeboard to account for precipitation. 207. Hazardous materials like paints, oils, enamels and others will be kept on impermeable surface, and adsorbents like sand or sawdust will be kept for handling small spillage. Paints with toxic ingredients or solvents or lead-based paints will not be used.			

	Asbestos containing material	208. During the rehabilitation works, the Contractor may have to dismantle asbestos pipes or asbestos containing materials. Due to the potential health impacts that may arise from the handling and disposal of asbestos, Contractor should prepare Asbestos Management Disposal Plan as part of the SSEMPs. Measures against asbestos containing materials include: 209. Removal of asbestos materials without dust formation; 210. Use of personal respiratory protection equipment. 211. Use of impermeable bags or containers. 212. Solid asbestos waste pending disposal should be stored in an area where it will not deteriorate. 213. Bags (or other containers) that contain loose asbestos	Contractor	PIU-EPO/PIC	Hazardous Waste/Materials Management Plan and Spill Response Plan prepared as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor Visual inspection

		fibers should be removed by shredding or packing in tight transportable bales in a designated area. 214. Reuse asbestos-free bags as wastepaper or containers for any materials is not allowed. 215. All asbestos waste awaiting disposal in containers, bags or containers must be appropriately labeled and labeled. 216. Work related to loading and transportation, unloading and disposal of waste must be mechanized; 217. Transportation of asbestos waste should exclude the possibility of losses along the route and environmental pollution. 218. Transportation of unpackaged asbestos in open is not allowed.			

Impacts on landuse	Land acquisition during construction	219. Mitigation measures will be implemented as specified in the Land Acquisition and Resettlement Plan of the subproject. 220. Farmers affected by seasonal crop loss will be compensated by the subproject. 221. The contractor will be instructed to schedule his works considering minimum impact on land acquisition. 222. All construction works will be implemented within allocated lands.	Contractor	PIU-EPO/PIC	Construction report

Impact of site clearance after civilworks completion		223. Rehabilitate all sites after construction/quarrying activities are completed such as ploughing and plantation. 224. All disturbed sites prior to subproject completion and commissioning will be reinstated at least to pre-project conditions by 225. cleaning area from wastes and debris, (ii) mechanical remediation and (iii) biological re- vegetation with native plants.	Contractor	PIU-EPO/PIC	All areas used for subproject activities rehabilitated
Grievances	Grievance redress mechanism (GRM)	226. GRM will be established, and focal point will be appointed to implement GRM. 227. GRM will be implemented as prescribed in the subproject IEE.	Contractor, PICand PIU-EPO	PIU-EPO	GRM established
C. Operation Stage					

Sedimentation in canals Conflicts in water supply rights Change of groundwater level	Potential waterlogging in downstream areas	228. Implement integrated management plan which will be developed by the Project.	Farmers, BISA and MWR	PIU-EPO	Waterlogging
Disproportionate impacts on the poor and women	Reduced income of women and poor	229. Implement gender action plan.	BISA, PIU	PIU	Gender action plan implemented .

Impairment of downstream waterquality	Negative impacts of pesticides and fertilizers	230. Farmers to use pesticides only as a last resort and only after trying other methods. Farmer must be sure that pest problem is serious enough to warrant a pesticide treatment and also use the least toxic, yet effective, materials available and use them in ways that reduce human and pet exposure and protect the environment; and 231. Farmers to maximize the use of organic fertilizer and minimize the use of chemical fertilizer, and minimize the use of insecticides and pesticides in the area; 232. Farmers to take account of specifications produced by FAO and WHO for highly hazardous agricultural pesticides. These specifications detail the appropriate pesticide, formulation, rate of application and suitable equipment for specific pest control; 233. Farmers to avoid use of pesticides classified as	Farmers	BISA	Amount and kind of pesticides and fertilizersused by farmers.

		Persistent Organic Pollutants (POPs) under the Stockholm Convention and pesticides regarded as obsolete under the WHO classification scheme;			
		234. BISA to provide farmers with training on the above mitigation measures and the proper use of pesticides, appropriate dose and timing for it use 235. BISA to encourage the farmers to use more specific chemicals, such as growth regulators and pheromones that attract insects. They tend to be more selective and have less impact on the agricultural ecosystem; 236. BISA to conduct regular monitoring of the water quality including the hill streams and ponds, ground water to understand the problem and take adequate measures.	BISA	BISA	Training and information dissemination activities conducted by BISA. Water quality (including thehill streams and ponds, ground water)

Occupational and Community Healthand Safety Risk	accidental and natural hazards causing injury to the community	237. Ensure the safety of hydraulic structures and provide regular monitoring and maintenance. 238. During the maintenance of canals, silt curtains and/or settling ponds will be provided as a comprehensive system to prevent sediment transport in the water courses.	BISA, ISA, Melioration Expedition	BISA, ISA, Melioration Expedition	Number and kind of accidents
Flooding and natural disasters	Risk of flooding and natural disasters	239. Regular maintenance and repair of canals and water infrastructure to ensure operational capacity. 240. Taking preventive measures during flood periods to maintain normal water table level	BISA	PIU-EPO	Visual inspection
Waste generation	O&M waste – sediment spoils from drainage systemand canals	241. Identify appropriate waste management plan for cleaning of collector drains. 242. Weeds and sediment can be used as construction material of fertilizer by farmers.	BISA	PIU-EPO	Visual inspection

9.3. R8 Environmental Monitoring Plan

481. To ensure that mitigation measures are implemented in accordance with the requirements of the EMP, regular monitoring should be undertaken:

a) *Instrumental Monitoring* to monitor environmental quality such as ambient air and noise level. The cost for this equipment is included in Contractor's budget. Schedules, parameters, locations are presented in Table 59.

b) *Observational Monitoring* – Throughout the subproject construction phase, the PIU will monitor the contractor's environmental performance. This will be achieved through inspections/audits. PIU will have the right to suspend works or payments if the Contractor is in violation of any obligations under the EMP and SSEMPs.

482. Besides instrumental environmental monitoring indicated into the Table 59, monitoring of EMP's implementation must be carried out. The frequency of inspections or audits shall be undertaken:

a) Daily inspection by the contractor's environmental officer, Contractor's Safety Officer, or designated specialist,

b) Monthly inspection by PIU, and

c) Periodic audit (at least quarterly) by PIC's IES.

483. Results of environmental performance, including monitoring activity, will be properly documented and reported. The contractor will maintain a logbook with information about conducted training on EHS for workers, and another book for the registration of accidents during the civil works. Original records on the results of required instrumental environmental monitoring (noise level, air) also will be kept in the separate file for records.

Table 59: Environmental Monitoring Plan

Mitigation	Parameter to be	Location and sensitive	Frequency	Responsibility	Standards	Cost
Pre-Construction Stage (baseline monitoring)						
A. Air quality	Dust	Near the human settlement	Once before any site activity starts.	Contractor and PIU	National standard	Dust measurement devise – $2,500. The cost is included in Contractor budget.
B. Noise level	Noise level	Near the human settlement	Same as above	Same as above	San R&N No.0267-09 (Table 4)	Two noise Measurement devices – $400. The cost is included in Contractor (1 device) and PIU (1 device).
Construction Stage						
C. Air quality	Dust	• Same as above • Construction site located within settlement or any sensitive receptors such as school, mosques etc • As necessary (in response to complaints etc.)	Weekly during dry season Monthly in other seasons or as directed by PIU	Contractor and PIU	Same as A	Equipment cost considered in contractor budget
D. Noise and vibration	Noise and vibration level	• Same as B above	Monthly or as directed by PIU	Same as above	Same as B	Equipment cost considered in contractor

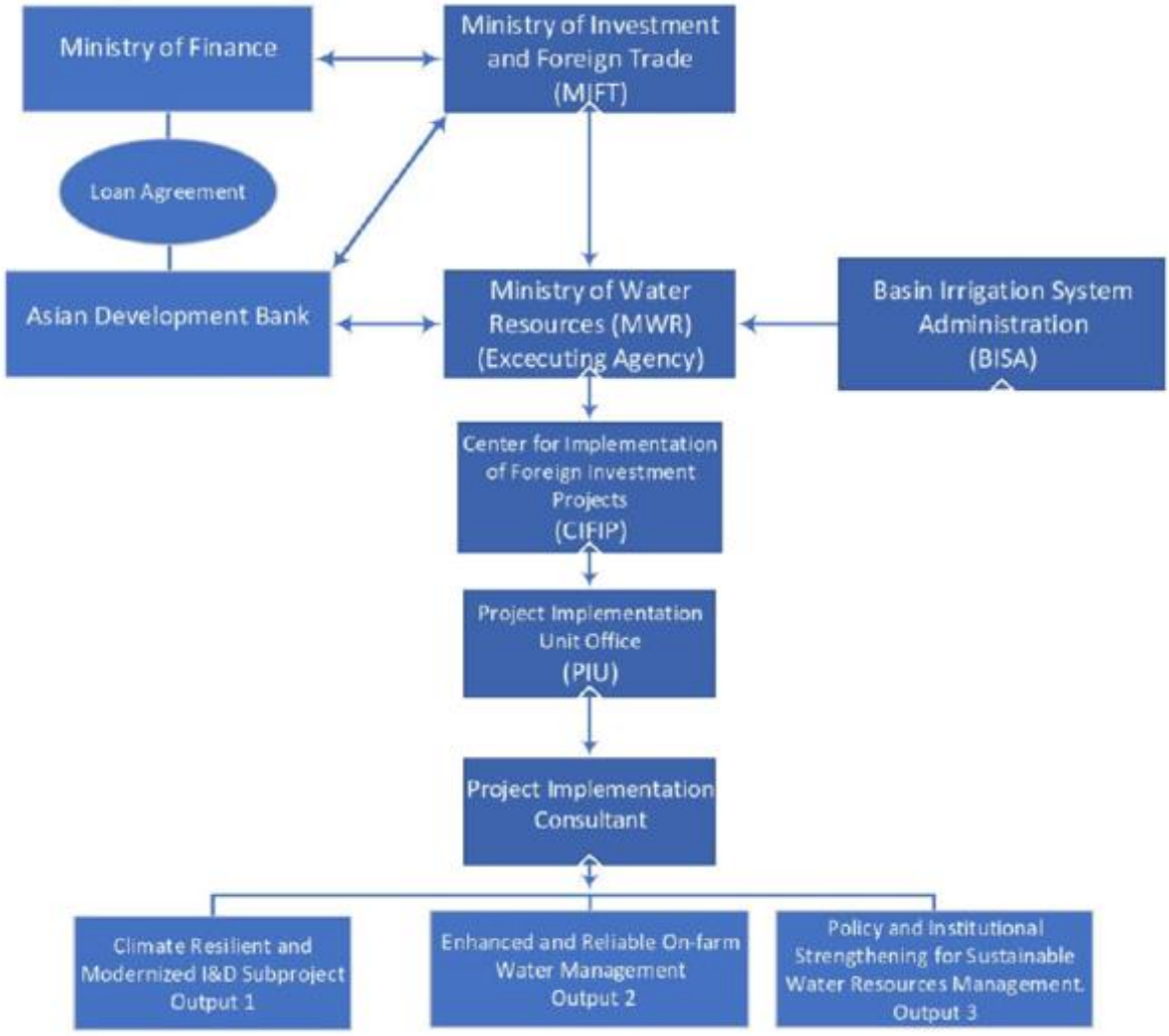
		• As necessary (in response to complaints etc.)	Any complaint			budget
E. Soil quality	Excavated spoils used for any further activities	Excavated spoils	Once at each excavation site	Same as above	SanPIN #0191-05 (Table 8)	Cost covered in contractor budget
F. Canal water quality (baseline)	SS, pH, DO, BOD, COD, coliform or as suggested by PIU/PIC for additional parameter	Canal water quality	Only once (canal entry and exist point of canal) Before civil intervention As directed by PIU	Contractor	SanPiN №0172-06	Cost covered in contractor budget
Operation Stage[82]						
Surface water quality	Salinity, SS, pH, DO, BOD, COD, coliform	Main and secondary canals	Monthly	BISA	SanPiN №0172-06 (Table 3)	BISA budget[83]
Community and Safety Health	Number/summary of incidents related to occupational and community health and safety	Subproject area	Monthly	BISA	No incident related to occupational and community health and safety identified	BISA budget

[82] *Modern monitoring and data acquisition system will be installed at key locations at the main and inter-farm level as part of the Project. Water levels and flows of the irrigation system will be monitored by supervisory control and data acquisition (SCADA) system which will be equipped as part of the Project.*
[83] *Water quality monitoring kits will be provided as part of the Project*

9.4. Institutional Arrangement for Safeguard Governance and others

484. The MWR will serve as the Executing Agency and a newly established Center for Implementation of Foreign Investment Projects in Water Sector (CIFIPWS) through the existing Project Implementation Unit (PIU) for ADB projects will be designated as an implementing agency. The existing PIU will be supervised by a Director of CIFIPWS, coordinated by a Deputy Director of CIFIPWS (responsible for implementation of foreign investment and grant aid projects. The project institutional structure is given in Figure 34.

Figure 34: Project Implementation Organization Structure



485. The project implementation organization structure together with the roles and responsibilities are in Table 60

Table 60: Project Implementation Organizations

Project Implementation	Organizations Management Roles and Responsibilities

Ministry of Water Resources (MWR)	Executing Agency • Provide overall guidance to project implementation. Staff members from the Operating Authority of BISA will provide support in the field. • Provide policy guidance and review of project performance; • Overall responsible for implementation; • Overall responsible for reporting on both physical and financial progress of project activities; • Facilitate, together with Ministry of Finance, the timely payment of VAT reimbursements; • Overall responsibility for assuming direct responsibility for all civil works; • Overall responsibility for ensuring safeguards compliance; and • Overall responsibility for developing the government's project completion report and its submission to ADB.
Center for Implementation of Foreign Investment Projects in Water Sector (CIFIPWS) under MWR	**Implementing Agency** • Regular monitoring, support and coordination of the project implementation, including coordination of PIU work; • Submit project's annual budget (drafted by PIU) to MWR for approval purposes and monitor the execution of MWR-approved annual budget as well as annual work plan; • Organize procurement process for selection of contractors and timely payment of executed contracts from loan proceeds by ADB directly.
Project Implementation Unit (PIU) under CIFIPWS	Focal point for communication with ADB on project-related matters • The Central PIU will facilitate coordination, with other agencies involved in design, construction management and supervision. It will facilitate coordination with CIFIPWS/MWR staff, PIU, contractors, design institutes, local administration, the beneficiaries and PIC. Its main tasks will be as follows: • assist MWR in coordinating all matters related to project implementation with relevant ministries of the Government of Uzbekistan (Ministry of Finance, State Committee on Nature Protection, Ministry of Investments and Foreign Trade and others), PIU, design institutes, PIC, the local administration, ADB, and other organizations related to project implementation; • provide EA staff with on-the-job training in implementing the ADB guidelines and procedures, efficient project management and scheduling techniques; • assist MWR in programming project activities, estimating the financial requirements for these activities and the release of funds on time;

	• work with MWR, BISA, DID and WCA in the selection of on-farm irrigation (drip, precision grading) according to selection criteria, monitor implementation and audit completed works, including cleaning of collector drain networks; • prepare the project M&E system, including (i) long-term environmental and social safeguards monitoring programs; and (ii) quantifiable indicators to monitor and measure the performance, level of maintenance and efficiency of the rehabilitated system; • assist MWR in ensuring that all periodic reports are prepared systematically, submitted on time, and reflect the real picture of project implementation; that major issues relating to project implementation are brought to the attention of the concerned parties; and that necessary remedial measures are implemented. • prepare, update and implement an overall implementation plan, establish financial management and procurement system, and prepare annual project budget; • guide the planning, feasibility and technical studies and endorse reports including safeguards documents; • prepare the feasibility study and due diligence reports for subsequent subprojects with the support from PIC, and submit for ADB's approval; • guide the plans, surveys, studies, detailed designs, capacity development activities, and workshops to be prepared or implemented by the consultants; • monitor and guide all planning, implementation, and O&M activities; • conduct economic analysis at the midterm of the project implementation; • implement required loan and grant covenants including the development of O&M plan; • monitor project progress and evaluate project benefits and social impacts with the management information system; • ensure environment safeguards compliance: • conduct non-core subprojects' environmental screening and classification following EARF; • prepare non-core subprojects' IEEs (including EMPs) following EARF and ADB SPS (2009), and submit to ADB for clearance and disclosure; • conduct meaningful consultation58 during the preparation of the • non-core subprojects' IEEs; • prepare non-core subproject's environmental safeguards documents following national relevant regulation and ensure their timely approval; • disclose environmental safeguards documents (including IEEs and SAEMRs); • ensure inclusion of EMPs in bid and contract documents; • review and clear contractor's SSEMPs; • ensure that the SSEMPs contain COVID-19 health and safety management plan following international good practice and relevant national/local requirements; • carry out public consultation during subprojects implementation; • conduct environmental monitoring and ensure that the day-to-

	day construction activities are carried out following the EMPs and SSEMPs and in an environmentally-sound and sustainable manner; • ensure corrective actions are implemented when necessary; • prepare SAEMRs and submit to ADB for disclosure, within 30 days after a completion of the monitoring period, until ADB's PCR is issued; • disclose relevant information from environmental safeguards documents (including the SAEMRs) to affected persons; • report in a timely manner to ADB of any non-compliance or breach of ADB safeguard requirements; • update the subproject's IEE in case of unanticipated impacts; • finalize the LARP for R8 subproject based on the detailed design; • prepare SDDR confirming components and subprojects without IR impacts, assess if there are legacy issues on the lands that would benefit from the project; • screen non-core subprojects for IR/IP impacts and prepare LARP based on detailed design, if needed; • oversee the implementation and reporting of LARP preparation, monitor and report for any unanticipated IR impacts during construction and prepare/implement corrective active plans to address such impacts; • establish GRM, monitor and promptly address complaints, and ensure their effective and adequate resolution, and keep the relevant records; • ensure compliance of contractors and subcontractors to core labor standards and report in the semi-annual social monitoring reports; • make sure that the GRM is operational to effectively handle environmental and social concerns of project affected persons; • carry out monitoring and public consultation during implementation to ensure the proper implementation of the project's EMPs and land acquisition and resettlement plans; monitor and promptly address complaints, and ensure their effective and adequate resolution; • monitor and supervise works conducted by contractors, and the delivery of goods procured by suppliers with the support of the consultants; • implement the gender action plan, monitor, and update on the progress of the implementation of the plan, as necessary; • update procurement plan, as necessary; • arrange necessary training programs for staff and other providers; • manage procurement, consulting, service provider and NGO/training services, and loan disbursement; • manage loan disbursement and maintain financial accounts; • prepare and submit withdrawal applications to ADB; • manage and be accountable for advance account and statement of expenditure procedures; • prepare supporting documents for replenishment of advance account, financial statements, and arrangement of the annual audit report in close consultation with concerned government

	agencies; • reconcile project accounts and ensure timely requests and release of funds; and • prepare periodic implementation progress reports.
Basin Irrigation System Administration (BISA)	• Over-all responsibility for implementation of all civil works contracts • Responsible for providing access to the site for contractors, and acceptance of works at completion • Responsible for O&M of the civil works
Ministry of Finance	**Designated representative of the Borrower (Government of the Republic of Uzbekistan)** • Sign the loan agreement; • Review and endorse feasibility study reports for non-core subprojects • Endorse to ADB the authorized staff with approved signatures for withdrawal applications processing; • Facilitate, together with MWR, the timely payment of VAT reimbursements; • Process and submit to ADB any request, when required, for reallocating the loan proceeds, extension of the loan closing date, and other changes in the project; and • Review use of savings, if any, requested by MWR.
Ministry of Investments and Foreign Trade	**Government counterpart agency for cooperation with ADB;** • Undertake annual and quarterly country portfolio review jointly with ADB; • Review and endorse feasibility study reports for noncore subprojects; • Register contracts for imported goods and works with foreign contractor • Monitor project implementation and facilitate the resolution of implementation challenges if they arise • Ensure compliance with ADB loan covenants and applicable government laws, regulations and requirements.
ADB	**Financier** • Assist the MWR, CIFIPWS and its PIU in providing timely guidance at each stage of the project for smooth implementation in accordance the agreed implementation arrangements; • Review all the documents that require ADB approval upon submission by the PIU; • Conduct periodic loan review missions, a mid-term review, and a completion mission; • Ensure compliance of all loan and grant covenants; • Timely process withdrawal applications and release eligible funds; • Ensure the compliance of financial audit recommendations; • Regularly update the project performance review reports with the assistance of MWR and PIU;

	• Regularly post on ADB website the updated project information documents for public disclosure, and also the safeguards documents as per disclosure provision of the ADB SPS, 2009; and • Review and approve detailed design for the project upon the submission by the PIU.
PIC	• Assist in the preparation of feasibility studies of 2 -3 non-core sub-projects • Assist in the preparation of IEE report of 2 -3 non-core sub-projects • Assist and provide technical support to PIU in obtaining Environmental clearance before the civil works' bidding process • Preparing the Social Due Diligence Report (SDDR) for subprojects and LARP (non-core subprojects with involuntary resettlement impacts) • Assist PIU in addressing and reviewing Environment and social safeguards aspects in bid/tender documents for civil works • Supervise & monitor the compliance of environmental and social safeguards • Assist PIU in implementation and monitoring the compliance of social/gender development aspects as provided in Gender action Plan and Social Assessment • Assist in Safeguard Performance monitoring and benchmarking including lessons learned. • Review site Specific Health and Safety Management Plan (SSHSMP) and recommend to PIU for approval including review the updated SSHSMP in case of any unforeseen even occur. • Supervise, ensure and undertake monthly Environment & safety audit thorough the project • Conduct trainings, workshops, and other knowledge sharing sessions on compliance requirement, lessons learned, good practices, etc. • Based on EMP and SSEMP monitoring results - identify environmental corrective actions and prepare a corrective action plan, as necessary.

Source: Project Administration Manual

ADB = Asian Development Bank, BISA = Basin Irrigation System Administration, CIFIPWS = Center for Implementation of Foreign Investment Projects in Water Sector, COVID-19 = coronavirus disease, EARF = environmental assessment and review framework, EMP = environmental management plan, GRM = grievance redress mechanism, IEE = initial environmental examination, IR = involuntary resettlement, IP = indigenous person, LARP = land acquisition and resettlement plan, M&E =monitoring and evaluation, MWR = Ministry of Water Resources, O&M = operation and maintenance, PIC = project implementation consultants, PIU = project implementation unit, SAEMR = semi-annual environmental monitoring report, SDDR = social due diligence report, SPS = Safeguards Policy Statement (2009), SSEMP = site-specific environmental management plan,

9.4.1. Executing Agency: Ministry of Water Resources (MRW)

486. The MWR shall ensure that the PIU is staffed with personnel, each of whom is fully qualified to carry out his assigned responsibilities and familiar with and knowledgeable about the details of the project, and all of whom together are familiar with and knowledgeable about the applicable policies, rules and regulations of ADB including, but not limited to, the Procurement Policy (2017), Procurement Regulations (2017), Safeguards Policy Statement (SPS) (2009), Policy on Gender and Development (2003), and Loan Disbursement Handbook (2017), throughout the project implementation period. The MWR shall ensure that the TOR, recruitment, evaluation, and appointment of all key PIU staff identified in the Project Administration Manual (PAM) have the prior approval of ADB. MWR shall cause the PIU to be fully functional and operational, with staff, financial and other resources as required and contemplated by the PAM and adequate to carry out the project a throughout the duration of the project.

487. The MWR shall also provide adequate office space with basic facilities for the PIU and the project implementation consultants (PIC) throughout the duration of the project. MWR will be the Executing Agency for the subproject and will oversee overall project implementation and management activities to ensure smooth and timely implementation and completion of subproject activities. The MWR has overall responsibility for the project and therefore is ultimately responsible for ensuring that the preparation, design, construction, implementation, operation and decommissioning of the project and all project facilities comply with (a) all applicable national laws and regulations relating to environment, health and safety; (b) the ADB SPS (2009); and (c) all measures and requirements set forth in the IEE, and any corrective or preventive actions set forth in Semi-Annual Environmental Monitoring Reports (SAEMRs). The MWR will guide and coordinate closely with other government agencies and the ADB for timely resolution of any issues.

9.4.2. Project Implementation Unit (PIU) under Center for Implementation of Foreign Investment Projects in Water Sector (CIFIPWS)

488. PIU will have immediate and direct supervision over daily EMP implementation, monitoring and reporting, covering all core and non-core subprojects. The PIU is tasked with specific responsibility to ensure environmental safeguards compliance of civil works, with particular emphasis on the monitoring of implementation of the EMP through the contractor's SSEMP and related aspects of the project. The PIU will include a full-time Environment Protection Officer (**PIU-EPO**), who will be responsible for supervising the contractor's environmental performance, coordinating the public consultations and project GRM, and submission to ADB the SAEMRs. The PIU-EPO will be engaged to undertake periodic audit (at least monthly) and monitor the contractor's activities. S/he will be assisted by the PIC who will provide intermittent inputs.

489. The PIU will ensure the implementation of the Project's EMP, which is part of this IEE report, and also part of the contract documentation. The PIU will (i) ensure the Project meets ADB safeguards requirements; (ii) ensure the Project complies with applicable laws, rules, and regulations on environment, health and safety; (iii) ensure that all the environmental mitigation measures required to be implemented are incorporated into the contract documents; (iv) review and endorse SSEMPs prepared by the contractors; (v) ensure that the contractors (and its subcontractors, if any) comply with the relevant measures and requirements set forth in the IEE and the EMP, and any corrective or preventative actions set out in SAEMRs or Corrective Action Plan; (vi) conduct environmental monitoring and ensure that the construction activities are carried out in an environmentally-sound and sustainable manner; (vii) prepare SAEMRs within 30 days after a completion of the monitoring period; (viii) resolve project related complaints or grievances as per the GRM; (ix) organize and conducting consultations and awareness-raising activities; and (x) conduct trainings, workshops, and other knowledge sharing sessions on lessons and good practices on safeguards and health and safety. Upon completion of the works, the PIU-EPO will, with PIC's assistance, also prepare a report on the project's environmental compliance performance; including

lessons learned that may help MWR in their environmental monitoring of future projects. This report will be part of the input to the overall Project Completion Report (PCR).

9.4.3. Basin Irrigation System Administration (BISA)

490. Basin irrigation system administration (BISA) is a regional office of the MWR. BISA will be responsible for monitoring of groundwater levels, mineralization of irrigation water, waterlogging and soil salinization, application of improved irrigation system operation and management plan. BISA is also responsible for regular operation and maintenance of the irrigation and drainage network at the project area during the operation stage.

9.4.4. Design Institute

491. Design Institute will be hired (subcontracted through the main contracts) to prepare detailed design of the subproject, incorporating IEE/ EMP into their EIA (OVOS) process, and acquiring SEE clearance for design documentation package. Design institute will provide designer supervision for construction period.

9.4.5. Project Implementation Consultant (PIC)

492. The PIC will include international environmental specialist (**PIC-IES**), national environmental specialist (**PIC-NES**), international biodiversity specialist (**PIC-IBS**), national biodiversity specialist (**PIC-NBS**), who will assist PIU (especially PIU-EPO) on environmental safeguards tasks.

493. **PIC-IES**. The PIC-EIS will have at least master's degree in environmental science or natural resource management or the equivalent, with at least 15 years of continuous experience working in the field of environmental management, for internationally funded infrastructure development projects. The expert should have considerable experience in environmental assessment and monitoring and be familiar with ADB SPS (2009) as well as having experience in ADB-financed infrastructure development projects as an environmental specialist. The expert should be guided by the government's procedures on environmental management, ADB SPS (2009), EARF, IEEs and environmental management plans (EMPs) of each subproject. Training skills would also be an advantage. The international environmental specialist, with the support of the national environmental specialist, will be responsible for preparing IEEs of non-core subprojects, supervising the contractor's environmental performance, coordinating the public consultations and project GRM, and reporting to the PIU management for submission to MWR and ADB through the periodic project progress reports and Semi-Annual Environmental Monitoring Reports (SAEMRs). The specialist will:

(i) Assist the PIU (especially the PIU's environmental specialist) and the PIC's team leader in managing and implementing the project and ensuring compliance with the project implementation plan, the loan agreement, and the project agreement(s), particularly with ADB SPS (2009) requirements, EARF, IEE of relevant/respective subproject, and project environment-related legal covenants;

(ii) Review the EARF and IEEs for two core subprojects conducted during the feasibility study stage to understand the project/subprojects' environmental safeguards requirement, and assist the PIU in updating the IEEs in case of unanticipated impacts;

(iii) Assist PIU in screening non-core subprojects following the EARF, and in preparing the IEE reports (including EMP) for noncore subprojects as a part of the feasibility study report;

(iv) Conduct trainings, workshops, and other knowledge sharing sessions on lessons and good practices on safeguards and health and safety to the PIU staff (including PIU's environmental specialist) and contractor's staff (relevant to environment, health and safety), and build capacity of relevant staff to undertake their tasks in EMP monitoring. One of the trainings should be conducted prior to the start of construction to develop the knowledge and understanding of the environmental, health and safety aspects of the project;

(v) In coordination with the other PIC team members and PIU staff, and with regards to EMPs, contribute to the preparation of bidding documents for the civil works contracts, and assist PIU in bid evaluation when required;

(vi) Ensure that all the environmental mitigation measures required to be implemented are incorporated into the contract documents;
(vii) Assist PIU in reviewing the site-specific environmental management plans (SSEMPs) prepared by respective contractors and provide clearance;
(viii) Ensure that the contractors (and its subcontractors, if any) comply with the relevant measures and requirements set forth in the IEE and the EMP, and any corrective or preventative actions set out in SAEMRs;
(ix) Assist PIU in supervising and monitoring the EMP/SSEMPs implementation and in preparation of SAEMRs for further submission to MWR and ADB; and
(x) Support PIU in resolving project-related complaints/grievances;
(xi) Assist PIU in organizing and conducting consultations and awareness-raising activities;
(xii) Contribute inputs to the quarterly progress reports for project management and supervision and the brief monthly summary reports, highlighting potential and actual issues and/or problems related to EMP and recommending corrective measures for PIU's actions;

494. Upon completion of the civil works, prepare a report on the project's environmental compliance performance; including lessons learned that may help MWR and the PIU in their environmental monitoring of future projects. This report will be part of the input to the overall PCR.

495. **PIC-NES**. The PIC-NES will have at least bachelor's degrees in environmental science or natural resource management or the equivalent, with at least 10 years of experience working in the field of environmental management, for internationally funded infrastructure development projects. The expert should have considerable experience in environmental assessment and monitoring and be familiar with ADB SPS (2009) and the laws and regulations of Uzbekistan related to environmental safeguards as well as having experience in ADB-financed infrastructure development projects as environmental specialist. The expert should be guided by the government's procedures on environmental management, ADB SPS (2009), EARF and the project environmental management plan (EMP) for each subproject. Training skills would also be an advantage. The national environmental specialist will support the international environmental specialist in conducting his/her tasks. The national environmental specialist will undertake periodic audit (at least quarterly) and monitor the contractor's activities.

496. **PIC-IBS**. The PIC-IBS will have at least degree or diploma in Wildlife Conservation or Ecosystem Management and related subjects, with at least 15 years of working experience in wildlife conservation related activities. S/he must have adequate experience and knowledge in designing and implementing wildlife conservation features to mitigate negative environmental impacts of agricultural projects on wildlife and be able to bring in relevant international best practices for incorporation in the project. The international biodiversity specialist, with the support of the national biodiversity specialist, will (i) assist international and national environmental specialists in preparing non-core subprojects' IEEs by providing inputs related to biodiversity; and (ii) provide technical oversight and support in the implementation of the environmental mitigation measures relevant to biodiversity, as necessary.

497. **PIC-NBS**. The PIC-NBS will have at least bachelor's degree in Wildlife Conservation or Ecosystem Management and related subjects, with at least 10 years of working experience in wildlife conservation related activities. The national biodiversity specialist will support the international biodiversity specialist in conducting his/her tasks.

498. **PIU-EPO**. The expert should have considerable experience in environmental monitoring and be familiar with the laws and regulations of Uzbekistan related to environmental safeguards as well as having had experience in ADB-financed infrastructure development projects as environmentalist. The expert should be guided by the government's procedures on environmental management, ADB's Safeguards Policy Statement (2009), and the project environmental management plan (EMP) for each subproject.

499. PIU-EPO should implement and monitor the EMPs for all project sites and ensure all is complied with ADB's and the government's laws and regulations. Provide inputs, data, and information related to environmental management to the PPMS and to the monthly briefs, of bi-annual environmental monitoring reports, quarterly progress reports, and annual progress reports.

9.4.6. Contractor

500. Contractor will be responsible for development of SSEMPs, and implementation, monitoring and reporting of all environmental mitigation measures during construction period. Contractor will prepare monthly monitoring reports on implementation of EMP. The Contractors are required to appoint a full-time and qualified environment officer and a full-time and qualified health and safety officer.

9.5. Key consideration in Project Design to reduce carbon footprint

501. At the design stage, the consultant would evaluate the feasibility of recommendations as suggested by various studies. Following are some key suggestions to reduce carbon footprint;

502. Integrating physical locking of pumps and sluices followed by centralized monitoring system.

503. Wherever tree density is high along the canal alignment, revisit the design to avoid and minimize tree-cutting; option for relocation of tress need to be explored rather than cutting.

504. Explore possibility of integrating concreate mat in main or secondary canal to reduce the overall carbon footprint of a project;

505. Explore possibility of Inclusion of Climate Adaptive design - Shift from flow based to modernized water level flow controlled design

506. Even after modernization, 40% of outlets will still operate on electricity (pumping). The following recommendations are suggested for reducing carbon footprint:

- If pumping is not avoided, explore options to replace old pumps with energy-efficient pumps to reduce carbon footprint
- Explore inclusion of canal-top and canal-bank solar PV projects - Canal-top and canal bank solar power.
- Explore possibility to use low carbon embodied materials and local construction material to reduce carbon footprint .

9.6. Contractor Reporting

507. Contractor will be responsible for development of SSEMPs, and implementation, monitoring and reporting of all environmental mitigation measures during construction period. Contractor will prepare monthly monitoring reports on implementation of EMP/SSEMP. The Contractors are required to appoint a full-time and qualified environment officer and a full-time and qualified health and safety officer.

9.7. Reporting during the Pre-construction and Construction stages

508. The Contractor(s) environmental officer, with inputs from contractor's health and safety officer, will audit and prepare weekly SSEMP compliance report of its implementation, such as audit finding, non-compliance, corrective action, training, challenges etc must be addressed in environmental sections in monthly progress reports which will be submitted to the PIU for review. Based on -site inspections and Contractors' reports, the PIU will be responsible for preparing an environmental section of detailed Quarterly Progress Reports to submit to the MWR.

509. The PIU will be required to prepare SAEMRs (semi annual i.e. January to June and July to December) during the project implementation until ADB's PCR is issued. The PIU with the support of the PIC, responsible for preparing SAEMRs. The SAEMRs will be submitted to the PIU, and to ADB for clearance before disclosure. Within three months after completion of all civil works, a report on the project's environmental compliance performance (including lessons learned that may help the PIU in their environmental monitoring of future projects) will also be prepared. This report will be part of the input to the overall PCR.

510. In January and July of every year, the MWR will submit SAEMRs to ADB and relevant government authorities, and these reports will be disclosed to the public on MWR website (in Uzbek or Russian) and ADB (in English) websites.

511. In addition to the above-mentioned reports, in case of any accident related to occupational and community health and safety, PIU is expected to (i) report to ADB within 72 hours, and (ii) prepare and submit an incident report with action plan within 7 days of the occurrence. PIC's international environmental specialist (IES) and national environmental specialist (NES) will support the PIU in preparing such reports.

9.8. Training and Capacity Building

512. Training and capacity building of various stakeholders involved in the implementation and monitoring of project activities is essential and should be undertaken to ensure that all identified environmental concerns are properly implemented and adequately monitored.
513. The detail training and capacity building on environmental safeguards is summarized in Table 61 will be conducted by the PIC environmental specialists.

Table 61: Training and Capacity Building Activities

Capacity Building Activity	Objectives	Frequency	Duration	Who will be trained	Trainer
Framework for preparation of SSEMP	To guide contractor on SSEMP preparation and compliance requirement, documentation and reporting	Once, after selection of contractor	1 day	Contractor	International Environment Specialist
Environment compliance requirement	To guide contractor on compliance	Before start of civil work	1 day	Contractor	International Environment Specialist

under National and ADB SPS (2009) and PAM	requirement under national statutes and ADB SPS				and National Environment Specialist
Awareness on ADB SPS (2009), EARF, EMP implementation and its monitoring	Create awareness of environment impacts, mitigation proposed in EMP, compliance requirement during design, pre-construction and construction stage	Prior to start of civil work	Half day Workshop	All key stakeholders involved in project design and implementation such as BISA's, ISA's, ameliorative authority and DID, PIU/ PIC staff and Contractors.	International Environment Specialist
Refresher programme awareness training - on ADB SPS (2009) and EMP implementation and its Monitoring Half day workshop Same as above.	Create awareness of environment impacts, mitigation proposed in EMP, compliance requirement during design, pre-construction and construction stage	Annual	Half day workshop	Same as above	International Environment Specialist

ADB = Asian Development Bank, ADBB SPS (2009) = ADB Safeguard Policy Statement (2009), BISA = Basin Irrigation System Authority, DID = District Irrigation Department, EARF = Environmental Assessment Review Framework, EMP = Environmental Management Plan, ISA = Irrigation System Authority, PIU = Project Implementation Unit

9.9. Cost Estimate for Environment Safeguards

514. Costs required to implement the EMP cover the following activities:

a) Safeguard cost to be considered at design, pre-construction and construction stage
b) Instrumental environmental monitoring of air and noise level by PIU/contractor;
c) Capacity building;

515. Based on the final project design, the potential impact of canal construction on riparian trees was reassessed. The assessment confirmed that, due to the narrowing of the P8 and Ostona canals, tree removal would be limited. According to calculations conducted by inspectors of the Commettee of Ecology, a total of 312 trees would be affected by the Project, including 118 Aktal

trees and 194 Karatal trees. It was determined that some of the affected trees would be replanted, while for trees that cannot be replanted, ten (10) new trees will be planted for each tree removed.

516. Although some of the measures included in the EMP are an integral part of the civil works (watering, storage of topsoil etc.), some measures such as archaeological research requires additional funds. The cost estimate for the environmental management for main items is presented in Table 62.

Table 62: Cost estimates for Environmental Management

	Activity / Item	Unit Cost	Cost USD
A	**Detailed Design**		
	Tree planting and replanting	The contractor's budget covers the cost of planting and replanting trees.	441 962,36 ~~To be estimated after final design~~
	Updating of IEEs after final project design approval	Lump sum	**$4000**
B	**Pre-construction stage**		
	Construction Camp Site	Included in Project Budget	0
	Soil Erosion protection Measures	Included in Project Budget	0
	Slope Stabilization measures	Included in Project Budget	0
	Hydrological measures	Included in Project Budget	0
	Air Quality Plan	SSEMP Budget	0
	Waste Management Plan	SSEMP Budget	0
	Noise Monitoring Plan	SSEMP Budget	
	Worker Health and Safety Plan	SSEMP Budget	0
	Permit/licence/approval	Included in Project Budget	0
	Community health and safety plan	SSEMP Budget	0
	Traffic management	SSEMP Budget	0
	Top soil management plan	SSEMP Budget	
	Canal Biodiversity protection Plan	SSEMP Budget	
	Labour camp management Plan	SSEMP Budget	
	Information dissemination Plan	SSEMP Budget	0
	Preparation of SSEMP	Lumpsum	10000
C	**Construction stage**		
	Instrumental Monitoring		
	Air quality monitoring equipment	Quantity = 2, one for PIU and one contractor, @$2500/device	$5000
	Noise measurement devices	Quantity = 2, one for PIU and one contractor, @300/device	$600
	Soil quality	Total 10 sample @500/sample	**$5000**
	Water quality monitoring	2 sample (one before civil intervention and one after	**$800**

		completion of project) @$ 400/sample	
	Environmental Awareness Program	Lumpsum	**$10000**
	Anti-COVID measures (hiring of doctor and nurse for the regular check-ups and establishing designated quarantine area, purchasing of necessary PPEs, sanitizers, handwashing facilities, face masks, etc.)	Lumpsum Training should be conducted for all persons involved in construction process	**$10000**
	Installation of signage boards	Lumpsum	**$5000**
	Potential restoration of Work and Storage Sites, Quarries and Borrow Pits, Construction Site Roads.	Included in Project Budget	
D	**Staffing**		
	Contractor's Environmental Officer[84]	$2,000 x 2 years	$48,000
	Contractor's Safety Officer[85]	$2,000 x 2 years	$48,000
	Biodiversity expert	$ 2000 x 6 month Intermittent input during pre-construction and construction period (6 month)	$12000
	Sub-total (A+B+C+D)		**158400**
	Contingency (10%)		**15840**
	Total		**174240**

SSEMP = Site-Specific Environmental Management Plan, PM = person-months

9.9.1. Cost Estimate for the PIC's Environmental Management

517. This cost has already been considered in the project titled "Uzbekistan: Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project" for core and non-core subprojects.

10. Conclusions and Recommendations

10.1 Conclusions

518. The environmental impacts of R8 subproject's and seconday inter-farm Ostona canal are expected to be localized and low throughout the construction and operation stages. The subproject is classified as Category B under ADB SPS (2009). The subproject meets the environmental criterial defined under EARF.

[84] Assuming 2.0 years construction period for this subproject

[85] Assuming 2.0 years construction period for this subproject

519. The rehabilitation of the proposed earthen channels and irrigation infrastructure is a feasible and sustainable option from the engineering, environmental, and socioeconomic points of view and will strengthened marginalized rural poor people, for more on project benefits refer to point no 253. The subproject will have significant environmental and social benefits and, if the prescribed mitigation and management measures are fully implemented, the subproject is unlikely to have major adverse environmental impacts. The MWR/PIU will ensure that sufficient budget will be allocated for environmental management and monitoring. A full EIA under ADB SPS (2009) is not required.

10.2. Recommendation for Design, bidding and project operations

520. Explore possibility of inclusion of Climate Adaptive Measures in Designs Stage, for details recommendation on climate adaptive measures, refer to point numbers 121, 122 and 123

521. Before bid is invited for R8, PMU is required to obtain the environmental clearance from the State Committee for Ecology and Environmental Protection. The EMP prepared in IEE can be used at the bidding stage to inform contractors about the requirements of the IEE and EMP and PIU must guide contractor in preparing the Site Specific Environment Management Plan (SSEMP) in align with the EMP (PAM requirement) and submitted to PIU for review and clearance

522. The EMP and all its requirements will then be added to the contractors' contract, thereby making the EMP's implementation a legal requirement according to the contract. Below Table (63) enumerates the recommendation including accountability of contractor, MWR/PMU/PIC for Environmental Safeguards.

Table 63: Recommendation for Environmental Safeguards

Contractor	MWR/PIU/PIC
The contractor shall be responsible for implementation of all the terms of the contract conditions, relating to: (a) The contractor shall estimate and include all necessary costs into their financial proposal for human resources, and cost required to implement the safeguards measures in line with the national and the donor compliance requirements (b) Obtaining necessary permissions, clearances, No-Objection Certificates, licenses, etc.; as specified in the statutes of the Government Uzbekistan and ensure compliance; (c) Comply with the Labor Standards, as specified in labour laws of the Government of Uzbekistan and ADB Safeguard Policy Statement, 2009; (d) Ensure implementation of Site Specific Environment Management Plan (SSEMP),	a) Before construction commences, PMU is required to obtain the environmental clearances/approval from State Committee for Ecology and Environmental Protection. b) Review and approve the SSEMP including review and update SSEMP in case of any unforeseen even occur c) Supervise & monitor the compliance of environmental and social safeguards including grievance redress mechanism d) Conduct trainings, workshops, and other knowledge sharing sessions on compliance requirement, lessons learned, good practices, etc e) Based on monitoring results - identify environmental corrective actions and prepare a corrective action plan, as necessary f) If any unanticipated environmental and/or social risks and impacts arise during construction, implementation or

(e) Ensure and comply implementation of Health and Safety measures (f) Ensure environmental monitoring, documentation and reporting (g) Establish, document and report to PIU on Grievance Redressal Mechanism (GRM) (h) Establish Information Dissemination Plan to disseminate information and create awareness amongst workers, and community on SSEMP, GRM including local livelihood (i) Ensure all site related compliance issues as prescribed by PIU during the pre-construction and construction period.	operation of the Project that was not considered in the IEE, the EMP/LARP, PIU ensure that for such event an assessment being undertaken and corrective action plan is proposed; g) Ensure restoration of local infrastructure, workshop, camps including any land being used for project activities shall be restored to at least their pre-Project condition upon the completion of construction h) Submit quarterly, semi-annual environmental monitoring report and completion report to ADB and ensure safeguard compliance with loan covenant agreement signed between government and ADB i) PIU ensure that burrow pits to be rehabilitated, if outsourced, should have all valid approval from the government

10.2.1. Operation stage

a) Incentivize farmers who are practicing or adopted water conservation measures such as drip irrigation and so on.
b) Create awareness on water conservation measures
c) Ensure a minimum guaranteed amount of water to farmers to increase the acceptance;

Annexure 1. CRITERIA FOR SELECTION OF NON-CORE PROJECTS

According to the 2022 Project Administration Manual for the Republic of Uzbekistan's Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project, the following criteria for selection of non-core projects were used.

CRITERIA FOR SELECTION OF NON-CORE PROJECTS

1. Following selection criteria were tentatively agreed between the government of Uzbekistan and ADB for selection of Non-Core subsubjects:

(i) Subprojects to be located in agreed provinces of Amu Darya River Basin,

(ii) Subproject command area to be greater than 10,000 hectares,

(iii) Water resource: Sites selected should have assured surface supply and be able to use water saving for expanded irrigation area. Only limited (backup) groundwater development as part of modernization will be considered,

(iv) Pumping: Subproject with total lifts less than 100m are preferred. Schemes involving high total lift (>150m) of large volumes should be avoided because of energy costs and future CO2 emissions policy. Non-core projects should be Paris Aligned and should avoid diesel-powered pumping.

(v) Climate change: Subproject where summer temperatures are already affecting productivity negatively should be avoided as this is likely to become a more severe issue in future,

(vi) Whole system approach: Projects with a whole-of-system approach consistent with the ADB Irrigation Sub Sector Guidance Note are preferred. Subproject with institutional strengthening including of WCA; and modernising water allocation and supply; main canal, inter-farm and on-farm canals and their O&M; field irrigation (e.g., field canal networks and whole farm plans, precision land levelling, drip irrigation etc) and increased crop production and water productivity; improving salinity and irrigation water salinity,

(vii) Modernization: (a) the subproject upgrades or replaces the original system infrastructure to provide better control, level of service for the water user (reliability, frequency, flow rate, supply level) throughout the system including for the tail end; and, (b) there is good opportunity for increased energy efficiency, water productivity and reduced O&M requirements. Subproject where focus is only on main canal rehabilitation are unlikely to be accepted,

(viii) O&M: MOM responsibilities for water supply infrastructure should be clear. Where Agri-clusters have asset management responsibilities these (where and the requirements) should be stated and unambiguous. Clusters should not be responsible for O&M of canals that also supply downstream users due to conflicts of interest. Financing of O&M for all levels of canal should be clear and sustainable and include volumetric based ISF.

(ix) Water savings: Subproject with demonstrated low water use efficiency and where significant water savings that will be used productively are encouraged, e.g., by including improved irrigation technologies such as pressure pipe supply, drip/micro sprinklers, precision land levelling.

(x) Salinity: Subproject where there are major challenges related to salinization and insufficient scope for its mitigation and reduction of impacts on agriculture and water quality should be avoided,

(xi) High Value Cropping: Systems that include substantial (25% or higher) areas of high value crops and farmer interest in increasing the area of such crops are preferred.
(xii) Institutions: Presence of functional Water Consumer Associations and/or newly created water services agencies, and interest of all stakeholders to participate. A plan to strengthen and support development and sustainability of WCAs should be apparent,
(xiii) Economics: An expected economic internal rate of return more than 9%, and, (xiv) ADB safeguard criteria: A detailed list of ADB's SPS (2009) criteria (Environment Policy, Involuntary Resettlement Policy and Policy on Indigenous Peoples) to be followed. Schemes without large acquisition and resettlement issues or environmental impacts are preferred. Schemes considered to be category A for environment and involuntary resettlement under ADB's SPS are not qualified.

2. **Environmental Criteria for Subproject Selection.** Subprojects proposed for funding shall meet the following criteria:

(i) Subprojects shall not include activities listed on the ADB Prohibited Investment Activities List in Appendix 5 of ADB SPS (2009) 33

(ii) Highly complex and sensitive subprojects shall be excluded.

(iii) Subprojects located inside a legally protected area are not eligible.

(iv) Subprojects adjacent to or within critical/natural habitat and subprojects that could lead to significant conversion or degradation of such sensitive ecosystems will not be eligible.

(v) Subprojects with measurable adverse effects, or likelihood of such, on critical habitat or natural habitat areas or that could lead to a reduction in the population of any Endangered (EN) or Critically Endangered (CR) species supported, or with significant negative impacts on cultural heritage sites of national and international significance are not eligible.

(vi) It is anticipated that the subprojects proposed for funding under the Project will meet the criteria for ADB Category B or C. Therefore, if the subprojects do not meet the criteria for Category B or C, the subproject locations should be changed to avoid impacts. This includes sensitive locations such as subprojects that fall in part or in whole within an area supporting high biodiversity value, including critical habitats under ADB SPS 2009.

Annexure 2. Ostana Canal crossings facilities

The Ostana Canal has crossings with power lines, communication lines, cables, water pipelines, and gas pipelines.

.

Crossings with water supply lines on the Ostona Canal

№	Name	ПК	Note
1	Water supply line	2+26	d= 400 мм
2	Water supply line	38+58	d= 200 мм - d= 300 мм

Crossings with gas supply lines on the Ostona Canal			
№	Name	ПК	Note
1	Gas supply line	2+12	d=150 мм
2	Gas supply line	38+46	d1=100 - d2=150 мм
3	Gas supply line	58+23	d=300 мм
4	Gas supply line	60+59	d=500 мм

Crossings with EPSL on the Ostona Canal			
№	Name	ПК	Note
1	Electric power supply line	0+05	
2	Electric power supply line	2+77	EPSL H/v 10 кв 3 пр h=8.0 м.
3	Electric power supply line	3+73	EPSL H/v 35 кв 4 пр h=7.0 м.
4	Electric power supply line	9+22	EPSL H/v 10 кв 3 пр h=9.0 м.
5	Electric power supply line	10+83	EPSL H/v 10 кв 3 пр h=9.0 м.
6	Electric power supply line	17+80	EPSL H/v 10 кв 3 пр h=9.0 м.
7	Electric power supply line	25+76	EPSL H/v 10 кв 4 пр h=6.0 м.
8	Electric power supply line	36+29	
9	Electric power supply line	38+10	EPSL H/v 10 кв 3 пр h=9.0 м.
10	Electric power supply line	42+79	EPSL H/v 10 кв 4 пр h=7.0 м.
11	Electric power supply line	47+80	EPSL H/v 35 кв 4 пр h=8 м.
12	Electric power supply line	52+24	EPSL H/v 10 кв 4 пр h=4.0 м.
13	Electric power supply line	56+77	
14	Electric power supply line	57+18	EPSL H/v 10 кв 1 пр h=4.0 м.
15	Electric power supply line	61+74	EPSL H/v 10 кв 3 пр h=7.0 м.
16	Electric power supply line	62+08	EPSL H/v 10 кв 3 пр h=9.0 м.
Crossings with the Aqueduct on the Ostona Canal			
№	Name	ПК	Note
1	Aqueduct	11+64	d1=600 - d2=300 mm
2	Aqueduct	50+89	d=1000 mm
3	Aqueduct	63+52	d=300 mm

Annexure 3. Flora and fauna of the project area in Khorezm region

Table 1: Flora of the project area in Khorezm, observed

№	Scientific name	English	Russian	Uzbek	Life forms		Main species [86]	
							Kegeyli canal	R-8 canal
1	*Elaeagnus angustifolia*	Russian olive, silver berry, oleaster	Лох узколистный	Узунбарг жийда	Terrestrial	Tree	+++	+++
2	*Populus euphratica (P. ariana)*	Euphrates or Desert Poplar (variegated)	Тополь евфратский (разнолистны)	Фрот тераги, ҳар хил баргли терак	Terrestrial	Tree	+++	+++
3	*Populus pruinose*	Poplar	Тополь сизолистный	Туранғил терак	Terrestrial	Tree	+++	+++
4	*Salix songarica*	Salix	Ива джунгарская	Жунғор толи	Terrestrial	Tree	++	++
5	*Halimodendron halodendron*	Russian Salt Tree	Чемыш серебристый	Кумушранг жангал	Terrestrial	Bush	++	++
6	*Halostachys belangeriana*	Belanger salt pan	Соляноколосник Беланже	Беланжерия қорабароғи	Terrestrial	bush	+++	+
7	*Lycium ruthenicum*	Dereza Russian	Дереза русская	Қора чинғил	Terrestrial	bush	++	++
8	*Tamarix hispida*	Bristle-haired comb	Гребенщик щетинистоволосый	Сертук юлғун	Terrestrial	bush	+++	+++
9	*Tamarix ramosissima*	Multi-branched comb	Гребенщик многоветвистый	Сершох юлғун	Terrestrial	bush	++	++
10	*Aeluropus repens*	Creeping riverside	Прибрежница ползучая	Ўрмаловчи шўражриқ	Terrestrial	Perennial	++	++
11	*Aeluropus littoralis*	Coastal saline	Прибрежница	Туксиз шўражриқ	Terrestrial	perennial	++	++

[86] *Note*:
+++ common plant species
++ rare species
+ very rare
These plant species are not listed in the Red Book

			солончаковая					
12	*Alhagi pseudalhagi*	False camelthorn	Верблюжья колючка ложная	Сохта янтоқ	Terrestrial	perennial	+++	+++
13	*Apocynum scabrum*	Rough Kendyr	Кендырь шершавый	Дағал кендир	Terrestrial	perennial	++	++
14	*Asparagus brachyphyllus*	Asparagus shortleaf	Спаржа коротколистная	Қисқабаргли сарсабил	Terrestrial	perennial	++	++
15	*Calamagrostis dubia*	Reed grass is doubtful	Вейник сомнительный	Буғдойиқ қамиш	Terrestrial	perennial	++	++
16	*Climacoptera lanata*	Climakoptera woolly	Климакоптера шерстистая	Сертук балиққўз	Terrestrial	perennial	++	++
17	*Cirsium arvense*	Field calf	Бодяк полевой	Дала пахтатикани	Terrestrial	perennial	++	++
18	*Dodartia orientalis*	Dodarcia eastern	Додарция восточная	Шарқ додартияси	Terrestrial	perennial	++	++
19	*Erianthus ravennae*	Erianthus Ravenna	Эриантус равеннский	Равен савағичи, Эркак қамиш	Terrestrial	Perennial	++	++
20	*Elymus repens*	Creeping wheatgrass	Пырей ползучий	Ўрмаловчи буғдойиқ.	Terrestrial	perennial	++	++
21	*Glycyrrhiza glabra*	Licorice	Солодка голая	Силлиқ ширинмия	Terrestrial	perennial	+++	+++
22	*Karelinia caspia*	Karelia Caspian	Карелиния каспийская	Каспий оқбоши	Terrestrial	perennial	+++	++
23	*Leymus multicaulis*	Multistemmed grate	Колосняк многостебельный	Кўппояли леймус	Terrestrial	perennial	++	++
24	*Limonium otolepis*	Kermek	Кермек ушколистный	Кенгбарг кармак	Terrestrial	perennial	++	++
25	*Potentilla supina*	Potentilla low	Лапчатка низкая	Пакана ғозпанжа	Terrestrial	perennial	++	++
26	*Phragmites australis*	Southern reed	Тростник южный	Оддий қамиш	Terrestrial	perennial	+++	+++
27	*Trachomitum lancifolium*	Kendyr lanceolate	Кендырь ланцетолистный	Наштарбарг кендир	Terrestrial	perennial	++	++
28	*Zygophyllum oxianum*	Amudaryan bean caper	Парнолистник амударьинский	Амударё туятовони	Terrestrial	perennial	++	++
29	*Bromus tectorum*	Roofing fire	Костер кровельный	Чўчқаёл ялтирбош	Terrestrial	annual	++	++
30	*Chenopodium album*	Mary white	Марь белая	Оқ шўра	Terrestrial	annual	+++	+++
31	*Chenopodium ficifolium*	Mary figolistnaya	Марь фиголистная	Анжирбаргли шўра	Terrestrial	annual	++	++
32	*Eremopyrum orientale*	Mortuk oriental	Мортук восточный	Шарқ арпахони	Terrestrial	annual	++	++

33	*Leptaleum filifolium*	Leptaleum filamentous	Лепталеум нителистный	Ипбаргли яғлиққора	Terrestrial	annual	++	++
34	*Polygonum aviculare*	Bird's throat, knotweed	Горлец птичий, спорыш	Чумчуқтил торон, қуштили	Terrestrial	annual	++	++
35	*Clematis orientalis*	Clematis orientalis	Ломонос восточный	Шарқ илонўти	Terrestrial	creepers	+++	++
36	*Cuscuta lehmanniana*	Dodder lehman	Повилика лемана	Леман зарпечаги	Terrestrial	creepers	+	+
37	*Cynanchum sibiricum*	Tsinanhum Siberian	Цинанхум сибирский	Сибир илонпечаги	Terrestrial	creepers	++	++

Source: Input from Biodiversity Study undertaken by International and National Biodiversity expert

Table 2:. Fish of Karakalpakstan and Khorezm region, possibly within the two non-core subprojects

№	Latin	English	Uzbek / Russian?	Status	Comments
1	* *Pseudoscaphirhinchus hermanni*	Dwarf Sturgeon, Little Shovelnose Sturgeon, Small Amu-Darya Shovelnose Sturgeon	Амударе кичик куракбуруни (тошбакра) Малый амударьинский лжелопатонос	1*(CR)*	*Critically Endangered 1 (CR), local Amudarya endemic relict species. It is spread at the Amudarya River, from Termez to the estuary can be found, currently can be found in Bukhara and Surkhandarya regions. It inhabits deep (2-3 m) parts of the river with sandy and stony bottoms in muddy waters. After 1964, 73 individuals were caught; the last individual was caught in 2010. Limiting factors: destruction of natural regime of the Amudarya River as a result of hydro-building and land-reclamation, pollution of rivers with wash water. Included in the IUCN Red Data List [CR] and Appendix II of CITES.*
2	* *Pseudoscaphirhinchus kaufmanni*	Amu Darya Sturgeon, False Shovelnose Sturgeon	Амударе катта куракбуруни (қилқуйриқ) Большой амударьинский лжелопатонос	1*(CR)*	*Critically Endangered 1(CR), Amudarya endemic relict species. It is reported from the Amudarya River, from the upper reaches to the estuary of the river; currently can be found in Khorezm, Bukhara and Surkhandarya regions. It inhabits deep parts (2-3 m) of the river with sandy and clayey soils in muddy waters. In 1964-2014, 712 individuals were caught. Limiting factors: destruction of natural regime of the Amudarya River as a result of hydro-building and land-reclamation measures, pollution of rivers with*

№	Latin	English	Uzbek / Russian?	Status	Comments
					wash waters. Included in the IUCN Red List [CR] and Appendix II of CITES.
3	*Esox lucius*	Northern Pike	Чўртан/Щука	LC	
4	*Alburnoides bipunctatus*	Schneider, Spirlin, Bleak, Riffle Minnow,	Шарқ тезсузари /Восточная быстрянка	LC	
5	*Alburnoides eichwaldi*	South Caspian Sprilin, Kura Chub			
6	*Aristichthys nobilis*	Bighead Carp	Чипор дўнгпешона/ Пестрый толстолобик	LC	
7	*Luciobarbus brachycephalus*	Aral Barbel	Орол мўйлабдори (сўғён, Сўзанбалиқ)/ Аральский усач	*1 (CR)*	*Critically Endangered 1 (CR), a local Syrdarya endemic relict species. It is spread at the upper reaches of the Syrdarya River downstream to the estuary; it may be recorded in the upper course. It inhabits deep parts (1,5-2 m) of the river with sandy and stony soils in troubled waters. After 1959, 20 individuals were caught; the last individual was caught in 1968. Limiting factors: destruction of natural regime of the Syrdarya River as a result of hydro-building and land-reclamation measures, pollution of rivers with wash waters. Included in the IUCN Red List [CR] and Appendix II of CITES.*
8	*Luciobarbus conocephalus*	Turkestan Barbel	Туркистон мўйлабдори (шимбалиқ, қаяз)/ Туркестанский усач	*2(VU:D)*	*Vulnerable, declining 2(VU:D) Aral endemic subspecies. It is spread at mid-stream of the Amudarya, Syrdarya, Zaravshan, Kashkadarya and Surkhandarya river; in the past – at the Aral Sea. It inhabits deep (2-3 m) parts of the running reservoirs with sandy stony or sandy-pebble bottom. Numbers sharply decreased in the last decade. Limiting factors: destruction of natural regime of river flows as a result of land-reclamation measures, pollution of rivers with*

№	Latin	English	Uzbek / Russian?	Status	Comments
					agricultural washes of fields, destruction of breeding grounds, competition with invasive fish species, poaching.
9	** Capoetobrama kuschakewitschi*	Sharpray	Паррак/Остролучка	*2(VU:D),*	*It inhabits running reservoirs with sandy and stony bottoms. It inhabits muddy streams. The numbers dropped in the last decade. Limiting factors: destruction of natural regime of river flows as a result of land-reclamation measures, pollution of rivers with agricultural wash waters, destruction of breeding conditions, and competition with invasive species.*
10	*Carassius auratus gibelio*	Prussian Carp	Товон балиқ /Серебряный карась	LC	
11	*Chalcalburnus chalcoides (Alburnus chalcoides) aralensis*	Aral Shemaya, Caspian Shemaya	Орол майбалиғи/ Аральская шемая	LC	
12	*Ctenopharyngodon idella*	Grass Carp	Оқ амур /Белый амур	LC	
13	*Cyprinus carpio*	Common Carp	Зоғорабалиқ, сазан /Сазан	LC	
14	*Hemiculter leucisculus*	Sharpbelly	Қиррақорин/ Востробрюшка	LC	
15	*Hypophthalmichthys molitrix*	Silver Carp	Оқ дўнгпешона балиқ/ Белый толстолобик	LC	
16	*Mylopharyngodon piceus*	Black Carp	Қора амур /Черный амур	LC	
17	*Parabramis pekinensis*	White Amur Bream	Амур оқ оқчаси /Белый амурский лещ	LC	
18	*Pelecus cultratus*	Sabre Carp, Sabrefish	Қиличбалиқ /Чехонь	LC	
19	*Silurus glanis*	Wels Catfish, Sheatfish	Лаққа /Обыкновенный сом	LC	

№	Latin	English	Uzbek / Russian?	Status	Comments
20	*Stizostedion lucioperca*	Zander, Sander, Pikeperch	Оқ сла /Обыкновенный судак	LC	
21	*Channa argus*	Northern Snakehead	Илонбош /Змееголов	LC	

Source: Input from Biodiversity Study undertaken by International and National Biodiversity expert

* *The Red Book of the Republic of Uzbekistan*, Volume II: Animals; T.: "Chinor ENK" Environmental Publishing Company. - 374 pp.

Table 3: Reptiles and Amphibians of Karakalpakstan and Khorezm, possibly within the two non-core subprojects

№	Latin	English	Uzbek / Russian	Status	Comments
1.	* *Agrionemys (Testudo) horsfieldi*	Steppe Tortoise	Ўрта Осиё чўл тошбақаси, Среднеазиатская черепаха	2(VU)	Anthropogenic impact: change (due to years of overgrazing) and the destruction of habitats, plowing of virgin lands, fisheries catching turtles and gathering their eggs for commercial purposes (exports), including poaching. Development of the natural habitat. Included in the IUCN Red List [VU].
2.	*Phrynocephalus moltschanowi*	Moltschanov's Toad-head Agama	Молчанов тўгаракбоши/ Круглоголовка молчанова	3(NT)	*It is spread in the Aral Sea area (Karakalpakstan). The area covers the territory of the ancient delta of the Amudarya and the Syrdarya (Northern Ahchadarinskaya alluvial delta plain) located in their modern interfluve. Some specimens are known from the south-eastern part of the Beltauhill and the dry riverbed Zhanadarya. Typical inhabits clay soils, takyrs dark gravel and sparse vegetation, and salt marshes. The population density varies from 1-4 individuals per hectare (an average of 2.6 individuals per ha). Limiting factors: the degradation of habitats as a result of sheep and goats and cattle grazing.*
3.	*Phrynocephalus rossikowi*	Uzbekistan Toad-head Agama	Хентоғ тўгаракбоши/ Хентаунская круглоголовка	1(EN)	It is reported from the southern Aral Sea (Karakalpakstan and Khorezm regions). It inhabits rubbly (crushed stone) parts of the desert on loamy, more rarely, sandy soils with scarce vegetation. In the 1970-80s, the recorded numbers reached 30 individuals per day. Currently, it vanished from most habitats; in other habitats, sole specimens are recorded. Limiting factors: development of virgin lands in the desert zone, especially, irrigation. Included in the IUCN Red List [EN].
4.	*Alsophylax pipiens*	Squeaky Gecko	Чийилдоқ гекконча Пискливый геккончик	LC	

№	Latin	English	Uzbek / Russian	Status	Comments
5.	*Gymnodactylus caspius*	Caspian Gecko	Каспий геккони, Каспийский геккон	LC	
6.	*Teratoscincus scincus*	Skink Gecko	Сцинк геккони Сцинковый геккон	LC	
7.	*Crossobamon eversmanni*	Crested Gecko	Тароқ бармоқли геккон Гребнепалый геккон	LC	
8.	*Gymnodactylus russovii*	Gray Gecko	Кул ранг геккон Серый геккон	LC	
9.	*Phrynocephalus guttatus*	Spotted Toadhead Agama, Saissan Toad-Headed Agama, Central Asian Toadhead Agama	Гажакдум тўгаракбош Круглоголовка-вертихвостка	LC	
10	*Phrynocephalus helioscopus*	Sunwatcher Toadhead Agama, Fergana Toad-headed Agama	Тақир тугаракбоши Такырная круглоголовка	LC	
11	*Phrynocephalus interscapularis*	Lichtenstein's Toadhead Agama	Қум тугаракбоши Песчаная круглоголовка	LC	
12	*Phrynocephalus mystaceus*	Secret Toadhead Agama, Toad-headed Agama	Қизил қулоқ калтакесак Ушастая круглоголовка	LC	
13	*Phrynocephalus reticulatus*	Reticulated Toad-headed Agama	Матрап тўгаракбоши Сетчатая круглоголовка	LC	
14	*Trapelus sanguinolentus*	Steppe Agama	Дашт агамаси Агама степная	LC	
15	*Eremias grammica*	Reticulate Racerunner	Тўр калтакесакча Сетчатая ящурка	LC	

№	Latin	English	Uzbek / Russian	Status	Comments
16	*Eremias intremedia*	Middle Racerunner	Ўртача калтакесакча Средня ящурка	LC	
17	*Eremias lineolata*	Ruled Racerunner	Чизиқли калтакесакча Линейчатая ящурка	LC	
18	*Eremias scripta*	Striped Racerunner	Тарғил калтакесакча Полосатая ящурка	LC	
19	*Eremias velox*	Fast Racerunner	Тез калтакесакча, Быстрая ящурка	LC	
20	*Natrix tesselata*	Dice Snake	Сувилон, Водяной уж	LC	
21	*Psammophis lineolatus*	Steppe Ribbon Racer, Arrow Snake	Ўқилон, Стрела-змея	LC	
22	*Platyceps karelini*	Spotted Desert Racer	Кўндаланг-йўлли чипор илон Поперечнополосатый полоз	LC	
23	*Coluber (Hemorrhois) ravergieri*	Spotted Whip Snake	Ранг-баранг чипор илони Разноцветный полоз	LC	
24	*Bufo viridis*	European Green Toad	Яшил қурбақа Зеленая жаба	LC	
25	*Rana ridibunda*	Marsh Frog	Кўл бақаси Озерная лягушка	LC	

* *The Red Book of the Republic of Uzbekistan*, Volume II: Animals; T.: "Chinor ENK" Environmental Publishing Company. - 374 pp.

Table 4: Birds of Karakalpakstan and Khorezm, possibly within the two non-core subprojects [87]

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
Podicepiidae		**Grebes**	**Қўнғирлар/ Поганковые**			
1.	*Podiceps grisegena*	Grey-Cheeked Grebe	Кулранг чаккали қўнғир/ Серощекая поганка	Migrant	LC	
2.	*Podiceps cristatus*	Grebe or Great Grebe	Катта қўнғир / Чомга илибольшая поганка	Migrant	LC	
Phalacroeoridae		**Cororants**	**Қоравойлар/ Баклановые**			
3.	*Phalacrocorax carbo*	Cormorant	Катта қоравой /Большойбаклан	Migrant	LC	
4.	*Phalacrocorax pygmaeus*	Pygmy Cormorant	Қорабузов (кичик қоравой)/ Малый баклан	Migrant	3(NT)	It inhabits large plainland lakes and reservoirs. In the past, it wasnesting on the islands of the Aral Sea; at present, it vanished from this territory. It occupies new habitats in the Amudarya and Syrdarya basins. From 10,000 to 12,000 nesting pairs were recordedin the early 2000s and about 10,000 wintering individuals. Now, the number is significant lower.Limiting factors: decline of habitats as a result of the changes of the water regime in the Aral Searegion. Extraction is prohibited. Protected in reserves (the LakeSudochie, Arnasay, Karakyr, Dengizkul lakes) while nesting, migration, wintering. Included in the IUCN Red List [LC] and Appendix II CMS

[87] **Refer to**: Avibase, The World Database (2023). *Bird Checklists of the World*: (1) **Karakalpakstan** https://avibase.bsc-eoc.org/checklist.jsp?region=UZqr and (2) **Khorezm** https://avibase.bsc-eoc.org/checklist.jsp?region=UZkh&list=howardmoore

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
Ardeidae		**Ciconiiformes**	**Қарқаралар/ Аистобразные**			
5.	*Nycticorax nycticorax*	Heron	Ҳаққуш/ Кваква	Migrant	LC	
6.	*Egretta alba*	Great Egret	Катта оқ қарқара, оққўтон/ Большая белая цапля	Migrant	LC	
7.	*Ardea cinerea*	Grey Heron	Кўл ранг қарқара, кўк қўтон/ Серая цапля	Migrant	LC	
8.	*Ardea purpurea*	Red Heron	Жийрон қарқара, жийрон қўтон/ Рыжая цапля	Resident	LC	
Anatidae		**Ducks**	**Ўрдаклар/Гусеобразные**			
9.	*Anser anser*	Greylag Goose	Кўк ғоз, Ёввойи ғоз /Серыйгусь	Migrant	LC	
10.	*Anas platyrhynchos*	Mallard	Крявка, ғоз	Migrant	LC	
11.	*Tadorna ferruginea*	Ogar	Қизил ўрдак / Огарь	Migrant	LC	
12.	*Tadorna tadorna*	Shelduck	Сўралай ғоз/ Поганка	Migrant	LC	
13.	*Anas crecca*	Teal Whistle	Чуррак /Чирок-свистунок	Migrant	LC	
14.	*Anas strepera*	Gray Duck	Қўнғир ўрдак /Серая утка	Migrant	LC	
15.	*Anas querquedula*	Garganey	Катта чуррак/ Чирок-трескунок	Migrant	LC	
16.	*Netta rufina*	Red-nosed Pochard	Олмабош/Красноносый нырок	Migrant	LC	
17.	*Aythya ferina*	Red-headed Duck	Қизилбош/Красноголовая чернеть	Migrant	LC	
18.	*Circus aeruginosus*	Marsh Harrier	Соз бўктаргиси/Болотный лунь	Migrant	LC	
Pandionidae		**Ospreys**	**Соколобразные/ Скопалар**			
19.	*Pandion haliaetus*	Osprey (Fish Hawk)	Сувқийғир/Скопа	Resident	*2(VU: R)*	It is found in the Khoresm region nesting and as migrating almost everywhere in Uzbekistan. It inhabits plainland and foothill reservoirs with transparent water. The number was always low.Breeds only some pairs, on the migration single birds and small groups are noted, total –

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
						several hundreds. Limiting factors: destruction of habitats as a result ofthe changes of the water regime, death on power lines. Included in the IUCN Red List (LC) and Appendix II of CITES.
Falconidae		**Falcons**	**Соколиные/Лочинлар**			
20.	**Falco pereginus*	Peregrine Falcon	Лочин/Сапсан	Resident	LC	
21.	*Falco subbuteo*	Eurasian Hobby	Жиғолтой / Чеглок	Resident	LC	
22.	*Falco tinnunculus*	Common Kestrel	Миққий /Обыкновенная пустельга	Resident	LC	
Phasianidae		**Pheasants**	**Қирғовуллар/ Фазановые**			
23.	*Phasianus colchicus*	Pheasant	Қирғовул/ Фазан	Resident	LC	
Rallidae		**Rails**	**Сувмошаклар/Пастушоковые**			
24.	*Rallus aquaticus*	Water Rail	Сувмошак/Пастушок	Resident	LC	
25.	*Fulica atra*	Coot	Қашқалдоқ /Лысуха	Migrant	LC	
Recurvirostridae		**Avocets**	**Бигизтумшуқлар/Шилоклюковые**			
26.	*Himantopus himantopus*	Stilt	Қизилоёқ / Ходулочник	Resident	LC	
Haematopodidae		**Oystercatchers**	**Қизилоёқлар/Кулики**			
27.	*Haematopus ostralegus*	Oystercatcher	Зах лойхўрак / Кулик-сорока	Resident	LC	
Scolopacidae		**Snipes**	**Лойхураклар/Бекасовые**			
28.	*Tringa totanus*	Common Redshank	Қизилоёқ балчиқчи /Травник	Resident	LC	
Laridae		**Gulls & Terns**	**Балиқчилар/ Чайковые**			
29.	*Larus ridibundus*	Black-Headed Gull	Кўл балиқчиси / Озернаячайка	Migrant	LC	
30.	*Larus genei*	Slender-billed gull	Денгиз каптари /Морскойголубок	Migrant	LC	

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
31.	*Larus cachinnans*	Caspian Gull	Оддий чағалай/ Чайка Хохотунья	Migrant	LC	
32.	*Larus canus*	Gray Gull	Кулранг балиқчи / Сизая чайка	Resident	LC	
33.	*Chlidonias niger*	Black Tern	Қора чигиртчи / Чёрная крачка	Resident	LC	
34.	*Sterna albifrons*	Little Tern	Кичик чигиртчи / Малая крачка	Migrant	LC	
Columbidae		**Pigeons**	**Каптарлар/Голубиные**			
35.	*Columba livia*	Rock Dove	Кўк каптар / Сизый голубь	Resident	LC	
36.	*Streptopelis decaocto*	Ringed Turtledove	Қумри / Кольчатая горлица	Resident	LC	
37.	**Streptopelia turtur*	Common Dove	Оддий ғуррак / Обыкновенная горлица	Resident	LC	
38.	*Streptopelia senegalensis*	Small Dove	Мусича / Малая горлица	Resident	LC	
Cuculudae		**Cuckoos**	**Какку/Кукушковые**			
39.	*Cuculus canorus*	Cuckoo	Оддий какку / Кукушка	Migrant	LC	
Strigidae		**Owls**	Япалоқ қушлар/Совообразные			
40.	*Bubo bubo*	Eurasian Eagle-owl	Укки/Филин	Resident	LC	
41.	*Asio otus*	Long-eared Owl	Қулоқдор япалоққуш /Ушастая совка	Resident	LC	
42.	*Otus brucei*	Pallid Scops Owl	Чўл соғи / Пустынная совка	Resident	LC	
Apodidae		**Swifts**	**Узун қанотлилар/ Стиржобразные**			
43.	*Apus apus*	Black Swift	Қора узунқанот /Чёрный стриж	Migrant	LC	
Coraciidae		**Rollers**	**Кўк қарғалар / Сизоворонковые**			
44.	*Coracias garrulus*	Roller	Кўк қарға / Сизоворонка	Migrant	LC	
Meropidae		**Bee-Eaters**	**Куркунаклар/ Щурковые**			
45.	*Merops apiaster*	Golden Bee-Eater	Тилла ранг куркунак/Золотистая щурка	Migrant	LC	
46.	*Merops superciliosus*	Green Bee-Eater	Кўк куркунак/Зелёная щурка	Migrant	LC	

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
Upupidae		**Hoopoes**	**Сассиқ попишаклар/Удодобразные**			
47.	*Upupa epops*	Hoopoe	Сассиқ попишак/Удод	Migrant	LC	
Picidae		**Woodpeckers**	**Қизилиштонлар/ Дятеловые**			
48.	*Jynx torquilla*	Wryneck	Бурма бўйин/ Вертишейка	Migrant	LC	
49.	*Dendrocopos leucopterus*	White-Winged Woodpecker	Оққанотли қизилиштон/ Белокрылый дятел	Resident	LC	
Hirundidae		**Passerines**	**Қалдирғошлар/Ласточковые**			
50.	*Riparia riparia*	Sand Swallow	Қирғоқ қалдирғочи/Береговая ласточка	Migrant	LC	
51.	*Hirundo rustica*	Barn Swallow	Қишлоқ қалдирғочи / Деревенская ласточка	Migrant	LC	
Alaudidae		**Larks**	**Сўфитўрғайлар/Жавронковые**			
52.	*Calandrella rufescens*	Gray Lark	Кулранг тўрғай/ Серый жаворонок	Resident	LC	
53.	*Calandrella chelensis*	Salt Marsh Lark	Шўр тўрғайи/Солончаковый жаворонок	Resident	LC	
54.	*Melanocorypha yeltoniensis*	Black Lark	Қора тўрғай/Чёрныйжаворонок	Resident	LC	
Sturnidae		**Starlings**	**Чуғурчуқлар/ Скороцовые**			
55.	*Acridotheres tristis*	Common Myna / Indian Myna	Майна/ Майна	Resident	LC	
Corvidae		**Crows**	**Қарғалар/ Врановые**			
56.	*Pica pica*	Magpie	Зағизғон, ҳакка / Сорока	Resident	LC	
57.	*Coloeus monedula*	Jackdaw	Заға / Галка	Resident	LC	
58.	*Corvus frugilegus*	Rook	Гўнг қарға / Грач	Resident	LC	
59.	*Corvus corone*	Black Crow	Қора қарға / Чёрная ворона	Resident	LC	
60.	*Corvus cornix*	Hooded Crow	Ола қарға/Серая ворона	Resident	LC	

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
Bombycillidae		**Waxwings**	**Свиристеллар /Свиристеловые**			
61.	*Bombycilla garrulus*	Waxwing	Свиристель /Свиристель	Resident	LC	
62.	*Settia cetti*	Broad-Tailed Warbler	Кенг думли тўқай чумчуғи/ Широкохвостая камышевка	Resident	LC	
63.	*Acrocephalus agricola*	Indian Warbler	Ҳинд тўқай чумчуғи / Индийская камышевка	Resident	LC	
64.	*Acrocephalus dumetorum*	Garden Warbler	Боғ тўқай чумчуғи/ Садовая камышевка	Resident	LC	
65.	*Acrocephalus palustris*	Marsh Warbler	Ботқоқ тўқайчумчуғи/Болотная камышевка	Resident	LC	
66.	*Acrocephalus scirpaceus*	Reed Warbler	Қамишзор тўқай чумчуғи /Тростниковая камышевка	Resident	LC	
67.	*Turdus pilaris*	Fieldfare	Ола шақ-шақ, Рябинник	Resident	LC	
68.	*Parus bocharensis*	Bukharan Tit	Бухоро читтаги / Бухарская синица	Resident	LC	
69.	*Passer domesticus*	House Sparrow	Уй чумчуғи / Домовой воробей	Resident	LC	
70.	*Fringilla coelebs*	Finch	Қизилтўш / Зяблик	Resident	LC	
71.	*Chloris chloris*	Greenfinch	Кўк чумчуқ / Зеленушка	Resident	LC	
72.	*Spinus spinus*	Eurasian siskin	Чиж / Чиж	Resident	LC	
73.	*Acanthis cannabina*	Common Linnet	Каноп чумчуқ/ Коноплянка	Resident	LC	
74.	*Emberiza citrinella*	Yellowhammer	Оддий деҳқончумчуқ / Обыкновенная овсянка	Resident	LC	
75.	*Emberiza hortulana*	Ortolan bunting	Боғ деҳқончумчуғи / Садовая овсянка	Resident	LC	

* *The Red Book of the Republic of Uzbekistan*, Volume II: Animals; T.: "Chinor ENK" Environmental Publishing Company. - 374 pp.

Table 5: Mammals of Karakalpakstan and Khorezm, possibly within the two non-core subprojects

№	Latin	English	Uzbek / Russian	Status	Comments
1	*Erinaceus auritus*	Lesser Shrew	Қўлоқдор типратикан /Ушастый ёж	LC	
2	*Crocidura suaveolens*	Bukhara Horseshoe Bat	Кичик оқтиш сичқон / Малая белозубка	LC	
3	*Rhinolophus bocharicus*	Mustachioed Bat	Кичик тақабурун / Бухарский подковонос	LC	
4	*Myotis mystacinus*	Whiskered Bat	Мўйлабли кўршапалак / Усатая ночница	LC	
5	*Vespertilio serotinus*	Serotine Bat	Кечки кожан /Поздний кожан	LC	
6	*Eptesicus bottae (ognevi)*	Botta's Serotine Bat	Огнев кожани /Кожан Огнева	LC	
7	*Lepus tolai*	Tolai Hare	Қум қуён/ Заяц-толай	LC	
8	*Alactagulus pumilio*	Dwarf Fat-tailed Jerboa, Lesser Five-toed Jerboa	Ер товушқони / Зайчик земляной или тарбаганчик	LC	
9	*Dipus sagitta*	Northern Three-toed Jerboa	Жун оёқли қушоёқ /Мохноногий тушканчик	LC	
10	*Cricetulus migratorius*	Grey Dwarf Hamster	Кулранг олахуржун/ Серый хомячок	LC	
11	*Ellobius talpinus*	Northern Mole Vole	Оддий кўрсичқон / Обыкновенная слепушонка	LC	
12	*Ondatra zibethicus*	Muskrat	Ондатра / Ондатра	LC	
13	*Meriones tamariscinus (Pallas)*	Tamarisk Jird, Tamarisk Gerbil	Тамарикс қумсичқони/ Гребенщиковая песчанка	LC	
14	*Mus musculus*	House Mouse	Уй сичқони / Домовой мышь	LC	
15	*Nesokia indica*	Short-tailed Bandicoot Rat	Пластинка тишли каламуш/ Пластинчатозубая крыса	LC	

№	Latin	English	Uzbek / Russian	Status	Comments
16	*Canis aureus*	Golden Jackal	Чиябўри/ Шакал	LC	
17	*Vulpes vulpes*	Red Fox	Тулки/ Лисица	LC	
18	* *Vormela peregusna*	Marbled Polecat	Олакузан/перевязка	*2(VU:D)*	*Vulnerable, declining 2(VU:D), sporadically distributed, naturally rare species. Limiting factors: land cultivation and reduction of forage resources. Included in the IUCN Red List [VU].*
19	*Meles meles*	European Badger	Бўрсиқ / Барсук	LC	
20	*Mellivora capensis,* ssp. *buechneri*	Honey Badger, Ratel	**Ҳинд асалхўри/** Индийский медоед	*1(CR)*	*It can be found in the south-western part of the Ustyurt Plateau, the northern edge of the Sarakamysh depression, and the western margin of the Khorezm oasis. It inhabits ravines, precipices and chinks, deserts with billowy relief and solid (dense) soils, and saline areas. It was always low in number. In 1960–80s only 10 individuals were counted, in 1997–2016s – 13 individuals. Limiting factors: winters with heavy snowfalls, disturbance by wolves and stray dogs.*
21	*Felis chaus*	Jungle Cat, Reed Cat, Swamp Cat	Тўқай мушуги/ Камышовый кот	LC	
22	*Sus scrofa*	Wild Boar	Кабан / Еввойи чўчқа	LC	

* *The Red Book of the Republic of Uzbekistan*, Volume II: Animals; T.: "Chinor ENK" Environmental Publishing C

\

Annexure 4. MoM public consultations

Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project (RRP UZB 53120)

Venue: Tuzloq makhalla building, Yangiariq district, Khorezm Region

Date: September 22, 2023
Public Consultation: Disclosure the FS and Environment and Social Impact Assessment
Presented by: Oybek Azimov, Deputy of the Project Manager, Magfirat Muminova, National Environmental specialist

Participants:
- Representatives of Yangiariq, Bogot, Hanqa regions,
- Farmers,
- Representatives of the local khokimiyats,
- Experts of the Basin Irrigation System Authority, cadastre and others.

Discussed main topics on the PC:
Project description and its components; potential planning project activities, national environmental, social legislation and relevant ADB SPS's (2009) requirements. Identified social and environmental risks and mitigation measures. Components of IEE: EMP, the role of each stakeholders; occupation, health and labor requirements and risks associated with it, the resources necessary to address labor issues. GRM; assistance to vulnerable and rural households involved to the project.

After the presentation the participants raised the following questions:

#	Questions	Answers
1	*Farmer*: How much water will flow into the canal after reconstruction?	According to the draft project FS flow of the R8 canal after reconstruction would be 35,000 m3/sec.
2	*Farmer*: How many pumps will remain after reconstruction?	The main idea of the project is the concreting and hydroisolation of the R8 canal. We proposed 2 options: Option 1: raise the bottom of the canal by 2 meters and narrow the canal. Due to this option, water will flow by gravity and there will be no need for 28 pumps. One pump will remain and it will pump water from the head distribution unit to channel P8. The 2nd option involves hydroisolation and concreting R8 partial, using concrete only in places where filtration is observed.
3	*Farmer*: Will communications along the canal be affected, is it planned to reconstruct bridges, relocate power lines and gas pipes	Yes, during the R8 canal reconstruction, it's expected to repair and relocate affected facilities, such as bridges, high-voltage lines, and gas pipelines. All these expenditures are included in the FS draft.

\

4	*Farmer*: As you know, the Yangiarik and Bogot regions are fed only from the P8 canal. In our experience, a water volume of 35,000 m3/sec is not enough for our areas. Is it possible to increase the volume of water flow in the canal? It is also necessary to consider floods and how flood risks can be reduced.	Thank you for this question, we will once more discuss this issue with experts from the local canal management, cadastre, and khokimiyat. We will try to find a positive solution to this issue.
5	*Farmer*: We are grateful for the reconstruction of the R8 canal, and will be even happier if you increase the flow of the canal to 40,000 m3/sec because 35,000 m3/sec is not enough for our areas.	The calculation of water in the canal was carried out in accordance with the approved standards and norms in the republic. However, we will discuss this issue again with the canal local managers, cadastre, and khokimiyat specialists.
6	*Farmer*: As you mentioned in the presentation, it is planned to hydroisolation of the bottom and slopes of the canal. Will this cause the soil to dry out?	In the Khorezm region, the table of groundwater is high. Irrigation experts are interested in decreasing groundwater levels. Therefore, if the P8 canal hydroisolating affects the groundwater level and reduces its level, then this will be another positive impact of the project on the environment.

Photos:

\

\

List of participants:

Проект Управление водными ресурсами в бассейне Аральского моря с учетом адаптации к изменению климата – Общественные встречи / консультации с заинтересованными сторонами ?

Место проведения: [illegible] район

Дата проведения: 22.09.2023

№	ФИО	Должность	Контактный телефон	Подпись
1.	[illegible]	[illegible] МФЙ	[illegible]-24-76	[signature]
2.	[illegible]	[illegible] МФЙ	[illegible]	[signature]
3.	[illegible]	[illegible] МФЙ	93 202 [illegible]	[signature]
4.	[illegible]	[illegible] МФЙ	933864458	[signature]
5.	[illegible]	[illegible]	97 201-59-54	[signature]
6.	[illegible]	[illegible]	99 [illegible]	[signature]
7.	[illegible]	[illegible]	995015974	[signature]
8.	[illegible]	[illegible]	93-251-06-[illegible]	[signature]
9	[illegible]	[illegible]	[illegible]	[signature]
10	[illegible]	[illegible]	[illegible]	[signature]
11.	[illegible]	[illegible] МФЙ	[illegible]	[signature]
12.	[illegible]	[illegible]	[illegible]	[signature]
13	[illegible]	[illegible]	[illegible]	[signature]
14	[illegible]	[illegible] МФЙ	[illegible]	[signature]
15.	[illegible]	[illegible] МФЙ	99 964 99 14	[signature]
16.	[illegible]	[illegible]	[illegible]	[signature]
17.	[illegible]	[illegible] МФЙ	[illegible]	[signature]
18.	[illegible]	[illegible] МФЙ	[illegible]	[signature]
19.	[illegible]	[illegible]	[illegible]	[signature]