Initial Environmental Examination

PUBLIC

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Draft Report

Uzbekistan: Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project (Kegeyli Non-core Subproject, Republic of Karakalpakstan)

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

CURRENCY EQUIVALENTS
(As of 1 November 2023)
Currency unit – Sum (SUM)
SUM1.00 = 0.0000817747 USD [1]
$1.00 = SUM 12,229.83

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] Foreign Exchange (adb.org)

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.

Goskomecologiya - State Committee for Ecology and Environmental Protection 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.

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EXECUTIVE SUMMARY

1. The Republic of Uzbekistan Uzbekistan is a land-locked country located in Central Asia with a total area of 448,900 square kilometer (km2). 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 percent 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, and nearly 90 % of water is consumed by the agricultural sector.

4. According to the World Bank report *(Country Climate and Development Report, November 2023)*, water demand for irrigation could increase by 5 percent by 2030 and by 7–10 percent 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 decline of water resource by in Amu Darya (by 15 percent) and Syr Darya (by 5 percent), both rivers are life line for irrigation in Uzbekistan.

6. **GHG Emissions** - Pumping water for irrigation purpose consumes 15–20 percent of the electricity used in Uzbekistan, which is equivalent to more than 3 million tons of CO2 emissions every year or about 2–3 percent of the country's total emissions.[5] According to GHG inventory data for the period 2010-2016, after energy sector, the agriculture occupy the second largest source of GHG emissions in Uzbekistan[6].

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 ageing irrigation and drainage infrastructure, the reported irrigation efficiency is low, at about 40 percent,[7] and currently, requires large-scale rehabilitation and modernization, for details refer to Figure 3.

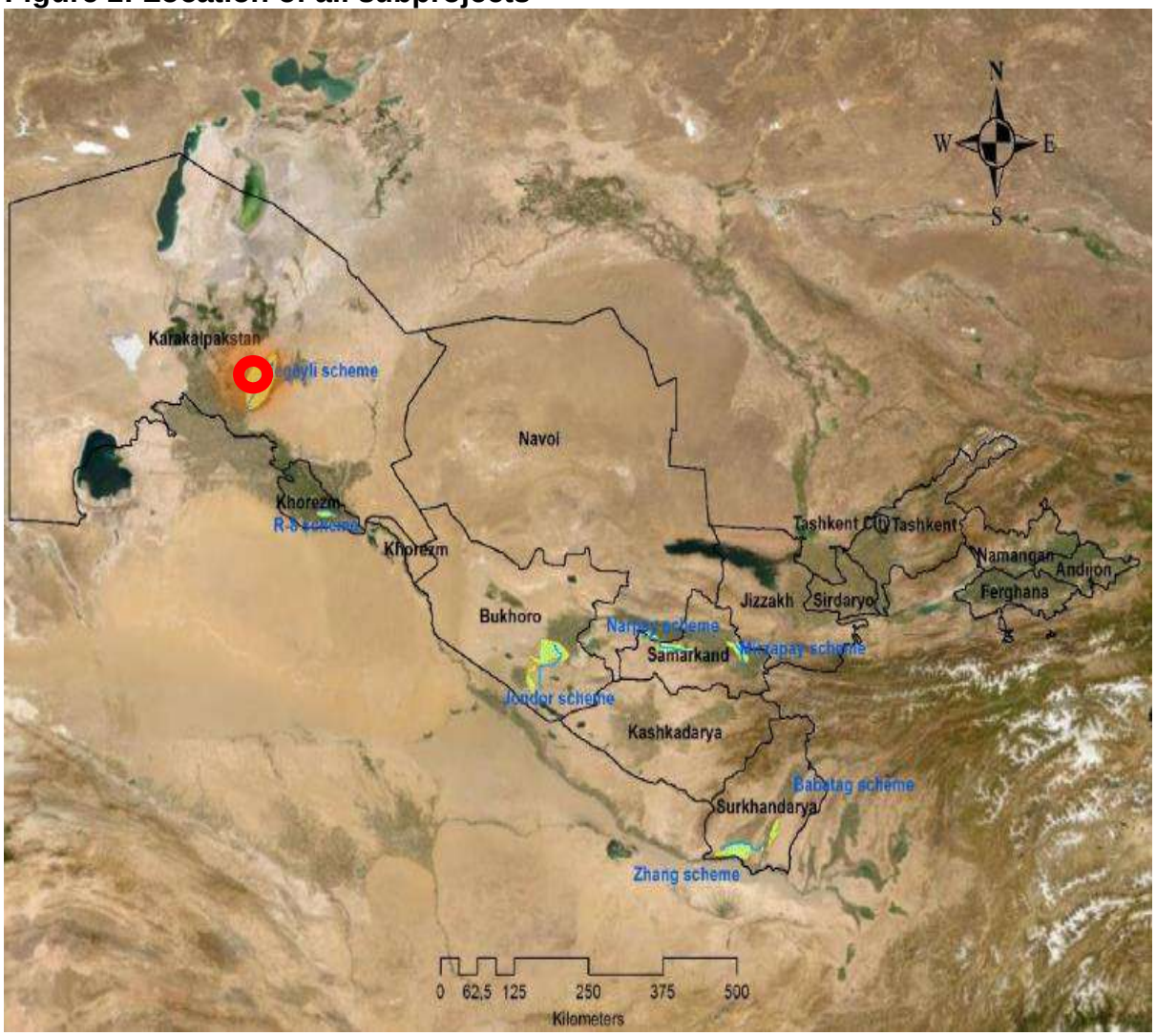
8. In the recent past, substantial attention has been given by the Government to improve land and water resources management, including drainage and irrigation schemes and hundreds of such projects are being implemented in this direction. Among all, one such

[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*

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 eight potential subprojects, the location of all subprojects is shown in Figure 1. The government and ADB jointly selected the two representative **'Core'** subprojects in 2019 i.e. (a) Babatag Irrigation system (b) Jondor irrigation system, which are currently under implementation; It has also been agreed between the government and ADB to use **pre-defined ADB criteria to select two 'non-core' subprojects** from the list proposed by the government, See Table 16.

Figure 1: Location of all subprojects



10. **Selection of 'non-core'** - Among two non-core sub-project, **the government identify Kegeyli canal in Republic of Karakalpakstan for rehabilitation and modernization by using pre-defined Screening Criteria,** for detail refer to Table 17 A and 17B and also refer to Annexure 1. The modernization of Kegeyli canal and inclusion of climate-proofing measures will strengthen the farm and water use management capacities including agricultural productivity and 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 factor for selection of Kegeyli canal for modernization.

12. The **Kegeyli non-core subproject** is an earthen canal and was built in 1938.It is located in the Republic of Karakalpakstan, is a part of Kyzketken Canal Irrigation System. It has a command irrigated area of 100,650 thousand ha. The length of canal is 56.4 km long and source water from the Amu Darya River. The Kegeyli canal supplies water to ***Nukus, Kegeyli, Chimbay, Karauzyak, Bozatau and Moynak rayons***. The earthern canal has high level of filtration. The details of Kegeyli canal are summarized in *Table 1*.

13. **Institutional Arrangement** - The project executing agency is the Ministry of Water Resources (MWR) for four subprojects (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 58.

14. **JV SMEC International Pty Ltd. and Annexure Financial Solutions Ltd**. are appointed as a 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 'non-core' irrigation subprojects; overall project implementation, including procurement, financial management, construction supervision, safeguards (environmental and social), monitoring and reporting.

Table 1: Snapshot - Kegeyli Sub-project

Particulars	Kegali 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)
Donor	• **Asian development Bank**
Project category	• Classified as category B projects *for detail refer to Table 17*
Location	• Republic of Karakalpakstan
Year Constructed	• 1938
Canal length and type	**Kegeyli canal** • Earthen canal • The canal is 55.5 km long, from CH 0 to CH 366+00 **Secondary canal (Kegeyli Nizhniy)** • Earthen channel
Scope of modernisation and rehabilitation	**Kegeyli canal** • Out of the total length of canals, 36.6 km is planned to be upgraded and modernised. **Secondary canal (Kegeyli Nizhniy)** • 18.64 km is considered modernisation

<table>
<tr><td>Source of water for Kegali canal</td><td>• Kegeyli canal source water from the Dustlik canal from the Razvilka waterworks facility, which source water from the Amu Darya River.
• Secondary canal (Kegeyli Nizhniy) takes water from the Kegeyli-lower canal PK366</td></tr>
<tr><td>Cropping</td><td>• Major crops – Wheat, Rice and cotton
• Other include - Maize for green fodder, potatoes, vegetables etc.</td></tr>
<tr><td>Utility shifting</td><td>For details rfer to Table 36</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>
<tr><td>Trees felling</td><td><table>
<tr><td>Name of Trees</td><td>R-8 Canal</td><td>Kegeyli</td></tr>
<tr><td>Asiatic Poplar (Turongil</td><td>1,797</td><td>1,506</td></tr>
<tr><td>Willow (Southern)(Terak)</td><td>124</td><td>161</td></tr>
<tr><td>Elaeagnus angustifolia (Jida)</td><td>58</td><td></td></tr>
<tr><td>Tamarix hispdla wild (Juglun)</td><td></td><td>780</td></tr>
<tr><td>Salix Wilhelmsiana M.B. (Qoratol)</td><td>188</td><td></td></tr>
<tr><td>Total</td><td>1,567</td><td>2,447</td></tr>
</table></td></tr>
<tr><td>Biodiversity status</td><td>• 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 area[8]
• No presence of any Keystone Species, or those Species, which are crucial to the overall functioning of an ecosystem</td></tr>
<tr><td>Land acquisition and Involuntary displacement</td><td>People expected to be impacted:
Kegeyli canal: 9 APs (including 8 farm lands, cluster) and 9 public lands plot. In total 54.94 ha
R8 no affected persons</td></tr>
<tr><td>Project impacts on lands, Kegeyli, land acquisition and resettlement plan</td><td><table>
<tr><td>District</td><td>Types of impact</td><td>Number of land plots</td><td>Affected land users</td><td>Total affected land, ha</td><td>% of affected lands</td></tr>
<tr><td rowspan="4">Kegyli</td><td>Farm lands</td><td>8</td><td>8</td><td>44.57</td><td>81%</td></tr>
<tr><td>Karakul cluster</td><td>1</td><td>1</td><td>2.25</td><td>4 %</td></tr>
<tr><td>State reserves lands</td><td>9</td><td></td><td>8.12</td><td>15 %</td></tr>
<tr><td>TOTAL</td><td>18</td><td>9 APs</td><td>54.94</td><td>100 %</td></tr>
</table></td></tr>
<tr><td>Number of consultations with the social safeguards team</td><td>Kegeyli canal: Public meeting on Sept 23, 2024 and individulal meetings with AP on March 12-14, 2024</td></tr>
<tr><td>Asbestos containing material (ACM)</td><td>• No Asbestos containing materials were identified during site survey.</td></tr>
</table>

15. As per ADB pre-defined Screening Criteria, the Kegeyli sub-project is classified as category B projects. The Kegeyli subproject is also aligned with the government of

Source: *Cadaster Agency, Republic of Karakalpakstan*

[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

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) 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. REA checklist will be accomplished and included as an Annex after completion of the final design of the Project In addition, reference to the different elements will be considered as per sub project criteria given in the EARF. This will be accomplished and included as an Annex after completion of the final design of the Project.

16. The Initial Environmental Examination (IEE) of the Kegeyli subproject 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 Kegeyli subproject;
    b) Analyze 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 into subproject design package and further implemented by contractor;
    d) Inform potential impacts of a project, summarize the finding of stakeholder's consultations, including grievance redress procedures.

17. The Potential environmental impacts of Kegeyli sub-project and its allied activities are short term, reversible and mostly site specific. The potential impact during construction of Kegeyli 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; and (ix) Occupational health and safety risks to workers (x) social conflict due to labour influx etc. These potential impacts are typically localized, short-term and small scale, and can be minimized by implementing EMP/SSEMP and adopting good construction practices.

18. Initial investigation shows that modernization of Kegeyli 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. The borrow area will be checked and finalized during detail design phase and tender bidding process. About 100,000 m3 of sand, and 200, 000 m3 of aggregate estimated along the 34 Km length of canal.

Name of Trees	R-8 Canal	Kegeyli
Asiatic Poplar (Turongil	1,797	1,506
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Elaeagnus angustifolia (Jida)	58	
Tamarix hispdla wild (Juglun)		780
Salix Wilhelmsiana M.B. (Qoratol)	188	
Total	1,567	2,447

[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 Kegeyli is expected to bring positive cumulative and induced impacts in the Karakalpakstan such as – more irrigated land available, 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 Khokimiyat of Chimbay district on 23rd September 2023 in Karlpakisthan. The Kegeyli 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 Chimbay, Kegeyli , Nukus districts, 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. The deterioration of water management facilities makes it challenging for local authorities to ensure a sustainable water supply for irrigation. If the Kegeyli subproject is not implemented, followings are some keys 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 lands will increase due to lack of water,
    g) Farm management and water use capacities will not be improved,
    h) Overall, farm incomes in the Kegeyli 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 Kegeyli subproject, as described in the subsequent chapters, can be avoided or minimized by adopting suitable mitigation measures.

Recommendation

23. **Inclusion of Climate Adaptive 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 and taking care of tress/bushes 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 possibility of Inclusion of Climate Adaptive design - Shift from flow based to modernized water level flow controlled design

e) Even after modernization, 35-40% 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 290 - Learning from India - Canal-top and canal bank solar power.
   - Explore possibility to use low carbon embodied materials and local construction material to reduce carbon footprint

24. **Pre-construction and Construction stage**

a) Involuntary Resettlement - Modernization of Kegeyli canal may trigger involuntary resettlement, according to initial estimate, 56.94 ha of land will be affected. Hence, it is recommended to undertake Social Due-diligence to assess the extent of social impact and prepare LARP accordingly.

b) Before the construction commences, PMU is required to obtain environmental clearance/approval from the State Committee for Ecology and Environmental Protection.

c) 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. IEE and EMP are drafts and will be updated during the detail design phase.

d) 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;

e) Table 61 enumerates the recommendations including accountability of MWR/PMU/PIC for Environmental Safeguards.

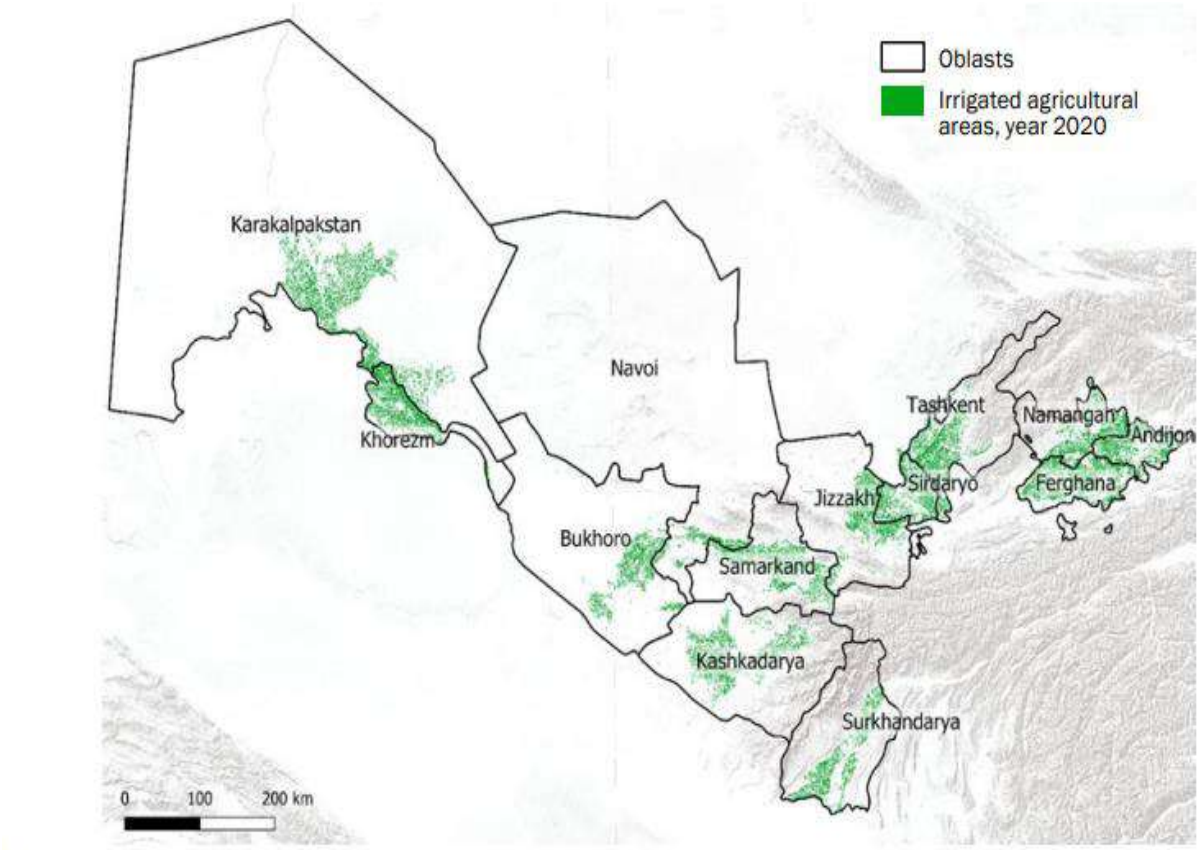
25. **Operation stage**

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

I. INTRODUCTION

26. Around 95 percent 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]



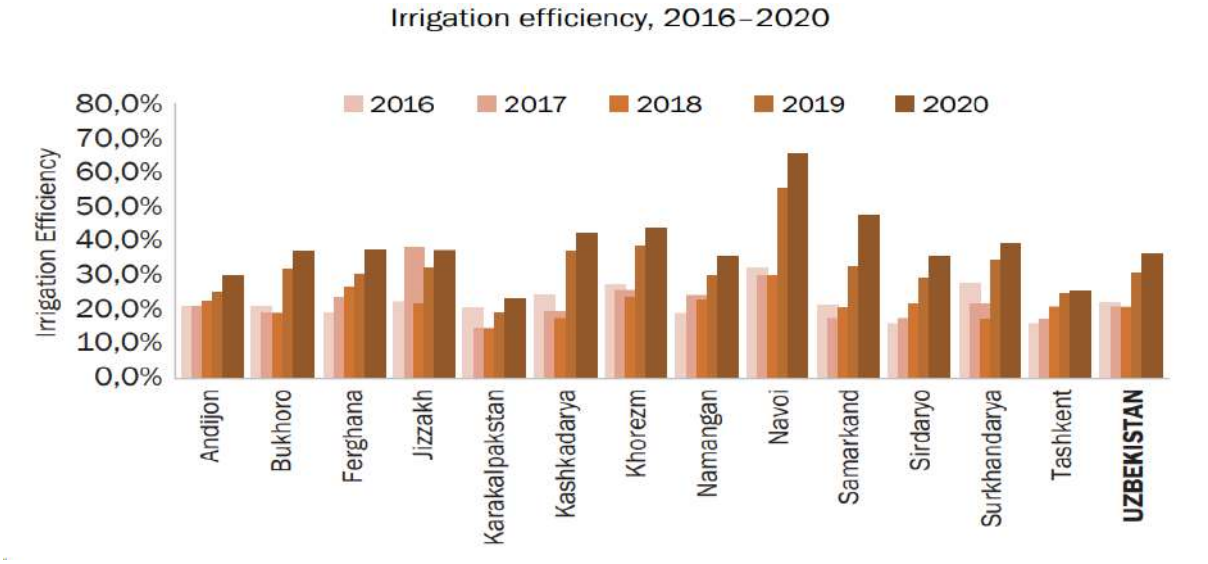
Source: *Uzbekistan, Country Climate and Development Report, November 2023, The World Bank*

27. 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.

28. In 2019, the country has used 2.6 million hectares land for irrigation out of 4.3 million hectares 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.

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

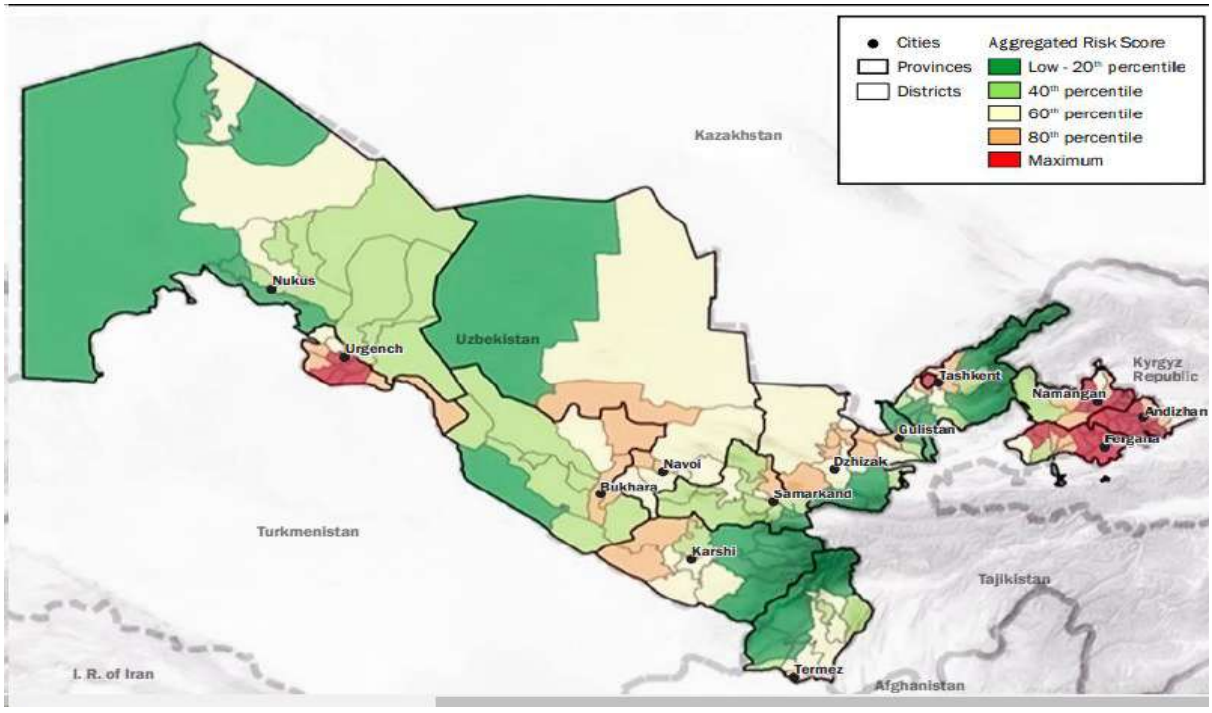
Figure 3: Irrigation efficiency from 2016 to 2020 in different irrigated agricultural areas



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

29. The rate of land degradation and its reasons differ widely in different provinces; some 30 per cent (13.7 million ha) of the country's land is severely degraded, mainly due to water stress, soil degradation, and salinization, which seem to be the leading causes of land degradation, see Figure 4 Land Degradation Hotspots.

Figure 4: Land Degradation Hotspots in the Country



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

30. The irrigation efficiency in the country is around 40 percent (World Bank 2023). However, the efficiency in Karlpakisthan is less than national figure (slightly higher than 20% in 2020), see Figure 3. The reason for low irrigation efficiency includes;

    (a) Abandonment of agricultural lands
    (b) Old and damage infrastructure, water consumption more than established norms of irrigation
    (c) Lack of water availability by competing users
    (d) Shortage of electricity
    (e) Rising salinization of soils

31. 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 estimate, by adopting efficient water management practices and modernization of existing irrigation infrastructure, the agricultural yields would increase by 62 percent.

32. 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.

33. 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;

34. 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;

35. 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 16*.

36. 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.

37. 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 "Kegeyli" Irrigation

System, for details, see Annexure 1. Prior to to screening, a reconnaissance survey was conducted to assess the extent of environmental and social risks,

1.1. Purpose of IEE

38. Kegeyli canal 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.

39. The Kegeyli subproject's Initial Environmental Examination (IEE) is being conducted as a part of a larger project that aims to comply with the environmental legislation of the Republic of Uzbekistan, as well as the requirements of ADB's Safeguard Policy Statement (SPS, 2009).

40. As per the ADB Safeguard Policy Statement, 2009 (SPS), Kegeyli irrigation system is categorized as B category project. The IEE of Kegeyli is prepared based on input from draft 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 for:

    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

41. 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 of draft feasibility report.
    e) Safeguards conditions as stipulated in PAM
    f) Screening based on pre-defined criteria
    g) Review of IEE report of core sub-projects and other similar projects
    h) Public consultations

i) Interaction with national and international specialist enagaged in this project
j) Review of published reports on geology, groundwater, surface water, soil, climate, flora, fauna, and cultural resources for Karakalpakstan province.
k) Review of additional studies undertaken by international experts for this project

1.3. Project Categorization

42. Before Screening of "Kegeyli" Irrigation System, a reconnaissance survey was conducted by safeguards experts on 27th May 2023 and subsequest visit by other experts to assess the extent of environmental and social risks. The reconnaissance survey concludes that most environmental and social impacts are site-specific and can be mitigated by adopting sound Environment and Social Management Plan. The finding of environmental and social screening is summarized in Table 17B. Based on the conclusion of the pre-defined ADB screening criteria, the project is classified as a Category B project due to the following reasons, See Box 1

Box 1: Why Kegeyli falls in Category B project

a) Environmental impacts are less 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), and
c) In most cases mitigation measures can be designed more readily than for Category A projects.

Therefore, IEE is considered sufficient to meet ADB's environmental safeguard requirements. Based on the preliminary assessment, around 56.94 ha of land will be impacted either temporarily or permanently by the project. Therefore, both national law and ADB's SPS 2009 get triggered.

43. ***According to the National Policy (Resolution of the CM 541, 07.09.2020), Kegeyli subproject 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. "With" and "Without" Kegeyli subproject

44. The Kegeyli irrigation system was built in 1938, some 80 years before the country's independence in 1992. It has a command area of about 100.65 thousand ha and receives water from the Amu Darya River. The canal supplies water to Nukus, Kegeyli, Chimbay, Karauzyak, Bozatau and Moynak rayons, for detail, see Figure 7 and 8.

45. Based on site survey and the extent of proposed civil interventions in Kegeyli canal, it has been found that most of the environmental and social impacts are site-specific and can be mitigated by adopting a sound Environment and Social Management Plan, for details, *see Table 2 and 3:* Impacts of a project "with" and "without a project".

46. Based on ADB pre-defined screening criteria, the project is categorized as B category project in accordance with the ADB SPS 2009. The findings of environmental and social screening is summarised in Table 17B.

47. There is no forest/protected area present. As per International Union for Conservation of Nature (IUCN) status, the species in the Kegeyli canal areas belong to least concern

1111Decree 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)

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 and noise 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 and loss of livelihood	Based on initial assessment, mordenisation of of Kegeyli canal will trigger involuntary resettlement (ADB's SPS 2009). According to estimate, 56.94 ha will be affected; • 4 leasehold farms – 26.81 ha • 1 silkworm farm and lands of the Livestock Development Committee – 4.25 ha • 4 agro enterprises -17.76 ha • District reserve lands - 8.12 ha. Some loss of livelihood is envisaged in Kegeyli due to the diversion of agricultural land. In kegeyli subproject, the initial site investigation show that it will create positive impacts (a) improve water security (b) generating local employments (c) strengthen economy of beneficiaries due to water security (d) improve economic and social well-being.	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	• Based on initial assessment Around 1565 tress to be cut down	No impact	+++
8	Community health and safety	• Less population density mostly agricultural land, • Few patch of scattered human settlements were noted on both sides of the canal.	Normal	+++

		• 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.		
9	Occupational health and safety	• Project will involve new road constrction for transportation of constrction material • The project will attract many workers; hence, a project of such size will pose workers' occupational health and safety concerns.	No impact	+++
10	Traffic impacts	Due to large-scale civil works, there will be significant pressure on local resources due to increased transportation, which triggers air and noise pollution, including community health and safety issues and public inconvenience.	Normal	+++
12	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 (particulary constction camp). Lack of mitigation measures triggers soil and groundwater contamination.	Normal	++
13	Water pollution	Not very significant, mainly generated from labour camps, construction camp and mechanical workshops.	Normal	+
14	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	+++
15	Noise pollution	Causes inconvenience to people and health impact to workers due to constant exposure..	Limited	+++
18	Influx of worker	Create pressure on local resources, trigger social conflict, and spread communicable diseases by mixing with locals.	Limited	+++

21	Transboundary Impacts	No transboundary impacts are anticipated	No	Environmental impacts are general types, temporary, reversible and mostly site specific
22	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. (+++), Positive impact
24	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 (+++), Positive impact

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

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

Sr. No	Name	System efficiency	Water consumption million m^3
1	Water consumption without project	0.53	3422.7
2	Water consumption with project (canal modernization)	0.72	2519.6
3	Reducing/increasing water consumption	-	903.1

1.5. Constraints and Limitations

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

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

All above issues may differ from current accepted scope of works. 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.

1.6. Report Structure

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

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

50. 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.

51. 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

52. 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.

53. Based on ADB pre-defined screening criteria, Kegeyli subproject is categorised as a category B project. *Table 4, 5 and 6 enumerates* the applicability of 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 4: Environment Safeguard Requirements - Applicability of Policy Principal in Kegeyli

Policy Principal	Environmental Safeguards requirement (ADB SPS)	Applicability and coverage
1	Screening and categorization of project	• Based on the pre-defined ADB screening criteria, 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, Kegeyli has been selected based on ADB pre-defined screening criteria,;
4	Environmental management plan (EMP)	• Detailed mitigation measures have been proposed for 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 meet the requirements of EMP.
5	Carry out meaningful consultation with affected people	• A detailed public consultation was conducted on 23nd 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	• To ensure EMP implemention, a Site Specific Environmental Management Plan (SSEMP) will be developed by contractor in align with EMP. To essure compliance, a detailed monitoring plan has been proposed in IEE. To comply with ADB SPS (2009) and PAM - a 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	• A detailed mitigation measures has been proposed for pre-construction and construction phase, for detail refer to Chapter V.
10	Ensure Safe and healthy working conditions for worker	• A detailed mitigation measures has 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 survey, 1000 meter on both side of canal, no archaeological or historical site exist

Table 5: Safeguard Requirement (Involuntary Resettlement) - Applicability of Policy Principal

Policy Principal (IR)	Description	Applicability and coverage in IEE
1	Screen and asses risks of Involuntary resettlement (IR)	• Based on the initial survey and proposed civil intervention, moderisation of Kegeyli canal will trigger involuntary resettlement. • According preliminary estimate, 56.94 ha will be affected; - 4 leasehold farms – 26.81 ha - 1 silkworm farm and lands of the Livestock Development Committee – 4.25 ha - 4 agro enterprises -17.76 ha - District reserve lands - 8.12 ha. • Furthermore, after finalisation of the design, it is recommended for Social due diligence to assess the extent of social impact and prepare RAP accordingly..
2	Meaningful consultations with affected persons, host communities, and other stakeholders. Inform all displaced persons of their entitlements and resettlement options. Establish a grievance redress mechanism Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and Indigenous Peoples	• Recommendation – Will undertake meaningful consultations during Social due diligence with the affected persons, host communities and other indirect affected persons including vulnerable person. After finalization of entitlements and resettlement options, the affected persons must be informed. • To address environmental and social grievances, including worker and community health and safety issues, a detailed GRM framework will be proposed, and PIU shall ensure that it is implemented in a meaningful manner. • Socio-economic baseline, gender/poverty assessment will be undertaken separately
3	Improve or at least restore, the livelihoods of all displaced persons through (i) land-based resettlement strategies when affected livelihoods are land based where possible or cash compensation at replacement value for land when the loss of land does not undermine livelihoods, (ii) prompt replacement of assets with access to assets of equal or higher value, (iii) prompt	• Based on the finding of Social due diligence and consultation, the entitlements and resettlement options must address said IR and comply with it.

	compenstion at full replacement cost for assets that cannot be restored, and (iv) additional revenues and services through benefit sharing schemes where possible.	
4	Provide physically and economically displaced persons with needed assistance, including the following: (i) if there is relocation, secured tenure to relocation land, better housing at resettlement sites with comparable access to employment and production opportunities, integration of resettled persons economically and socially into their host communities, and extension of project benefits to host communities; (ii) transitional support and development assistance, such as land development, credit facilities, training, or employment opportunities; and (iii) civic infrastructure and community services, as required.	• Based on the finding of Social due diligence and consultation, the entitlements and resettlement options must address said IR and comply with it.
5	Improve the standards of living of the displaced poor and other vulnerable groups, including women, to at least national minimum standards.	• PIU must ensure compliance with said IR
6	Maintain the same or better income and livelihood status if land acquisition is through negotiated settlement	• Based on the finding of Social due diligence and consultation, the entitlements and resettlement options must address said IR and comply with it.
7	Ensure that displaced persons without titles to land or any recognizable legal rights to land are eligible for resettlement assistance and compensation for loss of no land assets.	• Based on the finding of Social due diligence and consultation, PIU shall comply with said IR
8	Prepare a resettlement plan elaborating on displaced persons' entitlements, the income and livelihood restoration strategy, institutional arrangements, monitoring and reporting framework, budget, and time-bound implementation schedule.	• PIU must ensure compliance with said IR
9	Disclosure of resettlement plan (draft and final)	• PIU must ensure compliance with said IR
10	Conceive and execute involuntary resettlement as part of a development project or program. Include	• PIU shall comply with said IR, a separate gender/poverty assessment will be undertaken to design framework for inclusive growth

	the full costs of resettlement in the presentation of project's costs and benefits.	
11	Pay compensation and provide other resettlement entitlements before physical or economic displacement.	• PIU must ensure compliance with said IR
12	Monitor and assess resettlement outcomes, their impacts on the standards of living of displaced persons, by taking into account the baseline conditions	• PIU must ensure compliance with said IR

Table 6: Safeguard Requirement (Indigenous Peoples) – Applicability of Policy Principal

Policy Principal	Description	Kegeyli subproject
Policy Principal 1 to 9	Under Indigenous Peoples safeguard requirement, Policy Principal 1 to 9 are applicable on Kegeyli subproject.	

54. Gender Mainstreaming, Transparency and Accountability - Besides safeguard compliance, in ADB-financed Kegeyli projects, PIU shall ensure compliance with ADB's Policy on Gender and Development (1998) and **Access to Information Policy**. In implementation of Kegeyli 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

55. 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.

56. 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.

57. The Law **"On Water and Water Use"** (1993) regulate water resources, rational use of water for the needs of the population and economic sectors, protection of water from pollution, prevent and eliminate the harmful effects of water, improve the condition of water bodies, and protect the rights and legitimate interests of enterprises, institutions, organizations, farms, dehkan farms and citizens.

58. The Law the Oliy Majlis of the Republic of Uzbekistan is the main Government Institution, which identifies and approves the regulation of water related issues, adopts legislative acts on water and water use. In addition, determine main directions of state policy in the field of use and protection of water resources and adoption of strategic state water management programs. 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.

2.2.1 Applicable National Laws, Regulations and Standards

59. 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

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

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

61. The Basic Law stipulates in 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.

62. 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."

63. 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.”

64. The Basic Law states that “Everyone shall have the right to decent work, to free choice of profession and occupation, favorable working conditions that meet the requirements of safety and hygiene, to fair remuneration for work without any discrimination and not below the established minimum wage, as well as the right to unemployment protection in the manner prescribed by law. The minimum wage shall be determined taking into account the need to ensure a decent standard of living for a person. It shall be prohibited to refuse to hire women, dismiss them from work and reduce their wages on the basis of pregnancy or having a child.”

65. 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".

66. Environmental regulations of Uzbekistan are governed by several supporting laws and statutes for environmental management. The main ones are presented in Table 7 below and briefly summarized further in this section of the report.

Table 7: List of Key Environmental Laws

Law/regulation	Date of adoption	Date of last amendment	Key provisions
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, preceded 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 compensations for damages from atmospheric pollutions. The main purpose of the law is 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 on Water and Water Use	06.05.1993	01.12.2021	This law regulates the rational use of water by the population and economy. The law also regulates the protection of waters from pollution and depletion, and prevention and liquidation of harmful effects of water, improvement of water bodies and the protection of the rights of enterprises and institutions, organizations and dekhan farms and individuals in the field of water relations. This law also authorizes the State (through authorized agencies) to carry out management and control of water use and protection.
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/regulation	Date of adoption	Date of last amendment	Key provisions
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 generations, 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 the rules 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 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/regulation	Date of adoption	Date of last amendment	Key provisions
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 Expertise	25.05.2000	29.04.2021	It specifies the purposes, objectives and types of environmental expertise. The law defines the qualifications, duties and obligations of environmental experts. MinEcology has overall responsibility for implementing this legislation.
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 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	Section 4. Environmental Crimes (approved on 22.09.1994; amended on 16.02.2022). 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.		

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

a) “Procedure for elaboration and execution of draft standards on maximum permissible emission of contaminants discharged to water bodies including drainage water” (RD 118.0027719.5-91);
b) “Procedure for granting permission for special water use” (RD 118.0027714.6-92);
c) “Instruction for determining of damage caused to the national economy by underground water contamination” (RD 118.0027714.47-95);
d) State Standard - Drinking water. O’z DST 950:2011 – Drinking water. Hygienic requirements and quality control;
e) SanR&N RoU No.0172-04 Hygienic norms. For the protection of surface waters in the territory of the Republic of Uzbekistan;
f) “Temporary recommendation on control of underground water protection of the Republic of Uzbekistan”. State Nature Committee and Uzbek-gidrogeologiya of the Republic of Uzbekistan, Tashkent, 1991;
g) Decree of the Cabinet of Ministers “On approval of Provision on the State Environment Monitoring” (No 49, 3.04.2002);
h) Decree of the Cabinet of Ministers “On the Action Program for the Protection of Environment in the Republic of Uzbekistan for 2013-2017” (No 142, 27.05.2013);
i) State standard O’z DSt 1057:2004 “Vehicles. Safety requirements for technical conditions” and O’z DSt 1058:2004 “Vehicles. Technical inspection. Method of control”;
j) SanR&N RoU No. 0293-11 Sanitarian Rules and Norms List of Maximum Permissible Concentrations (MPC) of pollutants in the atmospheric air of populated areas on the territory of the Republic of Uzbekistan;
k) SanR&N RoU No. 0158-04 Sanitarian Rules and Norms on collection, transportation and disposal of wastes contained asbestos in Uzbekistan;
l) SanR&N RoU No. 0267-09 Admissible noise level into the living area, both inside and outside the buildings;
m) SanR&N RoU №0120-01 Sanitarian Norms of allowed level of noise at the construction sites;
n) SanR&N RoU No 0088-99 Sanitarian requirements for development and approval of maximum allowed discharges (MAD) of pollutants discharged into the water bodies with waste waters;
o) KMK (Construction norms and rules) 2.01.08-96 “Noise Protection”;
p) Decree of the Cabinet of Ministers of the Republic of Uzbekistan on Approval of the collection and disposal of used mercury-containing lamps. No. 266 of 21.09.2011;
q) SanR&N # 233-07 On occupational health and environment protection during production and usage of asbestos contained materials.

2.2.2. Institutional Framework for Environmental Management

68. A range of government departments is responsible for the management, rational use of natural resources, and protection of the environment in Uzbekistan. Following government bodies administer and enforce laws under different statutes:

a) The Cabinet of Ministers (CM),

b) The Ministry of Ecology, Environmental Protection and Climate Change (Minecology), and

c) Khokims on place.

69. **The Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan** (MinEcology) is the primary agency and environmental regulator responsible for implementing the Law on Nature Protection (1992). The Ministry reports to the **Cabinet of Ministers** of the Republic of Uzbekistan. The main tasks of the MinEcology include ensuring the implementation of a unified state policy in the field of environmental safety, environmental protection, use and reproduction of natural resources; the implementation of state control over the observance by ministries, state committees, departments, enterprises, institutions and organizations, as well as individuals, in the area of use and protection of land, mineral resources, water, forests, flora and fauna, atmospheric air; interdisciplinary integrated environmental management; and organization and coordination of work to ensure a favorable state of the environment and improve the environmental situation.

70. The MinEcology structure includes a central body in Tashkent with regional branches and agencies providing scientific and technical support. Regional environmental authorities are structures organized similarly to the central MinEcology. According to the Article 123 of the Constitution **Khokims** is responsible for implementation of measures aimed at ensuring the economic, social, cultural and environmental development of the territories.

71. The activities of the **Center for State Ecological Expertise** (CSEE) is directly related to Environmental Impact Assessment and the issuance of a document on determination of the compliance of the planned or ongoing business and other activities with the environmental requirements and determination of the admissibility of the implementation of the object of environmental expertise.

72. Other state bodies of the Republic of Uzbekistan (RUz) dealing with environment-related issues are:

    a) Ministry of Water Resources;
    b) State Committee for Geology and Mineral Resources;
    c) Centre of Hydro-Meteorological Service;
    d) Ministry of Health;
    e) State Inspectorate for Exploration Supervision, Operations Safety Supervision of Industry, Mining and Utilities Sector;
    f) Ministry of Culture;
    g) Ministry of Emergency Situations, etc

73. The Constitution stipulates (Article 123) that Khokims of regions, districts, and cities are responsible for the implementation of measures aimed at ensuring the economic, social, cultural and environmental development of the territories.

2.2.3 Environmental Assessment Process in Uzbekistan

74. The national environmental impact assessment (EIA) procedure is regulated by the Law "On the Environmental Examination" and the Resolution of the Cabinet of Ministers № 541 "On further improvement of Mechanism of the Environmental Impact Assessment dated 07.09.2020 (last amendment № 774 dated 27.12.2021). The Resolution specifies the requirements for EIA process in Uzbekistan, *see Figure 5 and Table 8;*

75. MinEcology carried out State Ecological Expertise (SEE) by the three specialized expert divisions:

a) Center for State Ecological Expertise (CSEE) of the SCEEP carried SEE for project classified as I and II categories of environmental impact (high and medium risk);

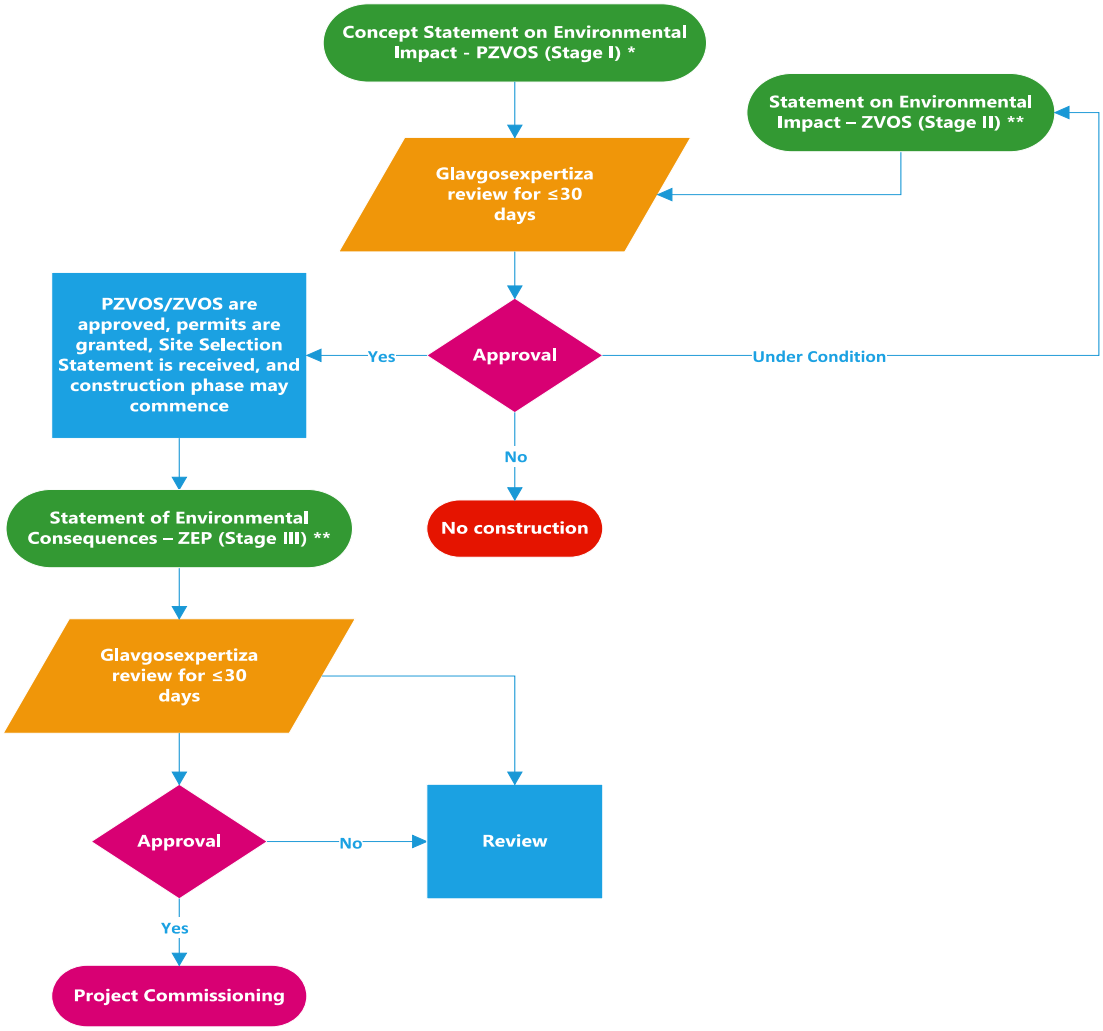
b) Center for State Ecological Expertise of the Republic of Karakalpakstan carries out environmental examination of EIA for a project classified in III and IV categories of environmental impact (low risk and local impact);

c) Center for State Ecological Expertise of regions and Tashkent city – undertake environmental examination of EIA of project classified in III and IV categories of environmental impact (low risk and local impact).

Table 8: Project Categorization as per National Statutes

Category	**Requirement**
Category I	**"High risk of environmental impact",** the state environmental expertise, national MinEcology , undertake environmental examination of EIA within 20 days
Category II	**"Medium risk of environmental impact"** (state environmental expertise, national MinEcology , undertake environmental examination of EIA within 15 days;
Category III	**"Low risk of impact",** state environmental expertise, regional branch of MinEcology , undertake environmental examination of EIA within 10 days;
Category IV	"Local impact" (state environmental expertise, regional branch of MinEcology, undertake environmental examination of EIA within five days

Figure 5: EIA procedure in Uzbekistan[14]



Note:
* - Apply for Project Categories I to IV
** - Apply for Project Categories I to III

76. The types of activities classify under in I and II categories of environmental impact are subject to SEE. The procedure for holding public consultations is provided in Appendix 3 of the Resolution of the Cabinet of Ministers № 541. Section 24 of the Resolution on state environmental expertise outlines the information that should be within the documentation at each of these stages. Three stages of the EIA and their required results are summarized in Table 9.

[14] *Regulation on the State Environmental Expertise in the Republic of Uzbekistan № 541 dated 07.09.2020 and its amendment №774 dated 27.12.2021.*

Table 9: Stages of EIA and Outcome

Stage	Description
Stage I.	The draft Environmental Impact Statement (PZVOS is the national acronym) is the first stage of the assessment process and is developed before a decision is made on the implementation of planned economic activities and other activities. The draft Environmental Impact Statement is reviewed and approved on a national level for projects falling under categories I and II, and on a regional level for projects falling under categories III and IV under the MinEcology. The state environmental expertise confirms the project category and identifies the main issues that the project beneficiary should focus on in the next stages of the environmental assessment process, as well as during the project implementation (construction or rehabilitation works).
Stage 2	This stage is triggered when additional investigations or analyses are required, as identified by CSEE at Stage I. The Statement must be submitted to the CSEE before approving the project's feasibility study.
Stage 3	The Statement on Environmental Consequences (ZEP is the national acronym) represents the final stage in the SEE process and is conducted before the project is commissioned. The report describes in detail the changes in the project made as a result of the analysis of the state environmental expertise during the first two stages of the EIA process, the comments received during public consultations, applicable environmental standards, and the environmental monitoring requirements, as well as the main conclusions.

77. State environmental expertise approval (conclusion issues by SCEE) is a mandatory document for project financing by local banks and other lenders (Section 18).

78. The Conclusion of state environmental expertise is valid for three years from the date of its issuance. If the object is not implemented within three years from the date of issuing the Conclusion of SEE, it needs to be revised and re-submitted to the MinEcology for revision and approval.

79. The Conclusion of SEE shall be sent to the relevant regional (city) control inspections. Such inspections under the MinEcology supervise compliance with the requirements and conditions specified in the Conclusion of SEE.

Box 2: ***According to the National Government Environmental Policy, the Kegeyli subproject R8 subproject falls under Category II, and therefore, a national EIA report is required, and approval must be obtained from the authority (Resolution of the CM 541, 07.09.2020)***.[15]

2.2.4. Environmental Standards

80. 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, for details, refer to Annexure 4.

2.2.5. Social and Labour-Related Policies

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

[1515]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 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	21.12.1995	30.04.2023	Regulates labor relations of individuals employed with labor contract by enterprises, institutions, organizations of all type ownership forms, including contracted by individuals.
Law on Population Employment	13.01.1992	21.01.2021	Deal with employment
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, 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

82. **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 (11) briefly provide a summary of the main provisions;

Table 11: 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.	Prohibition of forced labour/child labour and punishment.
Wages and deductions.	Stipulate provision for minimum wage, amount of compensation for the work performed.
Women	Women have equal right for employment, work, weekend, salary. Night work, overtime work, weekend 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.

83. **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.

84. **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).**

2.2.6. Climate Inclusion in National Policy

85. 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.

2.2.7. Legislation and Regulations on Land Use and Land Acquisition for Public Needs

86. **Civil Code** (adopted on 29.08.1996, last amended on 08.11.2022) defines general rules of property seizure, determination of property cost and rights for compensation, terms of rights termination. The Civil Code (CC) defines the legal status of participants of public relations, the grounds, and procedure of implementation of property rights and other proprietary rights, rights of intellectual property, regulates the contractual and other obligations, as well as other property and related personal non-property relations. The CC defines general rules of property seizure, determination of property cost and rights for compensation, terms of rights termination. The CC provides that: a person whose right has been violated may demand full compensation for damages unless the law or the contract provides compensation for losses in a smaller size. The CC also specifies that losses are understood as:

a) Expenses that the person whose right is violated, made or must make to restore the violated right;

b) Loss of or damage to property;

c) Revenues that this person would have received under normal conditions of civil turnover if his right had not been violated (lost incomes).

87. **Land Code** dated 30.04.1998 (last amendment 30.06.2022). **The Land Code is the main regulatory framework for land related matters in Uzbekistan.** The land code regulates allocation, transfer and sale of land plots, defines ownership and rights on land. It describes responsibilities of different state authorities (Cabinet of Ministers, region, district, and city khokimyats) in land management; rights and obligations of land possessor, user, tenant, and owner; land category types, land acquisition and compensation issues, resolution of land disputes and land protection. The land code also defines the terms of rights termination on land plot, seizure, and land acquisition of land plot for state and public needs, and terms of seizure of land plot in violation of land legislation.

88. **Resolution of Cabinet of Ministers "On Additional Measures on Ensuring Guarantees of Property Rights of Individuals and Legal Entities and improving the Procedure for acquisition of Land Plots and Payment of Compensation"** № 911 dated 16.11.2019. This resolution deals with regulations that determine the procedure for withdrawal/redemption of a land plot or its part, as well as the procedure for calculating the amount of compensation to citizens and legal entities for demolished residential, industrial, and other buildings, structures and trees and crops in connection with the withdrawal/redemption of land plots for state and public needs. The resolution envisages procedures for acquisition of lands for state and public needs that belong to individuals (individual entrepreneur, citizen of the Republic of Uzbekistan, foreign citizen and stateless persons) and legal entities (business entities, non- governmental organizations) on the basis of ownership, permanent use or temporary use, as well as in the framework of investment projects and compensation for property owners including for the properties located on impacted lands.

89. **Resolution of Cabinet of Ministers "On Measures to Improve the Procedure for Providing Land Plots for Urban Planning and Other Non-Agricultural Needs"** № 146 dated 25.05.2011. This Resolution aimed to improve the procedure of granting land plots, protect the rights of legal entities and individuals on land, and improve the architecture of settlements and the efficient use of their (settlements) land for construction in accordance with the Land Code and the Urban Planning Code. This resolution has approved two Regulations: (i) Regulation on the procedure for granting land for urban development and other non-agricultural purposes, (ii) Regulation on the procedure of compensation for land possessors, users, tenants, and owners, as well as losses of agriculture and forestry.

90. **Resolution of Cabinet Ministers "On measures to improve the effectiveness of training and realizing projects with participation of international financial institutions and foreign government financial organizations"** № 3857 dated 17.07.2018 (with amendments dated 27.01.2021). The resolution provides that payment of compensation for the land acquisition, demolition of houses, other structures, plantings within the framework of projects with the participation of International Financial Institutions (IFIs), if it is agreed and stated in agreements, then will be carried out by authorized bodies.

2.2.8. Biodiversity Related Policy in Uzbekistan

91. The national biodiversity policy in Uzbekistan is based on the provisions of the National Constitution of 1992. Article 55 defines that flora and fauna as well as other natural resources are protected by the state and considered to be resources of national wealth subject to sustainable use. Biodiversity management and conservation in Uzbekistan are regulated through a range of national laws and regulations.[16]

National Laws – Biodiversity

a) *Law of the Republic of Uzbekistan on Protected Natural Areas* (#710-II of 03 December 2004, as last amended 30 September 2020).
b) *Law of the Republic of Uzbekistan on Protection and Use of Flora* (#543-I of 26 December 1997; new addition - #409 of 21 September 2016).

16 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.

c) *Law of the Republic of Uzbekistan on Protection and Use of Fauna* (#545-I of 26 December 1997; new addition - #408 of 19 September 2016)..
d) *Law of the Republic of Uzbekistan on Forestry* (#770-I of 14 April 1999; new addition - #475 of 16 April 2018)..

92. **Decrees related to biodiversity**

a) *Decree of the Cabinet of Ministers (DCM) of Uzbekistan on Approving a Strategy for the Conservation of Biological Diversity in the Republic of Uzbekistan for the Period of 2019-2028* (#484 of 11 June 2019)**.**
b) *DCM on the Settlement of the Use of Biological Resources and the Procedure of Permission of the Resolving Procedures in the Field of Nature Use* (#290 of 20 October 2014 as last amended 27 May 2019)
c) *DCM on Measures to Improve the Public Administration System in the Sphere of Protected Natural Territories* (#4247 of 20 March 2019)
d) *DCM on the Approval of the Strategy for the Preservation of Biological Diversity in the Republic of Uzbekistan for the Period 2019-2028* (#484 of 11 June 2019)
e) *DCM about Measures on the Organization of the Preparation, Edition, and Management of the Red Book of the Republic of Uzbekistan* (#1034 of 19 December 2018)
f) *Decree of the Supreme Council of Uzbekistan on Reinforcement of the Protection of Valuable and Endangered Species of Flora and Fauna and Harmonization of their Use* (#937- XII of 3 September 1993)
g) *Appendix of the DCM on Classification of Technogenetic, Natural and Environmental Emergencies* (#455 of 27 October 1998)

2.2.9. ADB and Uzbekistan Legislation Requirements

Table 15 enumerates the summary of the comparison of ADB and Uzbekistan Legislation Requirements.

2.3. International Conventions and Agreements

93. The Republic of Uzbekistan has approved and adopted following (see table 13) international conventions for environmental protections in the country.

Table 13: International Conventions and Treaties

Sr.No	International Conventions and Treaties[17]	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	Committed to implement the 2030 Agenda for Sustainable Development.[18]	2015

2.4. International labour - Legal instruments and commitments

94. **ILO core labor standards -** The Republic of Uzbekistan ratified 18 ILO conventions and 1 Protocol[19] 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 14.

Table 14: 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

[17] https://www.adb.org/sites/default/files/linked-documents/50063-001-ieeab.pdf
[18] https://sustainabledevelopment.un.org/memberstates/uzbekistan
[19] Source: International Labor Organization: https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103538

Convention	Date	Status
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
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[20]

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

Table15: 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.	Kegeyli 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, Kegeyli 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 or 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	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.

			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.	
	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 SUBPROJECT)

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

95. Under this project, the MWR provided a list of eight I&D subprojects for modernization, the name of project and location of the all subprojects is given in Table 16. The government and ADB jointly selected two 'core' subprojects in 2019 i.e. (a) Babatag Irrigation system (b) Jondor irrigation system. 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 16: Subprojects Proposed by the MWR for Modernization

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

96. Based on ADB selection criteria and considering the suggestions from the Minister's Council of the Republic of Karakalpakstan, the client requested ADB's no-objection to start the development of feasibility study for Kegeyli. The said canals have been evaluated and selected from among three canals proposed by the Ministry of Water Resources of the Republic of Uzbekistan.

97. 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 17A and 17B enumerates the detailed screening procedure followed for three non-core subprojects.

98. Before Screening of Kegeyli canal, a reconnaissance survey was conducted by safeguards experts on 27th May 2023 to assess the extent of environmental and social risks. Based on the Reconnaissance survey, it has been concluded that most environmental and social impacts are site-specific and can be mitigated by adopting a specific Environment and Social Management Plan. The findings of environmental and social screening is summarised in Table 17B.

Table 17 A. 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[21]	7,500 ha [22]
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 [23]	Yes
WCA / WUA	Yes	Yes	Yes	Yes
Modernization of whole system	Yes	Yes	Yes	Yes
O & M tariff on volume	Yes	Yes[24]	Yes[25]	Yes[26]
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 [27]
High Value crops	>25%	40.0%	30-35.0%	N/A

[21] The area of Kegeyli exceeds 100,000 ha and will require at least one year to develop the Feasibility Study for the "whole system approach" criteria
[22] The area of Zey-Yab is less than 10,000 ha and the expansion of area is possible only for 82 ha
[23] The area of Kegeyli exceeds 100,000 ha and will require at least one year to develop the Feasibility Study for the "whole system approach" criteria
[24] The water tariff is now free of charge
[25] The water tariff is now free of charge
[26] The water tariff is now free of charge
[27] Soil salinity affects about 50% of the irrigated area

Selection Criteria	Condition for selection	Subproject 1 R-8	Subproject 2 Kegeyli	Subproject 3 Zey-Yab
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
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

* for safeguard screening, refer Table 17B

Table 17B: Safeguard Screening Criteria for "Kegeyli" sub-project

Screening Criteria	Yes/No	Remarks
Activities listed on the ADB Prohibited Investment activities	No	Not listed under prohibited activities.
Sub-projects located inside a legally protected area	No	Site is not inside a legally protected area; during site inspection, 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 are present or cause degradation to local sensitive ecosystems
Sub-projects likely to impact critical habitat or natural habitat areas or that could lead to a	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 39, 40 and 41 and Figure 19.*

reduction in the population of any Endangered (EN) or Critically Endangered (CR) species		
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	May disturb local due to increase in traffic movement
Human settlement	Yes	Very few human settlements were noted
Accident	Yes	Increase in traffic movement may trigger community health and road safety and maycause local due road blockage and traffic diversion.
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	The project will involve extensive trees cutting, a lot of trees noted on both side of the canal.
Land acquisition and involuntary resettlement	Yes	Based on the preliminary assessment, around 56.94 ha of land will be impacted either temporarily or permanently by the project.
Conflict	Yes	Project is labour intensive, hence construction and labour camp may trigger conflict with local population due to labour camp and may also trigger other social conflicts

3.2. About Kegeyli Subproject

99. Kegeyli non-core sub-project was built in 1938. Most water infrastructure facilities' service life exceeds 80 years; their technical condition has deteriorated over the years. The existing water level does not have enough gravity for water intake, and canals has high level of filtration. The details of the Kegeyli irrigation system are summarised in Table 18.

Table 18: Details of Kegeyli sub-project and Secondary Canal

Sr. No	Particulars	KEGEYLI non-core subproject
1	Project executing agency	• Ministry of Water Resources (MWR)
2	Project Implementing Agency (PIU)	• PIU under Center for Implementation of Foreign Investment Projects in Water Sector (CIFIPWS) is the Project implementing agency
3	Project Implementing Consultant (PIC)	• **JV SMEC International Pty Ltd. and Annexure Financial Solutions Ltd. JV** is a Project Implementation Consultant (PIC)
4	Project category	• Kegeyli non-core sub-project is classified as category B projects as per ADB's Safeguards Policy (SPS-2009), *for detail refer to Table 17A and 17B Safeguard Screening of 'non-core' Sub-project Based on Agreed Screening Criteria.*
5	Location	• Republic of Karakalpakstan
6	**Year Constructed**	• 1938
7	**Canal length and type**	**Kegeyli canal** • Earthen canal • The canal is 55.5 km long, from CH 0 to CH 366+00 **Secondary canal (Kegeyli Nizhniy)** • Earthen channel • Takes water from the Kegeyli-lower canal PK366
8	**Scope of modernisation and rehabilitation**	**Kegeyli canal**

		• Out of the total length of canals, 36.6 km is planned to be upgraded and modernised. **Secondary canal (Kegeyli Nizhniy)** • Total length of 18.64 km considered modernisation
9	**Irrigated area**	**Kegeyli canal** • Total irrigated area is 100.65 thousand hectares. • Due to mordensiation irrigated capacity will increase to 129 thousand hectares. **Secondary canal (Kegeyli Nizhniy)** • Canal command area is= 55.988 thousand hectares of irrigated land
10	**Source of water for** Kegeyli **canal**	**Kegeyli canal** • Source water from the Dustlik canal from the Razvilka waterworks facility, which in turn source water from the Amu Darya River. **Secondary canal (Kegeyli Nizhniy)** • Takes water from the Kegeyli-lower canal at PK366
11	**Coverage & efficiency of canal**	**Kegeyli canal** • The canal Kegeyli was built in 1938 and has been undergone rehabilitated in (a) In 2013-2014, 19.2 km canal section was reconstructed (b) concreting of length of 2.5 km of canal slopes (since 2020) in the Chimbay city limits, currently about 1.8 km have been completed. • Original designed flow: 180 m^3/sec, actual flows is about 158 m^3/s (canal head). • **Water loss and canal efficiency** – According to an estimate made in the feasibility report (2024), total water losses in 55.4 km long canal is around 35.0 m^3/s and canal efficiency is estimated at about 0.708 • Irrigates lands in Nukus, Kegeily, Chimbay, Buzatauskiy, Karyauzak and Muynak districts of Karakalpakstan • Overall condition of system is medium to poor. • Shortage of water supply during vegetation season **Secondary canal (Kegeyli Nizhniy)** • Earthen flat channel with eroded slopes • Command area – 55.988 thousand hectares, takes water from the Kegeyli-lower canal at PK366.

		• The canal flow rate is 63 m3/s and efficiency is 0.70.
12	**Proposed intervention for modernisation**	**Kegeyli canal** • Head structure (CH0+00) • Waterworks facility «Dostlik», CH114+00 • Waterworks facility, Mayab, CH362+00 • Water outlets (branches), 45 pumping station and 35 outlets • Canal slope linining (36 km) **Secondary canal (Kegeyli Nizhniy)** • Reconstruction works includes; - Cleaning of pumps; - Concrete lining of canal slopes 18.64 km; - Replacement of the outdated gates and lifting mechanisms of the regulators and outlets; - Rehabilitation of hydraulic structures, if necessary; - Construction of new gauging stations (measuring bridge);
13	**Water withdrawal**	• The average annual water withdrawals in last 18 years (2005-2022) is 1126.87million m^3, including 888.06 million m^3 during non-growing season and 286.30 million m^3 during growing season.
14	**Cropping**	Cropping includes cotton, winter wheat, rice, orchards (apple, apricot and grape), fodder crops (maize and alfalfa) and homestead gardens.
15	**Utility shifting and impacts**	See Table 36 for mail and secondary canal
16	**Environment and Social issues**	
	Environmental impact	• Mostly moderate, temporary and site specific
	Trees felling	Based on preliminary investigation, around 1565 number of trees fell in main canal + in secondary canal, it is around 2000 trees.
	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 withien 1, 2 and 5 km • Falls in Central Asian Flyway (CAF) hotspot area[28] • No presence of any Keystone Species, or those Species, which are crucial to the overall functioning of an ecosystem
	Involuntary displacement	Yes
	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
17	**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 strengthens farmers' incomes, and improves socio-economic status • Strengthening capacity of WMO and WCA on infrastructure management and water use efficiency. • More inclusion and participation of women in project management and women-managed farms. • Gender equality and enhance women's participation in land and water management. • Climate resilient I&D infrastructure

[28] *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*

Figure 6: Kegeyli canal

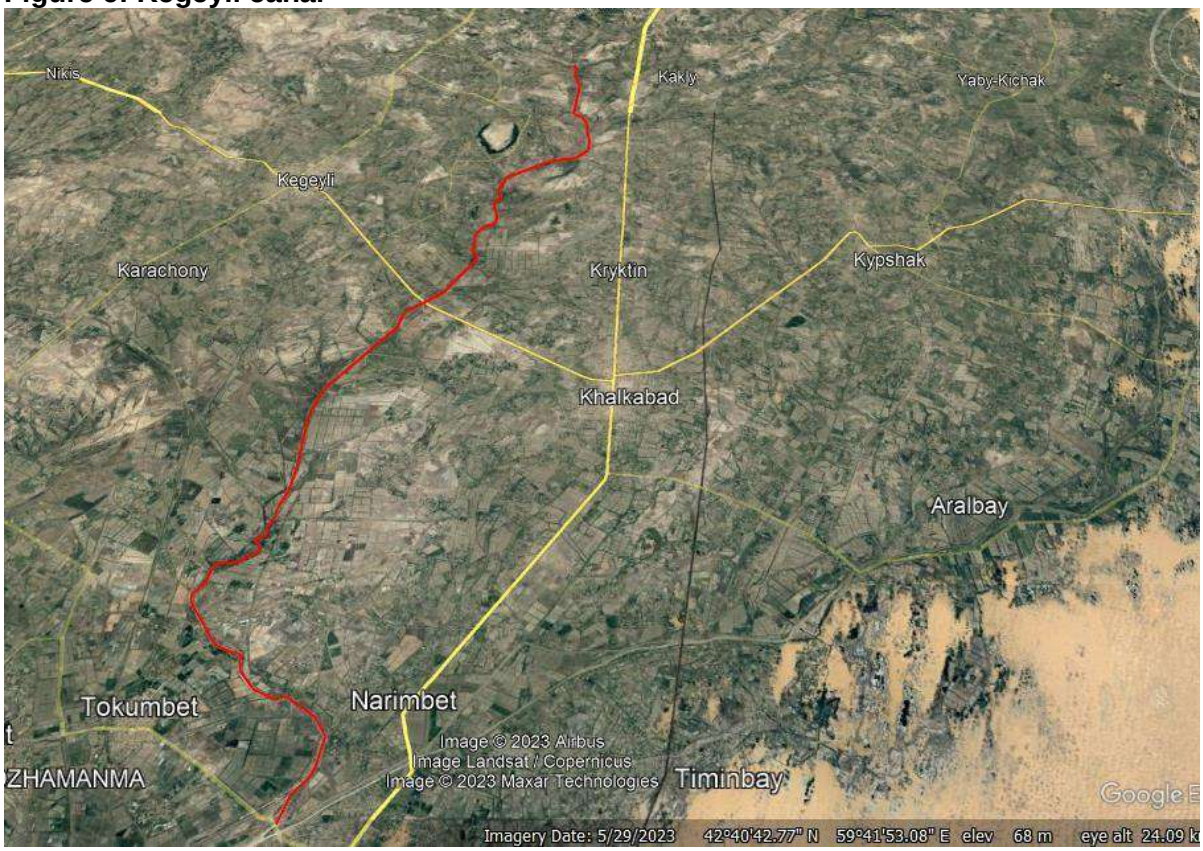
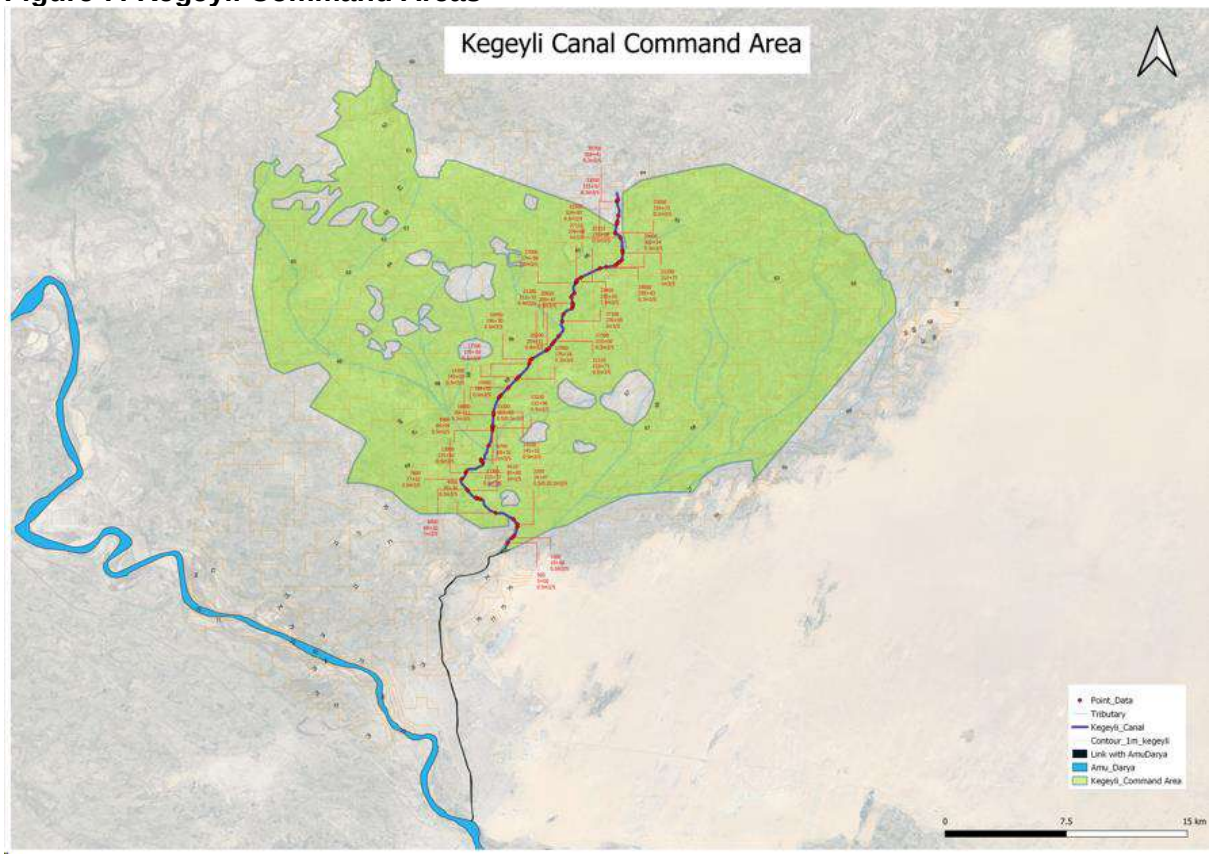


Figure 7: Kegeyli Command Areas



3.3. Need for modernization and upgradation of R8 canal canal

100. In Republic of Karakalpakstan, agriculture is the primary source of employment and income, especially in the rural areas, where most of the population is engaged in the agricultural sector. Due to the physical deterioration of existing water management facilities, it becomes challenging for local authority 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

101. 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 of project is to strengthen agricultural productivity, decrease land degradation and increase water security through climate resilient and modernized irrigation systems which receive water from the Amu Darya River. Table 19 enumerates the scope of Kegeyli subproject under different outputs as agreed between the government and ADB.

Table 19: Scope of Kegeyli modernization under different outputs

Output 1: Main Canal Water Supply Systems Modernized	Scope of intervention 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 • Concrete lining (slope) of 36.6km canal by using high-density polyethylene (HDPE) membrane • Secondary canal `concrete lining (18.64 km), for details refer Box 3
b) Establishment of improved control structures and protective works	• Modernization of three main water distributing structures (1 head structure, main distribution structure) and 54 outlets in option 1 and 57 outlets in option 2
c) Construction of improved measurement and canal control systems	• Repair of 6 hydrometric bridges, 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	Survey work completed; detail is provided in final feasibility report
(b) Introduction of innovative climate smart on-farm irrigation technologies	Survey work is in progress; detail is provided during the detailed design stage
(c) Drainage works for salinity improvement	Survey work is in progress; detail is provided during the detailed design stage
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 Kegeyli canal

102. 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 Kegeyli 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

103. In order to reduce channel losses and increase its performance, the following intervention has been proposed:

a) Cutting of vegetation layer, excavation of sediment
b) Concrete lining of the canal (only slope)
c) Replacement of outdated sluice gates and lifting mechanisms regulators and releases
d) Restoration of concrete hydraulic where necessary
e) Installation of equipment or monitoring water flow (SCADA)

3.6. Existing Hydraulic Structure on Kegeyli and Secondary Canal

104. The 55.4 km long Kegeyli Canal is located on the right bank of the Amu Darya River. The canal takes water from the Dustlik canal from Razvilka waterworks facility. As per the cadastre, the maximum canal discharge is 180.0 m^3/s, irrigated area is 100.65 thousand ha. The existing slopes in the canal range from 0.0001 to 0.00014. The water flow speed is from 1.01 to 1.11 m/s, the cross section is close to parabolic. The canal runs in an earthen channel throughout its entire length. The canal slopes are diverse - from 1.0 to 2.0, flatten out towards the bottom. There is no inspection road along almost the entire canal length.

105. Since 2000s, the size of head water intake has decreased, which was accompanied by siltation of the canal bed. As a result, there has been a strong probability of changing canal parameters (depth and width), which complicates their normal operation. Canal capacity tends to decrease over time. Thus, the Kegeyli Canal in 2016 had a capacity of no more than 120m3/s, for detail, see Table Hydraulic elements of the Kegeyli canal and seconday canal.

106. Secondary canal is also an earthen canal, taking water from the Kegeyli-lower canal at PK366. The canal flow rate is 63 m3/s and its efficiency is 0.70, for detail of Hydraulic elements of main and seconday canal, see Table 20 and 21 respectively.

Table 20: Kegeyli Canal - Hydraulic elements

CH – CH	Q m3/s	I	n	m	B, м	H , м	V, м/с
CH0+00 – CH114+40	180,0	0,0001	0,02	2,0	28,0	4,0	1,08
CH114+40 – CH366+00	120,0	0,0001	0,02	2,0	24,0	3,75	1,01
CH366+00 – CH554+00	60,0	0,0001	0,02	2,0	22,0	2,68	0,82

Source: Draft Feasibility Report

Table 21: Kegeyli-Lower Canal - Hydraulic elements

PC- PC	Q m3/c	i	n	m	B, м	H , м	V, м/с
PC366+00 – PC554+00	60,0	0,0001	0,0225	2,0	22	2,68	0,82

Source: Draft Feasibility Report

107. Table 22A and 22B enumulates the status of existing hydraulic structures on Kegeyli canal and secondary canal.

Table 22A: Status of Existing Hydraulic Structures (Kegeyli canal)

No.	Chainage location	Name of the structure	Year of Constrction	State	Required actions
1	CH0+00	Head structure	Built in 1959	Unsatisfactory.	Modernization needed
2	CH114+00	Waterworks facility «Dostlik»	Built in 1990	Unsatisfactory.	Modernization needed
3	CH362+00	Waterworks facility Mayab	Built in 1964	Unsatisfactory.	Modernization needed
4	CH0 - CH362+00	Water outlets (branches)	-	Unsatisfactory.	Modernization needed

Source: Draft Feasibility Report

Table 22B: Status of Existing Hydraulic Structures (secondary canal", Kegeyli Nizhniy)

№	Location picket	Name of structure	Status	Necessary actions
1	Пк0+00	Head structure	dissatisfactory	Modernization required
2	ПК471+00	Hydroengineering complex	dissatisfactory	Modernization required
3	П554+00	Hydroengineering complex Besjap	dissatisfactory	Modernization required

Source: Draft Feasibility Report

3.7. Water Extraction from Kegeyli canal

108. During the last 17 years till 2022, the maximum monthly average flow rate was 153.86 m3/s and it was observed in July 2010. Minimum flows are usually observed in November when canal maintenance and cleaning are carried out. The maximum annual water withdrawal in the canal was observed in 2005 (1826.69 million m3), and the minimum in 2008 (649.55 million m3). Table 23 enumerates statistics of water withdrawal during growing and non-growing season.

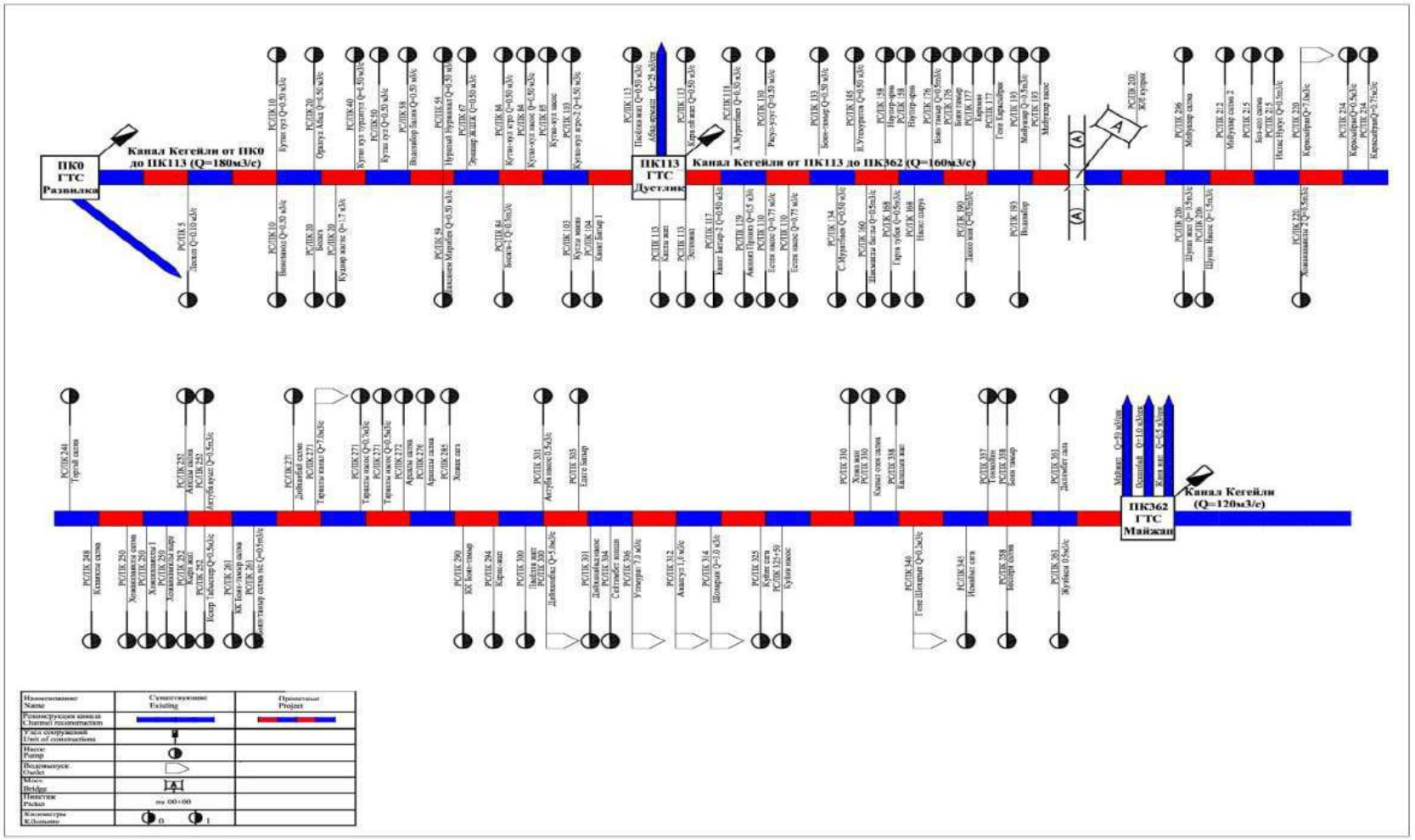
Table 23: Water withdrawal in growing and non-growing season

Year	Indicators	Unit measure	Total Growing season	Total Non-growing season	Total
2005	Average flow rate	m^3/sec	62.92	51.15	57.03
	Water flow	mln.m^3	1001.53	825.16	1826.69
2006	Average flow rate	m^3/sec	59.49	3.18	31.34
	Water flow	mln.m^3	943.73	52.34	996.06
2007	Average flow rate	m^3/sec	48.73	17.47	33.10
	Water flow	mln.m^3	774.68	278.02	1052.70
2008	Average flow rate	m^3/sec	20.54	20.53	20.53
	Water flow	mln.m^3	324.64	324.91	649.55
2009	Average flow rate	m^3/sec	67.69	7.64	37.66
	Water flow	mln.m^3	1080.15	119.45	1199.60
2010	Average flow rate	m^3/sec	93.23	19.67	56.45
	Water flow	mln.m^3	1481.50	310.34	1791.84
2011	Average flow rate	m^3/sec	33.72	16.51	25.12
	Water flow	mln.m^3	534.69	261.18	795.86
2012	Average flow rate	m^3/sec	78.20	18.77	48.49
	Water flow	mln.m^3	1242.64	298.57	1541.20
2013	Average flow rate	m^3/sec	51.49	24.84	38.17
	Water flow	mln.m^3	819.76	407.10	1226.85
2014	Average flow rate	m^3/sec	52.43	12.07	32.25
	Water flow	mln.m^3	834.25	189.20	1023.45
2015	Average flow rate	m^3/sec	68.06	16.94	42.50
	Water flow	mln.m^3	1082.47	272.85	1355.32
2016	Average flow rate	m^3/sec	60.78	16.23	38.50
	Water flow	mln.m^3	967.84	271.74	1239.58
2017	Average flow rate	m^3/sec	75.68	14.86	45.27
	Water flow	mln.m^3	1204.52	240.25	1444.77
2018	Average flow rate	m^3/sec	32.32	14.34	23.33
	Water flow	mln.m^3	512.86	229.29	742.16
2019	Average flow rate	m^3/sec	83.08	26.74	54.91
	Water flow	mln.m^3	1320.92	426.64	1747.56
2020	Average flow rate	m^3/sec	44.84	20.22	65.06
	Water flow	mln.m^3	707.33	331.72	519.52

2021	Average flow rate	m^3/sec	39.13	9.89	24.51
	Water flow	mln.m^3	617.60	178.16	795.75
2022	Average flow rate	m^3/sec	33.72	7.72	41.44
	Water flow	mln.m^3	534.05	136.49	335.27

Source: Draft Feasibility report

Figure 8: Schematic Diagram of Kegeyli canal



Picture 1: Head structure of Kegeyli canal

Picture 2: Head structure of Kegeyli canal (front view)

Picture 3: View of Bank Erosion

Picture 4: View of full grown tress on the canal bank

Picture 5: View of full grown tress on both side of canal bank

Picture 6: Water intake point - Kegeyli canal

Picture 7: Energy intensive pump used for water withdrawing

3.8. Design of the Kegeyli Canal and Secondary canal (Kegeyli Nizhniy)

109. The project aims to reconstruct and modernize Kegeyli and secondary canal. The main canal is 36.6 km long, while the secondary canal is 18.64 km long with concrete slopes lining. For details on the secondary inter-farm canal, please refer to Box.3. The project proposes narrowing of Kegeyli canal, i.e. embankment construction in the cross-section (backfill on both sides of the canal) by separate dams. It has also been proposed during meeting (Kuuanyshzharma ISA under No. 01/01-16 dated May 24, 2023) to consider straightening the Kegeyli canal bed in 4 sections. The straightening would help;

a) Reduce the canal length by 3.2 km;
b) Reduce losses and increase velocity in canal;
c) Reduce the time of water delivery to consumers;
d) Improve the ability to operate the canal and reduce the canal operation;

110. In feasibility study, four options have been considered for Kegeyli canal rehabilitation;

a) Concreting the canal with lining of bottom and slopes without canal straightening;
b) Concreting the canal with lining of slopes without canal straightening;
c) Concreting the canal with lining of bottom and slopes with canal straightening;
d) Concreting the canal with lining of slopes with canal straightening;

111. Based on technical meeting with the Ministry of Water Resources of the Republic of Karakalpakstan (minutes No. 11/05 dated August 3, 2023), CONCRETING THE CANAL SLOPES has been recommended for canal reconstruction.

After approval, the final two options has been considered in the Feasibility Study;

(a) Option 1: Concreting the canal with lining of slopes without canal straightening;

(b) Option 2: Concreting the canal with lining of slopes with canal straightening;

Table 24: Impact of Kegeyli Canal Modernization

No.	Parameter name	Unit	Existing	Design	
				Option 1*	Option 2**
1	Canal length	Km	36.6	36.6	33.5
2	Canal efficiency		0.7 0	0.95	
3	Increase canal efficiency of the Kegeyli canal system (total efficiciency of Kegeyli canal system)		0.53	0.72	
4	Increase share of canals with concrete lining	%	0	66	
5	Switch to gravity irrigation	pcs.	45	17 (decrease in pumping)	
6		Ha	12931	3403	
7	Reduce water consumption through the canal	mill.m ^{3}	3422.7	2519.6	

Source: Draft Feasibility Report

*Option 1: Concreting the canal with lining of slopes without canal straightening
** Option 2: Concreting the canal with lining of slopes with canal straightening

112. Canal branches - Currently, there are 80 outlets (branches) on canal from CH0+00 to CH366+00. Of total, 35 are gravity and 45 are pump-based. After canal rehabilitation, the number of outlets in option 1 and option 2 through gravity and pumping are as follows;

a) Option 1 = Gravity 54, pumping 26;

b) Option 2 = Gravity 57, pumping 23;

113. The canal's proposed bottom width is considered 25 m (b) for design. The construction height is considered from 4.63 – 5.51 m, and the assumed optimal water velocity is given in the Table 24 and 25 hydraulic elements of the canal. Reconstruction of the canal involves concreting the slopes of the canal (concrete class B15, F 150, M200, prepared with sulfate-resistant cement, t = 0.20 m, reinforced with 07 mm reinforced mesh) with an underlying geocomposite (geotextile -200 g/m2, geomembrane t =1.0 mm), the thickness is considered equal to t =0.20 m. The hydraulic elements of the reconstructed canal are shown in Table (25A and 25B) and for secondary canal refer Table 25C.

114. The width of the left and right berms is considered 6.5 m. The height distance between the berms is 6.5 m, and the width of the second berm on the left and on the right is 6.5 m, which has been considered for design. The construction of canal dams is made of compacted fill (from local soil) with removing the topsoil t = 0.20 m. The width at the top of the left and right berms is 6.5 m. For the construction of compacted fill of dams, it is planned to import soil from the nearby quarries. Feasibility study of the project, envisages narrowing of the canal bed, backfilling of a part of the canal bed, and construction of quality compacted dams with soil imported from quarries to create command marks.

Box 3: Reconstruction of Secondary canal "Kegeyli Nizhniy"

1. Earthen flat channel with eroded slopes
2. Takes water from the Kegeyli-lower canal at PK366
3. Scope of reconstruction – 18.64 km km, for details refer to Table 26C
4. Objective 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 canal slopes
6. Command area = 55.988 thousand hectares
7. Secondary canal located in Kegeyli and Chinbai districts
8. The canal flow rate is 63 m3/s and efficiency is 0.70.
9. Reconstruction works includes;
- Cleaning of pumps;
- Concrete lining of canal slopes 18.64 km;
- Replacement of the outdated gates and lifting mechanisms of the regulators and outlets;
- Rehabilitation of hydraulic structures, if necessary;
- Construction of new gauging stations (measuring bridge);
10. Total utilities intersection - Secondary Canal has crossings with Reinforced concrete Bridge (3 number), Pesh bridges (3 number), Water supply line (2 number), Gas supply line (1 number), power line crossing (5 number), Cable pipe (1 number), 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.
11. Project envisages uprooting of 2000 trees with diameters: d-16 cm - 350; d-32 cm - 680 and more than d-32 cm - 970

Picture 8A: Head Structure on the Kegeyli Nizhniy Canal

Picture 8B : Downstream pool of the head structure on the Kegeyli Nizhniy Canal

Picture 8C: Head Structure on the Kegeyli Nizhniy Canal

Picture 8D : Downstream pool of the head structure on the Kegeyli Nizhniy Canal

Picture 8E: Motor Road Bridge of the Kegeyli Nizhniy Canal

Picture 8F: ПК554+00 Head structure Bes-Jap downstream of the Kegeyli Nizhniy Canal

Picture 8G: Concrete section along the Kegyli Nizhniy Canal

Table 25A: Canal hydraulic elements (Option I)

Chainages	Flow Q, m^3/s		Width on the bottom, bm	Slope, i	Side slope, m	Roughnes, n	Filling depth, h,m	Velocity, m/s	Construction height, H, m
0+50 - 115+00	Min	63.4	25	0.00007	2.0	0.018	2.67	0.78	5.51
	Normal	158.5	25				4.47	1.05	
	Force	174.35	25				4.71	1.08	
1 15 +00 - 367 +00	Min	51.4	23	0.0001	2.0	0.018	2.23	0.84	4.75
	Normal	128.5	23				3.75	1.12	
	Force	141.35	23				3.95	1.16	

Source: Draft Feasibility resport

Table 25B: Canal hydraulic elements (Option II)

Chainages	Flow rate Q, м3/s		Bottom width, b m	Slope , i	Side slope, m	Roughness, n	Depth of filling, h,m	Velocity m/s	Costruction height, H, m
0+50 - 95+20	Min	63,4	25	0,00008	2,0	0,018	2,57	0,82	5,34
	Norm	158,5	25				4,31	1,10	
	Force	174,35	25				4,54	1,13	
95+20 - 335+25	Min	51,4	23	0,0001	2,0	0,018	2,23	0,84	4,75

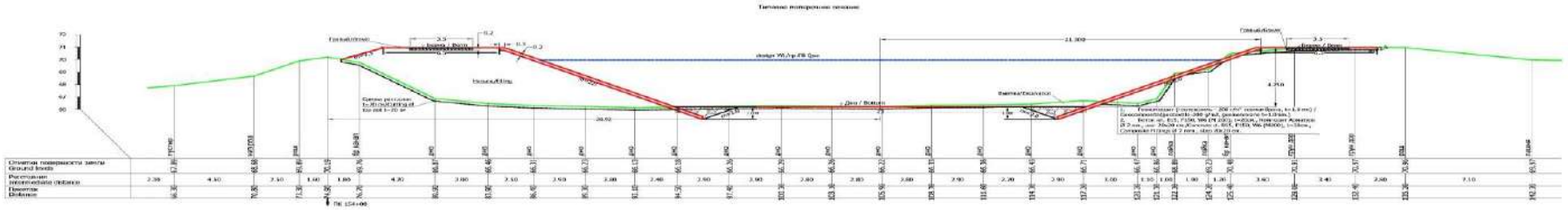
Source: Draft Feasibility Report

Table 25C: Canal Hydraulic components (secondary canal)

Pickets	**Flow rate Q, м3/s**		**Bottom width , b m**	**Slope, i**	**Slope ratio, m**	**Coarseness, n**	**Depth of filling, h,m**	**Velocity m/s**	**Construction depth , H, m**
368+00 - 477+08	Min	21.91	15	0,00007	2,0	0,018	1.94	0.6	3.88
	Norm	54.78					3.22	0.79	
	Force	63.00					3.48	0.82	
477+08 – 554+40	Min	16.35	10	0,00006	2,0	0,018	2.01	0.58	3.88
	Norm	40.87					3.28	0.75	
	Force	47.00					3.53	0.78	

Source: Draft Feasibility Report

Figure 8: Typical cross sections of Proposed Kegeyli canal



3.9. Proposed Options for Kegeyli Canal Modernization and Resource Requirement

115. For Kegeyli canal modernization, engineering and design team suggested two options in feasibility study, for detail on both options, for details, refer to table 26 A and 26 B, and for secondary canal refer to Table 26C.

Table 26A: Proposed Interventions (scope) and raw materials requirement in Option I

No	Name	Unit of measure	Kegeyli
1	Length	m	36 650
	Earthworks		
2	Topsoil Stripping	m³	311 867.38
3	Excavation	m³	1 092 777.13
	Including manual work	m³	11 390.70
4	Topsoil stripping off a dam	m³	49 451.75
5	Embankment	m³	2 944 259.13
	Including manual work	m³	47 179.75
6	Backfilling	m³	473 191.82
7	Slope grading	m²	840 832.00
8	Planning of a berm	m²	498 440.00
	Concrete works		
9	Concrete class B15, F150, W6 (M 200), t=20cm. Slope	m³	167 605.50
	Including manual work	m³	2 846.00
10	Monolythic concrete on toe wall (M 200) t=20см.	m³	25 838.25
11	Rebar A-III. 10 mm	Ton	5 992.96
	Other works		
12	Gravel	m³	51 310.00
13	Stone	m³	117 485.24
14	Geotextile 2 layer – 1m²= 200 gr	m³	1 954 340.00
15	Geomembrane t=1.0 mm	m³	977 170.00
16	Polyisol	m³	81 003.25
17	Bitumen mastic	m³	338.3

Table 26B: Proposed Interventions (scope) and raw materials requirement in Option II

No	Name of works	Unit of measure	Kegeyli		
1	Length	m	New 10425 м	Renovation 23050 m	Total 33 475
	Earthworks				
2	Topsoil stripping	m³	94 133.13	307 113.47	401 246.60
3	Excavation	m³	855 985.65	426 865.42	1 282 851.07
	Including the manual work	m³	9 867.30	5 954.80	15 822.10
4	Topsoil stripping off a dam	m³	104	18 364.50	18 468.50
5	Embankment	m³	649 753.98	2 031 799.59	2 681 553.57
	Including the manual work	m³	7 000.65	38 924.85	45 925.50
6	Embankment	m³	0	325 826.81	325 826.81
7	Slope gradding	m²	279 148.50	598 125.80	877 274.30
8	Planning of a berm	m²	141 780.00	313 480.00	455 260.00
	Concrete works				
9	Concrete class B15, F150, W6 (M 200), t=20cm. slope	m³	48 209.00	102 761.10	150 970.10
	Including the manual work	m³	555	2 259.50	2 814.50

10	Monolythic concrete on toe wall.(M 200) t=20cm.	m³	7 349.63	16 250.25	23 599.88
11	Rebar A-III. 10 mm	тн	1 804.88	3 615.19	5 420.07
	Other works				
12	Gravel	m³	14 595.00	32 270.00	46 865.00
13	Stone	m³	33 418.38	73 889.08	107 307.46
14	Geotextile 2 layer	m²	559 755.00	1 198 608.00	1 758 363.00
15	Geomembrane t=1.0 mm	m²	279 877.50	599 304.00	879 181.50
16	Polyisol	m²	23 158.13	49 607.32	72 765.45
17	Bitumen mastic	m²	96.58	208.77	305.35

Source: Draft Feasibility resport (2023)

*Option 1: Concreting the canal with lining of slopes without canal straightening
** Option 2: Concreting the canal with lining of slopes + canal straightening

Table 26C: Scope of interventions in secondary canal (Kegeyli-Nizhniy) reconstruction

No	Names of works	Unit of meas.	Quantity
1	Length	M	18 640
	Excavation works		
2	Cutting of top soil	m³	153 128.26
3	Excavation	m³	110 805.49
	Including manual work	m³	2 067.15
4	Cutting of embankment	m³	15 806.53
5	Filling	m³	264 865.95
	including manual work	m³	5 286.85
6	Riverbed cleaning	m³	30 924.00
7	The leveling of the slopes	m³	287 527.70
8	The leveling of the berm	m³	208 819.00
	Concrete works		
9	/Concrete cl. B15, F150, W6 (M200), t=20cm., slope	m³	43 209.47
	Including manual work	m³	1 129.80
10	Reinforced concrete tooth	m³	3 533.86
11	Fittings A-III. 10 mm	TONS	1 871.17
	Other works		
12	Gravel	m³	22 488.20
13	Stone D-10-15cm	m³	21 203.16
14	Geotextile 2 layer – 1m?= 200 gr	m³	575 055.40
15	Geomembrane t=1.0 mm	m³	287 527.70
16	Polyizol	m³	24 040.96
17	Bituminous mastic	m³	113.89

116. **Environmental footprint** – When considering the environmental impact, it's important to note that Option 1 has a high environmental and climate footprint due to the increased consumption of raw materials and significant tree cutting. In contrast,

Option 2 involves canal straightening which requires less raw material due to a shorter canal length of 3.2 km. Also, the excavated material will be reused for embankment construction. However, there is a risk of land acquisition. Table 27A and 27B provides the required quantities of construction materials, semi-finished products, products, and structures for Kegeyli and secondary canal.

Table 27 A: Requirement of Construction materials in Option-I and Option-II

№	Name	Unit of measure	Total	
			Option-I	Option-II
1.	Monolithic concrete	m^3	202104	183248
2.	Prefabricated reinforced concrete	m^3	142.76	160.86
3.	Stone	m^3	121746	111598
4.	Crushed stone	m^3	1570	1570
5.	Cement	Ton	60631	54974
6.	Sand	m^3	80841	73299
7.	Gravel for monolithic concrete	m^3	181894	164923
8.	Geomembrane	m^2	977170	879182
9.	Geotextile in two layers	m^2	1954465	1758488
10.	Metal structures	ton	4231.0	4233.24
11.	Reinforcement	ton	856.27	799.36
12.	Gravel for other works	m^3	52234.33	47803.33
13.	Asphalt concrete	m^2	7355	7355
14.	Steel pipes	п.м	385	385

Source: Draft Feasibility resport

Table 27B: Requirement of Construction materials in Secondary canal (Kegeyli Nizhniy)

№	Name	Unit of measure	Total
			«Kegeyli Nizhniy»
1.	Monolithic concrete	$м^3$	47967.2
2.	Prefabricated reinforced concrete	$м^3$	166.8
3.	Stone	$м^3$	22224
4.	Crushed stone	$м^3$	-
5.	Cement	тн	14390
6.	Sand	$м^3$	19187
7.	Gravel for monolithic concrete	$м^3$	43171
8.	Geomembrane	$м^2$	287528
9.	Geotextile in two layers	$м^2$	575055
10.	Metal structures	т	65.70
11.	Rebar	т	1890.81
12.	Gravel for other works	$м^3$	22488
13.	Asphalt concrete	$м^2$	-
14.	Steel tubes	Linear meter	380

117. Constrction period - The total construction period for Option 1 and option 2 is 38 months, including 3-month preparatory period in which all activities required for the main works will be carried out. The total construction period for Secondary canal

(Kegeyli Nizhniy) is expected to be 15 month including three month for preparatory works.

118. Out of total (80) canal branches, after intervention, water transfer through gravity is summerised in table 28 for both Options.

Table 28: Impact of modernisation of Kegeyli on water transfer in Option-I and II

	Option 1	Option 2
Gravity based outlet	54 number	57 number
Pump based outlet	26 number	23 number

Source: Draft Feasibility Report

119. Based on proposed interventions and construction materials requirement, the project will require light and heavy machinery for civil intervention, the details of proposed machinery for main and secondary canal are summarized in Table 29A and 29B respectively.

Table 29 A: Estimated machinery requirement

№	NAME	Quantity
1	Excavator with backet with capacity of 0.65 m^3	5
2	Excavator with backet with capacity of 1.0 m3	6
3	Excavator with backet with capacity of 0.4 m3	2
4	Bulldozer with power of 130 l/s	4
5	Trailed rollers weighing 8 tons	3
6	Rollers weighing 16 тн	3
7	Dumptruck with bearing capacity of 10.0 tons	4
8	Dumptruck with bearing capacity of 20.0 tons	5
9	High-suded truck with bearing capacity of 6.0 tons	4
10	High-suded truck with bearing capacity of 4.0 tons	4
11	Road tanker with bearing capacity of 3.5 tons	3
12	Bulk Cement truck with bearing capacity of 7.0 tons	3
13	Fuel tanker	2
14	Concrete mixer truck	4
15	Crawler crane with bearing capacity of 10 tons	2
16	Truck crane with bearing capacity 6.3 tons	3
17	Mobile power station	1
18	Field workshop	2
19	Welding unit	4
20	Electric internal vibrators	4
21	Surface electric vibrator	4
22	Mobile dormitory cars	4

Source: Draft Feasibility Report

Table 29 B: Estimated machinery requirement (secondary canal)

№	Name	Quantity
1	Excavator with bucket capacity of 0.8 m3 and 0.65 m3	3
2	Excavator with bucket with capacity of 1.0 m3	3
3	Bulldozer with power of 130 hp	4
4	Trailed rollers weighing 8 tonnes	2
5	Rollers weighing up to 16 tonnes	2
6	Dumper truck 10.0 tonnes g/mt	4
7	Dumper truck with a carrying capacity of 20.0 tonnes	4
8	Flatbed truck with a load capacity of 6.0 tonnes	4
9	Flatbed truck 4.0 tonnes	4
10	Tanker truck 3.5 tonnes	3
11	Cement truck 7.0 tonnes	3

12	Fuel truck	2
13	Concrete mixer	4
14	Crawler crane g / n 10 tonnes	2
15	Truck crane 6.3 tonnes g / p 6.3 tonnes	3
16	Mobile power station	1
17	Field workshop	2
18	Welding unit	4
19	Deep vibrator	4
20	Surface vibrator	4
21	Mobile dormitory wagon	4

Source: Draft Feasibility Report

120. **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).

121. **Cost of Kegeyli canal reconstruction** - The cost of construction and erection work for Kegeyli canal is estimated around **63 544,07** thousand USD . The item wise cost under different heading is given in Table 30A for Kegeyli canal and 30B for secondary canal.

Table 30 A: Summary cost of Kegeyli canal reconstruction

№	Description of costs	Cost, (USD thousand)
1	**2**	**3**
1	Costs of basic wages and salaries including social security charges	2 451,38
2	Costs of operating machinery and mechanisms	14 688,98
3	Costs of construction materials, products and structures	23 418,80
4	Transport costs for materials	1 170,94
5	Procurement and warehousing costs	468,21
	Total:	**42 198,31**
6	Other production costs (0.83%)	350,25
	Total:	**42 548,55**
7	Other costs and expenses of the Contractor (21.05%)	8 956,47
	Total:	**51 505,02**
8	Equipment, furniture and inventory costs	131,92
9	Transport costs for equipment	2,64
10	Procurement and warehousing costs	1,58
	Total Equipment:	**136,14**
	Total:	**51 641,16**
11	Insurance costs for construction of facilities (0.32%)	165,25
	Total:	**51 806,41**
12	Risk ratio (6.0%)	3 108,38
	Total:	**54 914,80**
13	VAT on construction materials, products and structures (12.0%)	6 589,78
	Other Costs of the Customer	2 039,50
	Draw up a Detailed Design	131,80
	Indemnification	1 371,29
	Compensation for land acquisition	426,59
	Maintenance of the State Architectural and Construction Supervision Committee	109,83
	Total construction cost including VAT	**63 544,07**

Source: Draft Feasibility Report

Table 30B: Summarized cost of the Kegeyli-Nizhniy Reconstruction

№	Description of costs	Cost, thousands of USD
1	**2**	**3**
1	Costs of basic wages and salaries including social security charges	1 183,30
2	Costs for operation of machinery and mechanisms	2 599,62
3	Costs of construction materials, products and structures	7 361,02
4	Transportation costs for materials	368,02
5	Procurement and warehousing costs	147,17
	Total:	**11 659,13**
6	Other production costs (0,83%)	96,77
	Total:	**11 755,90**
7	Contractor's other costs and expenses (21,05%)	2 474,62
	Total:	**14 230,51**
8	Equipment, furniture and inventory costs	44,58
9	Equipment transportation costs	0,89
10	Procurement and warehousing costs	0,53
	Total Equipment:	**46,00**
	Total:	**14 276,51**
11	Insurance costs fro construction of facilities (0,32%)	45,68
	Total:	**14 322,20**
12	Risk ratio (6,0%)	859,33
	Total:	**15 181,53**
13	VAT on construction materials, products and structures (12,0%)	1 821,78
	Other customer costs	**2 056,96**
	Development of detailed design	36,44
	Compensation of damage	1 990,16
	Maintenance of the State architecture and construction supervision	30,36
	Total construction cost including VAT	**19 060,28**

3.10 Comparison between Concrete mat and Concrete ceiling

122. The concrete mat, available in the market by different brand names, is a low-carbon alternative to traditional concrete ceilings. Both options proposed for canal ceiling has been compared with concrete mats by considering four sustainability indicators such as

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

The details of assessment of both options is summarized in Table 31.

Table 31: Comparison between concrete mat versus proposed options for Kegeyli canal

Thematic areas	Indicators	Concrete mat		
			Option 1	**Option 2**
Environment	Tree cutting	Improve biodiversity Tree cutting less. In **concrete mat,** the trees strethen the ceiling rather than damaging the solid plate as in case of concrete ceiling	• Removal of vegetation • In option 1, the tress cutting more as compared to option 2	• Removal of vegetation • Less tress cutting than option 1 due to straithing of canal
	Energy consumption	Significantly reduce heavy machine requirement as well as transportation of construction materials (sand, cement, metal etc.)	• As material handling is more in option 1, even after modernization, 33 % of outlets will still based on pumping	• After modernization, 28 % of outlets will still based on pumping
	Material requirement (cement/sand /gravel)	Reduction of raw material (cement, sand and metal, stone).	• High	• Less than option 1
	Traffic	Minimal	• High	• Less than option 1
	Community health and safety	Minimal	• High	• Less than option 1
	Air & noise pollution	Less use of heavy machinery including construction material transportation thus generation of air and noise pollution is less	• High	• Less than option 1
	Greenhouse gas	Less generation of greenhouse gas	• High	• Less than option 1
	Biodiversity	Saving of biodiversity (partly nature based solution)	• Remove local ecosystem	• Less than option 1

		Option for inclusion of additional biodiversity (i.e. fishing)	• No such measures	• No such measures
Social	Involuntary displacement	May be, design of canal yet to be finalized	• Low as compared with option 2	• Involunatey resettlement may trigger due to canal straightening
	Loss of livelihood	No	• No	• Yes (loss of farm land)
	Local employment	Create local employment for long period in a year	• Short seasonal employment	• Short seasonal employment
	Local energy supply (wood as fuel)	Not affected	• High	• Less impact than option 1
Climate	Integration of climate adaptive in design	Reduce carbon footprint significantly	• High carbon footprint due to material use (cement, steel etc) including emission from heavy machinery	• Less carbon footprint due to reduction of 3.2 km
	Carbon offset	No carbon offset needed	• By renewable source • Replacement of old pumps with high energy efficient pumps will save 30 to 50% of energy consumption.	• By renewable source • Replacement of old pumps with high energy efficient pumps will save 30 to 50 % of energy consumption. • Suggested reusing the excavated earth material during canal straightening for improving embankment. This will reduce pressure on the quarry and transport, thereby reducing carbon emissions.
	Low carbon embodied material	Low	• High	• Less than option 1 due to reuse of excavated earth material

Source: Input from International Climate & Environment Specialist

123. **Limitation of concrete mat in current scenario**

a) **Concrete mat** has not been used in past in the canal ceiling in Uzbekistan; hence, performance data is not available.
b) Engineers have more confidence in the conventional method (i.e., the concrete ceiling).
c) Lack of awareness among engineers and other stakeholder, hence, risk of acceptance will be there
d) Lack of local concrete mat supplier in the country.

124. **Way forward**

a) At design stage, explore integration of concrete mat for canal ceiling. Undertake a pilot study for a small section in secondary canal and assess the performance.
b) Build the capacity of PIU and stakeholders; if possible, arrange an international exposure visit.

3.11. Stages of Kegeyli Canal Development

125. The Kegeyli subproject will be undertaken in several phases, which are summarised in Table 32.

Table 32: Stages of Subproject Development

Stage	Status	Important outputs
Screening of non-core subproject based on ADB pre-defined criteria	• Completed (for detail refer to table 17A and 17B)	• Project is classified as Category B project
Feasibility stage	• Draft Feasibility Report ready for submission • 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 SCEEP • Draft IEE report is ready in align with ADB SPS
Design stage	• Final design not initiated	• Inclusion of Climate adaptive measures in detailed design, for details refer recommendation. • 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 PIU's • Contractor obtain the necessary permissions and approvals under different statutes. • 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

126. **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 plant, labour camp, mechanical workshop are envisaged. This needs to be reviewed after finalisation of detailed design.

127. **Access Roads -** The civil works at the Kegeyli 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.

128. 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.

129. **Construction Camps and Laydown Areas -** Location of camp sites will be selected keeping in view the availability of 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 PIU. 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.[29] The Camp location shall be agreed with PIU, PIC and local government authorities.

130. 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.

131. Based on local standard and ADB SPS requirement. The contractor is required to 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 for workshop
f) Designated parking space for heavy and light vehicles
g) Power back up system (i.e. DG set) with acoustic enclosure
h) Fuel oil stored on lined platform with embankment all around

[29] *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*

4. DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

4.1. Introduction

132. Amu Darya River is the lifeline for Agricultural water supply in Republic of Karakalpakstan, see figure 16. The Amu Darya, is the largest river in Central Asia. The Amu Darya River is formed by the junction of the Vakhsh (Tajikistan) and Panj (Afghanistan) rivers, which originate in the Pamir Mountains of Central Asia. The river basin includes the territories of Afghanistan, Tajikistan, Uzbekistan and Turkmenistan.[30] The river flows generally northwest. The total water catchment area of the Amu Darya basin is 227,000 km.[2]

133. Average annual water consumption of Uzbekistan's economy is 53.7 km^3, including 24.0 km^3 of water taken from Amu Darya river, 12.1 km^3 from Syr Darya river, 15.6 km^3 from small rivers, 0.5 km^3 from groundwater and 1.5 km^3 constitutes reuse of drainage water. From the overall water consumption of 53.7 km^3 only 11.5 km3 is runoff from Uzbekistan's area and 42.2 km^3 comes from neighbouring countries.

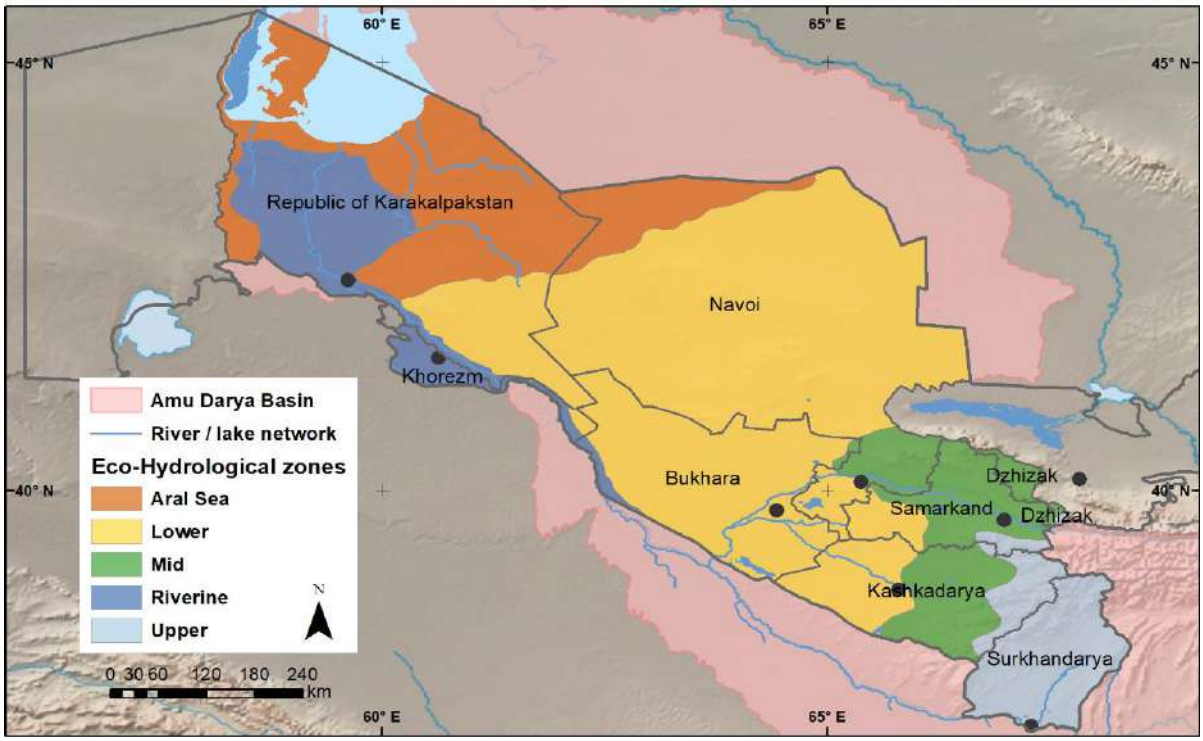
134. Uzbekistan receives 52% of the total water available in the region, 92% of which is consumed by the agricultural sector. Total agricultural land constitutes 25.2 million hectares (ha) out of which 4.3 million [31] (ha) are irrigated lands and 23.4 million ha are poor or low-productive pasture land. 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.[32]

135. 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.

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

[32] 2019, Inception Report, ADB, TRTA 9782-UZB, Preparing the Climate Adaptive Water Resources Management in the Aral Sea Basin Project

Figure 9: 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.

136. This section of the report discuss the existing environmental and social conditions within the KEGEYLI subproject area under the following headings:

a) Physical Resources (air quality, hydrology, topography, among others.);
b) Ecological Resources (flora, fauna, protected areas);
c) Social and Cultural Resources (population, health, education, cultural resources, among others.).

The potential impacts of the Kegeyli subproject on its surrounding physical and biological environments include impact on air and water quality, noise generation, community health and safety, worker safety, pollution generated from the batching plant, construction camp, labour camp etc. These impacts are expected to be reduced with the increased distance from the subproject facilities, affecting areas close to site. For this, a study has been carried out (a) along the canal (b) District level (c) region level, to assess the baseline conditions likely to be affected by the subproject due to its proximity. The subproject area selected for the IEE includes several sensitive receptors including local residents, local flora and fauna, surface and ground water that are most likely to be impacted by the subproject's development activities.

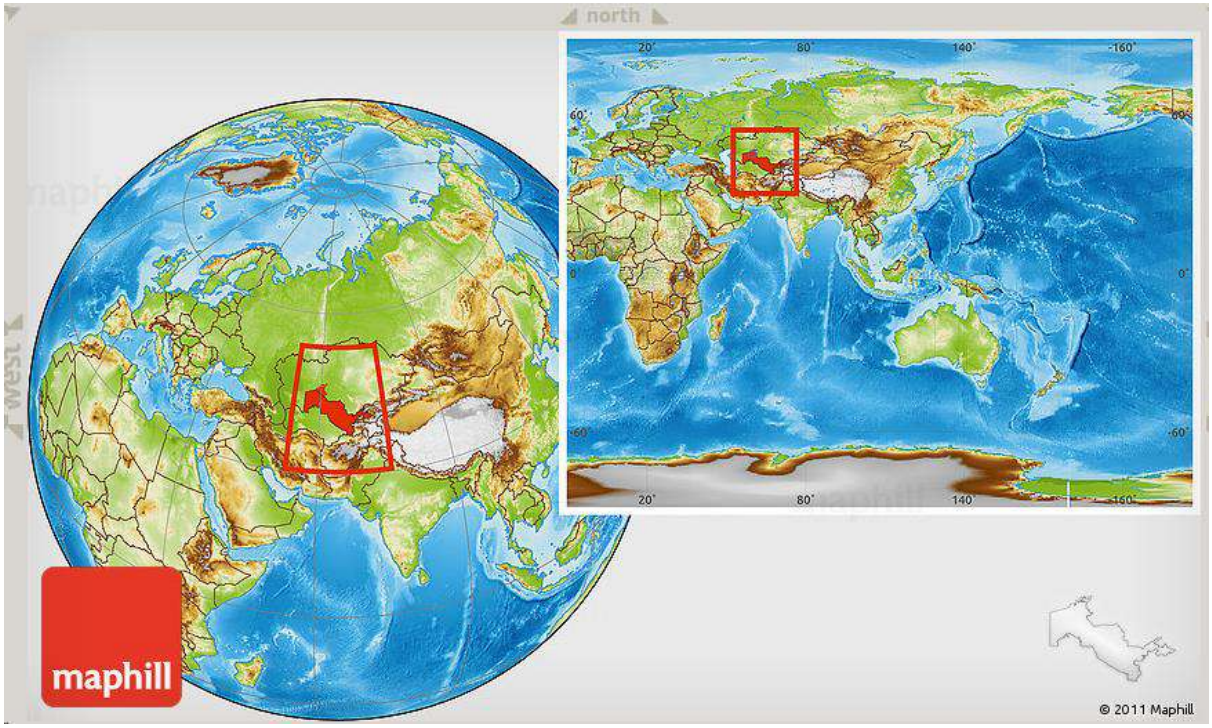
4.2. General information of Kegeyli subproject Area

137. Karakalpakstan, officially known as the Republic of Karakalpakstan is an autonomous Republic of Uzbekistan. It is located in the north-western part of Uzbekistan, in the lower reach of the Amu Darya, on the southern coast of the Aral Sea. The south-western part of the Republic borders the Karakum Desert. In the north-west is the Ustyurt lowland, and in the north-eastern part is the Kyzylkum desert. The southern part of the Aral Sea is located on the territory of Karakalpakstan. It cover

a total area of 166592 km^2.[33]. The climate is typically characterized by continental desert climate with extremely low precipitation with hot and dry summers and cold winters.The capital of Republic of Karakalpakstan is Nukus. The other major towns in Karakalpakstan region are Khodjeyli, Turtkul, Beruni, Chimbay, Takhiatash.

138. The Amudarya River is the only river that runs through the region. Water is used to irrigate crops through network of canals.[34] The main economy in the region is primarily based on cotton.

Figure 10: Map of Republic of Karakalpakstan (Project area)



http://www.maphill.com/uzbekistan/location-maps/physical-map/entire-continent/

139. Republic of Karakalpakstan is divided into 16 districts and 1 city: the Amudarya, Beruni, Karauzyak, Kegeley, Bozataw, Kungrad, Canlikul, Muynak, Nukus, Takhtakupir, Turtkul, Khodjeli, Takhiatash, Chimbay, Shumanay, Ellikkala and Nukus[35]. The Kegeyli canal supplies water to Nukus, Kegeyli, Chimbay, Karauzyak, Bozatau and Moynak rayons, See figure 11 Districts in Republic of Karakalpakstan and Kegeyli canal project location.

[33] https://invest.gov.uz/regional-map/respublika-karakalpakstan/
[34] https://www.e3s-conferences.org/articles/e3sconf/pdf/2021/03/e3sconf_gi2021_01002.pdf
[35] http://www.karakalpakstan.uz/en/page/show/4#:~:text=Borders%20with%20Khorezm%2C%20Navoi%20and,%2C%20Shumanay%2C%20Ellikkala%20and%20Nukus.

Figure 11: Coverage of Kegeyli canal

Source: https://invest.gov.uz/regional-map/respublika-karakalpakstan/
Red highlight indicate - supplies water to *Nukus, Kegeyli, Chimbay, Karauzyak, Bozatau and Moynak rayons*

4.3. Physical Resources

4.3.1. Land Resource in the Country and Project area

140. Some 30 percent, which is around 13.7 million ha of the country's land is severely degraded.[36] The rate of land degradation and its causes vary from region to region. The reasons include water stress, soil degradation, and salinization are the main causes of land degradation, see Figure 4. Due to unequal distribution of water resources and complex topography of irrigated lands, about 60 percent of irrigated lands are supplied with water through 1,687 pumping stations with an annual electricity consumption of 8 billion kWh.

141. The irrigated land area of the republic is 4.3 million hectares, see Figure 2, on average 90-91 percent of all water resources are used in agriculture, 4.5 percent - in the sphere of public utilities, 1.4 percent - in industry, and rest in the other sector. Irrigated agriculture adds more than 25 percent to GDP and employment. Crop production (around 90%) is dependent on the country's extensive irrigation and drainage network, which is the largest in Central Asia**.**

142. According to published report by The World bank (2023), the irrigation efficiency is the country about 40 percent. However, the efficiency in Karlpakisthan is less than national figure (slightly higher than 20% in 2020). The reason for abandonment of agricultural lands and low irrigation efficiency includes old and damaged infrastructure, lack of water availability by competing users, shortage of electricity and rising salinization of soils, see Figure 3: Irrigation Efficiency in different Irrigation

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

areas.

143. Ageing irrigation and drainage infrastructure puts stress on both surface water and groundwater resources, as well as on land resources. Poor water management and inadequate drainage are major contributors to land degradation, lowering yields and land productivity. More than 500,000 ha of land is already water-logged and salinized due to poor irrigation practices and inadequate drainage systems.

144. In Republic of Karakalpakstan, more than 80% of its territory is occupied by desert dunes. In the beginning of 2017, the irrigated area in the Republic of Karakalpakstan comprised of 509.6 thousand hectares with a total land area of 16.7 million hectares.[37] Cotton, a dominant crop in the Karakalpakstan, is highly sensitive to water availability.[38] Current condition of arable land is a concern.

145. Soil surveys revealed that 56.6 thousand ha of all irrigated lands in Karakalpakstan are saline, and 171.3 thousand ha (34%) are moderately saline. Total salinity of irrigated lands in the oblast is 68.8%. The table below enumerate coverage of irrigated area by the Kegeyli canal.

Table 33: Irrigated land in project area and coverage of Kegeyli canal

Rayons	Total area of irrigated land, ha	Out of them in the project area, ha	as a % of total area
Kegeyli canal			
- Nukus	14 998	13 514	90,1
- Kegeyli	15 867	15 594	98,3
- Chimbay	21 168	19 491	92,1
- Buzatau	1 982	1 971	99,4
- Karauzyak	14 180	12 408	87,5
- Moynak	2 852	2 701	94,7
Total	71 047	65 679	92,4

Source: Draft Feasibility Report

146. Increase in irrigated land coverage due to modernization and rehabilitation of project intervention will ensure improvement of water availability, farms and other commodity, producers can cultivate repeated crops after wheat harvesting. Sowing of corn, perennial grasses, potatoes, vegetables, melons and other crops will increase.

4.3.2 Topography

147. The topography of the Karakalpakstan is characterized by valley and delta of Amu Darya in the central part. On the eastern side, the Kyzylkum desert occupy the vast plains with shifting sand. The west side occupy by Ustyurt plateau, a slightly undulating area characterized by flat area rising to some 958 feet (292 m) above sea level.[39]The average elevation is 351 ft, whereas maximum and minimum elevation is 1345 ft and 236 ft respectively, See figure 12.

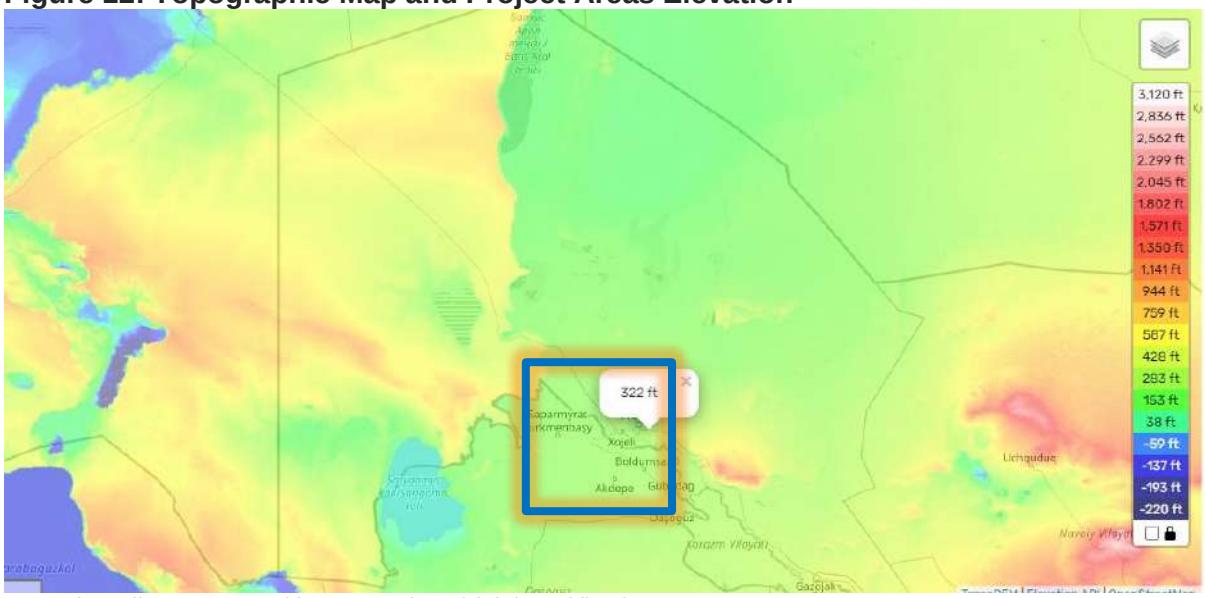
[37] https://www.undp.org/sites/g/files/zskgke326/files/migration/uz/un_uzb_survey_in_the_Aral_Sea_region_eng.pdf

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

[39] https://www.britannica.com/place/Karakalpakstan

148. The Kegeyli project areas is almost a flat land with agricultural fields on both side of the canal. The flat topography, soil and water resources make it possible to develop irrigated farming.

Figure 12: Topographic Map and Project Areas Elevation



Source:https://en-us.topographic-map.com/map-lzkdn/Republic-of-Karakalpakstan/?center=43.34116%2C58.93066&popup=42.40723%2C59.73267&zoom=7

4.3.3 Geomorphologic, lithologic structure and hydrogeologic conditions.

149. The area of Kegeyli canal has Quaternary sediments of alluvial origin, the bedrock is a complex combination of Tertiary Cretaceous and Palaeozoic rocks. The sediments are composed of interbedded loams, sandy loams, and sands. The canal head sections have relatively light soils, which are subject to erosion.

150. In the northern part of the canal tail, heavy lake soils with low filtration coefficients (0.01- 0.10m/s) are mainly concentrated in the Nukus and Kegeyli rayons. The upper part of sediments is composed of interbedded loams, sandy loams, and sands.

151. The 55.4 km long Kegeyli Canal crosses various soil-geological varieties and lithological sections, which within this area is composed of alluvial sediments, which in many places are underlain by Upper Pliocene deposits of Apsheron Stage. At the upper section of a canal, in some places bed sands come to the ground surface. The canal bed is composed of interlaced sands, sandy loam, loam, and clay. As the canal system moves downstream, the areas of lake and inter-channel deposits represented by loams and clays increase.

152. In accordance with the given description for a monolithic section of each individual soil property, the soil characteristic is as follows:

- Light and heavy loams with thickness upto 10.0 m occur from CH0 to CH150. Sands and light sandy loam in the form of lenses up to 3.0 m thick.
- From CH150 to CH423 loams: moist, medium, yellowish-grey, with thin interlayers up to 2.0 m thick.
- From CH423 to CH545 loams: light, yellowish-grey with sand interlayers up to 10-20cm thick, dusty wet with thickness up to 2.8m.

- Sandy loam is light, yellowish-grey, sandy, saturated with water, with a thickness of up to 7.0 m.

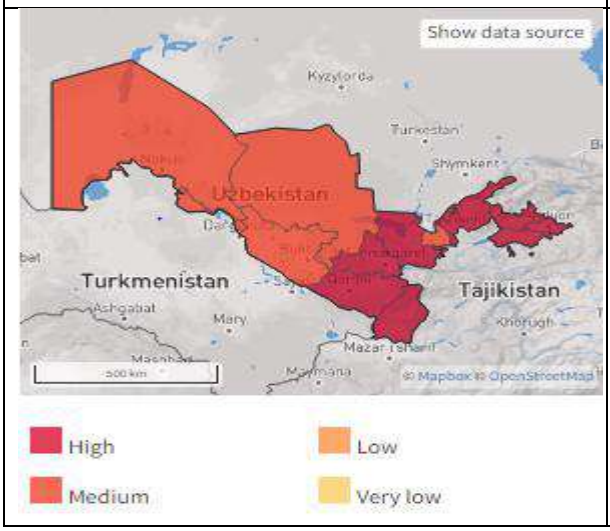
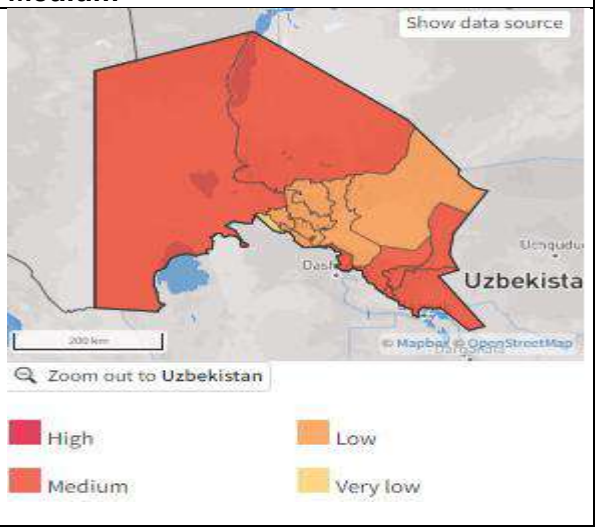
The level of groundwater in irrigated areas remains high, its depth is 1-1.5 meters (10.9%); 1.5- 2.0 meters (64,0%) and 2.0-3.0 meters (14,0%). These waters have a high level of mineralization.[40]

4.3.4. Seismicity

153. The country's central, southern and eastern parts is located in seismically active zones[41]. From 1900 to 2023, the country has witnessed more than 60 strong earthquakes of magnitude higher than 5 on the richer scale[42]. According to ThinkHazard, a web-based tool for risk profiling, the country is classified under high risk of earthquake hazard see figure 13.

154. The earthquake hazard is classified as medium for Karakalpakstan, where Kegeyli canal 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[43].

Figure 13: Seismic map of Country and Project Area

Uzbekistan Earthquake Risk level – High	Karakalpakstan Earthquake Risk level – Medium
	

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

4.3.5. Climate

155. Karakalpakstan is one of the coldest regions in Uzbekistan. The climate in Karakalpakstan is sharply continental with hot and dry summers and cold winters. The average temperature in January is from –5 to –8 C. The minimum temperature in winter is –38 C. The average temperature in June reaches from +26 to +28 C, and in July and in August +50 C.[44].

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40 https://www.undp.org/sites/g/files/zskgke326/files/migration/uz/un_uzb_survey_in_the_Aral_Sea_region_eng.pdf

41 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4145339

42 https://kun.uz/en/news/2023/03/25/magnitude-6-8-earthquakes-struck-uzbekistan-six-times-over-10-years

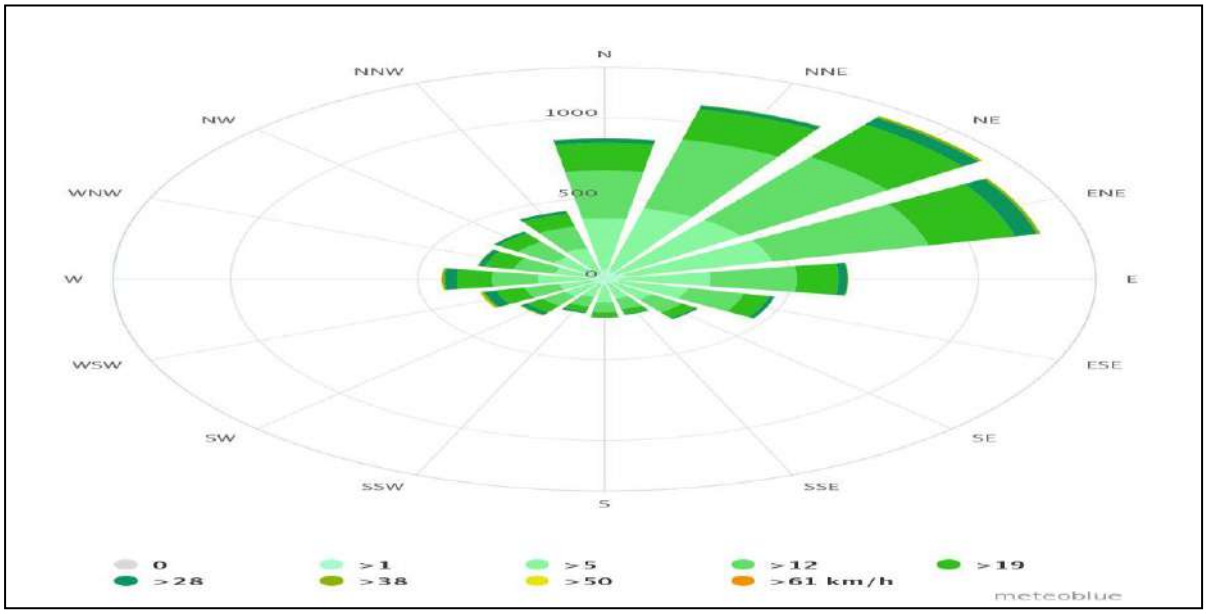
43 https://thinkhazard.org/en/report/3287-uzbekistan-karakalpakstan/EQ

44 https://invest.gov.uz/regional-map/respublika-karakalpakstan/#:~:text=The%20climate%20in%20Karakalpakstan%20is,%E2%80%935%20to%20%E2%80%938%20C.

156. Like most of the country, the project area is also arid with average annual rainfall of no more than 200 milli meters that mostly occur in winter and spring. Between July and September, little precipitation falls[45].

157. The below figure describe the wind rose for Karakalpakstan showing the dominant winds blow from the North East (NE) and East-North east (ENE) directions. Northeast and North winds prevail. Their average annual wind speed is 2.1- 4.8 m/s, the maximum reaches up to 10-15 m/s, the minimum is 1.8-2.2 m/s. The proximity of deserts with high summer air temperatures, and constantly blowing northeastern winds that carry away a large amount of moisture, affects the air humidity. The relative humidity in winter is 70-80%, spreading evenly throughout the Amu Darya River. Its lowest values are in the summer months, 45-50%. The average value of the relative air humidity is 62%.

Figure 14: Wind Rose – Karakalpakstan[46]



4.3.6. Air quality

158. Almost 2 million people in the western part of Uzbekistan (Republic of Karakalpakstan and Khorezm Oblast) experience the direct influence of air pollution by dust blown up from the dried bed of the Aral Sea. High winds carry an estimated 15 million to 75 million t/y of contaminated sand and dust. This dust contains salts, pesticides and heavy metals, and studies and analysis of public health have shown increased morbidity rates due to diseases such as bronchitis, asthma, anaemia, heart diseases and certain types of cancer that are relatively high in these regions**.**[47]

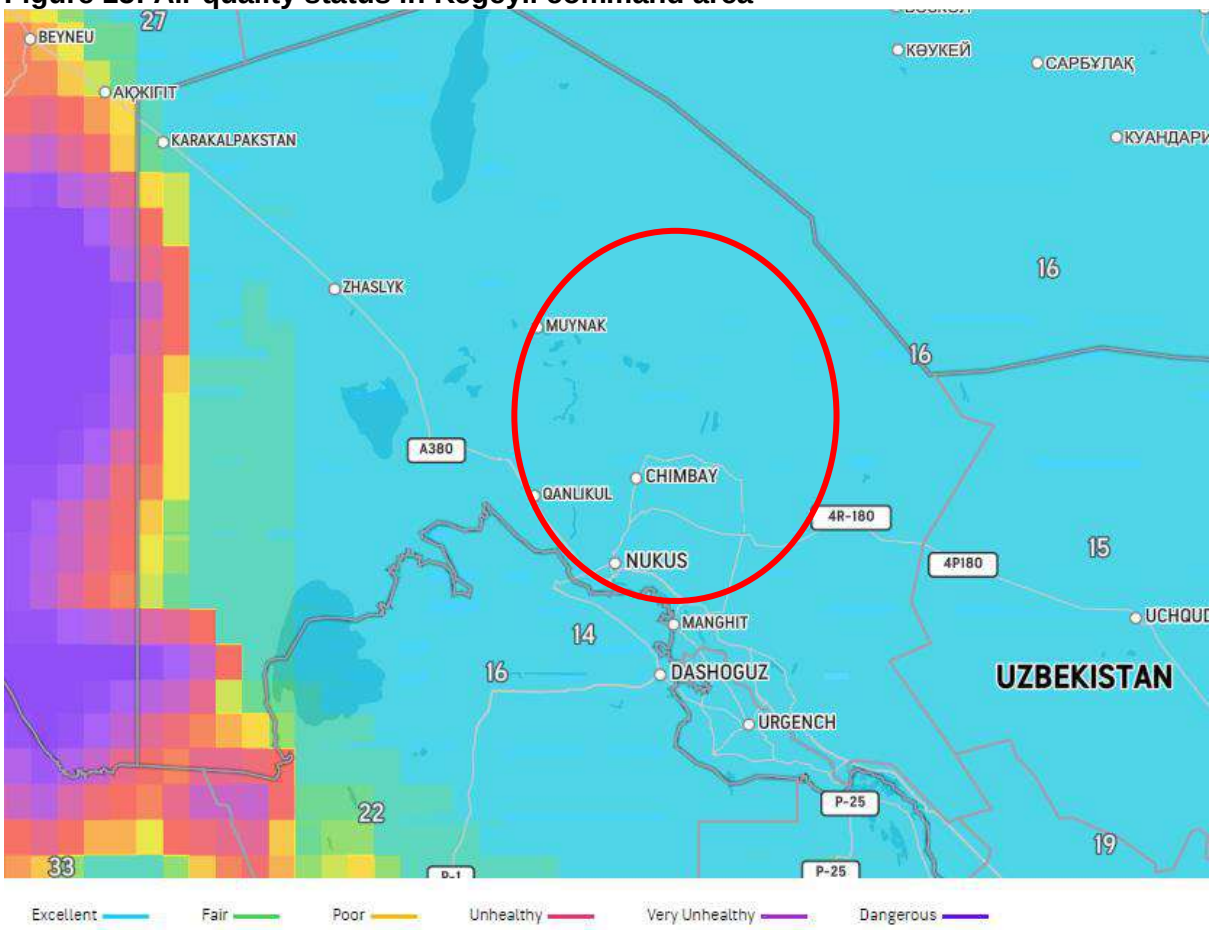
159. Nearest air quality station in Kegeyli subproject area is situated in Nukus. Based on the observation of daily monitoring data, the air quality in the Kegeyli command area *Nukus, Kegeyli, Chimbay, Karauzyak, Bozatau and Moynak rayons*) is excellent due to the rural setting, low traffic and lack of industrial pollution, see figure 15 and 16.

[45] https://www.worlddata.info/asia/uzbekistan/climate-karakalpakstan.php
[46] https://www.meteoblue.com
[47] https://unece.org/DAM/env/epr/epr_studies/ECE.CEP.188/ECE.CEP.188.ENG.03.Part_II.ENG.pdf

During site survey, the IEE team also noted good air quality in the Kegeyli command area.

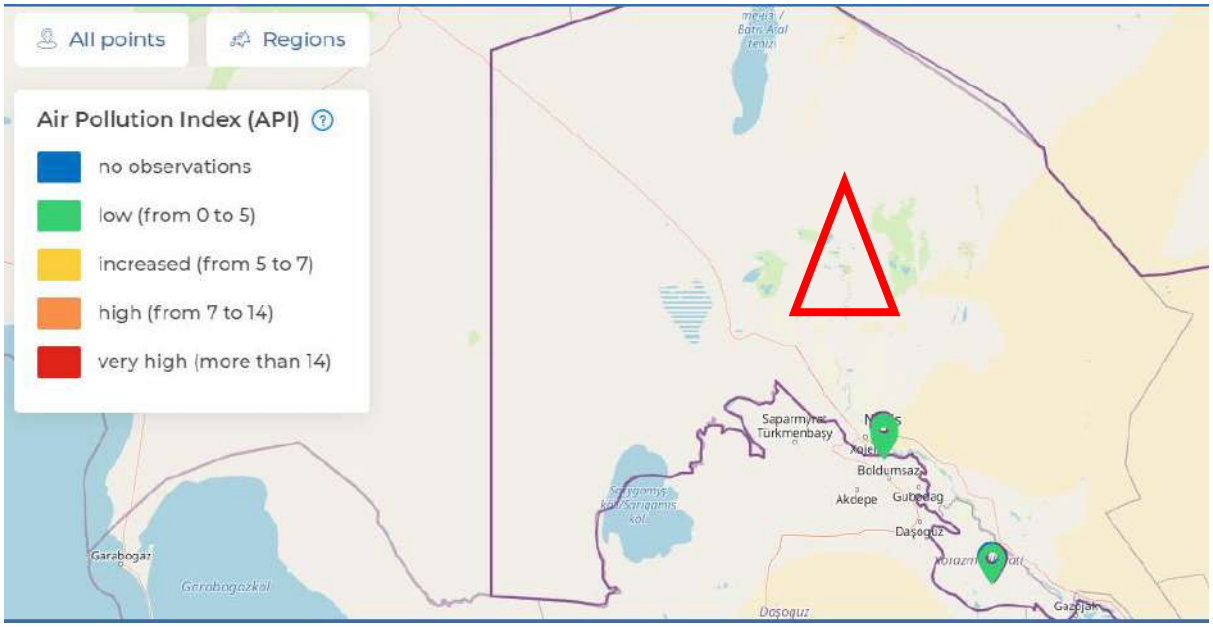
160. During the construction phase, the civil works, including temporary road construction and auxillary activities, will have a minor and temporary impact on local air quality due to the emission of surface dust from vehicles transporting construction materials, batching plants, materials stockpiles,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

Figure 15: Air quality status in Kegeyli command area



Source: https://www.accuweather.com/en/uz/nukus/355666/air-quality-index/355666

Figure 16: API index in project Area



4.3.7. Ambient Noise

161. No noise measurements were undertaken for IEE study or available for the project area from secondary sources. During survey of Kegeyli subproject area, ambient noise levels was noted (by observation) to be very less due to very limited human settlement, rural setting, very low traffic movement and lack of industrial sources. Similarly, vibration was also not a problem due to absence of infrastructure development or industrial activities such as mining.

162. 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.

163. Therefore, prior to civil interventions, in order to establish baseline ambient noise quality, measurements will be made in the pre-construction stage, to study noise quality particularly during day and night or as per prescribed by the environmental regulators. PIU/PIC ensure that contractor shall conduct ambient noise monitoring (a) One before civil intervention (for baseline) (b) monthly monitoring throughout the project, however, 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 ambient monitoring as recommended by environmental authority.

4.3.8. Water Quality

164. No water measurements were undertaken or available for Kegeyli canal from the secondary sources. During survey, turbidity (by observation) in the canal was high due to high silt content, see Picture 8H.

165. During the construction phase, the civil works and auxiliary activities will 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 water enter (Dustlik canal) in Kegeyli 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.

Picture 8H: Siltation in Kegeyli canal

4.4. Agriculture in Karakalpakstan and in Kegeyli Command Area

166. The aim of the project is to improve water supply to irrigated lands in the Republic of Karakalpakstan, reduce costs of water supply by machines, create long-term stable conditions for the development of private farms and dekhan farms, increase their incomes, efficiency of irrigated agriculture, employment and living standards. Of total 166592 km^2 of land, the total agricultural land in Karakalpakstan is 44.8 thousand hectares. Of these, irrigated agricultural area is 30.8 thousand hectares.[48]

167. Below table enumerate the number of active farm and dekhkan farm and backyard farm in command area.

Table 34: Number of active farms, dekhkan farms and backyards in the project rayons, 2023

Rayon	Number of farms	Farm lands	Number of dekhkan farms	Lands of dekhkan farms	Number of backyards	Number of backyards, ha
Bozatau	17	6843	21	7,1	294	83,0
Karauzyak	37	3012,7	0	0	703	240,8
Kegeyli	279	21111	412	640	6138	3256,5
Moynak	13	1650	0	0	120	325
Nukus	13	5493	48	17	120	134
Chimbay	539	37156,9	1077	772,8	19690	3405

Source: Draft Feasibility report

168. The largest area of agricultural land irrigated by the Kegeyli main canal is located in Chimbay rayons (53.0%) and Kegeyli (26.9%). Although the project rayons show an increase in the number of farms from 870 units to 898 units between 2019 and 2023, the number of dekhan farms increased from 341 units to 1,558 units. Nevertheless, 72.7% of all agricultural land irrigated by the Kegeyli main canal falls under pastures. Only one-third (27.3%) of the area is irrigated land.

[48] https://invest.gov.uz/regional-map/respublika-karakalpakstan/#:~:text=The%20climate%20in%20Karakalpakstan%20is,%E2%80%935%20to%20%E2%80%938%20C.

169. Table below (35) enumerate (a) the land under irrigation in project area (Kegeyli, Karauzyak, Chimbay, Bozatau, Moynak, Nukus), (b) crops grown including amount of land plots not used in agriculture (c) land plots to be returned for agricultural use.

Table 35: Statistic on Irrigated land, crops cover, unused land and proposed land to be resumed for agriculture use

Rayon	Irrigated land	Including														Including:	
		Cotton	Harvest, Centner	Wheat	Harvest Centner	Vegetable	Harvest centner	Melons	Harvest centner	Orchards	Harvest centner	Rice	Harvest centner	Pastures	Other lands	*Land plots not used in agriculture*	*Land plots to be returned for agricultural use*
Bozatau	6843	104	20,2	133	39,8	34	71,4	34	69,1			70	82,4	6468	2937,2	240	240
Kegeyli	26898	5425	19,7	3491	34,2	115	79,4	103	58,4	77	21,4	1591	78,5	16096		3260	3260
Karauzyak	5993	480	19,1	280	35,4	55	68,7	26	64,8			75	75,4	5077		465	465
Moynak	1650													1650			
Nukus	5644	74	20,1	257	35,1	53	74,7	55	68	3	18,4	334	84,2	4868		355	355
Chimbay	53122	5751	20,2	3900	31,7	198	68,2	295	54,8	62	12,5	4250	77,8	38666		14070	13245
TOTAL	**100150**	**11834**		**8061**		**455**		**513**		**142**		**6320**		**72825**	**2937,2**	**18390**	**17565**

4.5. Utilities Inventory

170. Rehabilitation and modernization of the Kegeyli subproject may trigger the shifting of utilities in main and secondary canal. During the preparation of the feasibility and IEE study, several utility systems have been identified and are likely to be impacted; however, initial investigation concludes that utility shifting can be avoided by restoring to manual work; for details, refer to Table 36.

171. During pre-construction and construction stage PIU/PIC ensure that

(a) Contractor takes all approval before shifting the utility

(b) Local community should be informed at least 15 days prior to utility shifting,

(c) In case, if gas and water pipeline required to be shifted, it need to be shifted within specified timeline.

Table 36: Impact on Utilities due to Modernization

Sr.no	Type of utilities	Number	Impact
1	Canal crosses transmission lines	At 17 locations	No impact Manual work will avoid shifting
2	Channel intersects with the Communication Lines	At 1 location	No impact Manual work will avoid shifting
3	Water pipelines	At 1 location	No impact Manual work will avoid shifting
4	canal crossings with the gas pipeline	At 4 location	No impact Manual work will avoid shifting
5	Bridge	At 1 location	No impact Manual work will avoid shifting

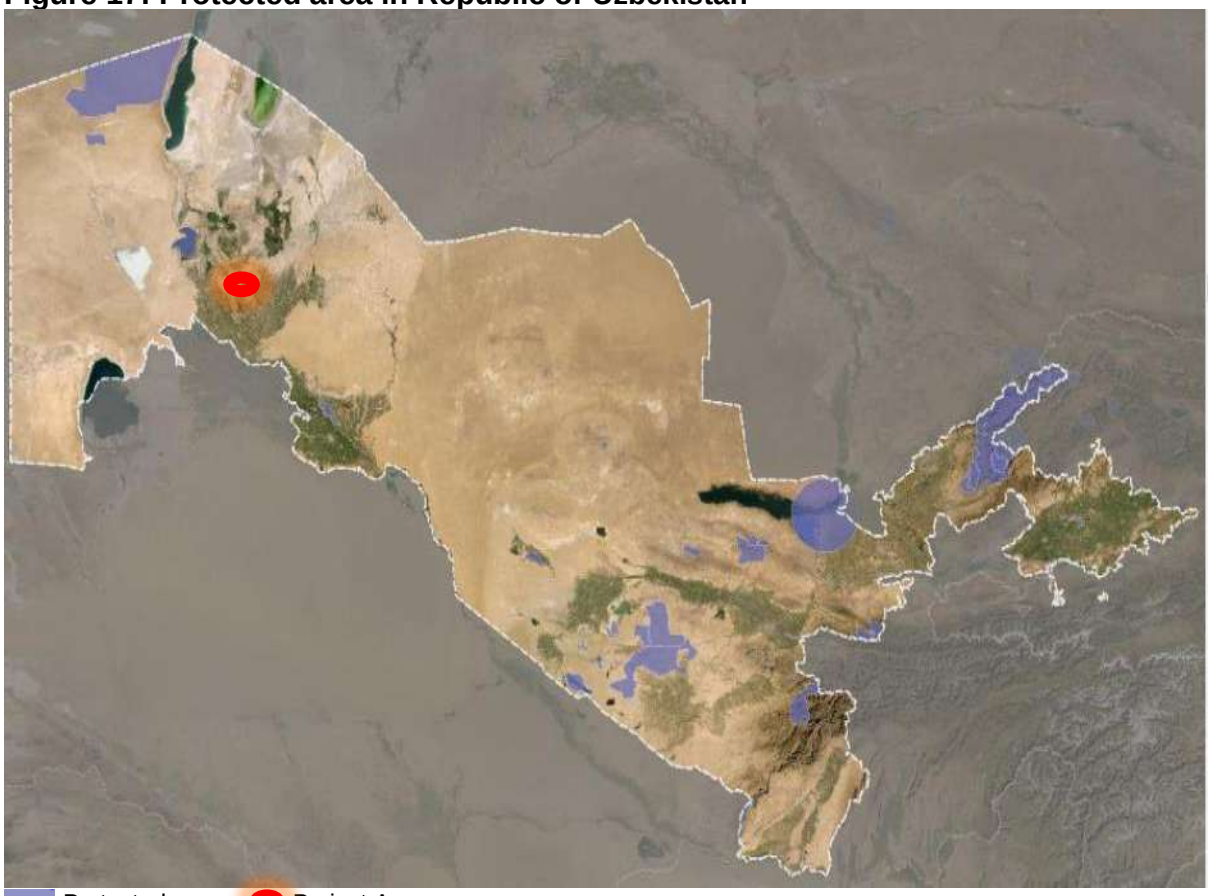
Table 36: Impact on Utilities due to reconstruction of secondary canal

Sr.no	Type of utilities	Number
Bridges	At 3 locations	No impact Manual work will avoid shifting
Pesh bridges	At 3 locations	No impact, Manual work
Water supply line	At 2 locations	No impact, Manual work
Gas supply line	At 1 locations	No impact, Manual work
Power lines crossing	At 5 locations	No impact, Manual work
Cable pipe	At 5 locations	No impact, Manual work

4.6. Ecological Resources and Ecological Sensitivity

172. As of May 2021, 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 km2) 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 17: Protected area in Republic of Uzbekistan



Protected areas Project Area
Source: https://www.cbd.int/pa/doc/dossiers/uzbekistan-abt11-country-dossier2021.pdf

173. 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.

174. *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.[49] With more than 230 plant species, the *tugai* forest is one of the most diverse vegetation types in the arid regions of Central Asia.[50]

175. The Kegeyli **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 a waterway for irrigation and agricultural

[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.*
[50] *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.*

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.

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

177. At several sites at Kegeyli canal, tree identification and enumeration were made to determine the dominant tree species, using the Drude method[51] in which trees were counted over a riparian transect area (plots 100 m x 8 m) between the channel wall and the channel head, the Plant species were identified, based on confirmation from scientific sources.[52] The main or dominant tree species are found is summarised in *Table 37 and 38*. 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 37: Abundance of some common tree species in Kegeyli canal [53]

№	Plant species	English	Russian	Uzbek	Degree of abundance	Average distance between individuals, cm
1	Elaeagnus angustifolia	Russian olive, Silver berry, Oleaster, Wild olive	Лох узколистный	Узунбарг жийда	Copious (cop2)	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	Social (soc)	Continuous Cover
3	Ulmus spp. (Ulmus minor?)	Elms U. minor = Field elm, introduced?	Карагач	Қайроғош	Unitary (un)	Singly
4	Morus spp. (Morus alba?)	Mulberry M. alba = White mulberry, Common mulberry, Silkworm mulberry, introduced?	Шелковица	Тут	Unitary (un)	Singly

178. Some brief interviews with residents were conducted during the surveys, and some information was collected on their use of flora and fauna and awareness about

[51] *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.*

[52] *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*

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

biodiversity and regulations. Informal consultations were held with several stakeholders, including the Department of Ecology and Environment, the regional branch of the Academy of Sciences, the local university (Karakalpakstan State University) as well as forestry and water (MWR) authorities at local and regional levels to collect maps and relevant data on the subproject areas and to understand potential impacts.

179. Several sites at Keygeli, where irrigation infrastructure intervention is proposed, were visited. Canal landscape profiling at each site characterized by the dominant flora and land-use (Table 38). During stakeholder consultation, it was informed that the vegetation along the canal is used by people for grazing, fishing, and hunting for hares and “pheasants” in particular.

180. **Ecological Sensitivity – Some key finding of the Assessment**

a) Keygeli non-core subproject areas are modified, non-critical habitats with no threatened or endangered species, *See Table 39: Ecological Sensitivity of the Project Area (*Keygeli*).*

b) As Keygeli 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.

c) To ensure the health of local biodiversity on both sides of Keygeli canal, it is important to follow the mitigation and monitoring prescriptions presented in the IEEs, regarding 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.

Table 38: Canal landscape profiling along Kegeyli at Five locations

No	Location	Picket	Dominant flora	Land-use
1	Kegeyli Canal, Head Structure	00+00	Along the canal, there are a lot of jida and tamarisk trees. The linear forest is heterogeneous, its length ends with an interval (500-1000 m) and continues. *Populus diversifolia, P. pruinose* is the most common among the dominant species of forest plants along the canal, in addition, the second dominant species is *Elaeagnus angustifolia*, the third species is *Tamarix*, *Halostachys belangeriana Moq., Halimodendron*. Mainly trees are 15-20 m wide along the canal. Grass: gorlets (*Persicaria hydropiper*), yantak (*Algahi*), Glycyrrhiza/ Licorice (*Glycyrrhiza glabra)*, common reed (*Phragmites australis*), Climacoptera lanata, Lomonos vostochnyy - Clematis orientalis	Farms and small villages in this part of the canal. Grows wheat, cotton, sorghum, sesame, melons, watermelon vegetables.
2	Dostlik Structure	114+00	The plants in this area consist of grassy areas with few trees. *Populus diversifolia, P. pruinose* is the most common among the dominant species of forest plants along the canal, in addition, the second dominant species is *Elaeagnus angustifolia*, the third species is *Tamarix*, *Halostachys belangeriana Moq., Halimodendron*. Mainly trees are 15-20 m wide along the canal. Grass: gorlets (*Persicaria hydropiper*), yantak (*Algahi*), Glycyrrhiza/ Licorice (*Glycyrrhiza glabra)*, common reed (*Phragmites australis*), Climacoptera lanata, Lomonos vostochnyy - Clematis orientalis	Occupied by farms and small villages in this part of the canal. Here, farmer mainly grows wheat, cotton, sorghum, sesame, melons, watermelon vegetables are grown.
3	Qarasiraq	177+00	This area is dominated by Taarix, *Halostachys belangeriana*, and *Halimodendron* species. Along the canal, mainly trees are 15-20 m wide *Populus diversifolia, Tamarix, Halostachys belangeriana, Halimodendron species* grow a lot. *Grass: gorles Persicariahydropiper,* yanta*k (Algahi),* Licorice *Glycyrrhiza glabra, Phragmites australis, Climacoptera lanata, Lomonos–Clematis orientalis* *Chenopodium album, Zygophyllum oxianum, Trachomitum lancifolium, Karelinia caspia*	Occupied by farms and small villages. Crops grow here are wheat, cotton, sorghum, sesame, melons, watermelon
4	Tararaqli	271+00	There are few woody plants in this area, mainly Licorice *Glycyrrhiza glabra*, yantak (*Algahi*), Julg'un (Tamarix). In some places there are *(Populus diversifolia)*, *(Elaeagnus angustifolia)*, prickly caper (Sapparis spinosa), *Chenopodium album, Karelinia caspia, Zygophyllum oxianum,*	Cultivated fields in this area are located 5- km from the canal, mainly grow cotton and wheat are grown.
5	Shokhariq	340+00	*Populus diversifolia* is the most common among the dominant species of forest plants along the canal, in addition, the second dominant species is *Elaeagnus angustifolia*, the third species is *Tamarix*, *Halostachys belangeriana Moq., Halimodendron*.	Cultivated fields in this area are located 2 km from the canal, grow mainly cotton and wheat. Area also

No	Location	Picket	Dominant flora	Land-use
				have pastures land for livestock.
6	Mayjap Structure	270+00	Mayjap is perhaps the most biodiverse. This area has *Populus, Tamarix, Halostachys belangeriana, and many Halimodendron species.* Grasses: yantak *(Algahi), Glycyrrhiza glabra, Phragmites australis, Climacoptera lanata, Lomonos–Clematis orientalis, Chenopodium album. Populus diversifolia* is the most common among the dominant species of forest plants along the canal; the second dominant species is *Elaeagnus angustifolia;* and the third most common species are *Tamarix*, *Halostachys belangeriana Moq.,* and *Halimodendron*.	Cultivated fields in this area are located 2-3 km from the canal, mainly cotton and wheat are grown.

Table 39: Ecological Sensitivity of the Project Area (KEGEYLI).

Measuring parameters	Kegeyli
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 Ramsar sites near the non-core subprojects.
Critical habitats with threatened or endangered species	• Not present
Plant species are listed in the Red Book of the Republic of Uzbekistan	• In the area of the Keygeli 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.
Central Asian Flyway (CAF) hotspot area[54]	• Within the CAF in Uzbekistan, Karakalpakstan provide crucial habitats as stopover points and nesting grounds for numerous migratory bird species
Environmentally Sensitive and Protected Areas	• Not available
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

[54] 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

	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:[55] • 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

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

Status of Flora and Fauna

181. The banks of the Keygeli canal have a moderate diversity of plant species, usually dominated by a few species. The riparian type of ecosystem along the canal is subjected to too much human disturbance and frequently fluctuating water levels. Despite relatively low diversity, more than 230 plant species are found within the narrow strips along the canals, much more diverse than many other arid regions of Central Asia.[56] For details, see table 38, which present results of landscape profiling at several sites along the Kegeyli.

182. 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.

183. Tamarisk, or salt cedar, sometimes forms dense stands along the canals and is a salt-tolerant tree species adapted to this arid environment. 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.

Picture 9A: View dense trees on canal bank

[56] Novikova (2001) citied 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. pp 263-264

Picture 9B: Some common tree species

UL: *Elaeagnus angustifolia* at Kegeyli, UR: *Populus* and *Tamarix* at Kegeyli

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

Fauna

185. The term "fauna" refers to the total diversity of all animal species found in a defined area or ecosystem. According to one reference, among the vertebrate fauna of Karakalpakstan there have been recorded 43 species of fish, 2 amphibians, 33 reptiles, 319 birds, and 71 mammals.[57], for detail refer to Annexure 3.

Fish

186. Native fish species, including carp, depend 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. During the survey, one rod-and-reel fishermen at Kegeyli was noted. In Karakalpakstan and Khorezm, at least 49 fish species have been recorded,[58] 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.

187. 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.

[57] Jumanov, M.A. and G.A. Asenov, eds. (2020). *The Animal World of Karakalpakstan*, 640 pp.
[58] *Original source? Found in https://karakalpakstan.travel/nature/fauna/*

Amphibians and Reptiles

188. 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.[59] However, the vast majority would not be found in the Kegeyli subproject areas. In Karakalpakstan and Khorezm, at least 33 reptiles and two amphibians have been recorded,[60] but certainly not all these species may be found in the Kegeyli 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*).

For detail on list of amphibian and reptile species species, refer Annexure 3.

Birds

189. The Avibase Bird Checklists of the World includes all 261 **birds** found in Karakalpakstan[61] based on information available in late 2022.

190. 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 18*).

191. 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 18*).

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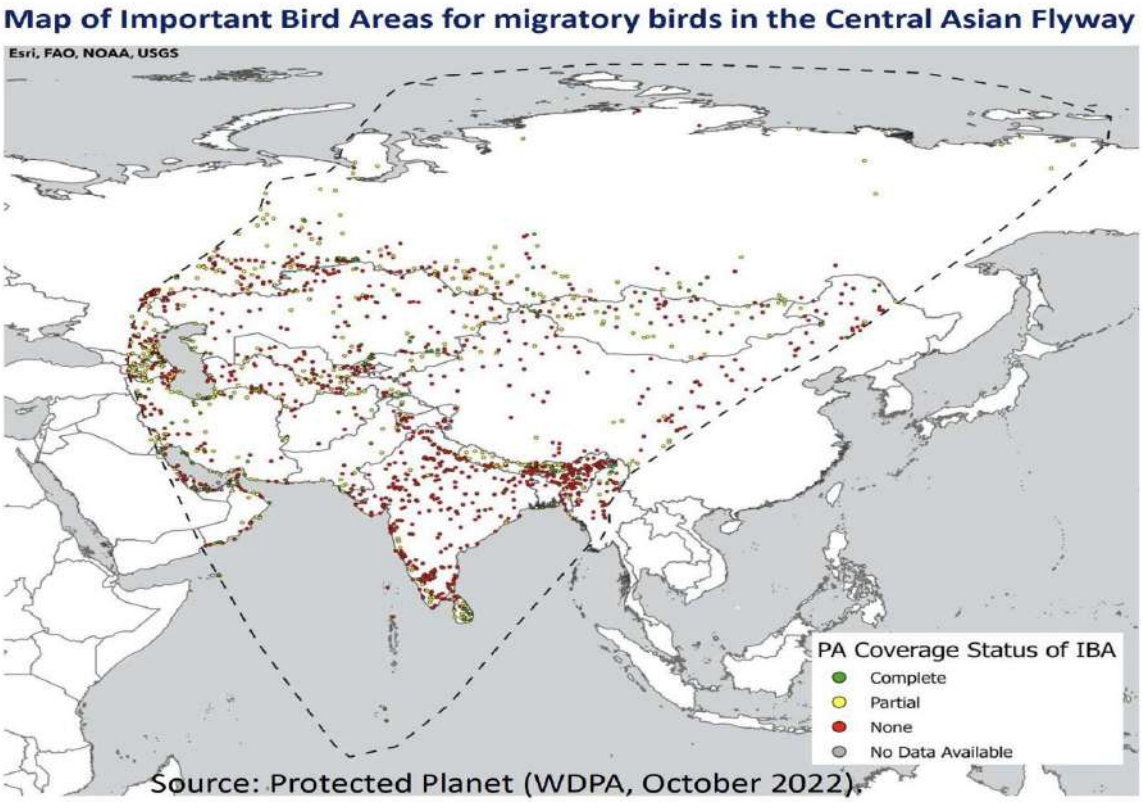
[59] *Showler, David A. (2016). A Checklist of the Amphibians and Reptiles of the Republic of Uzbekistan with a review and summary of species distribution. (e-mail: dashowler@hotmail.com)*

[60] *Original source? Found in https://karakalpakstan.travel/nature/fauna/*

[61] Avibase - *Bird Checklists of the World: Karakalpakstan*. Bird Checklists of the World is part of Avibase and Bird Links to the World, which are designed and maintained by Denis Lepage, and hosted by Birds Canada, a co-partner of Birdlife International. © Denis Lepage 2023. https://avibase.bsc-eoc.org/checklist.jsp?region=UZqr

Figure 18: Central Asian Flyway – Bird Migration



192. At least 15 bird species were observed at the Kegeyli sites in Karakalpakstan (9/6/23): Grey Heron (*Ardea cinerea*), White-tailed (Lapwing) Plover (*Vanellus leucurus,* on the cover to this report), Common Swift (*Apus apus*), Rock Dove (*Columba livia*), Collard Dove (*Streptopelia decaocto*), Eurasian Kingfisher? (*Alcedo atthis*), Indian Myna (*Acridotheres tristis*), Eurasian Magpie (*Pica pica*), Wagtail (*Motacilla* sp.), Marsh Harrier (*Circus aeruginosus*), Black Vulture? (*Aegypius monachus*), Common Kestrel (*Falco tinnunculus*), House Sparrow (*Passer domesticus*), Common Raven (*Corvus corax*), Common Starling (*Sturnus vulgaris*). Two observed species are listed as "Vulnerable" in the IUCN Red List of Threatened Species, the Collared Dove and Marsh Harrier.

193. It can be said that the Kegeyli canal is an important habitat and resting and feeding area for many wetlands and other migrant bird species. In addition, sucker trees and shrubs located near the canal are a good food base for land and tugai birds.[62] In the coastal zones of the Kegeyli canal and Aktuba lakes (Picket Shokariq: 340+00), tugai vegetation is largely comprised of sucker, comb, and turanga. The total projective cover reaches up to 90% on the bank of the canal (Pickets 00+00, 114+00, 177+00, 271+00) of Elaeagnus angustifolia, which creates favorable conditions for the habitat of pheasants and small passerine birds.[63] For detail on bird species, refer to Annexure 3.

[62] Ametov M.B., Matekova G.A., Ametov Ya. (2004). *Winter avifauna of the cultural landscape of Karakalpakstan*. Proc. scientific - practical. conf. "Environmental Education and Sustainable Development." Nukus, pp. 122-124.
Azhimuratov H. *Materials on the spring migration of birds in the Southern regions of the lower reaches of the Amu Darya.* // Migrations of birds in Asia. - Ashgabat, 1990. - P. 57-66.

[63] Ametov M. *Birds of Karakalpakia and their protection*. - Nukus: Karakalpakstan, 1981. - 138 p

Mammal

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

195. At least 68 species of mammals have been recorded in Karakalpakstan and Khorezm[64] but certainly not all species may be found in the subproject areas. No wild mammals were observed but two non-domesticated mammals were observed - Long-clawed Ground Squirrel (*Spermophilopsis leptodactylus*) and Tolai Hare (*Lepus tolai*).

For detail on mammal species, refer to Annexure 3.

IUCN Red List of Threatened Species

196. 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.

197. 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** Kegeyli **subproject sites.**

198. In Karakalpakstan, nine plant species are listed in the Red Book of the Republic of Uzbekistan.[66] However, these nine Red Book species are mainly distributed on the plains of Sultan-Vays (mountains), Kyzyl-Kum desert, and Ustyurt plateau. **In the area of the Kegeili, these species were not found.**

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

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

201. *IUCN Red List of Threatened Species*: Threatened species potentially found within 50 km of the subproject area are found in *Table 40*.

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[64] Original source? Found in https://karakalpakstan.travel/nature/fauna/

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

[66] *IUCN (2019). Red Data Book of the Republic Uzbekistan (Plants), Volume 2.*

[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.*

Table 40: 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
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)

Environmentally Sensitive and Protected Areas

202. The Kegeyli 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 Kegeyli non-core subproject.** The table below is the list of Environmentally Sensitive and Protected Areas and their distance from Kegeyli project.

Table 41: Protected Areas and Key Biodiversity Areas in Karakalpakstan

Name	Location		Area (km^2)	IUCN Category	Distance (km) from Kegeyli, Karakalpakstan
	Administrative conformity	Geographical location			
Biosphere Reserves					
The Lower Amudarya State Biosphere Reserve	Beruniy and Amudarya Districts	80 km NE from Reserve/ 68 km SE from Reserve	687.8	I	38
Complex (Landscape) Order Reserves					
Saygachi	Kungrad and Muynak Districts	213 km NW from Kungrad/ 280 km NW from Ustyurt	628.3	II	213
Order Reserves					
Barsakelmes	Kungrad District	184 km .NE from Usturt/ 276 km SE from Usturt	280.0	V	184
Sudochye-Akpetka StateReserve	Kungrad and Muynak Districts	130 km NE from LakeSudoche/ 280 km SE from LakeSudoche	280.5	V	130
Natural Parks					
National Natural Park "Southern Ustyurt"	Kungrad District	183 km NE from Usturt/ 270 km SE from Usturt	14471.4	III	183
Aralkum	MuynakDistricts	148 km NW from Muynak/ 270 km NW from Aral	100.0	III	148
Khorezm National Natural Park	Urgench District	160-180 km NW from Nat.Park/ 14-62 km NE, SE from Park	21,5	III	180
	Khozarsp District	190 km NW from Nat. Park/ 62 km SW, SE from Park	19.5 ha		190
	Khiva District	200 km NW from Nat. Park/ 25 km SW, SE from Park	1100 ha		200
	Yangibazar District	190 km NW from Nat. Park/ 45 km SW, SE from Park	705 ha		190
	Khanka	195 km NW from Nat. Park/ 14 km SW, SE from Park	50 ha		195
National Nature Park Aral	Bozataw District	40 km NE from Kegeyli/ 212 km ES from Bozataw	196.7	V	42
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	-	10
Dautkul Lake	BozatawDistrict	40 km NE from Kegeyli/ 212 km SE from Kegeyli	4.3	-	40
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	-	200

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]

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

Trees felling

203. Based on preliminary investigation, in Kegeyli main canal, around 1565 trees are cut down, whereas in the secondary canal, there are 2000 trees. During design stage, it recommended to revalidate tree counting, the cost of cutting and re-planting, the table below enumerate three options, however, option 2 and option 3 is expensive but sustainable and climate inclusive, whereas option 1 is purely based on national law, for detail, see Table 42.

Table 42: Options to reduce trees cutting

Mitigation options	Description of option	Remarks
Option 1:	National law stipulates for cutting one tree, plant 1:10	• Most simple and convenient option
Option 2:	Cut only those trees that cannot be avoided and relocate trees next to the canal (within 50 meters)	• By this method we can save some percentage of trees • Increase cost
Option 3:	Cut only those trees that cannot be avoided and relocate trees next to the canal (within 50 meters) + where tree density is high, revisit or optimise design to avoid or reduce tree cutting.	• By this method we can fairly save good percentage of trees • Increase cost but most preferred option
Conclusion *Option 1 does not require any additional study. However, Option 2 and Option 3 require detailed surveys such as re-validation of tress + identification of potential trees to be relocated + identification of trees that cannot be avoided + cost implication due to change in design + O&M cost of relocated trees, etc..*		

4.7. Socio-economic profile in subproject areas

About Republic of Karakalpakstan and project area

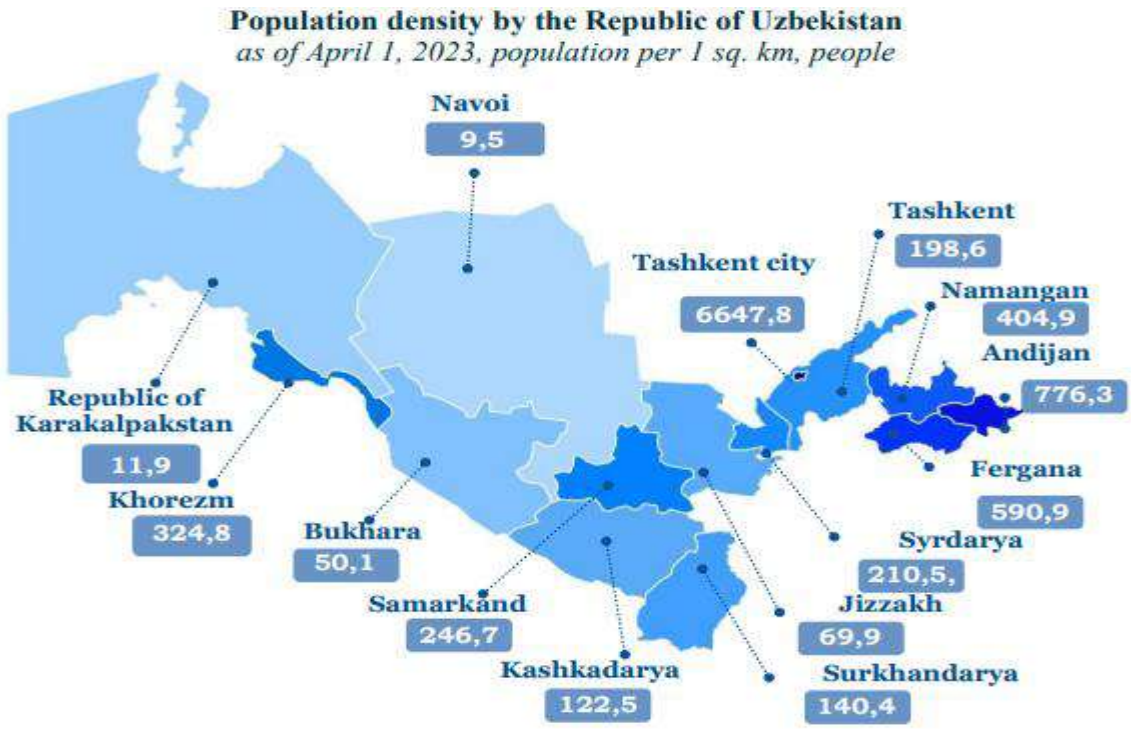
204. The current population of Uzbekistan is 36197,8 thousand (as of April 1, 2023) people[70]. As of April 1, 2023, the population density in the country was 80.6 people per one square kilometer. In terms of region wise, the highest population density in Tashkent city (6 647.8 people), 776.3 – in Andijan 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.[71] See figure 19.

[70] https://stat.uz/en/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=414&id=2852&Itemid=100000000000

[71] https://stat.uz/en/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=414&id=2852&Itemid=100000000000

205. **The Republic of Karakalpakstan** was formed on February 16, 1925. The population at the beginning of 2023 is estimated at approximately 1,976.3 thousand people (5.5% of the population of the Republic of Uzbekistan). The Republic of Karakalpakstan is divided into 16 administrative districts, including 6 project districts, - Nukus, Kegeyli, Chimbay, Karauzyak, Bozatau and Muynak districts. There are 38 urban settlements in the region (12 cities and 26 urban-type settlements) and 144 rural gatherings of citizens. [72]

Figure 19: Population Density



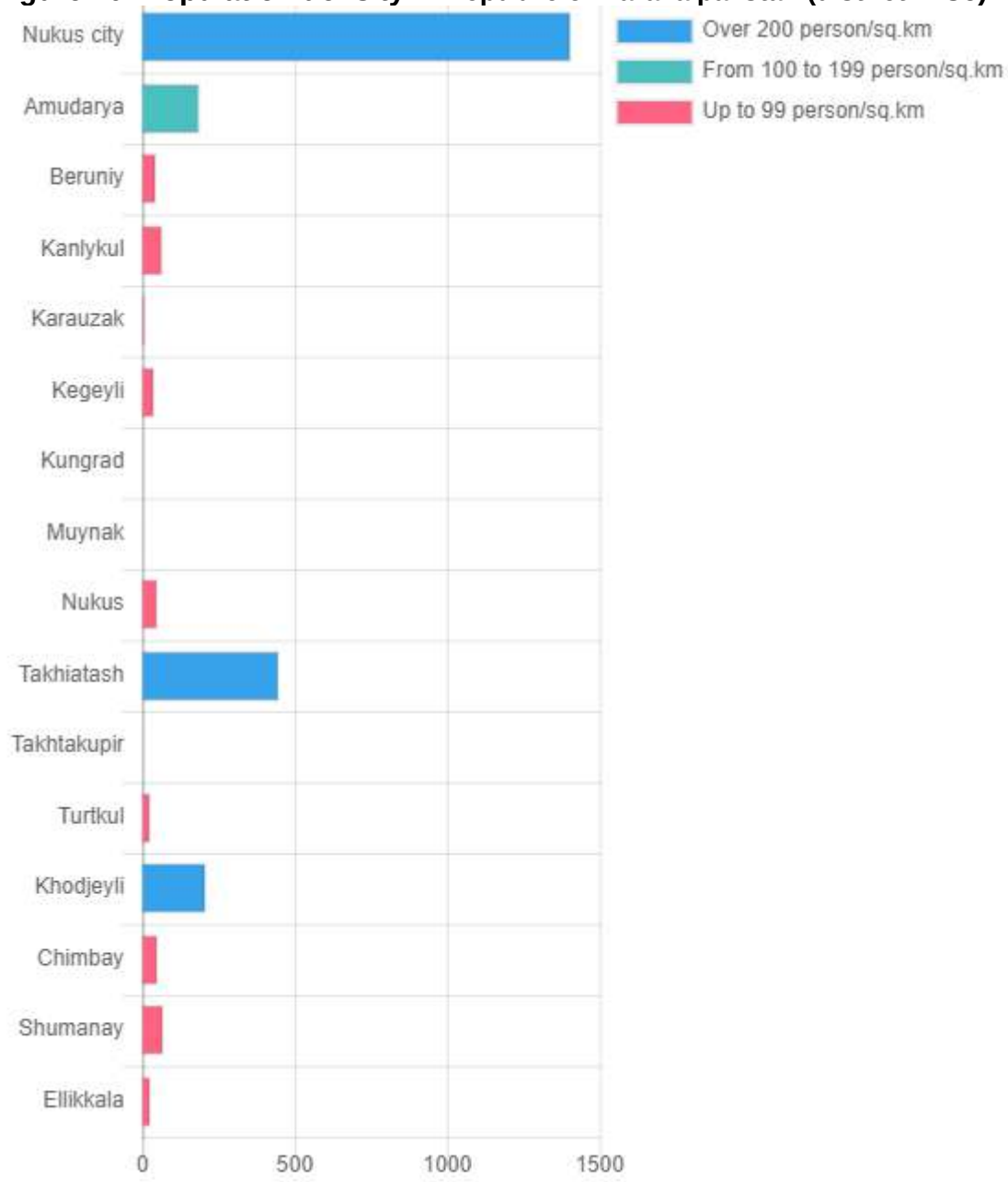
https://stat.uz/en/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=414&id=2852&Itemid=1000000000000

Population density in Republic of Karakalpakstan and Project Area

206. The population density in the Republic of Karakalpakstan and Kegeyli subproject command area is summarised in Figure 19 and 20 respectively. The highest population density is found in Nukus City, followed by district Takhiatash. In all project areas (Nukus, Kegeyli, Chimbay, Karauzyak, Bozatau and Muynak districts), the population density is up to 99 persons sq km.

[72] Statistical data of the Department of Statistics of the Republic of Kazakhstan

Figure 20: Population density in Republic of Karakalpakstan (district wise)



Source: https://invest.gov.uz/regional-map/respublika-karakalpakstan/

Details of the Project Area

207. The table below (43), enumerates the details of project area such as districts profile, total area, population, boarder area, population and household.

Table 43: Details of project areas districts

Project districts	Description
Bozatau	• Established in 2019. The administrative center is the city of Kazanketken (Bozatau). • The border regions are Kegeyli, Kungrad, Kanlikul, Chimbay, Muynak and Nukus districts.

	• Total area of the district is 2.04 thousand km². The population of the district is 21.9 thousand people (as of January 1, 2023). The average number of members in a HH is 6 people
Karauzyak district	• Established in 1930. • The southeastern part of the region is occupied by Taskudyk sands. • Border districts: - Nukus, Amudarya, Beruni, Kegeyli, Chimbay, Takhtakupyr, Muynak districts. • The total area of the district is 5.89 thousand km². The population of the district is 54.1 thousand people (as of January 1, 2023). The average number of members in HH is 6 people.
Kegeyli district	• Established in 1930. • The southeastern part of the region is occupied by Taskudyk sands. • Border regions: - Nukus, Chimbay, Karauzyak, Muynak districts. • The total area of the district is 0.92 thousand km². The population of the district is 74.2 thousand people (as of January 1, 2023). • The average number of members in HH is 5 people.
Muynak district	• Established in 1931. In 1963, the district was abolished, and in 1964 it was restored. The administrative center is Muynak town. Muynak district is located in the northern part of the Republic of Karakalpakstan. • The district area is 37.88 thousand km², but in recent decades, due to the decrease in the level of the Aral Sea, the area of the district has increased. • In terms of the area, Muynak district ranks second among the regions of Karakalpakstan. The main part of district is occupied by deserts, steppes and salt marshes, as well as part of the Aral Sea. • The population of the district is 33.4 thousand people. • The average number of members in HH is 6.5 people.
Nukus district	• It was established in 1968. The administrative center is the urban-type settlement of Akmangit. • Border regions: - Kanlykul, Khodjeyli, Kegeyli, Karauzyak and Amudarya districts. • The total area of the district is 0.94 thousand km². • The population of the district is 52.9 thousand people (as of January 1, 2023). • The average number of members in HH is 5 people
Chimbay district	• It is an administrative district of the Republic of Karakalpakstan. Chimbay district was formed in 1930. The administrative center is Chimbay town. • Border regions - Kegeyli, Karauzyaki districts.

	• The total area of the district is 1.44 thousand km². • The population of the district is 115.0 thousand people (as of January 1, 2023). • The average number of members in HH is 6 people

208. The ethnic composition of the population is represented by various nations and nationalities. According to recent data, 40.4% of the population are Uzbeks, Karakalpaks - 36.9%, Kazakhs - 15.4%. 5.69% are Turkmen. Russians, Kyrgyz, Koreans, Tatars and other nationalities together do not exceed 2% of the population.

Demographics

209. According to the Statistic Department of the Republic of Karakalpakstan, the total population of the Republic of Karakalpakstan as of January 1, 2023, is 1976.3 thousand people. The number of urban residents is 967.5 thousand (49.0% of the total population), and the rural population is 1008.8 thousand (51.0%), out of the total, 49.8% of the population are women (983.7 thousand people), and 50.2% are men (992.6 thousand people).

210. The districts in which Kegeyli project falls, share 18% of the total population of RK, See Table 44. The average population in the project area is 35.65 persons per sq km, the population density is highest in Chimbay district and lowest in Karauzyak, the average HHs size is 5.8 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 / m²*	*Unit*
Republic of Karakalpakstan	1976.3	967.5	49.0%	1008.8	51.0%	11.9	5.1
Bozatau	21.9	5.5	25.1%	16.4	74.9%	10.7	6.5
Karauzyak	54.1	16.4	30.3%	37.7	69.7%	9.2	6.0
Kegeyli	74.2	30.0	40.4%	44.2	59.6%	80.7	5.4
Muynak	33.4	14.5	43.9%	18.5	56.1%	0.9	6.5
Nukus	52.9	10.7	20.2%	42.2	79.8%	56.3	5.0
Chimbay	115.0	59.0	51.3%	56.0	48.7%	79.9	6.1
Total	**351.5**	**136.1**	**38.7%**	**215**	**61.2%**	**39.6**	**5.9**

Source: State Department on Statistics of the Republic of Karakalpakstan

Status of Education in project districts

211. In project districts there are 114 preschools (22% of the total number of preschools in RK) with 16,535 children. Of the 114 preschools in the project districts, 8 units are located in Bozatau district, 17 in Karauzya district, 16 in Kegeyli district, 19 in Muynak and Nukus districts respectively, 35 in Chimbay district.

212. The total number of schools in project districts is 184 units (25% of total school number in the RK). These are public and private schools in project districts which cover

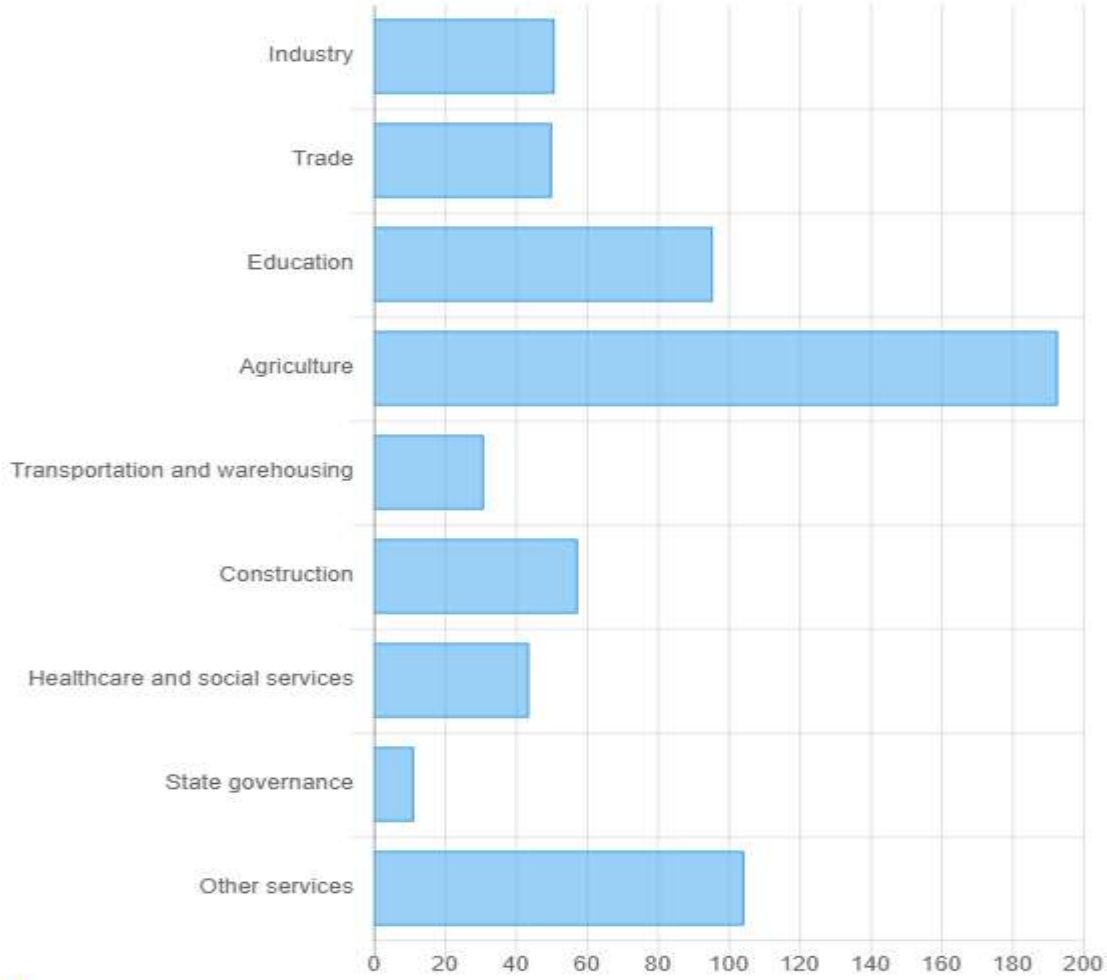
60,193 pupils. The total number of teaching staff in184 schools is 8694 teachers. The average number of teachers per school is about 47 people.

213. There are no higher educational institutions located in project districts. All the higher educational institutions of RK are located in Nukus city, capital of the region.

Employment

214. Below figure (21) depicts the employment statistic sector wise. In the Republic Karakalpakstan agriculture still holds the top position in providing employment, followed by other services, education and construction sectors.

Figure 21: Employment of the Population by Industry (thousand people)



Source: https://invest.gov.uz/regional-map/respublika-karakalpakstan/

Healthcare

215. The government maintains good statistic on health. In RK, disease related to respiratory disorder account highest followed by digestive diseases and diseases related to blood, see Table 45.

216. As of January 01, 2022, there are 12 hospitals and 63 polyclinics in the project area, which accounts 21% and 16% of the total number of hospitals and polyclinics in the

Republic of Karakalpakstan. The 12 hospitals all together have total 1227 beds, which accounts for 102 beds per hospital.

Table 45: Disease statistic in Karakalpakstan, January 1, 2022

Diseases	Quantity
Some infectious and parasitic diseases	1,187.2
Neoplasms	152.9
Diseases of the endocrine system, eating disorders, metabolic disorders	882.4
Diseases of the blood, hematopoietic organs and certain disorders involving the immune mechanism	**6,731.8**
Mental and behavioral disorders	80.9
Diseases of the nervous system	1340.5
Diseases of the eye and adnexa	1,835.6
Diseases of the ear and mastoid process	1356.6
Diseases of the circulatory system	2461.4
Respiratory diseases	**15,967.1**
Diseases of the digestive system	**7,758.4**
Diseases of the genitourinary system	**4494.9**
Complications of pregnancy, childbirth and the postpartum period	1368.4
Diseases of the skin and subcutaneous tissue	1298.7
Congenital anomalies, deformities and chromosomal abnormalities	25.8
Injuries, poisoning and some other consequences of external causes	1687.1

Source: State Department on Statistics of the Republic of Karakalpakstan

Roads and transportation and other infrastructures

217. Nukus, the capital of RK, is well connected by road, rail and air to different cities of Uzbekistan

(a) Road connectivity - Nukus is connected with all major cities with road such as;

- Nukus city-Beruni-145,2 km.
- Nukus city-Turtkul-172,1 km.
- Nukus city-Muynak-213,2 km.
- Nukus city-Urgench city-192,0 km.
- Nukus city-Bukhara city-550,2 km.
- Nukus city-Navoi city-657,5 km.
- Nukus city-Karshi city-734,5 km.
- Nukus city-Samarkand city-821,9 km.
- Nukus city-Tashkent city-1155,7 km...

(b) Rail connectivity

- Nukus city – Oasis Station of the Republic of Kazakhstan – 459 km.
- Nukus city – Karakalpakstan station – 439 km.
- Nukus city-Kungrad city -131 km.
- Nukus city-Khodjeyli city – 45 km.
- Nukus city-Turtkul city – 166 km.
- Nukus city- Miskin station – 196 km.
- Nukus city-Navoi city- 697 km

- Nukus city-Samarkand city- 853 km.
- Nukus city-Tashkent city- 1190 km.

(c) Air connectivity

- Nukus city – Tashkent
- Nukus city – Moscow

218. 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 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 Project Area

219. Islam is the predominant religion in Uzbekistan, more than 90% of the population of Uzbekistan follows Islam. Karakalpakstan has a unique and rich cultural heritage. It includes ancient architectural and archaeological monuments, unique folklore, performing arts, ceremonies and customs, as well as traditional handicrafts.

220. According to the Institute of History of Archeology and Ethnography of the Karakalpak branch of Academy of Sciences of the Republic of Uzbekistan, there are about 280 archaeological sites. Chronologically, they are located from the Stone Age to the late Middle Ages (XIV century). Among the most famous archaeological monuments can be identified such as Kazakly Yatkan-Kala - the oldest capital of Khorezmshahs, Ayazkala, which is important in the “Golden Ring of Ancient Khorezm ”, Koy- krylgan-Kala - ancient mausoleum and temple observatory, Toprakkala - Late Antique residence of Khorezmshahs, as well as numerous ancient and medieval cities and settlements - Guldursun, Nazlumhansulu and Shylpik.

221. The Karakalpakstan State Museum of Art named after IV Savitsky - also known, simply, as the Nukus Museum - hosts the world's second largest collection of Russian avant-garde art (after the Russian Museum in St. Petersburg). It is also home to one of the largest collections of archeological objects and folk, applied and contemporary art originating from Central Asia.

222. During the survey, within 100 meters on both sides of the canal alignment, the team could not see any cultural or historical heritage remains. However, there is a likely risk that digging and excavation activities during construction might unearth cultural resources, including archaeological and grave sites. In such a scenario, work will commence in the affected location once an agreement has been reached between the authorities and PIU. The contractor will include a “chance finds” section in the SSEMP. The following cultural heritage monuments are located in the territory of the project districts; for details, see table 46.

Table 46: Cultural heritages in project districts

District	Cultural heritages	Historical Period
Kegeyli	Archaeological site Kuyik kala	7th-8th centuries
	Attraction Ishan kala	XVIII-XIX, XX centuries
Karauzyak	Archaeological site Jampik kala	BC. IV - III centuries
	Archaeological site Gyaur kala (Sultan Wizdak)	don.e. IV - III centuries AD VI centuries
	Mausoleum of Kabakliat	XVIII-XIX centuries

	Attraction Zhienzhyrau	XVIII century
	Mausoleum Kuyik Sate	XVIII-XIX centuries
	Mausoleum of Koshkarat	XII-XIII centuries
	Attraction Murat Sheikh	XVIII-XIX centuries
	Attraction Otesh shaiyr	19th century
Muynak	Muynak branch Museum of the State of History and Culture of the Republic of Karakalpakstan	1984
	“ Cemetery of ships ”	Post 1970s
	Archaeological site Yernazar kal'a (Izlim zhol)	XVIII-XIX centuries
	Archaeological Site Molla Pirim kala	XVIII-XIX centuries
	Mausoleum Ajiniyaza	19th century
	Mausoleum Khakimat	XII-XIII centuries
Nukus	Mausoleum of Imom Ishan	XVIII century
	Mausoleum Azler Baba	XII - XIII centuries
	Mausoleums of Kazi Maurik	XVIII - XIX centuries
	Cultural heritage site Dar kala	VII-VIII centuries
	Cultural heritage site Krantau	BC. II century, IV - VII, XIII XVII XX centuries
	Hillfort Toprak kala	BC. IV - III century, AD XIII century
Chimbay	Mausoleum Berdak Baba	20th century
	Mausoleum Ahimbet baksi	XVIII-XIX centuries
	Mausoleum of Kara Kum Ishan	XVIII-XIX centuries
	Mausoleum of Kunhuzha bobo	19th century
	Mausoleum of Akhun bobo	19th century
	Archaeological site Kirga kala	XII-XIII centuries
	Archaeological site Porlytau	BC. 2nd century AD XII - XIII - XVII - XIX centuries
	Yerezhep Mausoleum tentek	19th century
	Mausoleum Berdak Baba	20th century

Picture 10: Some Cultural heritage sites in project districts

	
Archaeological site Gyaur kala (Sultan Wizdak)	“Cemetery of ships” in Muynak
	
Ishan kala	Zhampik Kala
	
Mausoleum Ajiniyaza	Hillfort Toprak –kala

5. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1. Approach and Methodology for Impact Assessment

223. Like other development projects, the potential impacts of modernization of Kegeyli subproject are not as severe as those of other development projects. The rehabilitation and modernization of the Kegeyli 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.

224. To ensure effective assessment, we have opted for a simple, logical and systematic approach in IEE; the team 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 strengthens farmer's incomes, and improves income, health and overall socio-economic wellbeing
b) More inclusion and participation of women in project management and women-managed farms
c) Gender equality and enhance women's participation in land and water management

225. 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 has collected.

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

The assessment of magnitude of impacts was undertaken by considering the following:

a) Duration of the impact;
b) Spatial extent of the impact;
c) Reversibility;

The magnitude of impacts was identified according to parameters outlined in Table 47.

Table 47: 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

226. In impact evaluation, the predicted adverse impacts have been assessed based on their significance, see table (48). The criteria for evaluating the significance of impacts and their effects have been set in advance (see Table 48) 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 48: Impact Evaluation Criteria used in Kegeyli subproject

Sr. no	**Impact evaluation criteria**
1	Trigger national laws and standard
2	Trigger international conventions (Refer to Table 14 and 15)
3	Donor commitment - ADB SPS (2009), conditions of loan agreement and PAM
4	Conservation or protected status of an area, features or species
	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 cutting
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

227. In all cases, we use processes, 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 of Kegeyli subproject

228. After considering size, nature of impacts and impact evaluation criteria, IEE team conclude that Kegeyli irrigation project will cause moderate impacts, majority of the impacts are temporary, local and reversible and mostly site specific, for detail see Table 49, 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 plants cause temporary air and noise pollution, including pressure on existing roads and people's safety due to the transportation of construction material
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 generates road dust, noise pollution, public inconvenience and community risks

229. In a country like Uzbekistan, where the population density is low, projects of this magnitude may cause not many impacts. However, projects may cause public inconvenience and road safety in the areas occupied by human settlements or close to populated locations. Table 49 enumerates the summary of Environment and Social Risks of Kegeyli subproject.

Table 49: Impact Assessment of Kegeyli subproject

Sr. no	Project activity	Extent	Magnitude	Period	Need for mitigation	Remarks	Significance
1	Involuntary displacement and Loss of livelihood	Local	High	Long term, if mitigation measures are not considered	Yes.	According preliminary estimate, 56.94 ha will be affected; - 4 leasehold farms – 26.81 ha - 1 silkworm farm and lands of the Livestock Development Committee – 4.25 ha - 4 agro enterprises -17.76 ha - District reserve lands - 8.12 ha. Furthermore, after finalisation of the design, it is recommended for Social-due diligence to assess the extent of social impact and prepare RAP accordingly.	Trigger national policy
2	Loss of local biodiversity	Local – Impacts are confined along the canal alignment.	Moderate	Short term	Yes	**Kegeyli** 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
3	Nearness to ecological sensitive area, presence of endangered, threatened or protected species, presence of KBAs and keystone species	Not applicable	No applicable	Not applicable	No	Kegeyli 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 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 withien 1, 2 and 5 km • Falls in Central Asian Flyway (CAF) hotspot area[73]	Not trigged

[73] 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

						• No presence of any Keystone Species, or those Species, which are crucial to the overall functioning of an ecosystem	
4	Impact on local utility	Local	Moderate	Short term	Yes	In Kegeyli, shifting of utilities has been avoided by opting manual means at utilities crossing, see table 36	Approval from local authority is mandatory
5	Tree cutting	Local	High	Long term	Yes	1565 number trees to be cut down on both side the canal	Trigger national policy
6	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 soil) due to movement of vehicles, vehicles exhaust, batching plant as well as from stockpiles of construction materials/excavated earth.	Trigger National standard
7	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
8	Noise pollution	Local	High	Continue till construction stage	Yes	Impact on air quality due to increased vehicle and equipmentoperations. Cause disturbance and annoyance to local community and health hazard to worker due to constant exposure	Trigger National standard
9	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
10	Occupational health and safety	Local	High	Continue till construction stage	Yes	Unsafe act and unsafe condition have potential to cause injury, death, loss of man-days and may cause site emergency	Trigger National standard
11	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
12	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
13	Canal desilting	Local	High	Short term	Yes	Potential of air and water pollution also cause public inconvenience	Risk of conflict and public litigation
14	Climate adaptive	Local/national	High	Long term	Yes	Build climate resilience I&D system.	Help in meeting SDGs and NDC commitment

						Explore possibility of integrating concreate mat in main and secondary canal to reduce the overall carbon footprint; Explore inclusion of canal-top and canal-bank solar installations	
15	GHG emission	National	High	Long term	Yes	Proposed concreate ceiling and pump supply will increase GHG emissions. Replace old pumps with energy efficient pump to reduce carbon footprint Explore for low cabon embodied material	Look for alternatives, which are less carbon intensive
16	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
17	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-economic well-being, including a positive impact on health.	Help in meeting government and ADB commitments
18	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
19	Lining of Canal	Local	Low	Continue till construction stage	No	It will protect from salinity of cultivated land. Decreases the possibility of bank failure. Increases the more beautiful environment.	Approval from local authority is mandatory
20	Spoil Mangement	Local	Low	Continue till construction stage	No	Modernization of existing canals and structures which does not need to manage huge quatity of earth and silt like in new canal. The excavated materials can be manged within the public land available at bothe banks of canal.	Approval from local authority is mandatory
21	Construction and rehabilitation of Bridge	Local	Low	Continue till construction stage	No	There will not be very big excavation and embankment. The construction works will be limited to small area.	Approval from local authority is mandatory
22	Coonstruction of access road	Local	Moderate	Continue till construction stage	No	This can be manged by contractor. The scope will be incorporated in General and Special Condition of Contract and Technical Specification.	Approval from local authority is mandatory

23	Labor camp construction and management	Local	Moderate	Continue till construction stage	No	This can be manged by contractor. The scope will be incorporated in General and Special Condition of Contract and Technical Specification.	Approval from local authority is mandatory
24	Intersection areas with water pipe lines, gas pipelines, transmission lines etc	Local	Low	Continue till construction stage	No	It will be manged by contractor. The scope will be incorporated in General and Special Condition of Contract and Technical Specification.	Approval from local authority is mandatory

230. To avoid repetition, detailed mitigation measures and monitoring plans for all activities have been elaborated in the EMP (Table 52). The EMP can be used at the bidding stage to inform contractors of the required measures and actions to satisfy the requirements of IEE and EMP and guide the contractor in preparing SSEMP during the pre-construction stage.

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

231. **Design and planning stage** - Inclusion of climate mitigation measures.

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 need 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 290.

e) Replace old pumps with energy efficient pump to reduce carbon footprint.

f) Explore possibility to use low carbon embodied materials and local construction material to reduce carbon footprint.

232. Pre-Construction Stage - **Pre-construction impacts of Kegeyli subproject** are usually moderate mainly associated with the preparatory works to facilitate construction phase**.** During pre-construction stage PIU will need to ensure;

a) Involuntary Resettlement - Modernization of Kegeyli canal will trigger involuntary resettlement, according to estimate, 56.94 ha of land will be affected. Hence, it is recommended to undertake Social due diligence to assess the extent of social impact and prepare RAP accordingly.

b) PIG shall 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) Environmental safeguards 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.

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

h) Assess the land requirement for batching plants, construction and labour camps. Identification of storage areas for construction materials and waste disposal areas.

233. **Important consideration for SSEMP**.

a) The approval from State Committee for Ecology and Environmental Protection shall be obtained by PIU before the bids are invited for civil interventions.

b) PIU/PIC will ensure that the contractors are well-informed and instructed on the need to prepare an SSEMP in align with EMP (for detail refer to tentative Framework for Preparing Site Specific Environment Management Plan (SSEMP) and shall be a part of bid and contract documentation. For avoidance of doubt and for purposes of the eventual contracts, SSEMP means "contractor's site specific EMP".

c) Prior to commencement of construction works, the contractor will prepare SSEMP (based on the EMP) on how the contractor will implement the mitigation as specified in EMP. The SSEMP will be agreed in advance with PIU /PIC during pre-construction stage.

d) 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 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 Annexure

e) PIU will ensure that the selected contractor has 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. 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.

f) 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.

g) 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.

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

5.4. Safeguards Consideration during Kegeyli Construction Phase

234. There will be some low to moderate impacts expected upon terrestrial habitats and flora as a result of the surveying, demarcation and clearance of the project facilities and areas. Surveying and demarcation will cause minor degradation of localized areas through the clearance of small fragments of vegetation, but the areas of concern will be extensive trees and bush removal on both side of canal during civil intervention.

235. Initial investigation shows that Kegeyli canal triggers involuntary resettlement and loss of livelihood. However, during design stage, a Land Acquisition and Resettlement Plan (LARP) will be prepared to establish policies and procedures for payment of compensation for disturbance of remaining productive areas and crops

or that will be affected in one way or another by construction and installation of the project.

Site Clearance and Excavation

236. 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 will be informed. The PIU will be responsible for complying with the requirements of the authorities and monitor them throughout the construction stages.

237. Work will not re-commence in the affected location 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.

238. 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 at the beginning of the mobilization phase and include training on HIV/AIDS and transmission of STD, and transmission and prevention of COVID-19.

Mobilization of the Contractor and Construction Camp

239. 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 including competition for potable water and water for hygienic sanitation facilities must be balanced with local village needs.

240. Measures:

a) 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.

b) Camps will ideally be located within the Kegeyli irrigation system area but at least 500m away from local populated areas.

c) Prior to contractor mobilization to the site, PIU-ES will work with the contractor to establish the communications protocol between the project contractor and communities to be summarized in a communications plan.

d) Local employment - The contractor will hire and train as many local workers as possible by using labor from local villages as the work proceeds.

e) PIU/PIC ensure that labour camp management plan in align with World Bank standard [Workers’ Accommodation: Processes and Standards][74]. 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 facilities (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

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

standards will not be discharged to the environment.

Management of Impacts to improve Air quality

241. Impact: During field survey, it was found that air quality of the Kegeyli 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 the movement of vehicles and high wind, other sources include batching plant, stockpiles of construction materials and canal desilted material, when it gets dried. However, these impacts should be significant given the scale of the works in the open air.

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

243. PIU/PIC ensure that contractor shall conduct air quality monitoring, for detail on monitoring, for detail, see Table 57. 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) Water spray on access roads, batching plant area, material storage area, at least thrice a day during summer, in other season, the frequency water spray as prescribed by PIU/PIC
c) Restricting speed of vehicles to reduce surface dust (20 -25 Km/hr.)
d) Covering trucks to avoid spillage of construction material
e) Use Anti-smog gun at potential areas where fine dust generation is high (see figure)
f) Provide personnel protective equipments (PPEs)
g) Contractor shall maintain proper housekeeping at the site and store raw materials in a designated area with appropriate labeling and ensure that dust suppression measure (like water spray) is implemented

Picture 11: Anti-smog Gun (dust suppression)

Noise Impacts and its Management during project Construction

244. Impact: In Kegeyli 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 noise impacts of the construction equipments, 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.

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

a) 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.

b) PIU ensure that contractor shall conduct noise monitoring, for detail on noise monitoring frequency and location, see table 57.

c) In case of complaint or legal intervention, the contractor is required to conduct additional noise monitoring as recommended by environmental authorities. If the noise level exceeds the national standard, the contractor is required to prepare action plan and submit to PIU for approval.

d) 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 work will be limited to 8 AM to 6 PM;
e) Noise generating equipment will be located at least 300 m from any sensitive areas.
f) 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.
g) 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
h) For workplace noise, the contractor shall provide ear-plug or ear-muff depending on noise level
i) DG set for power back up shall be fitted with acoustic enclosure
j) Fit all pneumatic tools with an effective silencer on their air exhaust port.
k) 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.
l) 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.
m) Any other measures as suggested by PIU/PIC after site inspection

Protection of Physical Cultural Resources

246. Impacts: During field investigation 100 meters on both sides of canal alignment, no historical monuments or cultural resources have been identified in the KEGEYLI. 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.

247. Mitigation: No mitigation is required. However, during project implementation, 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"

Hazardous Materials Management – Project Construction

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

249. Mitigation

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

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

c) 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.

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

Waste Management to Ensure Safe working Conditions

250. Impacts: Kegeyli 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 waste, 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 waste or kitchen will also be generated by contractor's workforce throughout the construction period. In addition, domestic and workshop wastewater (liquid waste) will also generate, Kegeyli 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.

251. 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 of 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 online 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 provides a detailed design of each labour camp including infrastructure planning (water supply, electricity supply, waste management, wastewater treatment and disposal). Workers will be trained in how to behave and to handle waste and wastewater according to national environmental management requirements and good international practices.

Protection Surface/Ground Water Sources

252. Impacts: The construction Kegeyli 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.

253. Mitigation: No construction camp and labor camp, permanent or temporary, will be located within 500 m 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 used for dust suppression.
.

d) Lubricating oil shall be collected and sold to authorised recyclers.

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 water courses or wetlands shall 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 follow a waste transfer manifests system

Site clearance and rehabilitation after civil works completion

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

255. 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 them by removing waste or debris, (ii) levelling of ground or mechanical remediation and (iii) biological revegetation with native plants. (Iv) or as agreed by landowner.

EHS Risk during Survey/ Site Inspections

256. **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.

257. 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 Annexure.**

Sexual Harassment of Women at Workplace

258. 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.

Gender Equality

259. 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 standards are not available, the contractor shall follow international standards.
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.

Site Security

260. Contractor shall;

a) Prevent unauthorised entry of workers and locals, who do not have valid ID.[75]
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.

Soil erosion and protection

261. 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.

262. Mitigation:

a) During construction, the contractor will be responsible for ensuring that embankments are monitored continuously during construction for signs of erosion.

b) 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.

c) Topsoil shall be preserved, stockpiled and reused in plantation.

d) Surface soil will be temporarily graded-to-drain and protected as necessary to reduce erosion and sediment runoff.

[75] 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

e) 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.

f) PIU/PIC ensure that contractors must take adequate measures for erosion by preventing or minimizing removal of trees and green cover vegetation. Revegetation measures will be applied, where appropriate

g) 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

i. Only native species for plantation
ii. Select species which grow successfully and matches 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 soil 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**

Impact on Ecological Resources

263. Impact: The Kegeyli rehabilitation works 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.

264. Mitigation:

a) 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. For more details on mitigation, refer to Table 42.

b) PIC/PIU ensure that setting up concrete batching plants, construction camps, labor camps, and other ancillary features does not involve tree-cutting.

c) In addition, the contractor will be responsible for supplying appropriate and adequate fuel in construction camps to prevent fuel-wood collection.

Community health and safety

265. 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.

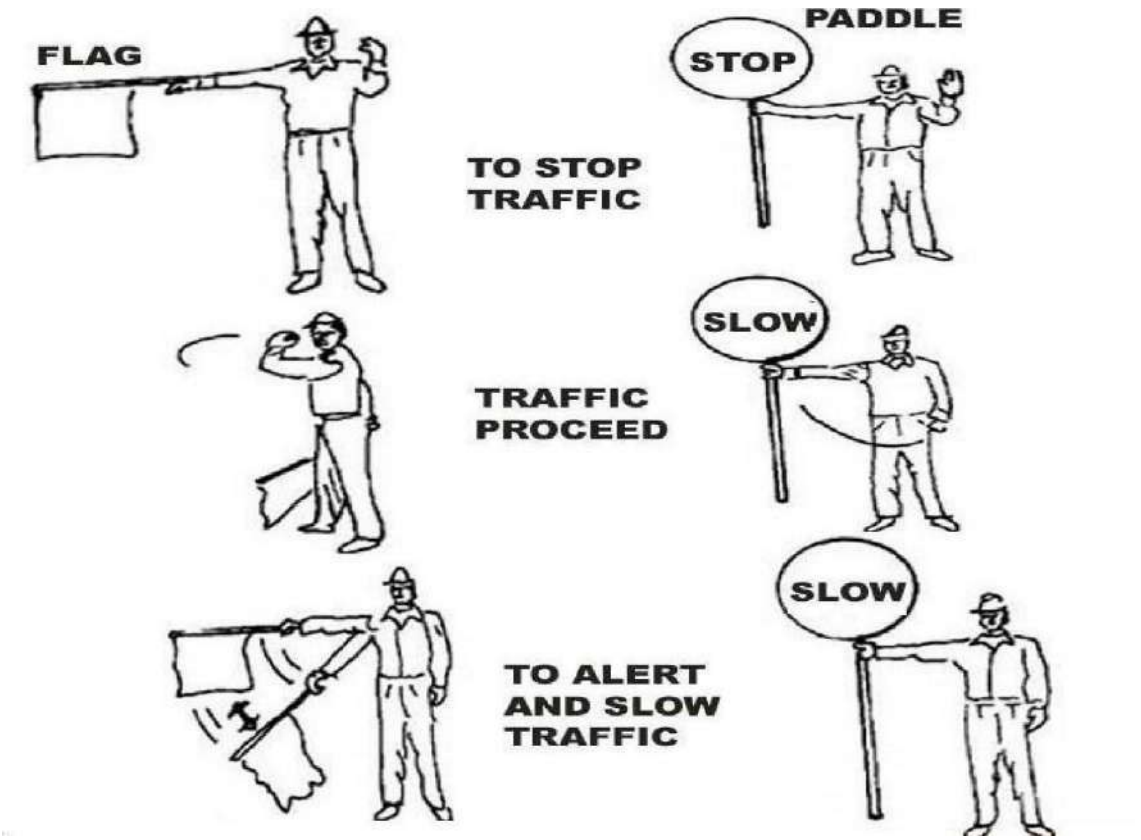
266. Mitigation: During the construction phase, the following mitigation measures will be taken:

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, see Figure 22, schedule transportation activities to avoid public inconvenience;
h) Do not overload vehicles beyond limits. In populated areas or sensitive areas, contractors must ensure and designate flaggers for diverging the traffic. All the personnel must be equipped with reflective jackets and traffic control batons.

267. Training and capacity building, The contractor shall;

a) Tool box meeting (10 min daily)
b) Routine training (weekly)
c) First Aid & CPR Training Course (monthly)
d) Fire Fighting Training & Drill (quarterly)
e) Drill (emergency response), quarterly

Figure 22: [Sample] Traffic control in project area

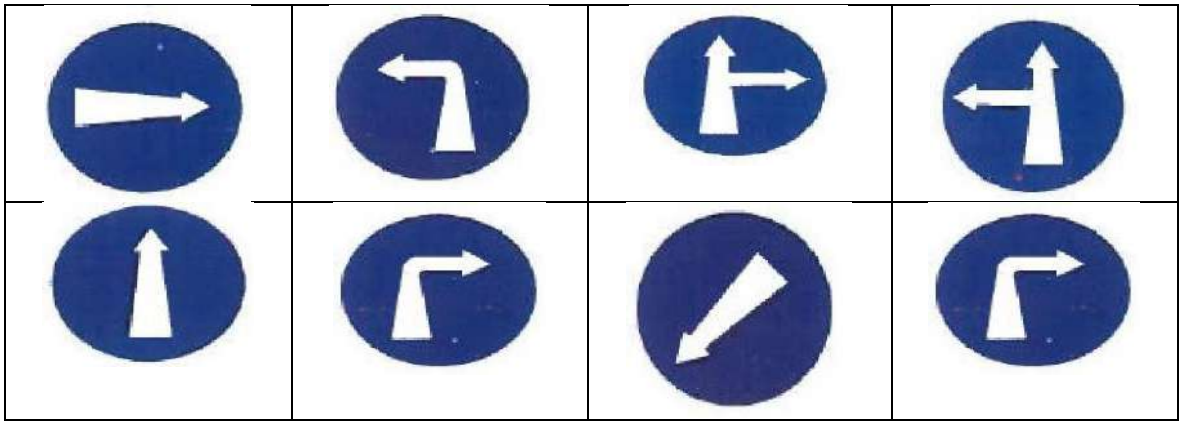


Traffic Management

268. 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 50 A: [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

Impact Management from the Operation of worker's camps

269. Impact: Without implementing suitable mitigation measures, the issues of inadequate water supply, sanitation and poor living conditions, including conflicts of local camp labours could arise.

270. Mitigation: The contractor will prepare the Labour Camp Management plan in align with the World Bank (ESF), and IFC guidance note[76] 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 providing 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

271. Impact: Workers' rights including OHS will be considered to avoid accidents and injuries, loss of man- hours, labour abuses and to ensure fair treatment, remuneration and safe working conditions. Kegeyli construction activities pose some potential hazards to both workers and the public. Hazards include injuries from incorrect lifting of heavy objects and falls from height, drowning (In some cases the work force will have to work near canals or other deep-water courses), hazard 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 made aware of risks from falling and especially from 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 from accidental leakage or discharge from another part of the irrigation or drainage system.

[76] Workers' Accommodation: Processes and Standards (ifc.org)

272. The Kegeyli 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 Kegeyli project must also exercise appropriate precautions against introducing the infection to local communities through;

a) Siting of labour camp
b) Establishing communication plan
c) Creating awareness
d) Maintaining sanitation at labour camp
e) Establishing GRM
f) Documented do's and don'ts for workers

273. Occupational health and safety in Uzbekistan are generally governed by the various regulations and codes covering mechanical safety, hygiene and sanitation and road safety. 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.

274. Mitigation: Health and Safety Management Plan and Emergency Response Plan including COVID-19 plan, shall be prepared by the contractor as a part of the SSEMPs to manage risks/hazard on-site during the construction phase. Contractor will allocate sufficient budget for OHS measures.

a) 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.

b) 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.

c) OHS Plan will follow national legislation requirements including donor commitment as specified in loan agreement or ADB SPS (2009), some of keys aspects include:

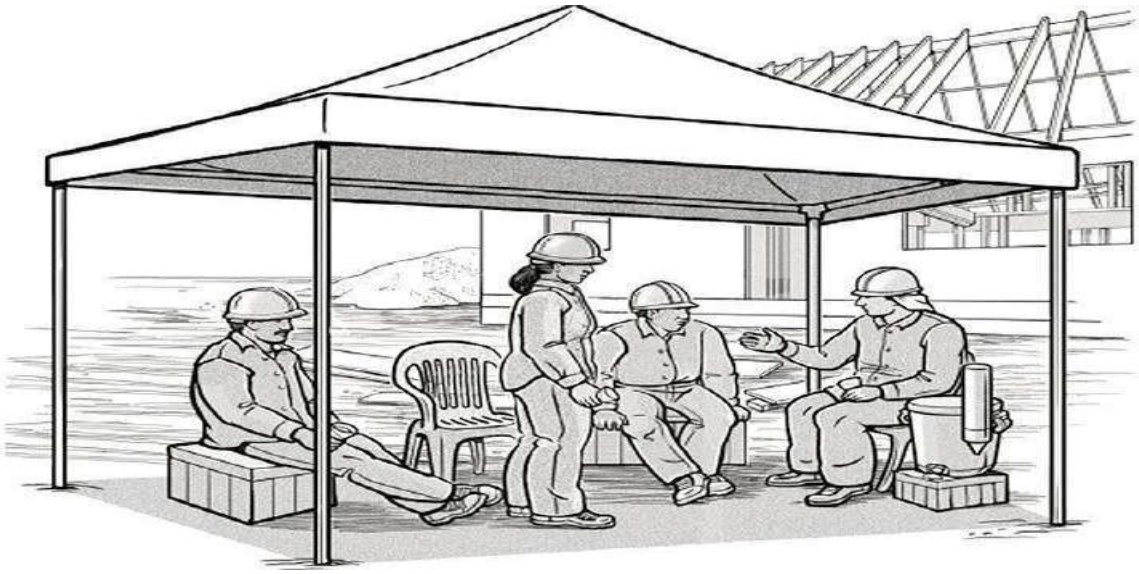
- Norms on provision of fresh water at all sites;
- Adequate hygienic and sanitation facilities;
- Labelling, warning, storage, and handling procedures;
- Emergency response procedures;
- Records and reports of occupational accidents, diseases, and incidents;

d) 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 23: Shelter room to protect from heat stroke



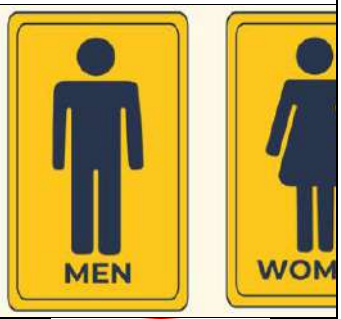
e) OHS publications, such as brochures, leaflets, posters and signage board at strategic locations in Uzbek and Russian languages at relevant construction sites, few samples are given in table 50B.

Table 50B: [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	

f) 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)

g) Ensure all workers have officially signed the contracts, receive timely payment, no excessive use of overtime.

h) 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 Table 50 C.

Table 50 C: [Sample] PPEs for work

Provide electrical resistant rubber hand gloves [approved] while working 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	

Contractors shall provide Gumboot shoes to workers engaged in work involving concrete and muddy areas.	
Safety shoes with steel toes must be worn at all times by all personnel at work. Safety shoe should be approved by the government of Uzbekistan	
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 with 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.	

i) Contractor shall arrang 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.

j) 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.

k) 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.

l) Movable sanitary facilities will be provided at the work site and kept clean, ensure adequate water, free of odors and usable.

275. 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) #0372-20[77] 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.

276. 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.

Impacts from excavation on infrastructure or foundations.

277. 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.

77 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”.

278. Measures: Engineering controls for shoring applications will be provided giving assurance that work in difficult soil is safely planned. This will be developed (in principle on how conduct work 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 soil. The details of the protective system will be a requirement of the contract and included in the contractor shoring plan in the SSEMP. Provide shoring for deep trenches (>1.2m or greater unless the excavation is made entirely in stable rock);

279. 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.

Damage to existing services, utilities, and infrastructure

280. Impact: Disruption to existing potable water supply pipes, gas line, electrical power lines etc may be necessary to complete works, but the locations and scale of this will only become evident at the detailed design stage.

281. 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

Borrow and quarry, sourcing of construction materials

282. 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. At this stage, no specific quarry sites have yet been identified or sourcing of construction materials have been planned.

283. 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, for details, see Box 4. .

Box 4: Burrow Pit Management and compliance requirement

a) The borrow pit owner or lease holder must obtain environmental and other statutory clearances from the concerned authorities as per the laws of Uzbekistan. They should share clearance, permit, or no-objection certificate obtained under different statutes with the PIU.

b) The activities related to the borrow should be carried out according to the approved borrow plan. A copy of the environmental compliance report including

borrow pit restoration that has been submitted to the authority must be shared with the PIU.

c) If the borrow pit leads to involuntary displacement, compensation must be paid, and other resettlement entitlements must be provided before any physical or economic displacement occurs. Afterward, a compliance report must be submitted to the PIU.

d) Transportation routes/dispatch routes should be planned in such a way so that trucks/tippers/vehicles moving to and from villages with habitation are avoided.

e) The functioning time of the transporting vehicles should be from 7.00 AM to 6.00 PM. No night sand transportation being allowed.

f) During transportation route planning, identify hotspots such as schools, settlements, and village markets to minimize people's inconvenience.

g) The vehicles transporting sand, soil and gravel must be covered with a tarpaulin prior to leaving the quarries or depots.

h) To prevent air pollution and public inconvenience caused by dust during sand, soil, or gravel transportation, constant water sprinkling on the pathways and dust-prone areas should be carried out.

i) Display boards shall be erected in local vernacular language in accident prone area in the village by which sand transportation will be carried out at the entrance of the village road from the main road.

j) An increase in traffic movement may trigger community health and road safety and may cause local road blockage and traffic diversion. To mitigate these effects, the contractor must prepare a Traffic Management Plan, taking into account local inputs and sensitive hotspots such as schools, local markets, and other busy areas. The Traffic Management Plan should include details on vehicle routes, placement of signage boards, and scheduling of transportation activities to minimize public inconvenience. It should also outline a plan for disseminating information to the public and a plan for managing any grievances that may arise.

k) Proper registers should be maintained at the entry points of depot sites. Register may be made available during safeguard inspection.

l) All the roads and pathways that may be disturbed during transportation should be levelled and repaired.

m) Contractors must ensure that trucks carrying sand, soil, and gravel are not overloaded beyond limits. In populated or sensitive areas, flaggers must be designated to control traffic. All personnel must be equipped with reflective jackets and traffic control batons

n) No stacking of sand, soil and gravel are allowed on roadside.

o) The contractor must ensure that they comply with the following conditions:
    a. Installing Traffic control devices (example - arrow panels, warning lights, sign boards, barricades
    b. Fixing speed limit (20 -25 Km/hr.) to ensure road safety and air pollution

c. Public awareness and information dissemination
d. Signs and demarcation for the population on those sections of the road where heavy truck will be moving. For community grievances inform public about approachable persons/departments and contact details for any kind of information

p) Truck drivers receive regular COVID-19/HIV awareness campaigns from contractor-appointed EHS experts. Road safety measures are also in place to protect residents and visitors.

q) Ensure restoration of storage sites being used for storage of sand, soil and gravel and restored to at least their pre-project condition upon the completion of construction

6. ANALYSIS OF ALTERNATIVES

284. Feasibility Study has considered two alternatives from technical standpoint: - the earth bed canals vs. lined with concrete.

6.1. Lined vs. unlined canals alternatives

285. The feasibility study considered two technical alternatives for modernization and rehabilitation of existing canals: (i) unlined earth bed canals, (ii) lined with concrete and geo-membrane. After several rounds of meeting and discussions with feasibility study designer and MWR, it has been decided to do slope lining with concrete in Kegeyli.

Table 51: Advantage and dis-advantage of Earth Bed Canals

Advantage	Disadvantage
• Low cost of works • Old technology requires less capital investment	• Gradual erosion and siltation • Overgrowth with weeds and bushes • Gradual deterioration of canal cross-section that led to insufficient delivery of water to the fields and potential yield losses, and inefficient water use per ha of irrigated land • Infiltration and percolation lead to larger water losses, thus decreasing efficiency of water delivery • Increase water intake from the source per ha of irrigated land, • 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

6.2. Concrete-lined Canals

286. Concrete-lined canals' advantages are:

Table 52: Advantage and disadvantage of Concrete-lined canals'

Disadvantage	Advantage
• Tree cutting and loss of local flora and fauna • Concreate lined canals are more "sterile" to biological habitats compared to unlined; • Construction costs are around twice as compared to unlined canals. • Use of high carbon embodied material (cement, metal etc). • Concrete cealing of the canal has a high carbon footprint, according to estimate, 1 ton CO2 is released by using a ton of cement	• Significant reduction of infiltration and percolation rates, thus reduce water loss, reduce waterlogging and salinization of soils; • Smaller cross-section area of canal with higher water flow velocity; • Higher efficiency in water delivery; • Longer life span of up to 50 years with guaranteed water supply to the fields

6.3. Option of Concrete Mat versus Concrete Lining

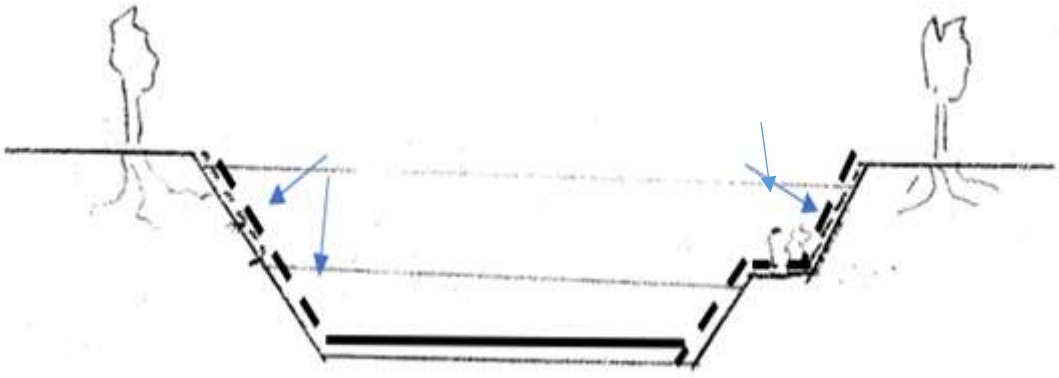
287. To make the entire project climate responsive, the feasibility team deliberated the third option, “Concrete Mat", available in the market by different names such as “Fleximat” [78] and others. However, consensus, limitations, feasibility and acceptance were discussed, see Box 5. Applying concrete mat fully or partly as a canal ceiling material can reduce the carbon footprint significantly. Based on the percentage of lining, see figure 24 and 25 [sample], the carbon footprint can be reduced by around 60 - 80% or more.

Box 5: Limitation of Concrete Mat in current scenario

- **Concrete mat** technology has not been used in past in the canal ceiling in Uzbekistan; hence, performance data is not available.
- Engineers have more confidence in the conventional method (i.e., the concrete ceiling).
- Lack of awareness among engineers and other stakeholders, hence, risk of acceptance will be there
- Lack of experts and local concreate mat supplier in the country

Figure 24 [Sample]: Full Concrete mat ceiling with geomembrane

Figure 25 [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

[78] https://www.flexamat.com/shoreline-erosion-control

Benefit of concrete mat versus concrete ceiling

288. Table 31 enumerates environmental and carbon footprints comparison between concrete mat versus concrete ceiling. For details, refer to section 123 and 124 for limitation and way forward.

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

289. During the design stage, explore the possibility of a modernized water level flow-controlled design instead of flow-based design for detail, See Box 6 for details.

Box 6: 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

6.5. Carbon offset - Canal-top and Canal Bank Solar Power

290. **For carbon offset, PIU, in consultation with the design team and ADB, explores possibility of canal-top and canal-bank solar power**.

Learning from India - Canal-top and Canal Bank Solar Power.

a) Canal-top solar was pioneered in India a decade ago when the first canal-top solar power plant was installed in Gujarat, having a capacity of 1MW.

b) After the pilot project's success, several canal-top solar installations have been commissioned across India. As of March 31, 2019, 50 MW canal-bank solar PV projects and 44 MW canal-top solar PV projects had been commissioned; see table 53 Performance of Solar Power on Canal top of cumulative capacity 35 MW

c) Following this, the government set an ambitious target to install 100 MW solar power project over the canals branching off the Narmada River.

Benefits

a) Reduce carbon footprint and make canal project more climate inclusive

b) Reduce water loss from canals, according to estimate, 1 MW canal-top solar plant can save 9 million litres of water per year.

c) Enhance efficiency of solar panel - Running water helps the panels to remain cool as a result the temperature of the cells dropped by 10% and increase electricity, which increases electricity capacity (efficiency) by at least 2.5-5% than a ground-mounted solar PV system[79]

d) Sustainable administrative model for village electrification.

e) Energy generated from the solar canal can provide electricity to farmers during peak irrigation season, and in non-cropping season, the electricity can be fed into the grid or sold to distribution companies or used by the canal authority.

Some drawbacks,

a) Canal-top plants are more expensive to construct than normal solar plants.

b) Construction is difficult and expensive.

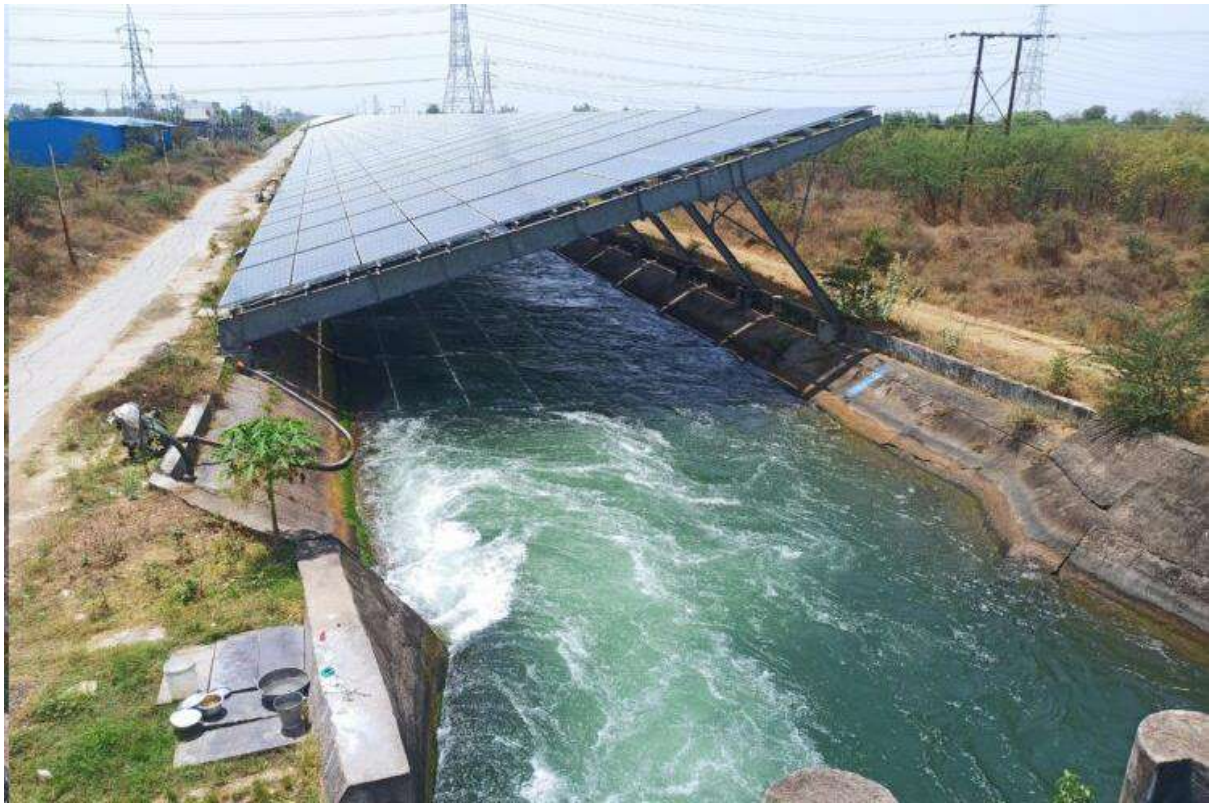
Table 53: India - Performance of Canal top Solar Power of cumulative capacity 35 MW

Name of Project	10 MW Canal Top Solar Grid Connected Power Plant	10 MW Canal Top Solar Grid Connected Power Plant	5 MW Canal Bank Solar Grid Connected Power Plant	10 MW Canal Bank Solar Grid
Location	Vadodara Branch Canal Between Chainage 31.750 KMS TO 35.340 KMS at Sama, Vadodara.	Vadodara Branch Canal between Chainage 16.720 KMS to 20.720 KMS at Village-Nimeta & Raval, Taluka-Waghodia	Vadodara Branch Canal between Chainage 17.940 KMS to 20.230 KMS at Village-Nimeta & Raval, Taluka-Waghodia	Vadodara Branch Canal between Chainage 12.690 KMS to 15.890 KMS at Village- Raval, Taluka-Waghodia, Distri ct-Vadod ara
Technology	Crystalline Silicon Photovoltaic	Crystalline Silicon Photovolta ic	Crystalline Silicon Photovolta ic	Crystalline Silicon Photovoltaic
Capacity of Plant	10 MW	10 MW	5 MW	10 MW
Solar Panels	33816 Nos.	33080 Nos.	15880 Nos.	33600 Nos.
Inverters	14 Nos.(630 KW)	16 Nos.(630 KW)	8 Nos.(630 KW)	10 Nos.(1000 KW)
Top Width of Canal	22.1 m	18.6 m	-	-
Length of the Solar Plant	3.6 Km	4 Km	2.29 Km	3.20 Km
Evacuation level	66 kV	66 kV	66 kV	66 kV
Commissioned on	23.11.2014	15.09.2017	17.09.2017	15.09.2017
Cumulative Generation up to 28-02-2023 (in Million units)	112.4064 Mus	210.2882 Mus		

Source:https://www.sardarsarovardam.org/fileman/Uploads/March2023/DETAILS%20OF%20SOLAR%20POWER%20PROJECT%2028.02.2023%20_2_.pdf

[79] https://ijrpr.com/uploads/V3ISSUE3/IJRPR2979.pdf

Picture 18 [Sample]: Canal-top solar power project[80]



[80] https://india.mongabay.com/2023/07/solar-canals-prove-to-be-good-for-the-environment-but-not-for-business/#:~:text=The%20study%20found%20that%20around,next%20big%20crisis%20facing%20humanity.

6.6. “No-project” alternative

291. Not implementing the Kegeyli subproject will have positive as well as negative consequences. Positive consequences include:

292. Environmental conditions will remain the same in the project area and there will be no impact, such as:

a) Grown trees will remain intact including canal’s flora and fauna;
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,

293. For detail, refer Table 2 Impacts on local environmental setting ‘With’ and ‘Without Project’. If the Kegeyli subproject is not implemented,

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 over time due to lack of water and
g) Farm management and water use capacities will not be improved.
h) Overall, farm incomes in the Kegeyli subproject command area will not be improved.

294. For above reasons, the “No Project Alternative” is not considered acceptable. In addition, the environmental impacts of Kegeyli subproject, as listed in the previous chapter can be avoided or minimized by implementing correct mitigations measures. The subproject can be made climate responsive and acceptable by integrating concrete mat fully and/or partly in the project design.

7. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

7.1. Public Consultations

295. 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.

296. 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 noted that local people can come up with very good suggestions on how to avoid or minimise adverse impacts, if locals are consulted timely.

297. 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.

298. 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 were conducted in subproject district (Khokimiyat of Chimbay district, Republic of Karakalpakstan) to capture the stakeholders' opinions about the subproject.

299. In compliance with ADB requirements with the aim of informing the communities in the subproject area about the upcoming consultations, the announcements on planning consultation were submitted to the local authority through official letter. In addition, all district water management staff involved in the subproject, were informed about planning activities.

Box 7:
Venue: Khokimiyat of Chimbay district, Republic of Karakalpakstan

Date: September 23, 2023

Public Consultation: Environment and Social Impact Assessment Presented by: Oybek Azimov, Deputy of the Project Manager, Magfirat Muminova, National Environmental specialist, Veronica Cherdikudi, National specialist on Social and Gender

Participants
- Representatives of Chimbay, Kegeyli , Nukus districts,
- Representatives of local khokimiyats,
- Specialists of the Basin Department of Irrigation Systems, Cadastre and others.
- Farmers,

300. On 23 September 2023, a stakeholder consultation was undertaken at Khokimiyat of Chimbay district, Republic of Karakalpakstan, where the subproject canal passes through. In a meeting, the Kegeyli subproject was introduced, the experts explained the project, and potential impacts, benefits, recommendations, comments and concerns were collected, see Table 50. During public consultation, some people also raised local employment potential. A list of participants who attended the public consultation and their details are given in Table 54B.

Picture 13: Photos of Public consultation conducted on 23rd September 2023

301. During public consultations, experts presented the information about the Kegeyli subproject - Project description and its components; project planning activities, national environmental and social legislation and relevant ADB SPS's (2009) requirement, explained 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 labour issues. GRM; information dissemination and so on. The presentations were followed by discussions. The brief information on questions raised by participants during the public consultations

is presented in Table 54A.

Table 54A: Comments/concerns raised by stakeholder

#	Questions	Answers
1	*Representative of the khokimiyat:* As far as I remember, the Kegeyli canal has always been subject to siltation. What measures did you consider in the anti-siltation project?	According to the preliminary draft feasibility study, four options for canal reconstruction have been proposed. One option is concreting the bottom and slopes of the canal. The proposed options will be determined after approval of the feasibility study.
2	*BUIS representative:* Is reconstruction of the canal expected, in addition to the project site?	The government of Uzbekistan, in coordination with the leadership of the Republic of Karakalpakstan, has identified 36.4 km long canal for reconstruction at this stage. It will be possible that the rest of the canal could be reconstructed at the latter stage.
3	*Representative of the population* : Are the pumps expected to be reconstructed?	According to the preliminary feasibility study, options for reconstructing the pumping facilities were considered. As I mentioned above, several alternatives have been proposed to reconstruct the Kegeyli Canal. Among the options, there is a proposal that the bottom of the canal will rise, and pumps will not be needed. The water will flow by gravity and enter the irrigation networks.
4	*Farmer:* You mentioned that the canal is expected to straighten. What will it give.	A proposal for canal straightening was received from the local canal management. The main argument of this proposal was to stop land erosion and reduce the length of the canal, which in turn would lead to water savings and allow the use of water for more agricultural land.
5	*Representative of the population* : We all understand the importance of this project and are looking forward to the reconstruction of the Kegeyli Canal . We really hope that water will reach our gardens and allow us to get a high harvest. Will the option of reconstructing the canal to our vegetable gardens be considered?	Thank you for your support and encouragement of this project. We will include your wishes so that water is available to you.

Table 54B: List of participants attended the public consulation

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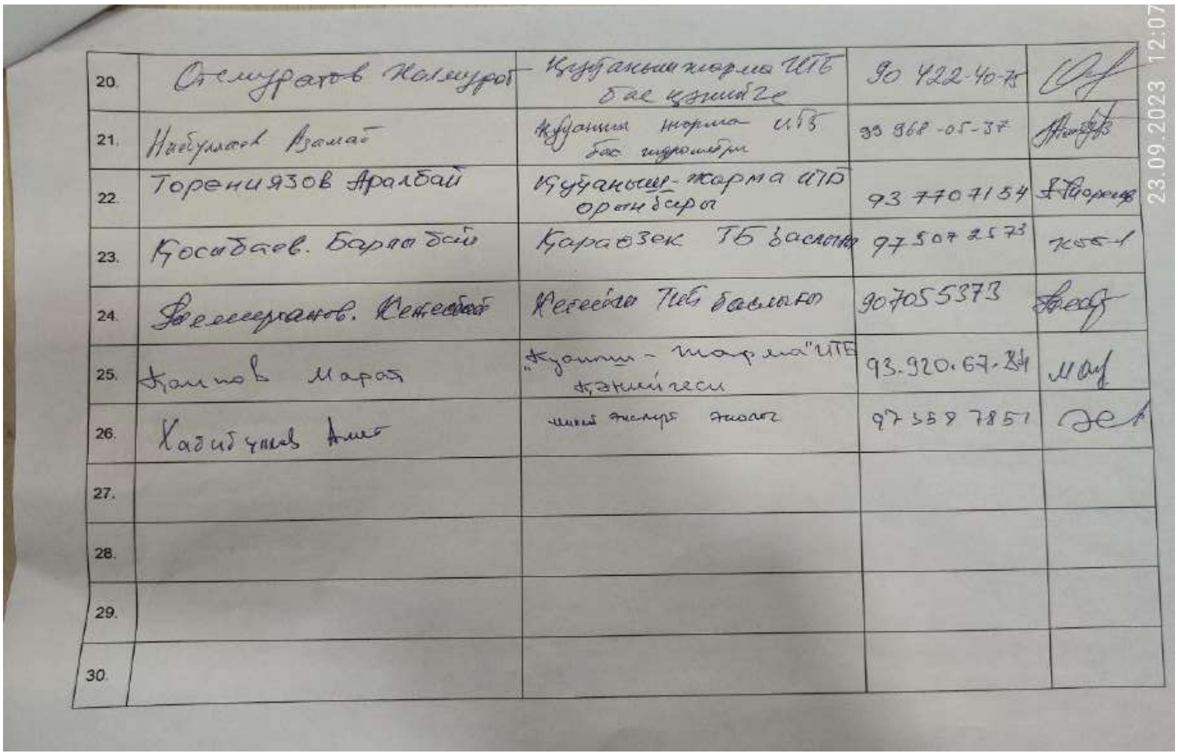
Проект Управление водными ресурсами в бассейне Аральского моря с учетом адаптации к изменениям климата – Общественная встреча / консультация с заинтересованными сторонами 1

Место проведения: Чимбай р-н Хаким-ят

Дата проведения: 23 сентября 2023 11^00

№	ФИО	Должность	Контактный телефон	Подпись
1.	Уразбоев Улугбек	Техник гидрометр Кызкеткенской ИТБ	33 4740094	[signature]
2.	Низамов Сабит	инженер гидротехник Кызкеткен ИТБ	99 082-71-17	[signature]
3.	Айтимов Ислам	Техник гидрометр ККИТБ	99-350-88-20	[signature]
4.	Сабуров Нурбек	ис жургизиуши КК ИТБ	99 269 71 77	[signature]
5.	Прамбетов Айдос	инженер гидротехник КК ИТБ	97 354 96 96	[signature]
6.	Нуралиев Алтынбай	Тайинлот баслигы ККИТБ	94 981 18 78	[signature]
7.	Нурлыбаев Давлетбай	Ходжели-рахма ITB texnika qadágalawshısı	99-333-73-07	[signature]
8.	Калмуратов Гайбулла	Хожелибая басшысы Шамбай ТИБ	99-920-12-63	[signature]
9.	Балтабаев Кеунимжай	Теркин ККИТБ	94 900 22 23	[signature]
10.	Арзыев Мэле	Есапшы Шымбай ирригация болими	94 900 30 08	[signature]
11.	Исамбетова Айгул	ККИУ Бас гидротехник	95 203500-71	[signature]
12.	Айтмуратова Зульфия	Шымбай районы ирригация болими отд кадр	99-940-85-47	[signature]
13.	Нестуллаева Нигора	Шымбай районы ирригация болими Техник гидротехник	99-572-75-14	[signature]
14.	Айбосынова Шолпанай	Шымбай районы ирригация болими ис-жургизиуши	93-861-64-94	[signature]
15.	Алимниязов Алишер	Караозек районы ирригация бўлими хожалик мудири.	93 719-70 55	[signature]
16.	Сапарбаев Ташкентбай	Кегейли района ирригация болими баслыгы орынбасары	94 119-87-08	[signature]
17.	Курбанбаев Арапбай	Кегейли районы ирригация бўлими Сув ресурслари ва ерлардан фойдаланиш мутахассиси	93 226-93-00	[signature]
18.	Бегдуллаев Айтбай	Бас қанийге	99 959-33-25	[signature]
19.	Лазаров Руслан	Бас қанийге	97 788 96 93	[signature]



20.	Отемуратов Жолмурат	Қуўаныш жарма ИТБ бас [illegible]	90 422-40-75	
21.	Наубуллаев Азамат	Қуўаныш жарма ИТБ бас гидрометри	93 368-05-37	
22.	Торениязов Аралбай	Қуўаныш-жарма ИТБ орынбасары	93 7707154	
23.	Косабаев. Бар[illegible]бай	Караөзек ТБ баслыгы	97 507 25 73	
24.	[illegible]. Кенесбай	Кегейли ТББ баслыгы	907055373	
25.	[illegible] Марат	"Қуаныш - жарма" ИТБ қәнийгеси	93.920.67.84	
26.	Хабибуллаев [illegible]	[illegible]	97 559 7851	
27.				
28.				
29.				
30.				

302. In addition, to understand the local environmental and social challenges in canal construction, the IEE team also met engineers of the Kegeyli canal; he informed the IEE team that tree cutting is the primary environmental issue. Further, he reported that the rest of the environmental impacts are local and can be well managed.

Picture 14: Consultation with engineers of Basin Administration

7.2. Information Disclosure

303. Environment Assessment documents such as IEEs, Semi-Annual Environmental Monitoring Report (SAEMRs) etc. will be available on MWR website and ADB website within two weeks after ADB's clearance of each document. For the document disclosed on the MWR website, executive summaries will be available in the Uzbek language and full reports in the Russian language. Hard copies of the executive summary translated into Uzbek language and complete reports in Russian will also be available at the offices of MWR, PIU, Project Implementation Consultant (PIC) and contractors. For more details on ID, refer to point no 314 to 218.

8. GRIEVANCE REDRESS MECHANISM (GRM)

8.1. Introduction

304. 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 cost 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 in project design.

f) Records on how grievances are addressed will be maintained at a central place where the public can 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.

8.2. Framework for GRM

305. The following paragraphs describe the flow of the GRM of the project. Every affected person shall have three options to get the grievance redressed.

a) Option 1 is established under the Project;
b) Option 2 is accessing through the country's legal system, and
c) Option 3 is for the affected person to access through the ADB Accountability Mechanism.

A. Option 1

Option 1, which is the 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 information on such complaints with the executing agency on a monthly basis.

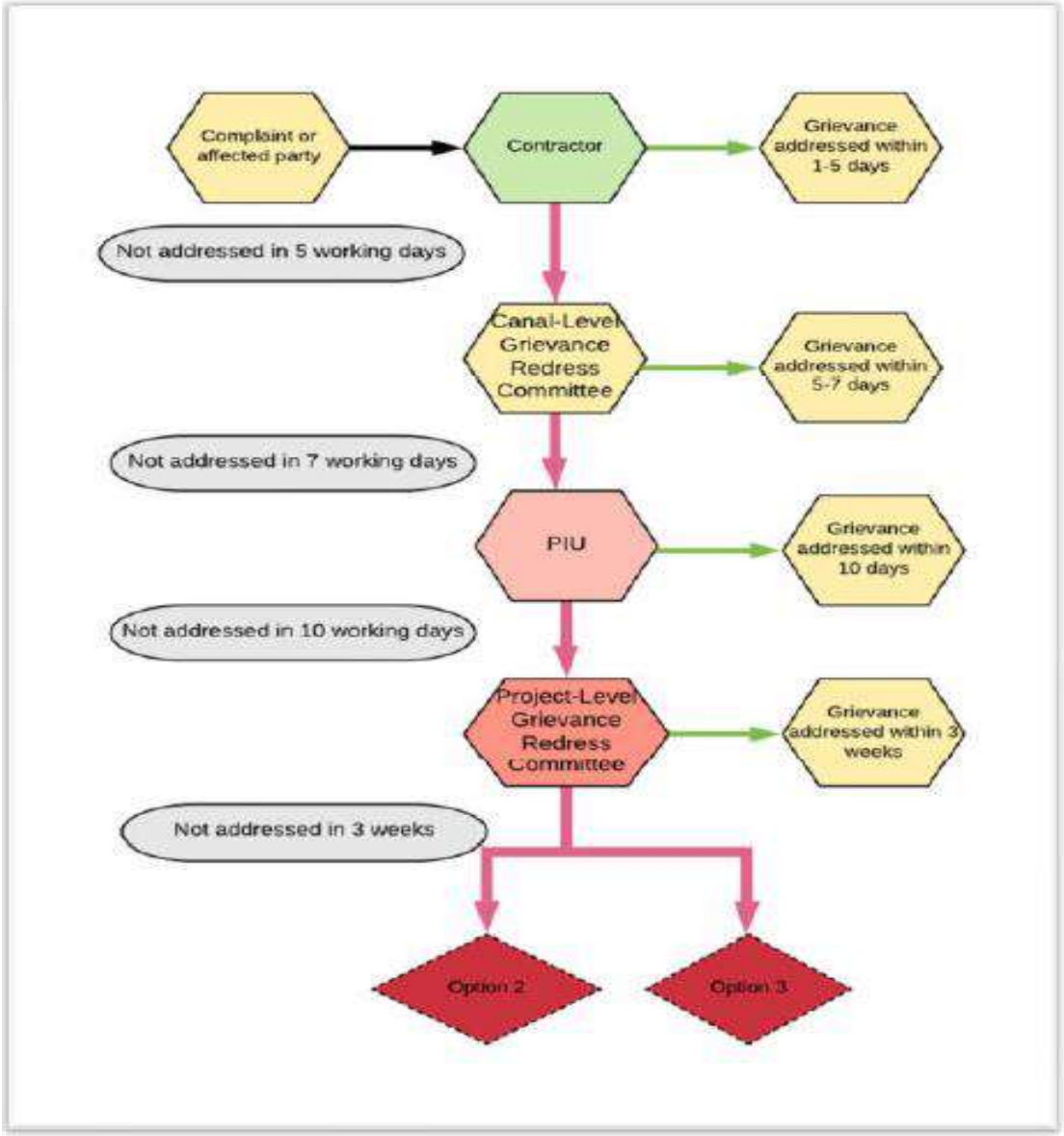
   Additionally, the PIU shall be instructed to maintain a Complaint Register.

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.

The flow chart of the Option 1 GRM process is provided in Figure 26.

Figure 26: Flow chart of the GRM process



B. Option 2:

306. 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.

C. Option 3:

307. 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 headquarters or ADB Uzbekistan Resident Mission (URM). 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 recommended that affected people make a good faith effort to resolve their problems by working with the concerned ADB operations department (in this case, URM).

308. 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.

8.3. Record Keeping

309. 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).

310. 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.

8.4. Periodic Review and Documentation of Lessons Learned

311. The PIU will periodically 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.

312. Costs - All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the respective PIU.

8.5. Proposed Framework for Information Dissemination (ID)

313. 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, pamphlet/audio/video etc.)
    d) Roles and responsibilities, budget requirement & monitoring

Potential Target Stakeholders (PIC will include all Potential Stakeholders in SOPs)

a) Project-affected people,
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) Local truck driver
g) Other stakeholders

314. Few key thematic Areas for ID

a) National statutes/ADB Safeguard Policy Statement (2009) etc.

b) Project activities, potential impacts & safeguards measures
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
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.

315. Tools for ID - Depending on type of stakeholder, PIU/PIC can adopt any method for ID, see table 55.

Table 55: 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 reports in public domain

Note: List is not exhaustive

316. 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

317. An Environment Management Plan is a framework for the implementation and execution of mitigation measures and alternatives. The objectives for developing Kegeyli EMP are:

a) To ensure that mitigation measures are properly implemented.
b) To establish a scheme and procedures.
c) To monitor how effective mitigation measures are.
d) To ensure that proposed mitigation measures comply with environmental laws and regulations.
e) An adequate action when unexpected impacts occur.

318. If case is 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 Framework for Kegeyli

319. The below table (56) is a detailed Environment Management Plan along with role and responsibility including monitoring indicators for performance assessment.

Table 56: Environment Management Plan of Kegeyli Subproject

Issue/Subject	Potential Issues/ Important Factors/ Impacts	Mitigation Measures	Institutional Responsibility	Supervision Responsibility	Monitoring Indicators
A. Project Preparation and Initial Environmental Examination (IEE) Development					
Project Preparation	IEE Preparation	1. Submit IEE for review and comments by ADB	MWR with TRTA /PIC support	PIU-EPO	Clearance of IEE by ADB
	Public Consultations	2. Conduct public consultations in target districts of Karakalpakstan	Same as above	PIU-EPO	Report on public consultation results in IEE
	GRM	3. Prepare detail framework for GRM	Same as above	PIU-EPO	Clearance of IEE including GRM by ADB
B. Detailed Design					
Detailed Design	Incorporating IEE results and EMP into detailed design process	4. Planning and design of all irrigation schemes components will be based on international standards under due consideration of local guidelines where available such as SniP and GOST 5. A preference to nature-based solutions should be promoted during design/explore possibility of concreate mat, a low carbon option for canal ceiling	Consultant	PIU-EPO/National expertise	Approval ofdetailed design by MWR
	Obtain clearance of national environmental assessment (OVOS)	6. Review, (update if necessary), and ensure incorporation of this IEE and measures defined in current EMP into subproject detailed design, decision-making, and national EIA (OVOS) process.	Consultant	PIU-EPO	Obtain environmental approval from State Committee for Ecology and Environmental Protection
	Consideration of seismicity at the subproject area	7. Incorporate into detailed design adequate considerations and provisions for structural integrity of hydraulic structures against potential earthquakes based on seismicity zoning and Uzbekistan construction standards	Consultant	PIC/PIU-EPO	Approval ofdetailed design by MWR
	Climate change impacts	8. Incorporate into detailed design adequate considerations and provisions in relation to climate change aspects in subproject area through recommended climate change adaptation measures and good engineering design practices	Consultant	PIC/PIU-EPO	Approval of detailed design by MWR
	Physical cultural resources	9. Archaeological research will be undertakenduring detailed design as	Consultant	PIC/PIU-EPO	Archaeological report to be cleared by PIC

		required by laws			Approval ofthe subproject from State Expertise
	GRM	10. Establish GRM 11. Appoint GRM coordinator for subproject 12. Conduct training for coordinator and affectedpeople on GRM procedures	PIU-EPO	PIU-EPO	GRM established as intended
	Public consultations ondetailed design	13. Conduct public consultations on decisions made in regard to detailed design, present (updated) IEE/ EMP, and get feedback to consider in final subproject design 14. Explain established GRM, disseminate information including contacts	Consultant/PIU-EPO	PIU-EPO	Report on Public consultation cleared by PIC
Bidding documents	IEE and EMP requirements	15. Include EMP obligations in tender documents and specifications, referencing to the subprojectIEE and EMP	Consultant	PIU-EPO	Bidding documents approved by MWR and ADB
C. Pre-Construction Stage					
Pre- construction arrangements	Contractor's Staffing	16. 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 allapplicable national laws and regulations, obtain all necessary environmental licenses and permits, and implement EMP requirements	Contractor	PIC/PIU-EPO	Environmental andhealth and safety officer hired by the contractor All licensesand permits obtained
	Roles and responsibilities	17. Assign roles and responsibilities related to Environmental Monitoring and Reporting System	PIU-EPO	PIU-EPO	Assign Roles and responsibility
	Environmental ProtectionTraining	18. Conduct environmental protection training on implementation and supervision of subproject's environmental mitigation measures for MWR,PIU-EPO and Contractor	PIC	PIU-EPO	Training delivered
	SSEMP	19. Prior to commencement of any construction works, prepare SSEMPs for construction site based on requirements set forth in bidding	Contractor	PIU-EPO	SSEMPs will be approvedby PIC and

		documents, design package IEE/ EMP actual on-site conditions and decisions on work arrangements.			MWR/PIU- EPO
Non-compliancewith national environmental regulation	Non-compliance with national environmental regulation	20. Obtain necessary permission on the use ofspoil area. 21. Make contract with licensed waste collection/transportation/ disposal facilities.	Contractor	PIU-EPO	Necessary permissions obtained Necessary contracts made
Baseline monitoring	Baseline monitoring	22. 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	23. Avoid cutting more trees than needed. 24. If possible, consider transplanting of tree to beremoved. 25. The felling of trees will be carried out in accordance with the DCM No. 43 dated 17 January 2019 and No. 255 dated 31 March 2018. 26. For all trees cut /removed, plantation will be at10 trees for every tree cut. 27. 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. 28. Ensure minimum damage to site during detailed design stage itself Where possible identify appropriate re-plantation activities withappropriate species. 29. Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live, such as vegetated roadside areas, tree belts, inner areas of bridges, canal riparianzones, etc.	Contractor and PIC	PIU-EPO/PIC	All work sites Trees removedonly afterPNPC approval obtained. Verify the adherence to recommendations in siteswhere clearance is performed
	Accidents among local population due to faultydesign and improper construction practices	30. Conduct community awareness / consultation to reduce the risk of accidents or health and safety incident 31. Ensure design has safety measures	PIC	PIU-EPO	Detailed designs Plans and bid documents show that required provisions have been included

		to reduceaccidental falling of children or adults in canal ortheir getting trapped in.			
	Human - animal conflict	32. 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	33. Do not undertake any construction/ quarrying activity during the spawning period of the different fish species.	Contractor and PIC	PIU-EPO/PIC	Monitoring report
		34. Discuss with local population before starting any construction activity to ensure minimum disturbance.			Complain records
	Chance finding of an archaeologically or culturally important site	35. 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 concernsin 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.	36. Rehabilitation of all sites must be undertaken once work is completed and plans developed well in advance of construction activities and willbe in the construction company contract to ensure it is taken up and appropriate budget willbe made for the activity. 37. Avoid identifying any quarrying work in anaesthetically important/significant place.	Contractor	PIU-EPO/PIC	Material removed from sides ofcanals. Borrow pitsclosed. 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	38. Identify water needs for different users and in consultation with them develop appropriatedesign 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	39. 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. 40. Where not possibly create alternate facilities inconsultation with the local	Contractor	PIU-EPO/PIC	Detailed designs Plans and bid documents show that required provisions have been included

		population.			
D. Construction Stage					
Soil erosion /contaminati on and sediment runoff	Soil erosion	41. Apply nature-based solutions for slope stabilization to prevent spoil loss, improve water retention and biodiversity and can act as a food source. 42. Any deep excavations in unstable soils will be shored, and below grade construction brought to grade quickly, then excavations closed. 43. Surface soils will be temporarily graded-to- drain and protected as necessary to reduce erosion and sediment runoff. 44. Minimize unnecessary encroachment onto adjacent lands to reduce area of disturbance to vegetation and soil. 45. 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. 46. Where possible, surplus soil will be used for earth filling works at approved locations. 47. Canal excavation width and depth will be kept to a feasible minimum to reduce extra spoil generation. 48. When excavating canals, silt curtains, water diversion structure, and/or settling ponds will beprovided as a comprehensive system to prevent sediment transport in the water courses. 49. Intercepting ditches and drains will be organized to prevent runoff entering construction sites and to divert runoff from sites to existing drainage. 50. Works and material handling will be limited during heavy rains and high winds to minimize soil erosion. 51. Works and material handling will be	Contractor	PIC/PIU-EPO	Visual inspection

		limited during heavy rains and high winds to minimize soil erosion.			
	Soil contamination	52. Petroleum products, hazardous materials and wastes will be stored covered against precipitation, on an impermeable surface, and secured from acts of vandalism. 53. 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). 54. Avoid soil contamination with petroleum products, lubricants, or hazardous materials during equipment maintenance and repair, field refueling, and hazardous material handling. 55. Filling and refueling will be strictly controlled and subject to formal procedures. Drip pans will be placed under all filling and fueling areas.Waste oils will be stored and disposed of by a licensed contractor. 56. Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies will be prohibited. 57. 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	Contractor	PIC/PIU-EPO	Visual inspection Soil quality measurementt result (when necessary)

		transfer manifests at its camp site for routine inspection by the engineer. 58. All valves and trigger guns will be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. 59. The contents of any tank or drum will be clearly indicated. Measures will be taken to ensure that no contaminated discharges enter any soils. 60. No bitumen drums or containers, full or used, will be stored on open ground. They will only bestored on impervious hard standing. 61. Areas using bitumen will be constructed on impervious hard standing to prevent seepage ofoils into the soils. 62. The construction camp maintenance yard will be constructed on impervious hard standing withadequate drainage to collect spills. There will beno vehicle maintenance activities on openground. 63. 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. 64. In case of spillage of waste during transportation, immediate actions should be taken on the measures appropriate to its scale 65. 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	66. 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. 67. Clear vegetation that must be removed. 68. As far as possible, use already	Contractor	PIC/PIU-EPO	Visual inspection

		identified roads and routes to access various sites.			
	Sediment runoff and deposition near sites or during transportation	69. 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. 70. Avoid work in high wind condition. 71. During soil excavation, ensure slope aspect ismaintained. 72. No driving in canal water. 73. No quarry work in running water of canals and minimize need to work in water. 74. Fence off in-stream work to reduce disturbance.	Contractor	PIC/PIU-EPO	Visual inspection
	Loss of fertile topsoil layer	75. The topsoil will be stored separately and reused for site landscaping and gardening where possible. 76. The contractor will reinstate the field where topsoil is removed. 77. Erosion will be prevented by minimizing any removal of trees and green cover vegetation. 78. Revegetation measures will be applied whereappropriate.	Contractor	PIC/PIU-EPO	Visual inspection
Impact on Surface/Ground Water	Surface water contamination	In addition to the measures against "Soil contamination"; 79. 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. 80. No construction camp, permanent or temporary, will be located within 500 m of any river, canal or reservoir. 81. No equipment washing is allowed in any surface water bodies throughout	Contractor	PIC/PIU-EPO	Spill Response Plan and ConstructionCamp Site Plan prepared as part of SSEMP, reviewed byPIC and approved by MWR/PIU-EPO, and implemented by contractor Visual inspection Surface/ground water quality measurementt result (when necessary)

		the subproject implementation period. 81. When excavating canals, silt curtains, water diversion structure, and/or settling ponds will beprovided as a comprehensive system to prevent sediment transport in the water courses. 82. No wastewater will be dumped into any ditches or streams. Wastewater arising on the site will be collected, removed from the site via asuitable and properly designed temporary drainage system and disposed of at a location and in a way that will cause neither pollution nornuisance. 83. Liquid material storage containment areas willnot drain directly to surface water. 84. Discharge of sediment-laden construction water directly into surface watercourses or wetlands will be forbidden. Sediment-ladenconstruction water will be discharged into settling lagoons or tanks prior to final discharge. 85. 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. 86. Spill cleanup equipment will be maintained on- site. The following conditions to avoid adverse impacts due to improper fuel and chemical storage. 87. Fueling operations will occur only withincontainment areas. Fuel storage, equipment maintenance and repair workshops, and vehiclewashing areas will be stationed at least 500 m away from any water body. 88. Measure surface/ground water quality in caseof need (complaint etc.).			
	Surface water contamination by domestic wastewater	89. There will be no direct discharge of sanitary orwash water to surface water,	Contractor	PIC/PIU-EPO	Visual inspection Surface/

		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. 90. 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 facilityor dumpsite. Measure surface/ground water quality in caseof need (complaint etc.).			ground water quality measurement result (when necessary)
	Waterlogging from poor site planning and management	92. 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	93. Air Quality Management Plan will be preparedas part of the SSEMPs and implemented by thecontractor. 94. Construction materials (sand, gravel, and rocks) and spoil materials will be transported by trucks covered with tarpaulin or other acceptabletype cover (which will be properly secured) to prevent debris and/or materials from falling from or being blown off the vehicle(s). 95. 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. 96. All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) willcomply with the national vehicle regulations and international emission standards.	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 relatedcomplaints Visual inspection

		Regular exhaust emissions tests will be conducted.			
	Stockpiles of materials and spoil:	97. Air Quality Management Plan will be prepared as part of the SSEMPs and implemented by thecontractor. 98. All stockpiles will be managed to reduce dust emissions. 99. Stockpiles will be located downwind of sensitive receptors, such as residential areas, schools, hospitals, kindergartens. 100. 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. 101. 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. 102. Stockpiles emitting dust will be sprayed with water prior to moving. 103. 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 befree of odor and pollution	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 relatedcomplaints Visual inspection
	Dust generation at construction site	104. Air Quality Management Plan will be prepared as part of the SSEMPs andimplemented by the contractor. 105. Water will be sprayed on constructionsites and material handling routes, where fugitive dust is generated. 106. No equipment using any fuel	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 relatedcomplaints

		that may produce air pollutants, including mobile generators, will be installed without consent of the PIC. 107. Construction equipment will be maintained to a good standard and fitted with pollution control devices which will be regularly monitored by the engineer. 108. Monthly air quality monitoring at sensitivereceptors.			Visual inspection Air quality measurement result
	Exhaust gases and Emissions	109. Air Quality Management Plan will be prepared as part of the SSEMPs and implemented by the contractor. 110. No burning of any waste is allowed on any construction sites throughout the subproject implementation period. 111. Construction vehicles and machinery willbe maintained to a high standard to minimize emissions and will avoid unnecessary idling tosave fuel and reduce emissions. 112. Batching plant's locations will be agreed with the PIC and will be downwind and at least 500 m from nearest residential area. National permission will be obtained from environmental department for installation of concrete batching plant	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 Visual inspection
	Increased particulate matter on transport route of raw material and at quarries	113. Ensure vehicles are properly maintained. 114. Reduce blasting and other similar activities that may create dust to the extent possible 115. Use sprinklers to settle dust whereneeded	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 Visual inspection
Noise and vibration	Noise	116. 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	Contractor	PIC/PIU-EPO	Noise ManagementPlan prepared as part of SSEMP, reviewed byPIC and approved by MWR/PIU- EPO, and implemented by contractor

		civil works will be designed and implemented in accordance with environmentally sound engineering practices and governed by the relevant environmental standards. 117. 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 prohibitedbetween 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. 118. Noise generating equipment will be located at least 300 m far from any sensitive areas. 119. Noise generating equipment at construction sites will be isolated and, where possible, will be faced away from mostsensitive directions. 120. Use temporary noise barriers while working in sensitive locations in caseexceedance of allowable limits is expected and in case of relevant complaints. Placing thebarrier close to the source proves to be effective. 122. 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			Noise relatedcomplaints Noise level measurementt result

		informed of progress and seek suggestions from community members to reduce noise annoyance, and dissemination of procedure on handling complaints through GRM. 123. Within normal working hours, where it is reasonable to do so: 124. Schedule noisy activities for less sensitive times. 125. Provide periods of respite from noisier works. 126. 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 thesetimes. 127. 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. 128. Fit all pneumatic tools with an effective silencer on their air exhaust port. 129. 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. 130. All vehicular movements to and from thesite to only occur during the scheduled normal working hours unless approval has been granted by the PIC.			

		131. Where possible, no truck associated withthe work will be left standing with its engine operating in a street adjacent to a residential area. All construction workers will be provided with PPE such as ear plug, earmuff. The workers must use them against high noiseand/ or lengthy exposure. 132. Monthly noise level monitoring at sensitive receptors			
	Vibration	133. Subproject area and vehicle movement routes will be inspected for sensitive structures. 134. Pictures and precautions will be taken toavoid 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	135. Acquire tree cutting permit from local department of biological control for any trees to be cut under the subproject. Consider budget in the bidding proposal for the number of trees at least mentioned in this IEE and two-year care period 136. 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. 43 (17 January 2019), ten trees planted for one cut (i.e., 10 saplings planted for each treefelled). 137. Use only native plants for re-vegetation of disturbed areas. 138. Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live, such as vegetated roadside areas, tree belts, inner areas of bridges, and canal riparian zones.	Contractor	PIC/PIU-EPO	Visual inspection

		139. Strictly prohibit poaching of wildlife and damaging plants. 140. Ensure that canal rehabilitation activities such as concrete batching plants, construction camps, labor camps and other ancillary features are properly sited. 141. Supply appropriate and adequate fuel in construction camps to prevent fuel-wood collection.			
Disturbance on local community	Disturbance to local population	142. Identify appropriate access routes, speed limits and timings with community. 143. 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. 144. Restore areas after work is over. 145. Minimize transportation of material through heavily populated areas.	Contractor	PIC/PIU-EPO	Monitoring report Complain records
	Damage to utilities	146. Identify potential utilities in the area prior to starting work to ensure thatthey are not damaged due to any constructionwork. 147. 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	150. Identify alternate routes for subproject construction activities where possible. 151. If not possible, in consultation with the local population, identify appropriate alternatives for them and provide required facilities.	Contractor	PIC/PIU-EPO	MonitoringReports Complain record
	Damage to infrastructure	152. Vehicles will take pre-identified routes. 153. Do not overload vehicles beyond limits.	Contractor	PIC/PIU-EPO	MonitoringReports Complain record

		154. If damage to infrastructure occurs, planfor any maintenance that maybe required.			
Impact from the operation of worker's camps	Workers/labor camps andfacilities	155. Construct and maintain a camp/camps following IFC and the EBRD's guidance note on Workers' accommodation: processes and standards (2009).[33] 156. Provide appropriate shelter and other facility for any labor brought from outside. 157. Do not use hazardous materials like asbestos for construction of shelters or temporary housing. 158. Ensure no conflict with local population due to labor camp.	Contractor	PIC/PIU-EPO	Monthly Monitoring reports
	Conflict with labor camps on resources	159. Select labor camp sites to ensure least possible conflict with local population - e.g., ata distance from where population density is high. 160. Ensure labor camps have required infrastructure like water supply, sanitation facilities and energy. 161. Develop appropriate waste managementsystem and rehabilitate the site after construction is over. 162. Labor camps will 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 management requirements and	Contractor	PIC/PIU-EPO	Monthly Monitoring reports

		international good practices. 163. 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 SafetyRisk	Occupational Health andSafety	164. An OCHS Plan including (COVID-19) Health and Safety Management Plan and Emergency Response Plan will be prepared bythe Contractor as part of the SSEMPs to manage worker safety on-site during the construction phase of the Subproject. 165. A full-time health and safety officer will behired by the contractor to develop, implement, and supervise the OCHS Plan subject to approval by the PIC. 166. 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, andtheir responsibilities for the safety of themselves and others. 167. Ensure provision and distribution of PPE including hard hats, and protective footwear, and keep record and report any health and safety incidents. 168. OCHS Plan will follow national legislation requirements and include among others requirements to: (i) norms on provision of freshwater 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	Contractor	PIC/PIU-EPO	OCHS Planincluding (COVID-19) Health and Safety Plan and Emergency Response Plan prepared aspart of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor

		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. 169. All legally required permits will be acquired for construction and/or rehabilitation. 170. Contractor will allocate sufficient budget for OHS measures. 171. Ensuring plant and vehicle operators areproperly licensed and trained. 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. 173. Arranging for regular safety checks ofvehicles and material, and allocation of responsibility for this. 174. 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. 175. Movable sanitary facilities will be provided at each work site and kept clean, freeof odors and usable. 176. 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. 177. Special attention will be paid to welding operations. It is prohibited to distribute the faulty or unchecked tools for work performanceas 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. 178. Child labor is prohibited by national laws with minimum full 16 years of age. 180. Facilities for handling emergencies at site. 181. Restricted access to hazardousmaterials. 182. Personnel handling hazardous material will be properly trained, licensed and with sufficient experience. 183. Drinking water facilities at construction sites.			
	Risks associated with working near water bodies	185. Workers will not be allowed to enter trenches deeper than waist height unless they are properly shored. 186. 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	Contractor	PIC/PIU-EPO	Number oraccident near waterbodies

		site near water body. 187. An appropriate number of workers will be trained for rescue operations and designated to perform the rescue tasks 188. Workers are informed about appropriate rescue procedures, and trained in rescue procedures and use of rescue equipment			
Community Healthand Safety Risk	Community Safety	189. Ensure all working areas (including construction camps and labor camps) havesafety barricades to prevent access by local population. 190. Provide hazard warning signs around construction sites including access roads, if any. 191. Excavated areas will be fenced and equipped with warning sign. 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. 193. Ensure appropriate signage at construction sites. 194. Locally contracted workers will be prioritized for recruitment. 195. The Contractor will prepare and strictly follow its Traffic Management Plan as part of the SSEMPs, which will outline haul routes and safety measures. The Traffic Management Plan will also describe the method for provisionof access in roads where trenches are being excavated. If any diversions are required, theywill be outlined in the Traffic Management Plan. 196. Temporary traffic management and roadsafety awareness measures will be taken to ensure safety of nearby residents, community and	Contractor	PIC/PIU-EPO	Traffic ManagementPlan prepared as part of SSEMP, reviewed by PIC and approved by MWR/PIU- EPO, and implemented by contractor Visual inspection

		visitors. 197. 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 thesite, if required for safe and convenientpassage for the public. 198. Adjustment of working hours to local traffic patterns, e.g., avoiding major transport activities during rush hours or times of livestock movement. 192. 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.	200. Waste and Spoil Management Plan will be developed as part of the SSEMP and implemented. 201. Stockpiling separately in designated areas. 202. Spoil randomly compacted to the maximum extent practicable by routing the haulage traffic over the area and will be gradedto prevent the ponding of water. 203. 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 established on the spoil tips to prevent the washing out of fine	Contractor	PIC-EPO	Visual inspection

		material 202. 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 specificlocations 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 theSubproject estimates			
Impact on Physical cultural resources	Impacts on Physical cultural resources	204. Chance find procedure will be prepared as part of the SSEMPs and implemented. 205. 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; workscan restart only after fulfillment of prescribed measures and permission received to resumeworks. 206. Stop all work that may be underway or planned in the area and discuss with RegionalDepartment of Cultural Heritage Agency for further action. 207. Ensure that the construction company and the PIC understand	Contractor	PIU-EPO/PIC	Chance find procedure developed aspart of SSEMP, reviewed byPIC and approved by MWR/PIU- EPO, and implemented by contractor .

		archaeological concerns in the area. 208. Ensure that any important archaeologicalarea is well identified and demarcated andrequired actions are demarcated in a detailed management and mitigation plan so that no damage takes place to it.			
Waste generation	Waste and spoil management	209. 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 spoildisposal sites, which will not be on slopes or near pasture lands and will have further plans for rehabilitation. 210. Recycling and Reuse – Where possible, surplus materials will be reused or recycled —this will include wood, plastic, metal and glass. Trees and bushes cut under the subproject works can be provided for use to localhouseholds. A plan for the recycling of materials will be included in the Waste and Spoil Management Plan. 211. Waste Disposal — No wastes will be burned throughout the subproject implementation period.	Contractor	PIU-EPO/PIC	Waste and Spoil ManagementPlan (including Hazardous Waste/Materials ManagementPlan) and Spill Response Plan prepared as part of SSEMP, reviewed byPIC and approved by MWR/PIU- EPO, and implemented by contractor Visual inspection

		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. Thecontractor 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. 212. No dumping in canal, or labor camps/temporary or material storage sites on canal bed. 213. 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. 214. All construction wastes and debris will bedisposed at authorized locations. 215. All household wastes will be segregated by kinds and collected into confined waste containers equipped with covers installedaway from sensitive areas. 216. 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	217. 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. 218. Temporarily storage on-site of			Plan and Spill Response Plan prepared aspart of SSEMP, reviewed byPIC and approved by MWR/PIU- EPO, and implemented by contractor

		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 handlinginformation. Oil and fuel will only be kept in small quantities on-site. 219. 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 smallspillage. 220. Paints with toxic ingredients or solvents or lead-based paints will not be used.			Visual inspection
	Asbestos containingmaterial	221. 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 materialsinclude: • Removal of asbestos materials by trained staff and without dust formation; • Use of personal respiratory protectionequipment. • Use of impermeable bags or containers. • Solid asbestos waste pending disposal should be stored in an area where it will not deteriorate. • Bags (or other containers) that contain loose asbestos fibers should be removed by shredding or packing in tight transportable bales in a designated area. • Reuse asbestos-free bags as wastepaper or containers for any materials is not allowed. • All asbestos waste awaiting disposal in containers, bags or containers must be	Contractor	PIU-EPO/PIC	Hazardous Waste/Materials ManagementPlan and Spill Response Plan prepared as part of SSEMP, reviewed byPIC and approved by MWR/PIU- EPO, and implemented by contractor Visual inspection

		appropriately labeled and labeled. • Work related to loading and transportation, unloading and disposal of waste must be mechanized; • Transportation of asbestos waste should excludethe possibility of losses along the route and environmental pollution. • Transportation of unpackaged asbestos in open is not allowed.			
Impacts on landuse	Land acquisition duringconstruction	222. Mitigation measures will be implementedas specified in the Land Acquisition and Resettlement Plan of the subproject. 223. Farmers affected by seasonal crop loss will be compensated by the subproject. 224. The contractor will be instructed to schedule his works considering minimumimpact on land acquisition. 225. All construction works will be implemented within allocated lands.	Contractor	PIU-EPO/PIC	Construction report
Impact of site clearance after civilworks completion		226. Rehabilitate all sites after construction/quarrying activities are completed such as ploughing and plantation. 227. All disturbed sites prior to subproject completion and commissioning will be reinstated at least to pre-project conditions by (i) 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)	228. GRM will be established, and focal pointwill be appointed to implement GRM. 229. GRM will be implemented as prescribedin the subproject IEE.	Contractor, PIC and PIU-EPO	PIU-EPO	GRM established
E. Operation Stage					
Sedimentation in canals	Potential waterlogging indownstream areas	230. Implement integrated management plan which will be	Farmers, BISA and MWR	PIU-EPO	Waterlogging

Conflicts in water supply rights Change of groundwater level		developed by the Project.			
Disproportionate impacts on the poor and women	Reduced income of women and poor	231. Implement gender action plan.	BISA, PIU	PIU	Gender action plan implemented .
Impairment of downstream water quality	Negative impacts of pesticides and fertilizers	232. 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, yeteffective, materials available and use them in ways that reduce human and pet exposure and protect the environment; and 233. 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; 234. Farmers to take account of specificationsproduced 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; 235. Farmers to avoid use of pesticides classified as Persistent Organic Pollutants (POPs) under the Stockholm Convention and pesticides regarded as obsolete under the WHO classification scheme;	Farmers	BISA	Amount and kind of pesticides and fertilizers used by farmers.
		236. BISA to provide farmers with training on the above mitigation measures and the proper use of pesticides, appropriate dose and timing for it use 237. BISA to encourage the farmers to use more specific chemicals, such as growth regulators	BISA	BISA	Training and information dissemination activities conducted byBISA. Water quality(including thehill streams and ponds, ground water)

		and pheromones that attract insects. They tend to be more selective and have less impact on the agricultural ecosystem; 238. 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.			
Occupational and Community Healthand Safety Risk	accidental and natural hazards causing injury to the community	239. Ensure the safety of hydraulic structures and provide regular monitoring and maintenance. 240. 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	241. Regular maintenance and repair of canals and water infrastructure to ensure operational capacity. 242. 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 system and canals	243. Identify appropriate waste managementplan for cleaning of collector drains. 244. Weeds and sediment can be used asconstruction material of fertilizer by farmers.	BISA	PIU-EPO	Visual inspection

9.3. Kegeyli Environmental Monitoring Plan

320. To ensure that mitigation measures are implemented in accordance with the requirements of the EMP, monitoring will 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 57.

b) **Observational Monitoring** – Throughout the subproject construction phase, the PIU will monitor the contractor's environmental performance. This will be achieved through inspections/audits by PIU throughout the construction period. PIU will have the right to suspend works or payments if the contractor is in violation of any obligations as stipulated under EMP/SSEMPs.

321. Besides instrumental environmental monitoring, 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/NES;

322. 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 civil work. Original records on the results of required instrumental environmental monitoring (noise level, air) also will be kept in the separate file for records.

Table 57: Environmental Monitoring Plan (Project is in Feasibility Stage not yet in Preconstruction stage , Not applicable for comments)

Mitigation measures	Parameter to be	Location	Frequency	Responsibility	Standards	Cost
Pre-Construction Stage (baseline monitoring)						
A. Air quality	Dust	Any points within project area such as – proposed batching area, near human settlement or other sensitive receptors	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	Any points within project area such as – proposed batching area, near human settlement or other sensitive receptors	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 (2 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 in dry season Monthly in other seasons	Contractor and PIU	Same as A	Equipment cost considered in contractor budget
D. Noise and vibration	Noise and vibration level	• Same as B above • As necessary (in response to complaints etc.)	Monthly As necessary (in response to complaints etc.)	Same as above	Same as B	Equipment cost considered in contractor 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)	As prescribed in national standard	Canal water quality	Only once (canal entry and exist point) Before civil intervention	Contractor	SanPiN №0172-06	Cost covered in contractor budget
Operation Stage[81]						
Surface water quality	Salinity, SS, pH, DO, BOD, COD, coliform	Main and secondary canals	Monthly	BISA	SanPiN №0172-06 (Table 3)	BISA budget[82]
Community Health and Safety	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

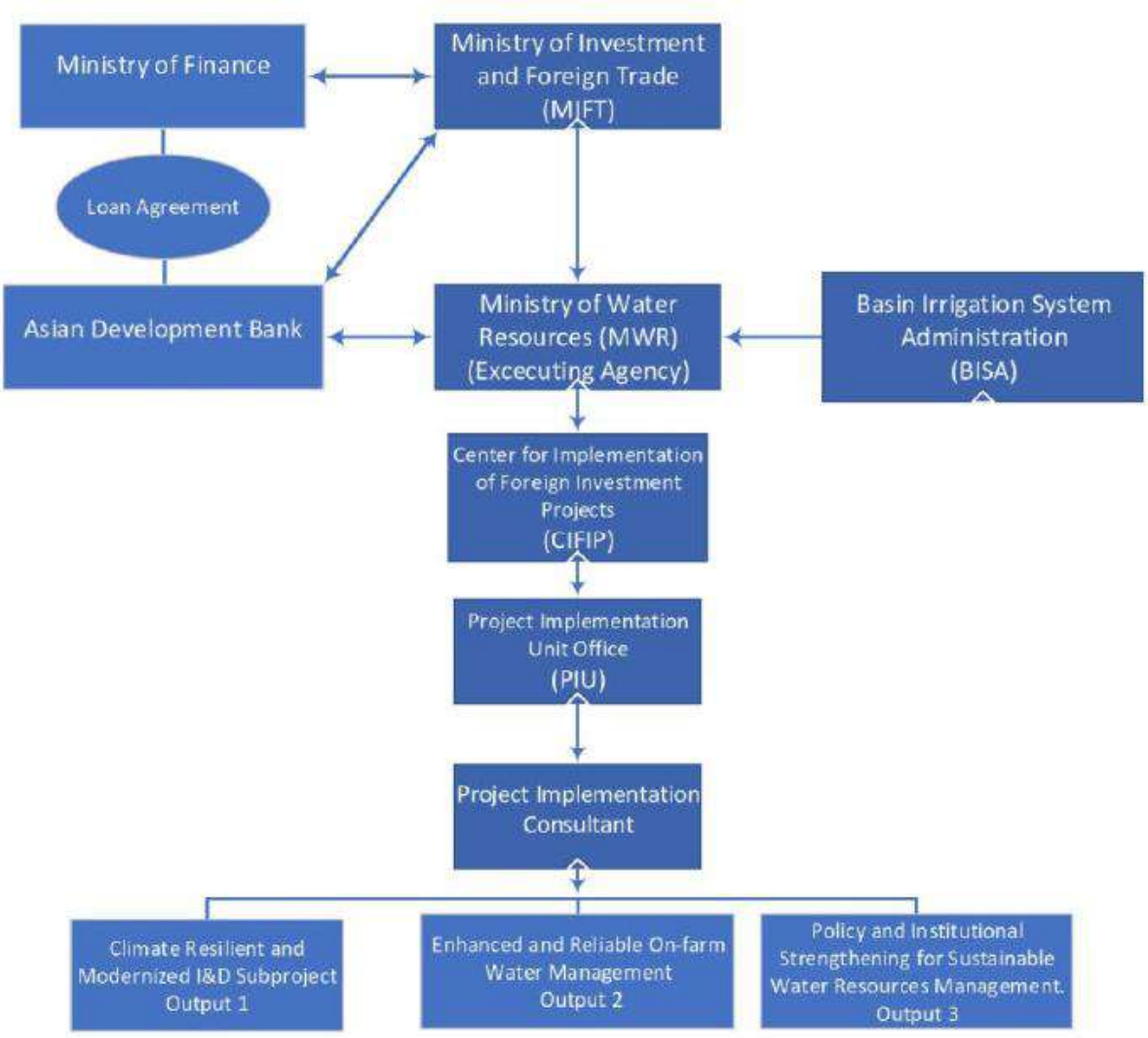
[81] *Modern monitoring and data acquisition system will be installed at key locations at the main and inter-farm level as part of the Project. Water levels and flows of the irrigation system will be monitored by supervisory control and data acquisition (SCADA) system which will be equipped as part of the Project.*

[82] *Water quality monitoring kits will be provided as part of the Project*

9.4. Institutional Arrangement for Safeguard Governance and others

323. 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) 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 27.

Figure 27: Project Implementation Organization Structure



324. The project implementation organization structure together with the roles and responsibilities are in Table 58.

Table 58: Roles and Responsibilities of 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 executing agency 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; • Assist MWR to ensure that the procurement of works, services, equipment and materials is in line with ADB procedures, and that all steps are taken expeditiously and in a transparent manner; • Work with MWR, BISA, District Irrigation Department 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 consultation 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 project completion report 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 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,

9.5. Key consideration in Project Design to Reduce Carbon Footprint

325. Existing consultant, who is preparing feasibility study will prepare a detailed design of the Kegeyli. The consultant shall ensure and integrate recommendations as given by different studies;

a) Incorporating IEE/ EMP,
b) Avoid and minimize trees cutting
c) Integrate recommendation of the climate study to reduce the carbon footprint.
d) For cabon offset, explore option for (a) inclusion of canal-top and canal-bank solar PV projects, (b) replace old pumps with energy efficient pumps to reduce carbon footprint
e) Integrating physical locking of pumps and sluices followed by centralized monitoring system.

9.6. Contractor Reporting

326. Contractors 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

327. The Contractor(s) environmental officer, with the inputs from contractor's health and safety officer, will audit and prepare weekly compliance report SSEMP implementation, such as audit finding, non-compliance, corrective action, training, challenges etc. must be addressed in environmental sections in the 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 MWR.

328. The PIU will be required to prepare SAEMRs (six monthly i.e. January to June and June to December) during the project implementation until ADB's PCR is issued. The PIU is, with the support of the PIC, responsible for preparing SAEMRs. The SAEMRs will be submitted to the PIU, and to ADB for disclosure. For each completed civil work package, the PIU with the support of PIC, will submit a subproject completion environmental audit report. The report may be attached as part of the project SAEMR. Within three months after completion of all civil works, a report on the project's environmental compliance performance (final report) including lessons learned will also be prepared. This report will be part of the input to the overall PCR.

329. 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.

330. 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

331. 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. The detailed training and capacity building on environmental safeguards is summarized in Table 59 will be conducted by the PIC environmental specialists.

Table 59: Training and Capacity Building Activities

Capacity Building Activity	Objectives	Frequency	Duration	Who will be trained	Trainer
Framework for preparation of SSEMP	To guide contractors on SSEMP preparation and compliance requirement, documentation and reporting	Once, after selection of contractor	1 day	Contractor	International Environment Specialist
Environment compliance requirement under National statutes, ADB SPS (2009) and PAM	To guide contractor on compliance requirement under national statutes and ADB SPS	Before start of civil work	1 day	Contractor	International Environment Specialist and National Environment Specialist
Awareness of 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 Annual 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

332. 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

333. 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 60. The project is in Feasibility stage and the final figure will be calculated after completion of Detail Design with consultation with the EA/IA.

Table 60: Cost estimates for Environmental Management

	Activity / Item	**Unit Cost**	**Kegeyli (in USD)**
A	**Detailed Design**		
	Tree felling & plantation	To be estimated after finalization of design	Estimated after finalization of design. This cost will include cutting cost, cost for planting 1:10 plants, cost involve in relocation of trees
	Updating of IEEs after final project design approval	Lump sum	**$4000**
	Carbon offset measures		To be estimated separately
	Involuntary resettlement		To be estimated separately after finalization of design
B	**Pre-construction stage**		
	Construction Camp Site	Part of Project Budget	0
	Soil Erosion protection Measures	Part of Project Budget	0
	Slope Stabilization measures	Part of Project Budget	0
	Hydrological measures	Part of Project Budget	0
	Air Quality Plan	Part of SSEMP Budget	0
	Waste Management Plan	Part of SSEMP Budget	0
	Noise Monitoring Plan	Part of SSEMP Budget	
	Worker Health and Safety Plan	Part of SSEMP Budget	0
	Permit/licence/approval	Part of Project Budget	0
	Community health and safety plan	Part of SSEMP Budget	0
	Labour camp management Plan	Part of SSEMP Budget	0
	Traffic management	Part of SSEMP Budget	0
	Top soil management plan	Part of SSEMP Budget	0
	Canal Biodiversity protection Plan	Part of SSEMP Budget	0
	Labour camp management Plan	Part of SSEMP Budget	0
	Information dissemination Plan/GRM	Part of SSEMP Budget	0
	Preparation of SSEMP	Lumpsum	Same

C	**Construction stage**		
	Instrumental Monitoring		
	Air quality monitoring equipment	Quantity = 4, one for PIU and 3 for contractors, @$2500/device	$10000
	Noise measurement devices	Quantity = 3, one for PIU and two for contractors, @300/device	$1200
	Soil quality	Total 10 sample @500/sample	$5000
	Water quality monitoring	2 sample (one before civil intervention and one after completion of project) @$ 400/sample	$800
	Environmental Awareness Program	Lump sum	$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.)	Lump sum Training should be conducted for all persons involved in construction process	$8000
	Installation of signage boards	Lump sum	$5000
	Potential restoration of work and storage sites, quarries and borrow pits, Construction site roads.	Part of Project Budget	Part of Project Budget
D	**Staffing**		
	Contractor's Environmental Officer[83]	R8 - $2,000 x 2.5 years Kegeyli - $2,000 x 3.0 years	$72000
	Contractor's Safety Officer[84]	R8 - $2,000 x 2.5 years Kegeyli - $2,000 x 3.0 years	$72000
	Biodiversity expert*	R8 - $ 2000 x 6 month Intermittent input during pre-construction and construction period (6 month) Kegeyli - $ 2000 x 8 month	$16000
	Sub-total (A+B+C+D)		$**215700**
	Contingency (10%)		$**21570**
	Total		$**237270**

SSEMP = Site-Specific Environmental Management Plan, PM = person-months

Cost Estimate for the PIC's Environmental Management

334. 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.

[83] Assuming 2.0 years construction period for this subproject

[84] Assuming 2.0 years construction period for this subproject

10. CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

335. The environmental impacts of Kegeyli subproject's and secondary canal (Kegeyli Nizhniy Canal) are expected to be localized and low throughout the construction and operation stages. The subproject is classified as Category B for environment under ADB SPS (2009). The subproject meets the environmental criteria defined under EARF.

336. The rehabilitation of the proposed Kegeyli canal and secondary canal is a feasible and sustainable option from the engineering, environmental, and socioeconomic points of view and will strengthen marginalized rural poor people, for more on project benefits. 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

337. Explore possibility of inclusion of Climate Adaptive Measures in Designs Stage, for details recommendation on climate adaptive measures, refer Chapter 6.

Pre-construction and Construction stage

338. Involuntary Resettlement - Modernization of Kegeyli canal will trigger involuntary resettlement, according to estimate, 56.94 ha of land will be affected. Hence, it is recommended to undertake social due diligence to assess the extent of social impact and prepare LARP accordingly. Before bid is invited for Kegeyli, PMU is required to obtain environmental clearance from the State Committee for Ecology and Environmental Protection.

339. 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 contractors in preparing the Site-Specific Environment Management Plan (SSEMP) in align with the EMP (PAM requirement) and submitted to PIU for review and clearance.

340. 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 (61) enumerates the recommendation including accountability of contractor, MWR/PMU/PIC for Environmental Safeguards.

Table 61: 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	a) Before construction commences, PMU is required to obtain environmental clearances/approval from State Committee for Ecology and Environmental Protection.

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, permission for tree related issues 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), (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.	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 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

341. **Operation stage**

a) Incentivize farmers who are practicing or adopting 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 for farmers to increase the acceptance

Good Practices

11.1 EHS Travel Plan for PIU/PIC experts for Survey and Site Investigation

11.2 Tentative Framework for Preparing Site Specific Environment Management Plan (SSEMP)

Environmental, Health and Safety Travel Plan
For
Site Survey and Inspection

Content

1. Preamble

The said report herein referred as “Environment, Health and Safety (EHS) Travel Plan”, it will trigger while undertaking a survey and field investigation of Kegeyli subproject.

Environment, Health and Safety (EHS) Plan highlights the procedures to be carried by individual or team members during survey, field investigation or site inspection;

It is compulsory to comply with and reported in Semi-Annual Environmental Monitoring Report (SAEMR).

2. Objectives of Making Environment, Health and Safety Management (EHS) Travel Plan

Followings are the objectives;

- To avoid accidents or any unforeseen incidents during the survey and field investigation.
- Ensure a safe and accident-free working environment.
- Set systems and procedures in place so that even during the emergency, field investigating experts or teams are able to manage the emergency situation with minimum impacts on their health and lives.

3. Scope and Applicability of Travel Plan

- The abovementioned Travel plan applies when experts conduct field investigations and surveys of KEGEYLI subproject.
- Applicable to PIC/PIU experts, whosoever, irrespective of designation while undertaking site survey, field investigation or routine inspection.
- As a good practices, throughout construction period, PIC/PIU must adhere to Travel plan.

4. Anticipated physical, Environmental, Health and Safety Risks

Based on preliminary survey, followings are the potential physical, environmental, health and safety risks associated KEGEYLI subproject; the list is not exhaustive, the team may increase the risk list as they experienced during the survey and filed investigation.

- Travel/road risks
- Drowning,
- Extreme weather (heat stroke cause dehydration)
- Frostbite
- Stomach upset/vomiting
- Insects bite (e.g. bees, wasps, etc.)
- Theft

- Injury due to falls or slips

The list is not exhaustive and the team may increase the list of risks they have encountered during the visit, interview and investigation.

5. What to do to Avoid Risks during Survey and Field Investigation?

During the inspection, visit and/or study, PIU/PIC experts, including donor (ADB), are required to comply with the requirements:

(A) Before leaving for Survey & Field investigation - Prepare a written Safety Travel Plan for your trip

Provide a filled copy and get it approved by a Team Leader, Deputy Team Leader or designated authorised person.

Include the following in your Safety Travel Plan

(a) **Yours and your team member's itinerary**
- Locations where you are travelling
- Arrival and departure dates,
- Names & addresses, and phone numbers of all fieldwork participants.

(b) **Contact person:** Name and phone number of a person to contact in case of emergency- a spouse, parent or friend, as well as a hotel contact where you are staying.

(c) **Activities:** General nature of activities being conducted during survey and field investigation

(d) **Local contacts**: Names of people at or near your fieldwork site who can reach you, as well as your check-in/check-out arrangements.

(e) **Possible Risks**: Potentially hazardous plants, animals, terrain and weather conditions of the location.

Complete a “Safety Travel Plan" and submit for approval.

(B) Assemble Your Protective equipment

- First aid kit
- Don't forget the medications you regularly take
- Don't forget your mobile phone, charger or mobile power bank
- Carry extra-long sleeves cloth and pants or jeans
- Take prescribed allergy medicine, if you have allergies
- Sunscreen and caps/hat/ sun protection glass
- Flashlight/Lead safety light
- Personal protective equipment for fieldwork activities (high visibility vests, safety glasses/goggles, gloves, sturdy work boots, etc.).

(C) While you are Working (survey/field investigation)

- Whenever possible, **fieldwork activities should be done in teams of at least two people (buddy approach).** This system is the safest way to work. Always make sure your supervisor knows where you will be and when you will return.

- Inform your office daily about your fieldwork location and the approximate return time (through what up, email or phone).

- After each day's work, the fieldworkers should notify the contact when they return.

- Local contact should be provided with the telephone numbers of people to call if the field staff do not return or report within a predetermined interval.

(D) Medical Care and First Aid

- A first aid kit should be maintained at all times during survey or field investigation.

- National and international experts should be given first aid training or possible health and climatic risks they may encounter during surveys or field investigations. In PIU/PIC, it is mandatory to have at least one staff who is trained and certified in first aid and cardio-pulmonary resuscitation (CPR).

- PIU/PIC experts from time to time undertake training by a certified first aid trainer.

- Before a field survey or field investigation, keep the emergency number of the nearest hospital or health care unit for medical emergency.

(E) Preventive Approach - To Avoid Physical, Environmental, Health and Safety Risks during survey and field investigation.

The table below enumerates suggestions to reduce potential Physical, Environmental, Social, Health and Safety risks during surveys, inspections or field investigations undertaken by PIU/ PIC experts.

Table 2: Tips to reduce Physical, Environmental, Social, Health and Safety risks

Risks during survey/field study	Prevention
Road travel by car	**Using office vehicles** • Obey traffic laws • Fasten your seatbelt • Don't drink alcohol and drive • Don't exceed the speed or drive recklessly • Don't take phone calls while driving **Using rented taxi** • Take a rented car from the authorised agency and explain your travel requirement to the agency beforehand. • When you are using a rented taxi, ensure (a) that the driver is not drunk, (b) safety belt is available, (c) tell the driver not do over speeding (e) tell the driver not receive calls while driving.
Extreme Weather conditions	• Plan your survey or field investigation based on metrological input. Nowadays, local metrological information is available online region-wise; use it for

	your travel plan, otherwise severe weather can result in physical injury and/or death. • Carry appropriate equipment to deal with severe weather (e.g. raincoat, umbrella)
Frostbite	• Dress in layers • Cover your extremities with warm clothing, e.g., hats, facemasks, gloves, socks, and shoes.
Dehydration	• Drink plenty of water, • Filling your diet with fruits and vegetables that have a high water content • Avoid or limit drinks with caffeine, like coffee, tea and soda. • Avoid or limit drinks with alcohol. • Working strenuously or in a warm climate, always carry Oral Rehydration Solution (ORS) and take frequent rest breaks
Stomach upset/vomiting	• Wash hands with soap before you eat/use hand sanitiser • Don't eat raw food • Never drink water from an impure source/ always take bottled water • Wash fruits and vegetables before consuming • Always keep medicine in first aid kit for vomiting/stomach upset/fever etc
High Altitude Illness (applicable for international experts)	• Impact your health due to oxygen deficit in body intake and increased breathing rate • Allow your body to acclimatize by gaining elevation slowly
Insects bite (Bees, Wasps, etc.)	• Wear long sleeves and pants. • Wear special shoes • Carry insect repellent cream, if possible • Avoid areas of standing water where mosquitoes breed
Theft	• Keep valuables in the front pocket • Carry the shoulder bag diagonally and keep the bag in front under your arm • If theft happens, inform and register your complaint to the nearest police station
Drowning	• Use the buddy system • Carry ropes & life jacket • Experts know swimming should go close to water, and non-swimmer experts should support • Always wear a life jacket when you enter in water. • Learn CPR (see Table 3) • Don't consume alcohol For more detail, refer following site https://www.sja.org.uk/get-advice/first-aid-advice/breathing-difficulties/drowning/

Note: The list is not exhaustive

Table 3: What to do, if someone is unresponsive and not breathing normally

Steps	What to do?	Picture
Step1	Call the nearest hospital/emergency	
Step 2	Pump 30 chest compressions at a rate of 100–120 per minute.	
Step 3	Breathe – • Give two rescue breaths *If you're unable, just give chest compressions* • Continue to pump and give rescue breaths until help arrives	

Source: https://www.sja.org.uk/globalassets/first-aid-posters/adult_cpr_poster.pdf

Tentative Guideline for Preparing Site-Specific Environmental Management Plans

SSEMP - Some Highlight to be Remembered

- Prior to commencement of construction works, the contractor will prepare SSEMP (based on the EMP) on how the contractor will implement the mitigation measures as specified in EMP.
- 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.
- The SSEMP will be agreed in advance with PIU /PIC in the project pre-construction stage.
- The contractors will ensure that the SSEMP is prepared in reference to national EHS Guidelines and ADB SPS requirement and submitted to the 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.
- PIU will ensure that the selected contractor has 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.
- One month before construction commences, the contractor will demonstrate to PIU that the SSEMP will be properly resourced, and a qualified/experienced ESO, and HSO, have been identified by the Contractor as per the tender agreement.
- 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.
- 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.

1. Objective of Guideline

This SSEMP guideline will assist and guide the civil contractor in planning, designing and developing SSEMP. The said guideline is not exhaustive; the civil contractor has the flexibility to add thematic issues based on the ground situation and location sensitivity.

2. Purpose of SSEMP

a) To ensure that the site complies with the applicable laws, regulations, and code of practices
b) Ensuring that mitigation measures as specified in EMP are implemented
c) Establishing systems and procedures
d) Taking necessary action when unforeseen impacts occur
e) To ensure a safe and accident-free working environment
f) To ensure that the rights of workers do not get compromised and are in line with the stipulated statutes and strengthen labour working conditions

g) Develop, implement and monitor Standard Operating Procedures for Health & Safety, and social welfare of employees and ensure better working conditions
h) Monitoring the effectiveness of implemented mitigation measures
i) Ensure systems and procedures are in place to ensure that during emergencies, the project can manage the crisis with minimum impacts to life of the people and the surrounding environment.

3. Responsibility

The civil contractor prepares the plan before civil works and must demonstrate that sound environmental practices will be followed during civil construction and decommissioning of existing activities.

4. Approval

Review and approved by PIU/PIC

5. Approach and methodology

SSEMP will be prepared by contractor based on the input from

a) Initial Environmental Examination (IEE) report
b) Condition as stipulated in bid/contract documents
c) Site inspection/consultation with local
d) Inputs from construction schedule

6. Clearances Report

As a first step, the contactor must prepare a Clearance Report to understand the compliance requirement under different national statutes including donor commitments as applicable to projects and auxiliary activities, including time required for obtaining clearance/permit/ No-objection certificate under different statutes. Under this following, three actions are proposed

a) Policy mapping, See Table 1 [Sample] Policy mapping
b) Listing of applicable Acts and Rules (local and national statutes)
c) Developing framework for Clearance report, See Table 2 [Sample] Framework for clearance report

(a) Outcomes

a) Will help contractors to understand Acts and Rules applicable including compliance requirements under different statutes
b) Will help contractors to know the permissions, clearances, No-objection certificates, licenses, etc; they need to take for compliance.

Table: 1 [Sample] Policy Mapping

Standards	National Acts/Rules/Guideline etc.	ADB' Safeguards Policy (2009)	Compliance Requirement
Environment Standards			
Social standards, labour code etc.			
Stakeholder consultation			
Public Communications Policy			
Indigenous Peoples			
Land Acquisition			
Biodiversity			
Grievance Redress Mechanisms			
Labour health and safety			
Labour amenities, security and Labour and Working Conditions			
Climate/disaster resilience			
Traffic standard			
Climate resilience			
SDG commitment in project planning and management			

The list is not exhaustive, it will be further elaborated.

The table below enumerates, the proposed framework for Clearance Report reporting

Table 2: [Sample] Framework for Clearance Report

Sr.No	Type of clearance / permit/ NOCs	Name Act/Rule with section	Clearance Authority	Stage (pre-construction/ construction/ operation)	List of documents and information need for obtaining clearance	Tentative timeline	Potential risks to executing agency, in case of non-compliance

*NOCs – No Objection Certificate

7. Framework for SSEMP

As mentioned above, SSEMP is prepared by the civil contractor to ensure that the commitments made towards environmental protection including occupational health and safety, etc., are being complied. Thus, based on the potential impacts, the civil contractor will prepare the Site-Specific Environmental Management Plan, see Table 3

Table 3: [Sample] framework for Site-Specific Environment Management Plan

Project activities	Impacts** / Location	Significance*	Mitigation measures	Responsibility	Timeframe	Tentative budget	Monitoring	Standard operating procedure (if any)
** Criteria for determining impact significance = Trigger acts or donor requirement, potential threat to lives, may trigger public protest or legal intervention or stoppage of work, the severity of the impacts (reversible or irreversible), etc.*								
*** Magnitude of Impact or risk will be analysed based on likelihood and consequence. After that, the civil contractor will suggest structural and non-structural risk treatment/management plans based on impact magnitude.*								
Note: Site-Specific Environmental Management Plans is not a static document. It will update with the advance of civil and project activities. Hence, contractor is required to update from time to time (version 1, version …., and so on)								

In addition to developing the **SSEMP**, the civil contractor will develop site-specific Standard Operating Procedures as required for:

a) Air Quality Management
b) Solid Waste Management (municipal waste, construction, and demolition waste)
c) Water Supply
d) Wastewater Management
e) Hazardous materials/waste Management (based on quantity and class)
f) Vegetation clearance plan, if applicable
g) Pollution Spill Contingency Plan
h) Landslide and erosion Management
i) Biodiversity conservation and protection of endemic species, including poaching by construction workers
j) Protection of Physical, Cultural, and historical sites
k) Construction materials handing
l) Equipment maintenance/workshop management
m) Noise and vibration Management
n) Vibration Management
o) Site Restoration Management & tree plantation plan
p) Any other as identified during preliminary site investigation

The civil contractor will design and develop above SOPs based on:

a) On-site survey
b) Inputs from project construction schedule and consultation with PIU;
c) Understanding potential hotspot areas (educational institutions, medical institutions, place of worship, human settlements, etc.), if any
d) Review of data on potential workforce to be engaged during construction including requirement of resources (construction material), auxiliary activities and quantity of waste generation
e) Potential hazardous wastes to be generated including chemicals used for construction
f) Understanding potential design interventions
g) Consultation with experts/engineers
h) Review of similar project/sector-specific best practices

Components of SOPs are:

a) Purpose
b) Role and responsibility
c) Procedures – structural & non-structural measures, PPEs requirement & specification
d) Compliance requirement (National/ADB commitment)
e) Training and capacity building requirement/target stakeholders/frequency
f) Inspection/audit and reporting

7.1. Occupational Health and Safety Plan

The occupational health and safety Plan will be prepared as a part of SSEMP by the civil contractor before initiating on-site civil works and must be implemented to ensure safe working conditions during decommissioning activities and project construction.

Based on the input from the Risk Mapping exercise, see table 3, the Site-Specific Occupational Health and Safety Plan will be prepared by the civil contractor to ensure that the commitments made for health and safety are being adopted and complied.

Based on the risk/hazard assessment, the contractor will develop Standard Operating Procedures (SOPs) for activities that are defined as high risk or may cause emergency situations. The SOPs comprise of the following components:

a) Purpose
b) Responsibility
c) Will trigger laws/policy or bank requirement
d) Procedures for reducing impacts

(a) Approach and methodology

For developing SOPs for each activity, which may lead to accidents, injury, death, or loss of man-day, the civil contractor will undertake following approach but not only limited to following:

a) Literature review & review of similar project
b) Requirement under laws, regulations, international standards and code of practice
c) Occurrence frequency
d) Expert opinion/best practices

Note: Site-Specific Health and Safety Plans is not a static document, the civil contractor will update with the advance of civil and project activities.

(b) Tentative thematic areas for Site Specific Health and Safety Management Plan

a) General safety measures,
b) Reinforcement and Concrete works
c) Housekeeping & cleanliness
d) Excavation, scaffolding, working at heights
e) Personal Protective Equipment (PPEs),
f) Material Handling (Manual & Mechanical)
g) Batching plant
h) Electrical and hot jobs
i) Display of Signage board,
j) First aid/onsite first aid room
k) Drinking water, lavatory for male and female workers, and sanitation
l) Gender Equality and Sexual harassment
m) COVID 19
n) Amenities for labour
o) Training and capacity building

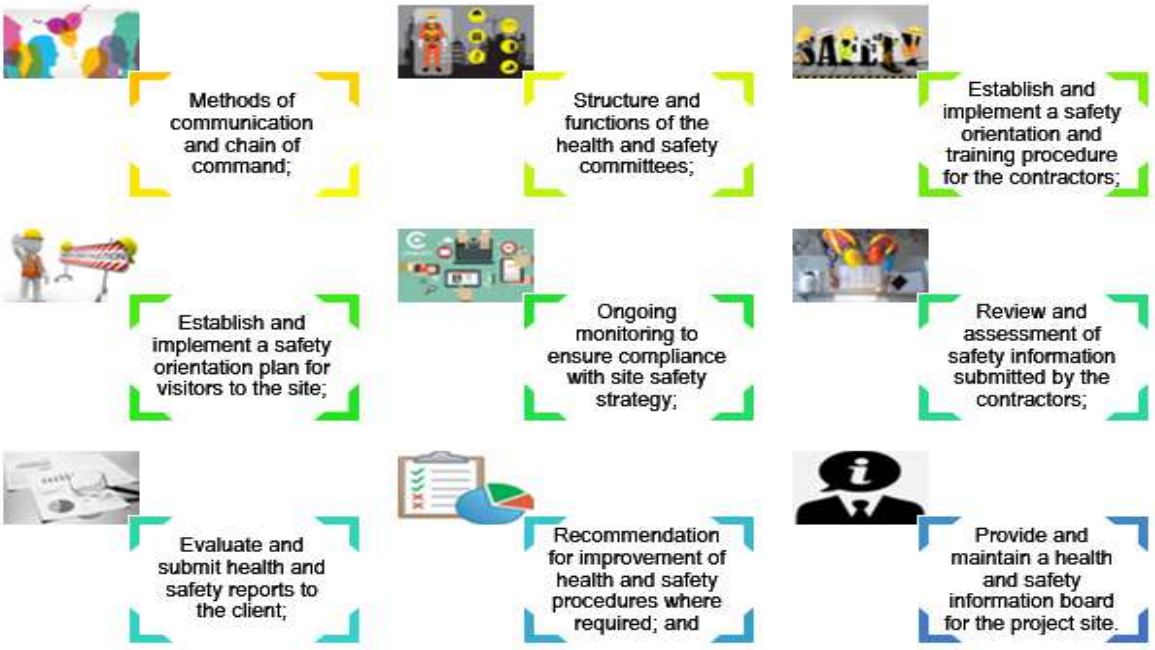
The above List is not exhaustive and the contractor can add as necessary other components.

Table 4: [Sample] Risk identification and Mapping Method

No.	Activity	Hazard / Environment Aspect	Hazard leads to Normal / Abnormal / Emergency Situation	Possible Outcome	Probability Rating	Severity Rating	Risk / Impact Level	Existing Control Measures/ SOPs
								Refer to SOP

The below figure 1 describes the interface amongst the client, consultant, and other stakeholders that define the process of consultation, cooperation and coordination by the workers and the other field personnel on health and safety matters. The main components have been listed, and the plan should be flexible and adaptable to the dynamic project requirements.

Figure 1 [Sample]: Components of Health and Safety Management Plan



Depending on compliance requirement and to promote safe conditions at the site, various FORMS for routine approval/inspection/audits will be developed by the civil contractor and get reviewed by PIU/PIC before being used by the civil contractor, some of the examples of FORMS/checklist are**:**

a) Unsafe Action & Unsafe condition
b) Crane Inspection Format
c) Hot Work permit
d) Height Pass & Medical fitness Certificate
e) Height Work Permit
f) Checklist for scaffolding erection.
g) Fire Extinguishers Inspection Format
h) Accident Information Report
i) Accident Investigation
j) Format of observation register and remedial measures
k) EHS Training Format
l) Content of First Aid

(c) Emergency Response Plan

Emergency planning will be required to ensure a structured and timely response to address all on-site emergencies. Site emergencies may arise during project activities and will be categorized into three levels based on the probability and magnitude of the impact, see table 5. The contractor will prepare an Emergency Response Plan in accordance with:

Table 5: Level of Emergencies

Emergency type	Probability	Severity	Example	Management Plan (Standard Operating procedure)
Level 1	High	Low	Injury, minor burn, cut & wound etc.). Requires first aid.	Develop SOP.
Level 2	Medium	Medium	Fall from height, electrical shock etc. First aid at the site, and thereafter taken to a hospital for further treatment	Develop SOP
Level 3	Low	High	Compound fractures, severe head injury, etc.	Develop SOP

a) Identification of the types of emergencies and their probability
b) Categorization – Procedure for determining Emergency (life-threatening/non-life threatening)
c) Composition, Role and responsibility of key members of the emergency response team
d) Develop SOPs for common emergencies (i.e., fall from height, electrical shock, and collapse of scaffolding, excavation, drowning, hazardous waste, asbestos, if applicable etc.)
e) Develop SOPs for Emergency Preparedness, such as:
   - Emergency Control room
   - Identify and form Emergency response team at the site
   - First aid and CPR
   - Tie up with hospital/ambulances
   - Training & capacity building

(d) Site response after an emergency:

- Accident information
- Accident Investigation
- Recording and reporting to PIU

Note: In consultation with PIU/PIC, the civil contractor will design and develop FORMS for the collection of accident information and accident investigation.

7.2. Labour working conditions

Purpose – To reduce environmental and social impact and to provide hygienic, comfortable working for construction labours, a safe labour management plan is crucial and integral part of SSEMP.

(a) Approach and Methodology

a) Review policy and compliance requirements related to labour health, labour benefits, etc., under different statutes of the Government of Uzbekistan
b) Consult with labour department and other relevant departments to understand any specific requirements

(b) Labour working - Some key thematic areas for inspection and compliance assurance

a) Resting areas, ventilation, and electricity for heating/cooling and essential appliances like lights, fans and plug points

b) Amenities – Separate lavatory facilities for male and female, bathrooms, drinking water supply
c) Health & hygiene - arrangement for sewage treatment, safe garbage disposal, sweeping, cleaning and sanitization, COVID-19 protection, safeguards from wild animals and reptiles.
d) Social facility – provision for worker entertainment room, *crèche, first aid, etc.*
e) *Labour and vehicle insurance*
f) Provision for labour grievance

7.3. Traffic Management Plan

The Traffic Management Plan aims to minimize the inconvenience to the community and ensure the safety of both workers and the community.
The plan will address the following:

a) Ensure safety of people travelling in the construction zone
b) Ensure safety of workers from possible hazards created due to traffic
c) Ensure convenience of people while travelling on the roads impacted by the project work
d) Information dissemination plan

(a) Approach & methodology

The civil contractor prior to making traffic management must ensure the following:

a) Consultation with local authority to understand any permission/approval required for diversion, and alternatives
b) Site survey and identification of hotspot areas (villages, schools, hospitals, and other service providers, etc.), which are likely to be affected
c) Consult nearby residents, businesses, and local authorities regarding possible measures for road diversion or alternatives
d) Consultation with engineering team/ contractor about construction schedule which will interfere with the local traffic or maximum number of days for which the road will get affected
e) Identify tools and techniques for information dissemination.

Based on site survey, consultation, and construction schedule, the civil contractor will design and develop Standard Operating Procedure for traffic management.

(b) SOPs will contain following components

a) Purpose
b) Responsibility
c) Any permission from the local authority
d) Procedures for reducing traffic impacts few examples are

    - Traffic control devices (for example - arrow panels, warning lights, sign boards, barricades
    - Speed limit & road safety
    - Demarcation of landslides and preventive measures
    - Public awareness and information dissemination
    - Signs and demarcation for the population on those sections of the road where heavy machinery will be moving.

7.4. Community Health and Safety Management Plan

The Community Health and Safety Management Plan aims to safeguard health and safety impacts on local communities due to project decommissioning and construction.

Key objectives are:

a) Establish framework for effective management of health and safety issues.
b) Avoid or minimize community exposure to project-related traffic, road safety risks, diseases, and exposure to hazardous wastes.

(a) Approach and methodology - Community Health and Safety Management Plan

For the community health and safety management plan, the contractor will develop a detailed Standard Operating Procedure to ensure minimal impacts by providing timely project-related information to the community. SOP will be developed by the contractor by obtaining inputs from the following activities:

a) Site survey and identification of sensitive receptor
b) Anticipated risk-prone areas/ hot spot areas
c) Consultation with local people & other stakeholders

Box : Anticipated Community risks

- Issue related to traffic congestion, road safety etc;
- Open pits/excavated area, risk of falling;
- Matter related to discomfort and inconvenience due to traffic diversion, air, and noise pollution
- Risks related to labour influx (social issues)
- Covid-19/HIV/AIDS

List is not exhaustive, will elaborated further.

7.5. Monitoring, Compliance, and Reporting

For smooth implementation of Environment Safeguards and to ensure compliance with national statutes, the contractor will design and develop the **Monitoring and Reporting Framework** for proposed project, which should be align with EMP.

(a) Benefit

Timely engagement, monitoring, reporting, and constant handholding are essential to ensure:

a) Long-term project sustainability and
b) Meet the compliance requirement
c) Enforce and implement good industrial practices.

(b) Outcomes

Following will be some key outcomes for monitoring, compliance and reporting.

a) In-depth understanding of compliance requirements
b) Help in mainstream sustainability features through better planning
c) Defining role and responsibility more comprehensively
d) Better co-ordination and engagement among stakeholders
e) Mainstream E&S safeguards requirement
f) Integrate climate resilience features
g) Help in execution of capacity building program
h) Meet the KPI and project objectives

Figure 2 [sample] enumerate procedures for Project Performance Monitoring

(c) Approach & Methodology

- Any specific and general Environmental Clearance (EC) conditions as stipulated by the authority while granting EC.
- Reviewing the compliance requirement in IEE report, project manual, project-specific covenants, etc
- Compliance requirement (clearance/permit/ No-objection certificate) under local statutes and standards
- Inputs from inspection/audit finding (construction stage)

Based on the compliance requirement under ADB SPS requirements, national statutes, and international conventions, contractors will develop a **Reporting Format** in consultation with PIC/PIU, such as

a) Environment Management Plan
b) Occupational Health & Safety
c) Compliance with Environment Clearance conditions
d) Grievance Redressal
e) Compliance with clearance/permit/ No-objection certificate under local statutes and standards
f) Compliance - National NDC & SDG commitments, if applicable

Figure 2 [Sample]: Project Performance Monitoring

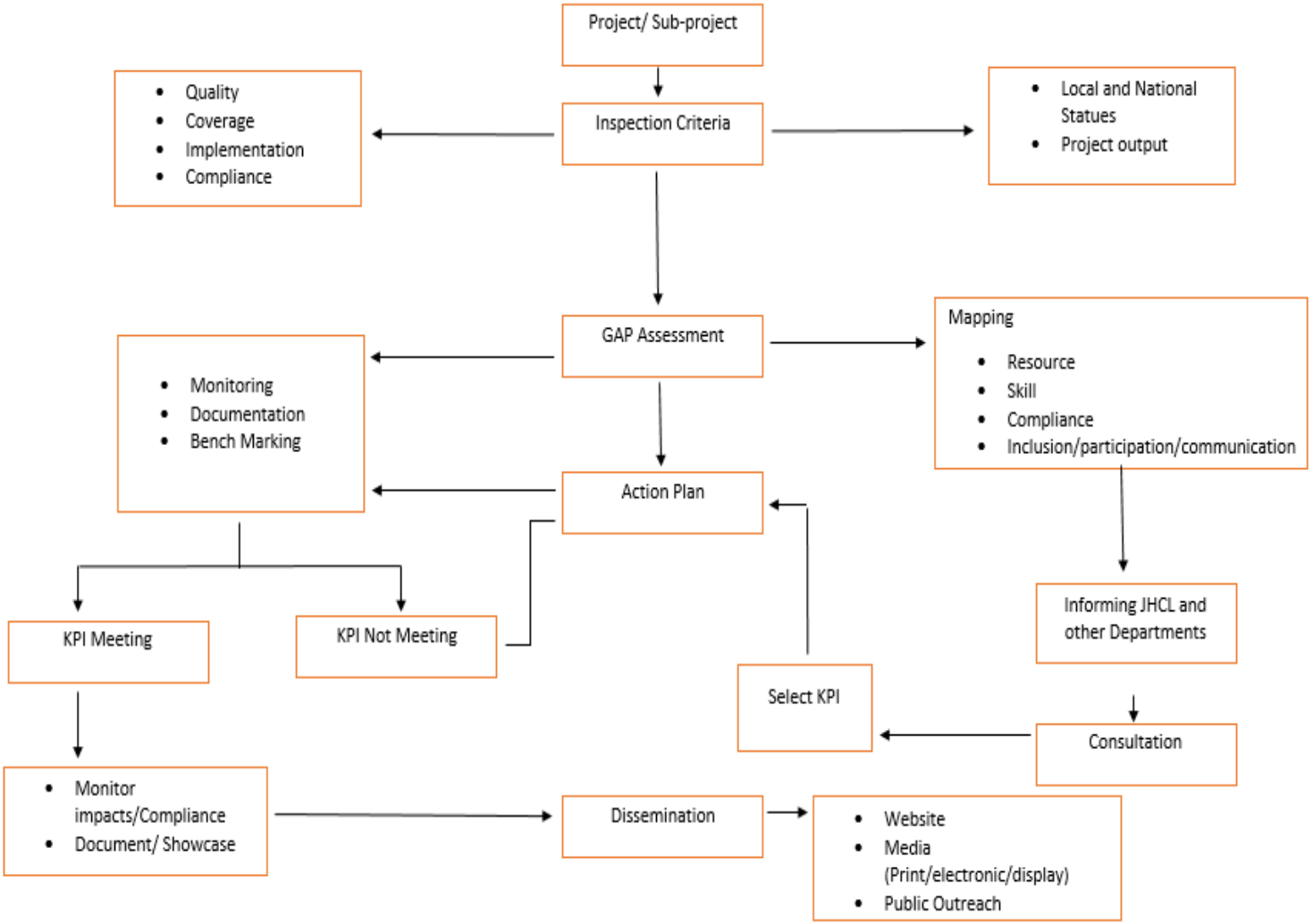


Table 6: [Sample] Performance Evaluation and Reporting

No	ESHS Components	Compliance	Risk level	Status	Reasons for Non-compliance if any	Action Plan	Expected timeline to meet the compliance	Responsibility
A	**Environment**							
1	Implementation of Environment Management Plan							
2	Compliance with air/noise quality standard							
3	Compliance with water quality standard							
4	Compliance of national tree policy							
5	--							
C	Permit and license obtained under different statutes							
	--							
E	Restoration of areas temporarily occupied during construction							
F	*Labour*							
1	Labour working conditions							
2	Health & Safety							
3	Labour camp & amenities							
4	Child labour							
	--							
H	Climate resilience implementation Plan							

No	ESHS Components	Compliance	Risk level	Status	Reasons for Non-compliance if any	Action Plan	Expected timeline to meet the compliance	Responsibility
I	National NDC & SDG commitments							
	--							
	--							

Note: The list is not exhaustive

During construction phase, the contractor will establish a systematic process to identify ongoing and emerging issues that may or may not have been predicted in earlier stages. The contractor EHS team will be responsible for detailed regular monitoring of waste, noise, dust, air quality, water quality, erosion, sediments, and hazardous materials arising from construction activities. The thematic areas of monitoring program and reporting is enumerated in table 7

Table 7: [Sample]: Monitoring Programme

Thematic area	Stage of project*	Monitoring parameters**	Sampling Method, location & duration of sampling	Monitoring frequency ***	Monitoring budget ****	Corrective action/ Measures/timeline
Air Pollutants/ Air Quality						
Water Pollutants/ water Quality						
Waste Management (solid and hazardous)						
Soil and Groundwater						
Occupational Health and Safety						
Ecological and Biological						
Socio-economic						

Note: Above table is not exhaustive, will elaborate further after scoping study and inception report

* Pre-construction/construction/implementation or operation

**Based on compliance requirement

***As agreed with client or requirement stipulated under different statutes
****on case-by-case basis

7.6. Information Dissemination (ID) Plan

For smooth project implementation and optimum performance output, contractors will design and develop **Standard Operating Procedures (SOP)** for information dissemination in consultation with PIU/PIC.

Key Aspects of SOPs	Possible target stakeholders
• Thematic areas for ID • Frequency of ID • Communication mode (public meeting, consultation, workshop, pamphlet/audio/video etc.) • Roles and responsibilities • Budget & monitoring	• Project affected people, • Water consumers associations • Ministry of Water Resources, local government, environment authority, other relevant department, etc. • Sub-contractor • Contractor's Labours • Local truck's driver • Others stakeholder identified during inspection meeting and *reconnaissance* survey.

The process of information dissemination will initiate right from inception surveys till construction of project and monitoring.

Some of keys thematic areas that will be considered for information dissemination are as follows

- Environment impacts and safeguard measures
- Compensation & resettlement and rehabilitation package, if applicable
- Traffic diversion and road blockage
- GRM
- Social Impacts and overall project benefits on following indicators (a) water security & agriculture productivity (b) Health Education (c) Livelihood (d) Water (e) connectivity (f) Sanitation (g) Livelihood opportunity etc.
- Local employments, training & skill development
- COVID 19 / HIV etc. awareness

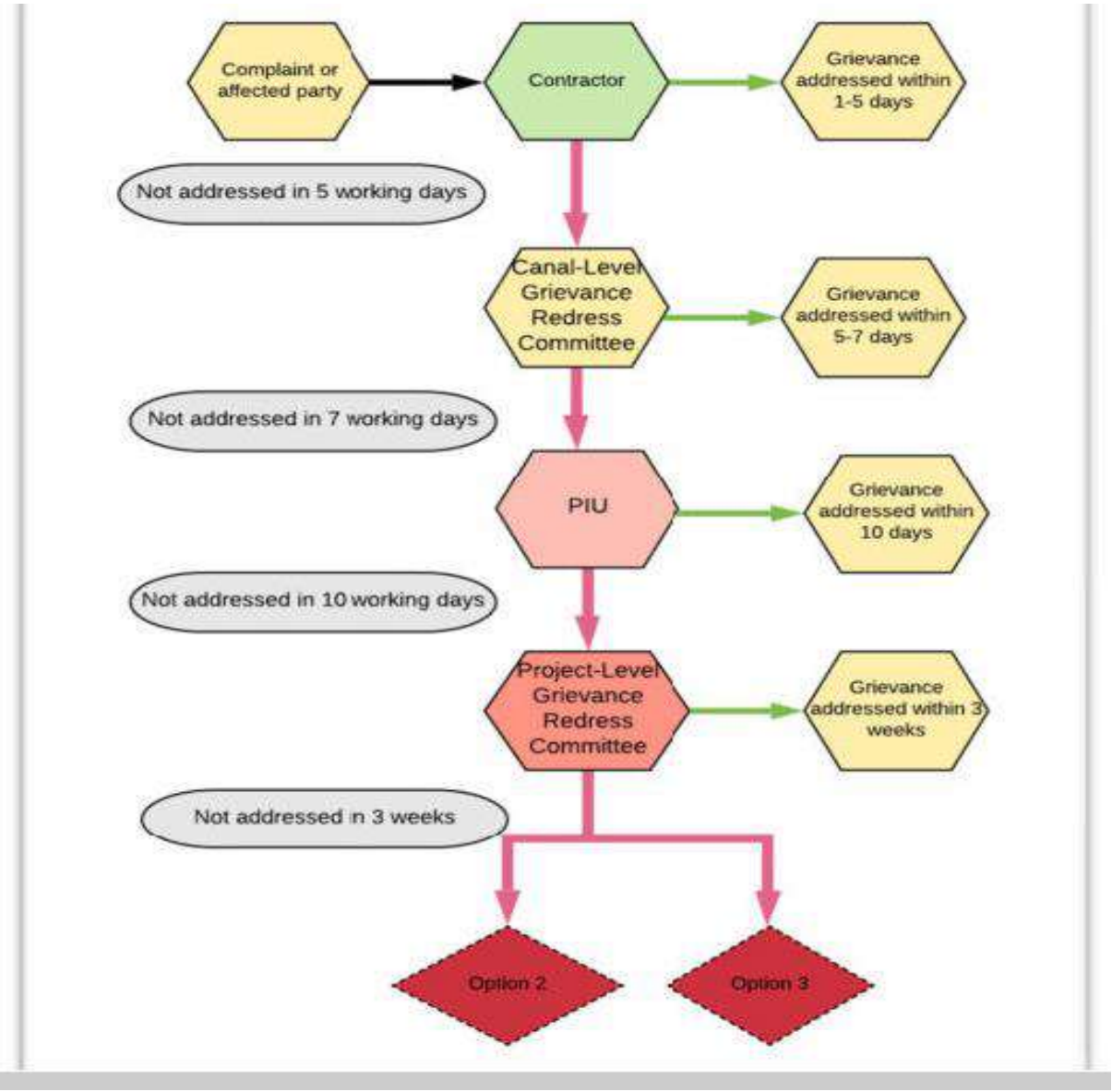
Note: *The list is not exhaustive, as per the project and requirement, it will be elaborated*

7.7. Grievance Redress Mechanism (GRM)

The GRM proposed in Chapter (8) of IEE report of KEGEYLI must be considered as a framework. The three levels of GRM have been suggested to resolve any types of grievances or complaints See, Figure.

d) Option 1 is established under the Project,
e) Option 2 is accessing through the country's legal system, and
f) Option 3 is for the affected person to access through the ADB Accountability Mechanism.

Figure: KEGEYLI GRM Framework



What Contractor should do?

- Create awareness about GRM at project level i.e. among worker and local community
- Form GRM team assign role and responsibility

- A Grievance Redress Register shall be maintained by the contractor for all complaints, See sample [3]
- Develop FORMS for reporting [4 and 5]
- The contractor shall share information on such complaints with the executive agency on a monthly basis.

Figure 3: GRM Register [Sample]

Grievance Register

[Sample]

Table: Grievance Register

Project Name										
Project No.										
Grievance Details						**Response Details**				
Grievance Number	**Name**	**Location**	**Recipient of Grievance**	**Date and Method of Receipt**	**Brief Description of Grievance**	**Action Taken**	**Date**	**Grievance Closure and/sent for next level**	**Date**	**Resolution Date**
Assign unique reference number	*Name of person submitting grievance*	*Location of the cause of the grievance*	*Provide name of line manager or designated focal point receiving grievance*	*Verbal or written*	*Describe the grievance. It may also be useful to define type of grievance in accordance with pre-defined criteria.*					

Figure 4: Community Grievance Form [Sample]

Community Grievance Form

[Sample]

Community Grievance Form				
Date	**Name**	**Organisation (if applicable)**	**Telephone Number**	**Email Address , if applicable**
Grievance Details				
Grievance location				
Date of grievance				
Description of grievance				
Grievance Response (for internal use only)				
Date grievance received				
Stakeholder group				
Name of contractor				
Review assigned to				
Review outcome	o General issue o Immediate action o Investigation			
Investigation details				
Grievance response				
Appeal details				
Sign off by aggrieved party				
Resolution date				

Figure 5: Worker Grievance Form [Sample]

Worker Grievance Form

[Sample]

Worker Grievance Form			
Date	**Name**	**Issue related to work site/labour camp**	**Telephone Number**
Grievance Details			
Grievance location			
Date of grievance			
Description of grievance			
Grievance Response (for internal use only)			
Date grievance received			
Review assigned to			
Review outcome	o General issue o Immediate action o Investigation		
Investigation details			
Grievance response			
Sign off by aggrieved party			
Resolution date			

What PIU should do?

- PIU (with the support of PIC) will collect the data from the contractor and submit it to MWR (state level).
- Reported to ADB by the MWR through the Semi-annual environmental monitoring reports (SAEMRs).

Annexures

Annexure 1

CRITERIA FOR SELECTION OF NON-CORE PROJECTS[85]

1. Following selection criteria were tentatively agreed between the government of Uzbekistan and ADB for selection of Non-Core sub subjects:

(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 modernizing 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.

[85] Project Administration Manual, 2022, Republic of Uzbekistan: Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project

(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:

Canal Branches and list of Utilities on Main and Secondary Canal

(A) Kegeyli Canal Branches (Gravity flow and pumping)

Table 1: Kegeyli Canal Branches

№	Name of a Consumer	Existing chainage	Project chainage	Water flow rate (м3/sec)	Method of water intake		Pump brand	On the balance of the MPS
					Gravity flow (pcs)	Pumping unit (pcs)		
1	Forestry Enterprise	5+00	5+00	0.5		1		
2	Kutan-kul p.u.	10+00	10+68	0.5		1		
3	Autoversion p.u.	12+00	21+96	0.5		1		
4	Busaga	20+00	22+00	0.5		1	24 НДН	1
5	Urozgulobod p.u.	22+00	24+47	0,5/0,2/0,2		1		
6	Novquron p.u.	26+00	27+48	1		1		
7	Turdigul Dexqon p.u.	40+00	39+30	0.5		1		
8	Water outlet Qutan qul	56+00	56+44	0.2	1			
9	Water outlet Water intake	58+00	59+77	0.2	1			
10	Nurali p.u.	59+10		0.5		1		
11	Ernazar p.u.	67+00	68+32	1		1		
12	Shakmokli Bogli	68+00		1		1	ПГ-50	1
13	Jana-Kadem p.u.	78+00	77+62	0.5		1		
14	Farm	84+00	84+09	0.5		1	ПГ-50	1
15	Qutan-kul boyan temir p.u.	84+10	85+85	2		1		
16	Juzimbag (Bereket) p.u.	85+00	86+50	0.5		1		
17	Qutli makon p.u.	100+00	98+47	0.5		1		
18	Kanat-Botir p.u.	101+00	99+47	0.5		1		
19	Qutan kul boyan temir p.u.	103+00	103+03	0,5/0,3		1		
20	Kanat-Botir p.u.	117+00	120+70	0.5		1		
21	Mevazor	130+00	131+02	0.5		1	ПГ-50	1
22	Estekjal p.u.	132+00	132+96	0.5		1	20 НДН	1
23	Boyan temir p.u.	133+00	133+72	0.5		1		

24	S.Muratbayev p.u.	134+00	135+04	0.5		1		
25	Mevazor	143+00	143+00	0.5		1	ПГ-50	1
26	Askar	145+00	145+52	0.5		1	ПГ-50	1
27	Water outlet Naupir Arna	158+00	159+18	0,3/0,3	1			
28	Naupir Arna p.u.	158+00		0.5		1		
29	Shakmokli bogli p.u.	160+00	161+32	0.5		1	ПГ-50	1
30	Garga-Tubek p.u.	168+00	166+11	0.5		1		
31	Nasil Chorva p.u.	175+00	176+18	0.5		1		
32	Karasiyrak p.u.	177+00	179+58	0.5		1	20 НДН	1
33	Lonkomiya p.u.	190+00	189+93	0.5		1		
34	Wodazabor p.u.	193+00	195+58	0.3		1	ПГ-50	1
35	Muiyazar p.u.	194+50	196+30	0.5		1		
36	Shunok	206+00	209+00	0.2		1	ПГ-50	1
37	Water outlet Shunak jap	206+15	209+47	0.5	1			
38	Shunak jap p.u.	206+50		0.5		1		
39	Shunak ja p.u.	206+60		0.5		1		
40	Water outlet Aralbay	208+00	211+68	0.6	1			
41	Muiyazar №2	212+00	213+22	0.4	1			
42	Water outlet Boz kul	215+00	215+00	0.3	1			
43	Ihlos - Nukus p.u.	215+10	219+71	0.5		1		
44	Shunoq	220+00	224+44	3.0	1		ПГ-50	1
45	Hujakazyayakly №2 p.u.	220+00	224+51	0.5		1		
46	Karasyirak №2 p.u.	234+00	233+25	1.2		1		
47	Water outlet Torgay	240+00	242+11	0.2	1			
48	Water outlet Kazyayakli	248+00	249+70	0.3	1			
49	Water outlet Hujakazaayakli	250+00	254+03	0.3	1			
50	Hujakazaayakli №1			0.5		1	ПГ-50	1
51	Water outlet Kiryk-jap	252+00	254+51	0.4	1			
52	Water outlet Ayakshy	257+00	261+05	0.4	1			
53	Water outlet Boyantomir	261+00	265+07	0.4	1			
54	Water outlet Dehqonboy	270+00	274+58	0.5	1			

55	Water outlet Tarakly	271+00	276+08	3	1			
56	Tarakly	271+10		1		1	20 НДН	1
57	Tarakly №2 p.u.	271+15		0.5		1		
58	Water outlet Arsary	272+00	279+90	0.2	1			
59	Water outlet Aranshy	276+00	282+20	0.2	1			
60	Water outlet Jarik-kul	290+00	299+43	0.3	1			
61	Water outlet Карис – жап	294+00	302+34	0.5	1			
62	Water outlet Dehkanabad	300+00	302+98	2.0	1			
63	Water outlet Dehkanabad			0.3	1			
64	Setimbet Konshi нс	302+00	303+74	0.4		1		
65	Setniyaz usta p.u.	303+00	304+36	0.5		1		
66	Water outlet Setimbet Konshi	304+00	305+04	0.3	1			
67	Water outlet Utemurod	306+00	309+28	8	1			
68	Water outlet Amangul	312+00	315+71	1	1			
69	Water outlet shoharyk	314+00	316+64	3	1			
70	Water outlet Kuyik	325+00	324+87	0.5	1			
71	Water outlet Huja jap	330+00	333+97	0.2	1			
72	Water outlet Kizil uzek	330+50	334+72	0.2	1			
73	Water outlet Kalashyk	338+00	334+91	0.3	1			
74	Shokarik	340+00	343+54			1	ПГ-50	1
75	Water outlet Gone Shoharyk	340+00		0.5	1			
76	Water outlet Ismail	345+00	351+07	0.5	1			
77	Water outlet Tonmoyin	357+00	359+41	0.3	1			
78	Water outlet Bessary	358+00	360+03	1	1			
79	Bessary p.u.	358+50	364+26	0.5		1		
80	Water outlet Dilembet	358+60	364+63	0.3	1	1		
	Total				**35**	**45**		**15**

(B) List of Utilities Crossing on Kegeyli Canal

The KEGEYLI Canal has many crossings: with transmission lines, communication lines, cables, water lines, gas pipelines and bridges, including a railroad bridge.

(a) **Power Transmission Lines** - The Table summerises the number of crossings of the canal with power transmission lines

Table 2: Power Transmission Lines Crossing

№	Name	CH	Note
1	PTL	1+57	PTL l/w 4 пр h=5.0 м. 0.04 kw
2	PTL	1+82	PTL h/w 10 kw 3 wires h=11.0 m
3	PTL	2+14	PTL h/w 35 kw 3 wires h=17.0 m.
4	PTL	11+53	PTL h/w 10 kw 3 wires h=11.0 m.
5	PTL	22+31	PTL h/w 10 kw 3 wires h=11.0 m
6	PTL	59+84	PTL h/w 10 kw 3 wires h=11.0 m.
7	PTL	103+16	PTL h/w 10 kw 3 wires h=11.0 m.
8	PTL	122+60	PTL h/w 10 kw 3 wires h=11.0 m.
9	PTL	133+84	PTL h/w 10 kw 3 wires h=11.0 m.
10	PTL	162+46	PTL h/w 10 kw 3 wires h=10.0 m.
11	PTL	174+49	PTL h/w 35 kw 3 wires h=19.50 m.
12	PTL	179+73	PTL h/w 10 kw 3 wires h=10.0 m.
13	PTL	203+08	PTL h/w 10 kw 3 wires h=10.0 m.
14	PTL	224+21	PTL h/w 10 kw 3 wires h=10.0 m.
15	PTL	233+07	PTL h/w 10 kw 3 wires h=11.0 m.
16	PTL	254+20	PTL h/w 10 kw 3 wires h=11.0 m
17	PTL	304+48	PTL h/w 10 к kw in 3 wires h=10.0 m

(b) Communication Lines.

Table 3: channel intersects with the Communication Lines

№	Name	CH	Note
1	Communication Line	203+08	Connection h=10.0 м.

(c) Water pipelines

Table 4: canal crossings with water pipelines

№	Name	CH	Note
1	Water pipeline	203+74	D=500

(d) Gas Pipelines.

Table 5: Gas Pipeline Crossing

№	Name	CH	Note
1	Gas Pipeline	0+20	
2	Gas Pipeline	204+07	D=300
3	Gas Pipeline	204+07	D=120
4	Gas Pipeline	205+48	D=300

(e) Bridge.

At CH 203+74 the KEGEYLI canal crosses the bridge of the Kegeyli - Chimbay highway. Since the berm marks of the KEGEYLI canal pass under the bottom of the bridge, according to the technical conditions received on 28.07.2023 from the Main Department of Roads of the Republic of Karakalpakstan, all works are carried out manually in the presence of representatives of this department.

(C) List of Utilities in Kegeyli Lower Canal

Kegeyli Lower Canal has crossings with power lines, communication lines, cables, water lines and gas pipelines has crossings with power lines, communication lines, cables, water lines and gas pipelines

Table 6: List of crossings with bridges on the Kegeley-Nizhniy wer Canal

№	Name	ПК	B, м
1	Reinforced concrete bridge	393+87	10.35
2	Reinforced concrete bridge	487+50	19.5
3	Reinforced concrete bridge	490+27	14.6

Table 7: List of crossings with Pesh bridges on the Kegeley-Nizhniy Canal

№	Name	ПК	B, м
1	Reinforced concrete bridge	494+42	4.7
2	Reinforced concrete bridge	502+70	2.9
3	Reinforced concrete bridge	502+79	2

Table 8: Intersections with Water supply line, Gas supply line, Gas supply line on the Kegeyli-Nizhniy Canal

№	Name	ПК	Note
1	Water supply line	471+79	d= 500 мм
2	Water supply line	472+09	d= 500 мм
Intersections with gas pipelines on the Kegeyli-Nizhniy Canal			
№	Name	ПК	Note
1	Gas supply line	447+08	d=200 мм
Crossings with power lines on the Kegeyli-Lower Canal			

№	Name	ПК	Note
1	Electric power supply line	395+05	PSL H/V 3 пр h=8.0 м.
2	Electric power supply line	469+70	PSL H/V 3 пр h=8.0 м.
3	ВВЛ reinforced concrete n=6пр	470+30	PSL H/V 6 пр
4	Electric power supply line	481+84	PSL H/V 4 пр h=7.5 м.
5	Electric power supply line	526+68	PSL H/V 3 пр h=8.0 м.
Intersections with conduit on the Kegeley-Nizhniy Canal			
№	Name	ПК	Note
1	Cable pipe	447+08	d=100 mm

Annexure 3

List of Flora and Fauna

Table 1: Flora of Karakalpakstan

№	Scientific name	English	Russian	Uzbek	Life forms		Main species [86] Kegeyli 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, ҳархил 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	Ўрмаловчишўражриқ	Terrestrial	Perennial	++	
11	*Aeluropus littoralis*	Coastal saline	Прибрежница солончаковая	Туксиз шўражриқ	Terrestrial	perennial	++	

[86] *Note*:
+++ many common plant species
++ rare species
+ very rare
These plant species are not listed in the Red Book

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	Ўрмаловчибуғдойиқ.	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	Ипбарглияғлиққора	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 (қилқуйрик) 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 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*

№	Latin	English	Uzbek / Russian?	Status	Comments
					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 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	

№	Latin	English	Uzbek / Russian?	Status	Comments
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	
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.*

№	Latin	English	Uzbek / Russian	Status	Comments
3.	*Phrynocephalus rossikowi*	Uzbekistan Toad-head Agama	Хентоғ тўғаракбоши/ 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	
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	Гажақдум тўғаракбош 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 тўғаракбоши Сетчатая круглоголовка	LC	
14.	*Trapelus sanguinolentus*	Steppe Agama	Дашт агамаси Агама степная	LC	

№	Latin	English	Uzbek / Russian	Status	Comments
15.	*Eremias grammica*	Reticulate Racerunner	Тўр калтакесакча Сетчатая ящурка	LC	
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	

Source: *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 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 was nesting 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 recorded in 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 Sea region. Extraction is prohibited. Protected in reserves (the Lake Sudochie, Arnasay, Karakyr, Dengizkul lakes) while nesting, migration, wintering. Included in the IUCN Red List [LC] and Appendix II

[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
						CMS
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 – several

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
						hundreds. Limiting factors: destruction of habitats as a result of the 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 /Обыкновеннаяпустельга	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	
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	

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
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	
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	

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
51.	*Hirundo rustica*	Barn Swallow	Қишлоқ қалдирғочи / Деревенская ласточка	Migrant	LC	
Alaudidae		**Larks**	**Сўфитўрғайлар/Жавронковые**			
52.	*Calandrella rufescens*	Gray Lark	Кулранг тўрғай/ Серыйжаворонок	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	
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 / Бухарскаясиница	Resident	LC	
69.	*Passer domesticus*	House Sparrow	Уй чумчуғи / Домовой воробей	Resident	LC	

№	Latin	English	Uzbek / Russian	Resident or Migrant	Status	Comments
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 / Садоваяовсянка	Resident	LC	

Source: Input from Biodiversity Study undertaken by International and National Biodiversity expert

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	
16	*Canis aureus*	Golden Jackal	Чиябўри/ Шакал	LC	

№	Latin	English	Uzbek / Russian	Status	Comments
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	

Source: Input from Biodiversity Study undertaken by International and National Biodiversity expert

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Annexure: 4

Environmental Standards[88]

Uzbekistan has a large set of specific standards that refer to emissions, effluent discharge, and noise standards, as well as standard to handle and dispose specific wastes ranging from sewage to hazardous wastes. The following summarizes these laws and standards along with other international best practice standards.

(a) Air Quality and Emissions

National Standards – Air quality in Uzbekistan is measured against Maximum Permissible Concentrations (MPC) and Maximum Permissible Emissions (MPE).

Ambient Air Quality Standards, or MPCs, are established by SanPiN 0293-11 (May 16, 2011). According to the United Nations Environment Program (UNEP), Uzbek national ambient air quality standards meet World Health Organization (WHO) standards. The MPCs relevant to the Project are shown in **Table 1.**

Table 1: National Air Quality MPCs

Parameter	Uzbekistan MPC (mg/m^3)			
	30 min	24 Hour	Monthly	Annually
Nitrogen Dioxide (N2)	0.085	0.06	0.05	0.05
Nitrogen Oxide (NO)	0.6	0.25	0.12	0.06
Sulphur Dioxide (SO2)	0.5	0.2	0.1	0.05
Dust	0.15	0.1	0.08	0.05
Carbon Monoxide (CO)	5.0	4.0	3.5	3.0

EHS Guidelines– According to EHS Guidelines, WHO Air Quality Guidelines (Table 2) applies in the absence of national legislated standards.

Table 2: Ambient Air Quality EHS Guidelines

Parameter	Averaging Period	EHS Guidelines Value (mg/m^3)
Sulphur Dioxide (SO2)	10 minutes	20
	24 Hour	500
Nitrogen Dioxide (NO2)	1 Hour	40
	1 Year	200
Particulate Matter PM10	24 Hour	20
	1 Year	50
Particulate Matter PM2.5	24 Hour	10
	1 Year	25

Project Air Quality Standards. Any air quality monitoring during the rehabilitation phase will be undertaken against national standards. As noted above, Uzbekistan has their own national legislated standards and as such they will be applied to the Project.

(b) Water quality

Ambient river water quality standard is given as Maximum permissible concertation (MPCs) in Uzbekistan established by "SanPiN №0172-06 The main criteria for the hygienic assessment of the degree of pollution of water bodies on the danger to public health in

[88] 2021, Environmental Assessment and Review Framework, Uzbekistan: Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project

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the conditions of Uzbekistan". MPC has two categories. The first is for centralized or non-centralized drinking water supply, and the second for cultural and everyday purposes of the population, recreation, and sports. Table 3 shows MPCs by SanPiN №0172-06.

Table 3: Maximum permissible concentration of pollutants in surface water (mg/m^3)

Indicators	Purpose of water use			
	Domestic use	Cultural and service	Fishery needs	
			Highest and first category	Second category
Suspended solids	Compared with the natural conditions the content of suspended solids at wastewater discharge shall not be increased by more than			
	0.25 mg/dm^3	0.75 mg/dm^3	0.25 mg/dm^3	0.75 mg/dm^3
	For reservoirs and watercourses containing at low water above 30 mg/dm^3 suspended solids, there may be an increase to 5%. Suspensions with fallout rate of more than 0.4 mm/s for watercourses and more than 0.2 mm/s for discharge reservoirs are prohibited			
Floating matter	There shall not be a film of oil products and concentrations of other contaminants on the water surface			
Color	Shall not be detected in the column of height		There shall be no foreign colour	
	20 sm	10 sm		
Smell and test	Intensity of more than 1 point is not permitted		Water must not give extraneous odours and flavours to fish meat	
Temperature	Temperature of water at the discharge point must not exceed 3ºC in comparing with average monthly temperature of the hottest month		Temperature of water at the discharge point must not exceed 5ºC in comparing average monthly temperature of the hottest month. Increasing of temperature more than 28 ºC in summer and till 8ºC in winter is not allowed	
Hydrogen exponent (pH)	Shall not beyond 6.5...8.5 pH		Shall not beyond 6.5...8.5 pH	
Mineralization	Shall not exceed by dry residue 1000 mg/dm^3, including chlorides - 350mg/dm^3 and sulphates - 500 mg/dm^3		Rated according to water bodies intoxications	
Dissolved oxygen	No less than 4 mg/dm^3 in any period of the year in a sample taken by 12 a.m. on the same day		In winter shall be no less than	
			6 mg/dm^3	
			No less than 6 mg/dm^3 in any period of the year in a sample taken by 12 a.m. on the same day	
BOD	At 20ºC must not exceed		At 20 º C shall not exceed 3.0 mg/dm^3 if in winter the dissolved oxygen content in the water of the first* category fishing water bodies fell to 6.0 mg/dm^3, and in the second** – to 4 mg/dm^3, then discharge in them is only permitted to wastewater that does not change the BOD	
	3.0 mg/dm^3	6.0 mg/dm^3		
COD	Shall not exceed			
	15.0 mg/dm^3	30.0 mg/dm^3	-	-
Causative agent (of a disease)	Not allowed			
Chemicals (pollutants)**	Shall not be contained in concentrations exceeding the MAC			
Source: 2021, Environmental Assessment and Review Framework, Uzbekistan: Climate Adaptive Water Resources Management in the Aral Sea Basin Sector Project				

(c) Noise

National Standards - SanPiN No. 0267-09 is used to ensure the rules of acceptable noise levels for residential areas in Uzbekistan. These rules and regulations establish permissible noise parameters in residential, public buildings and residential buildings of populated areas created by external **and** internal sources, as well as general requirements for measurements, measurement methods and hygienic noise assessment at research sites.

Evaluation of the sound level at the calculation point is performed for the day and night period

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of the day (from 7 to 23 hours and from 23 to 7 hours) and takes into account the maximum intensity of the sound source level during the half-hour period. Table 4 presents the permissible noise levels in the territories that are most significant for the project. The levels are almost identical to EHS Guidelines shown below, with the exception of the periods where EHS Guidelines are slightly more stringent. As such EHS Guidelines limits will be used for the Project.

Table 4: Noise limits from SanPiN No. 0267-09

Purpose of premises or territories	Time	SanPiN No. 0267-09
Territories adjacent to homes, clinics, dispensaries, rest homes, boarding houses, nursing homes, childcare facilities, schools and other educational institutions, libraries.	From 7 am to 11 pm	55 dB(D)
	From 11 pm to 7 am	45 dB(A)

EHS Guidelines – To meet EHS Guidelines requirements noise impacts should not exceed the levels presented in Table 7 or result in a maximum increase in background levels of 3 dB at the nearest receptor location off site.

Table 7: Noise Level EHS Guidelines

Receptor	One-hour L_{aeq} (dBA)	
	Daytime 07.00-22.00	Night-time 22.00 – 07.00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Workplace Noise - In order to protect the health of staff in the workplace Uzbekistan, utilizes the law (SanPiN) No. 0120-01 - "Sanitary norms and rules to ensure acceptable noise levels in the workplace"**.**

Table 8: Working environment Noise Limits

Type of work, workplace	SanPiN No. 0120-01	EHS Guidelines
Performance of all types of work at permanent workplaces in industrial premises and at enterprises operated since 12 March 1985	80 dB (A)	
Heavy industry		85 Equivalent Level Laeq, 8h
Light industry		50-65 Equivalent Level Laeq, 8h

* Laeq- equivalent average sound pressure level

Project Noise Standards**.** For construction phase monitoring, EHS Guidelines limits will be followed as the nighttime period is slightly longer than Uzbek standards. For workplace noise, national guidelines will be followed.

(d) Vibration

International Standards – The German Standard DIN 4150-3 – Vibration in Buildings – Part 3: Effects on structures provides short term and long-term limits for vibration at the foundation for various structures. This standard is considered international best practice and will be followed as part of the Project.

Table 5: Guideline Values for Vibration Velocity to be Used When Evaluating the Effects of Short- term and Long-term Vibration on Structures

		Guideline Values for Velocity (mm/s)	
		Short-term	Long-term

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Group	Type of structure	At foundation			Uppermost Floor	Uppermost Floor
		Less than 10 Hz	10 Hz to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	10
2	Residential dwellings and buildings of similar design and/or use	5 (105 dB)	5 to 15	15 to 20	15	5 (105 dB)
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g., buildings that are under a preservation order)	3 (100.5 dB)	2 to 8	8 to 10	8	2.5 (99.0 dB)

Source: DIN 4150-3, Structural Vibration, Part 3: Effect of vibration on structures

DIN 4150-3 notes that "experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible. Exceeding the value in the table does not necessarily lead to damage".

Project Vibration Standards. German Standard DIN 4150-3 will be followed during the rehabilitation phase.

(e) Waste

National Standards - The Law on Waste No.362-II of April 5, 2002 (modified January 4, 2011) regulates solid waste treatment procedures and defines the authority of various institutions involved in solid waste management. The law also provides rules for the transport of solid waste. Hazardous wastes that are transported must undergo environmental certification and be transported by special vehicles.

The rules for management of medical waste and other waste generated in laboratories and medical institutions are set out in SanPiN No. 0317-15. Sanitary rules and norms for the collection, storage and disposal of waste in medical institutions of the Republic of Uzbekistan.

(f) Hazardous material

National Standards - 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.

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

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Annexure: 5

Climate Risk Vunerability Report (CRVA)

Key findings for Kegeyli are

- Major change indicators of importance for the project are related to water resources availability in the Amu Darya feeding the irrigation scheme. Key climate indicators are change in yearly precipitation, seasonal precipitation and heavy precipitation.
- Key climate indicators pressing on the water resouces are heat, precipitation, extreme precipitation and drought duration. This counts also for the agricultural sector. Major impact of climate change in the project area is the result of restricted water resources availability as result tipping points in glacier melt, shift in sesonsl water flow to spring, increased spring/early summer peak flow in the Amu Darya.
- Besides water availability it is influencing evaporation and water request. Extreme precipitation is reducing the effective availability of water as reservoirs need higher buffer capacities and increase of runoff. Increased peak flows and flood risk are expected. Increasing water turbidity is a related issue.
- Acheieving these reductions in water extraction requires more than just minimizing losses in the canal system. It necessitates adopting adapted cropping calders and pattern, enhancingon-farm water water efficiency, and implementing irrigation methods like drip irrigation and separating water from saline ground water
- The inflow data into the Tuyamuyun Hydro complex, a critical determinant of water availability for Khorezm and Karakalpakistan reveals a significant reduction ove the period from 2012 to 2022

The project is in the Feasibility study stage, which do not differ from the project cycle that IEE report was prepared. The recommendations of the CRVA finding shall be prepared and integrated in the project EMP and IEE when the detail design will start.