CENTRAL ASIA

Environmental & Social Impact Assessment

Assessment of STREAM Programme Water Infrastructure in Small Watersheds of Kyrgyzstan, Tajikistan, and Uzbekistan

APRIL - MAY 2025

PATRIP FOUNDATION

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Cover Photo: Magistral Canals, Kulundu Ayil Aimak, Leylek District, Kyrgyzstan (IMPACT Initiatives, April 2025)

About IMPACT

IMPACT Initiatives is a Geneva based think-and-do-tank, created in 2010. IMPACT is a member of the Acted Group.

IMPACT's teams implement assessment, monitoring & evaluation and organisational capacity-building programmes in direct partnership with aid actors or through its inter-agency initiatives, REACH and Agora. Headquartered in Geneva, IMPACT has an established field presence in over 30 countries. IMPACT's team is composed of over 300 staff, including 60 full-time international experts, as well as a roster of consultants, who are currently implementing over 50 programmes across Africa, Middle East and North Africa, Central and South-East Asia, and Eastern Europe

About Acted

Acted is a non-governmental organisation with headquarters in Paris, founded in 1993.
Acted's vocation is to support vulnerable populations affected by wars, natural disasters and/or economic and social crises, and to accompany them in building a better future; thus contributing to the Sustainable Development Goals. The programmes implemented by Acted (around 300 per year), in Africa, Asia, the Middle East, Latin America and the Caribbean, aim at addressing the needs of populations affected by wars, natural disasters and/or economic and social crises. Acted's interventions seek to cover the multiple aspects of humanitarian and development crises through a multidisciplinary approach which is both global and local, and adapted to each context.

About STREAM

STREAM aims to foster evidence-based and effective Natural Resources Management (NRM) in the Fergana Valley. The initiative empowers local and national actors and promotes dialogue to ensure sustainable development in the context of climate change.
STREAM supports communities through 3 pillars: 1. Evidence-based planning; 2. Climate smart NRM practices; 3. Infrastructure and dialogue.

SUMMARY

The Syr Darya River Basin, spanning Kyrgyzstan, Tajikistan, and Uzbekistan, is a crucial water source for many communities in the Fergana Valley. Despite its importance, the basin lacks centralised management, leading to frequent water distribution issues, particularly for downstream countries.[1] Water originating in upstream countries often fails to reach downstream areas in sufficient quantities, exacerbating tension among communities along the border. The river is vital for agriculture, providing irrigation for crops, water for livestock, and supporting hydropower generation. Consequently, effective management and equitable distribution of the Syr Darya's resources are essential for the region's stability and prosperity.[2]

To address climate change challenges affecting natural resource management in the watersheds of the Fergana Valley, Acted, IMPACT, and International Alert, with support from European Commission and the PATRIP Foundation, launched the STREAM programme in 2022.[3] The findings from the STREAM programme's inception phase highlighted the interconnectedness of climate change, industrial activities, and natural resource management.[4] A recent comprehensive assessment of the Isfana Watershed, funded by EuropeAid and implemented with partner Central Asian Alliance for Water (CAAWE), revealed systemic water loss in the irrigation network due to outdated and deteriorating infrastructure and lack of data on waterflow.[5]

To tackle these challenges with systemic water loss, Acted plans to utilise PATRIP funds for the "hard component" of the programme, focusing on infrastructure rehabilitation and the installation of water measuring devices to improve water monitoring and reduce water loss. A technical feasibility study, conducted by the organisations WAPCOS and KIBERA, was further commissioned by Acted to identify the most suitable locations for water meters and canal rehabilitation, aiming to enhance water efficiency, and was completed in March 2025.[6]

In order to ensure that the selected interventions meet the, "do no harm" requirements of both PATRIP's Environmental and Social Policy requirements, and conform to Acted's own intervention requirements, the following Environmental and Social Impact Assessment (ESIA) was conducted in order to minimise or prevent negative environmental and social risks and impacts of the programme activities, including irrigation infrastructure rehabilitation and water meter installation, that may occur in the communities of intervention. By enhancing environmental and social benefits at the operational level, this assessment facilitates the identification and mitigation of risks and negative impacts, enabling continuous monitoring and improvement of the programme's environmental and social performance.

To do this, IMPACT adopted a workshop-based approach outlined in the Swiss Agency for Development and Cooperation's (SDC) Climate, Environment and Disaster Risk Reduction Integration Guidance

[1] University of Central Asia and Zoï Environment Network, "Central Asia Mountains", 2012.

[2] International Alert, The impact of climate change on the dynamics of conflicts in the transboundary river basins of Kyrgyzstan, Kazakhstan and Tajikistan, July 2021 – January 2022.

3 Concept note. Sustainable Transboundary Resource Allocation Mechanism for Peace (STREAM for Peace). ACTED.

[4] STREAM, Area Based Assessment of Ak-Suu and Isfayramsay Watersheds Report, Kyrgyzstan, December 2023; STREAM, Area Based Assessment of Kozu-Baglan Watershed Report, Kyrgyzstan, December 2023; STREAM, Area Based Assessment of Khojabakirghan Watershed Report, Tajikistan, December 2023.

[5] STREAM, Area Based Assessment of Isfana Watershed Report, Kyrgyzstan, April 2024

[6] WAPCOS & KIBERA, Final Feasibility Report: Consultancy on conducting a technical feasibility study for the rehabilitation of irrigation canals and installation of water meters in the Fergana Valley, March 2025.

(CEDRIG) toolkit. [7] This is a participatory methodology that aims to mainstream climate change, environmental sustainability, and disaster risk reduction considerations into development interventions, while also taking an inclusive approach that considers feedback from the community and ensuring Accountability to Affected Populations (AAP).

In each location, approximately 18-22 local stakeholders from local government, community leadership, and civil society, were invited for a 1-day workshop. This workshop utilised a series of guided modules, in which participants were asked to provide information in a structured format that could then be systematically analysed by the IMPACT team afterwards. The workshop was divided into 3 parts; 1) the participants were first introduced to the planned infrastructure, its locations, timeframes and outputs; 2) participants then assessed the likely hazards that may affect the successful implementation of the infrastructure, and 3) participants assesses the potential negative impacts that the infrastructure may have on the community. For both the hazards and negative impacts, participants then ranked both their likelihood and severity to determine their overall risk. Of the top selected risks, participants then provided potential locally-based mitigation measures that could be included in the planned construction which could reduce the likelihood or impact of these hazards and negative impacts, thereby ensuring more sustainable and community-lead project outcomes.

IMPACT conducted the workshops in 4 locations, covering 5 separate infrastructure sites, between 24 April and 14 June. Specific details are provided in Table 1 below:

Table 1: ESIA Locations, dates and participants, 24 April - 14 May 2025

Country	Workshop Location	Date	Participants
Kyrgyzstan	Kulundu, Leylek District, Batken Oblast	29/04/2025	22
	Uch Korgon, Kadamjay, Batken Oblast	24/04/2025	18
Tajikistan	Khujand City, Sughd Oblast	06/05/2025	21
Uzbekistan	Fergana City, Fergana Oblast	14/05/2025	24

The final selected mitigation measures were ranked by participants and then analysed by the IMPACT and Acted staff as a combined STREAM team. The STREAM team used these outcomes to develop final stakeholder lists and mitigation measures, which are included in tables at the end of this report. These results are to be included in the planned Environmental and Social Management Plans (ESMP)[8] that will guide implementation and ensure that the key findings and recommendations are mainstreamed into project construction by Acted contractor organisations.

[7] SDC, CEDRIG Operational Toolkit, 2024
[8] PATRIP Foundation, Environmental and Social Policy, December 2023.

CONTENTS

1.01: List of Acronyms

AA	Ayil Aimak
AAP	Accountability to Affected Populations
ALRI	Agency for Land Reclamation and Irrigation
CEDRIG	Climate, Environment and Disaster Risk Reduction Integration Guidance
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communication
KBA	Key Biodiversity Area
KGZ	Kyrgyzstan
LA	Local Authority
LSG	Local Self Government
MOES	Ministry of Emergency Situations
MSG	Mahalla
NRM	Natural Resource Management
PLC	Programmable Logic Controller
RUVH	District Water Authority
SCADA	Supervisory Control And Data Acquisition
TJK	Tajikistan
UZB	Uzbekistan
WUA	Water User Association

1.02: Geographic Classifications

Oblast / Region	Highest form of governance below the national level; leadership is appointed by national government.
Raion / District	Next administrative level down from an Oblast; leadership is appointed by national government.
Local Self Government	Next level down from district; leadership is selected by communities. Referred to as, "Ayil Aimak" in Kyrgyzstan, "Jamaat" in Tajikistan, and "Mahalla" in Uzbekistan.
Village	Lowest level of community governance.

1.03: Figures, Tables and Maps

Tables

Maps

Annexes

1.04: Project Exact Locations

There are 7 Project locations in three countries, which are defined in Table 2 below:

Table 2: Infrastructure project locations, April 2025

Country	District	Location	Latitude	Longitude	Irrigated land	Beneficiaries
KGZ	Leylek	Magistral canal Kulundu with hydrotechnical constructions	40.105245	69.651432	1,481.50	22,167
KGZ	Leylek	Mashine canal Kulundu with hydrotechnical constructions	40.062041	70.810824	600.00	22,167
KGZ	Leylek	Otvodyashiy canal X-4	40.054762	69.404947	50.00	1,847
KGZ	Kadamjay	Magistral canal Anchor	40.259817	72.0988	2,194.00	31,000
TJK	B. Ghafurov	Zero point (Main hydropost)	40.098339	69.69085	9,121.00	276,405
UZB	Fergana	Canal Trubny MSG Beruniy	40.192637	71.734467	331.07	5,845
UZB	Toshloq	Canal Zarkent MSG Jarkishloq	40.493388	71.832881	513.84	3,360

1.05: Implementation Partner

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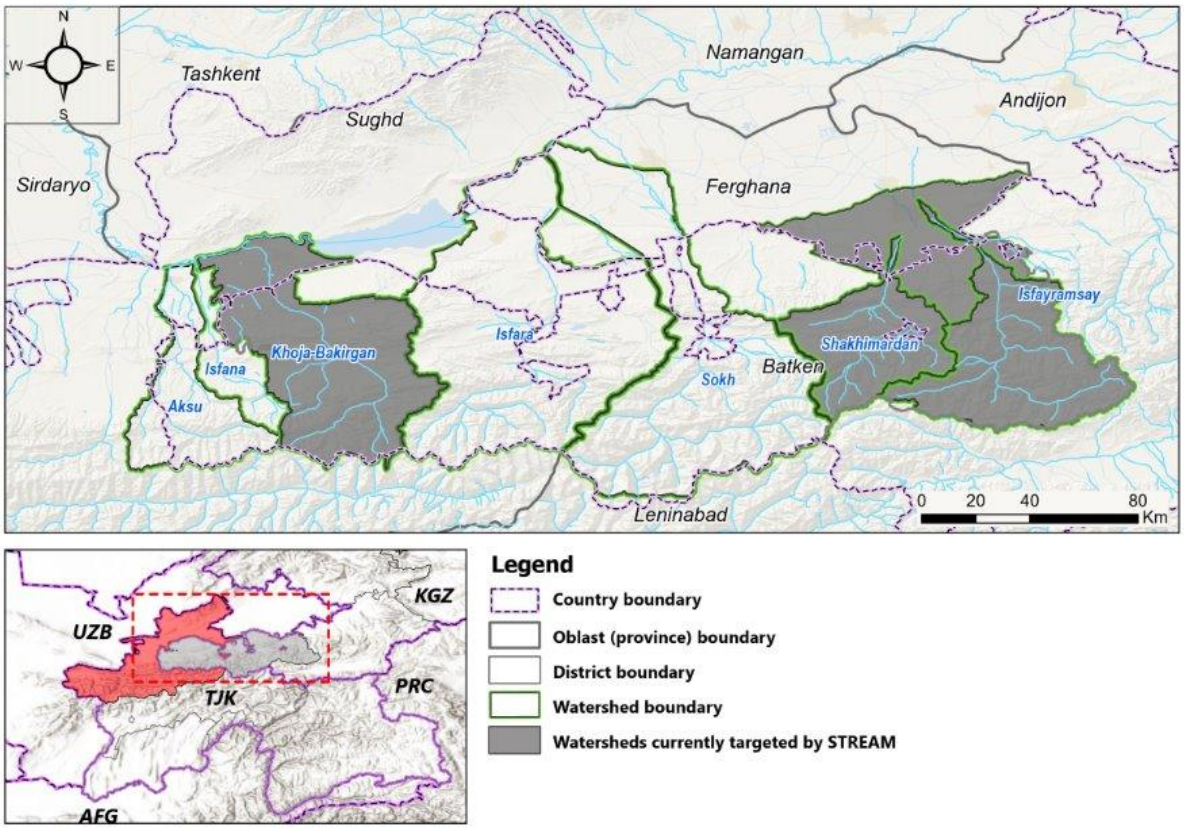
INTRODUCTION & BACKGROUND

The STREAM programme employs a data-driven approach. During its first phase, it identified watersheds experiencing significant pressure related to water availability, socio-economic constraints, and climate-related challenges impacting local communities. These targeted watersheds are Kozu-Baglan/Khojabakirghan (Kyrgyzstan-Tajikistan) and Ak-Suu/Shakhimardan and Isfayramsay (Kyrgyzstan-Uzbekistan), shown in Map 1 below:

2.01: Project Locations

Map 1: Selected watersheds for STREAM infrastructure project interventions, November 2023



The site selection is grounded in a Technical Feasibility Studies Report conducted by WAPCOS Ltd., India, from September 2024 through March 2025.[9] Between October and December 2024, WAPCOS Ltd. undertook field visits to gather essential data while concurrently consulting local stakeholders to enhance the accuracy and relevance of findings. These stakeholders included local government representatives, water authorities at various administrative levels, Water User Associations (WUAs) and community-based organisations (CBOs) focused on natural resource management and climate-related challenges.

The initial phase of the Technical Feasibility Study prioritised stakeholder identification and engagement to ensure inclusive and comprehensive planning. Subsequently, WAPCOS Ltd. systematically collected available data and existing reports to build a robust foundation for the detailed assessment. On 31 March, the WAPCOS team submitted the draft final report to Acted, integrating insights from national and local stakeholders alongside country-specific information provided by the STREAM team. This report underscored significant water management challenges and infrastructure gaps across targeted watersheds in Kyrgyzstan, Tajikistan, and Uzbekistan. Common issues identified include water scarcity, deteriorating irrigation infrastructure, insufficient water metering practices, and ineffective water management systems.

[9] WAPCOS & KIBERA, Final Feasibility Report – Main Report, Consultancy on Conducting a technical feasibility study for the rehabilitation of irrigation canals and installation of water meters in the Fergana Valley, March 2025.

As part of the broader initiative to modernise irrigation infrastructure and enhance water management systems in the region, a comprehensive set of interventions is planned for the transboundary rives. Based on the data derived from the Technical Feasibility Study's Bill of Quantities, the proposed works will introduce advanced automation technologies and energy-efficient systems. These improvements are designed to optimise canal operations, improve water distribution accuracy, reduce manual labour, and enable real-time monitoring through digital control mechanisms. All planned activities use modern, durable materials and solar-powered systems to ensure long-term sustainability and reduced environmental impact. Acted, in coordination with the needs of local stakeholders and the PATRIP foundation, selected 7 locations across the three countries on 10 April 2025. A detailed breakdown of each project by location is shown below:

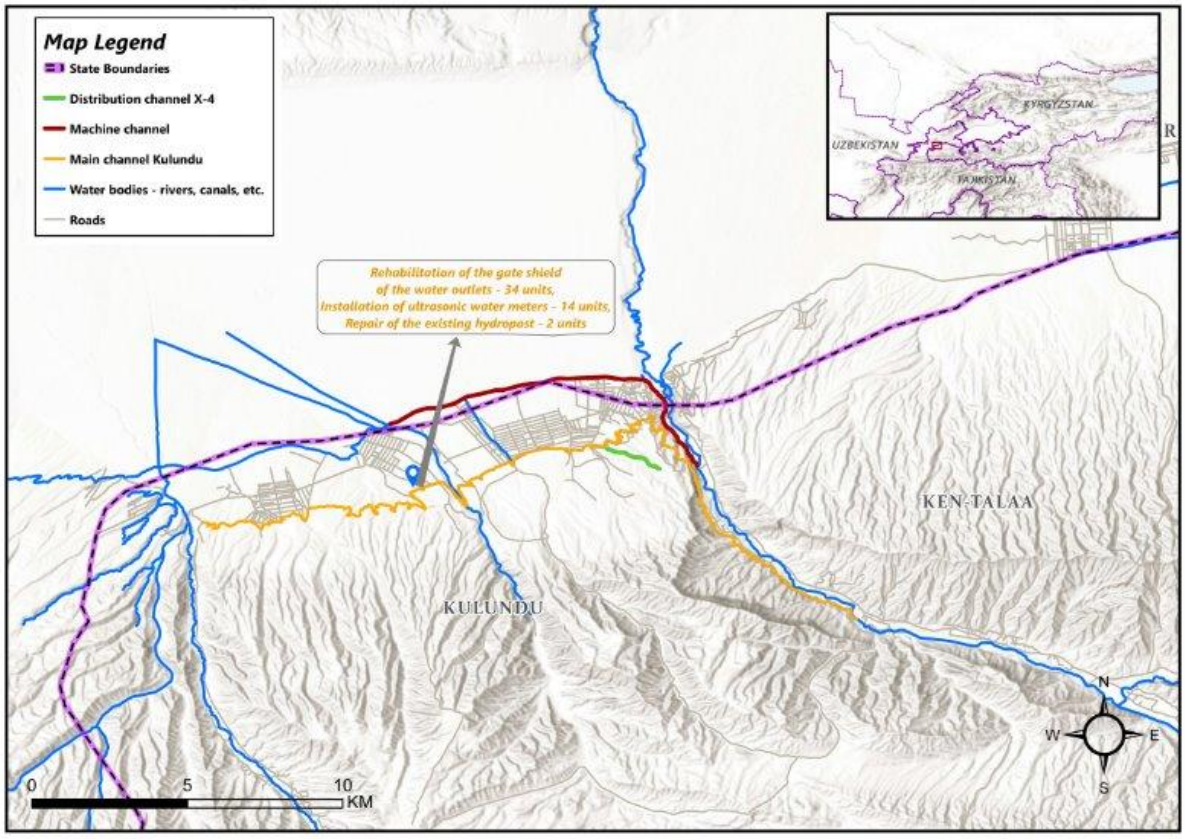
KYRGYZSTAN

In Kyrgyzstan, from an initial 87 evaluated sites, four were selected. Rehabilitation activities in Kyrgyzstan involve cleaning and de-silting canals, rehabilitating hydroposts, installing gates and ultrasonic water meters, and providing concrete lining and earthworks. Total costs for Kyrgyzstan are estimated at €284,720. In total there are an estimated 77,181 beneficiaries; 23.32 million cubic meters of annual water savings; 302 cubic meters per beneficiary; total area of 3,496 hectares; cost per hectare €81.45. The exact locations are shown below:

MAGISTRAL CANAL KULUNDU, LEYLEK DISTRICT

For the Magistral Canal, a similar approach will be taken. Concrete lining will use in-situ B20 grade cement with 20mm graded aggregates, placed and compacted using standard techniques including hand tamping and plate vibration. Gates and screw mechanisms will be fabricated and installed with all required components, also finished with zinc chromate primer and synthetic enamel paint. Solar-powered hydroposts equipped with radar sensors and Global System for Mobile Communication (GSM) / General Packet Radio Service (GPRS) modules will be installed to facilitate efficient and automated water level monitoring.

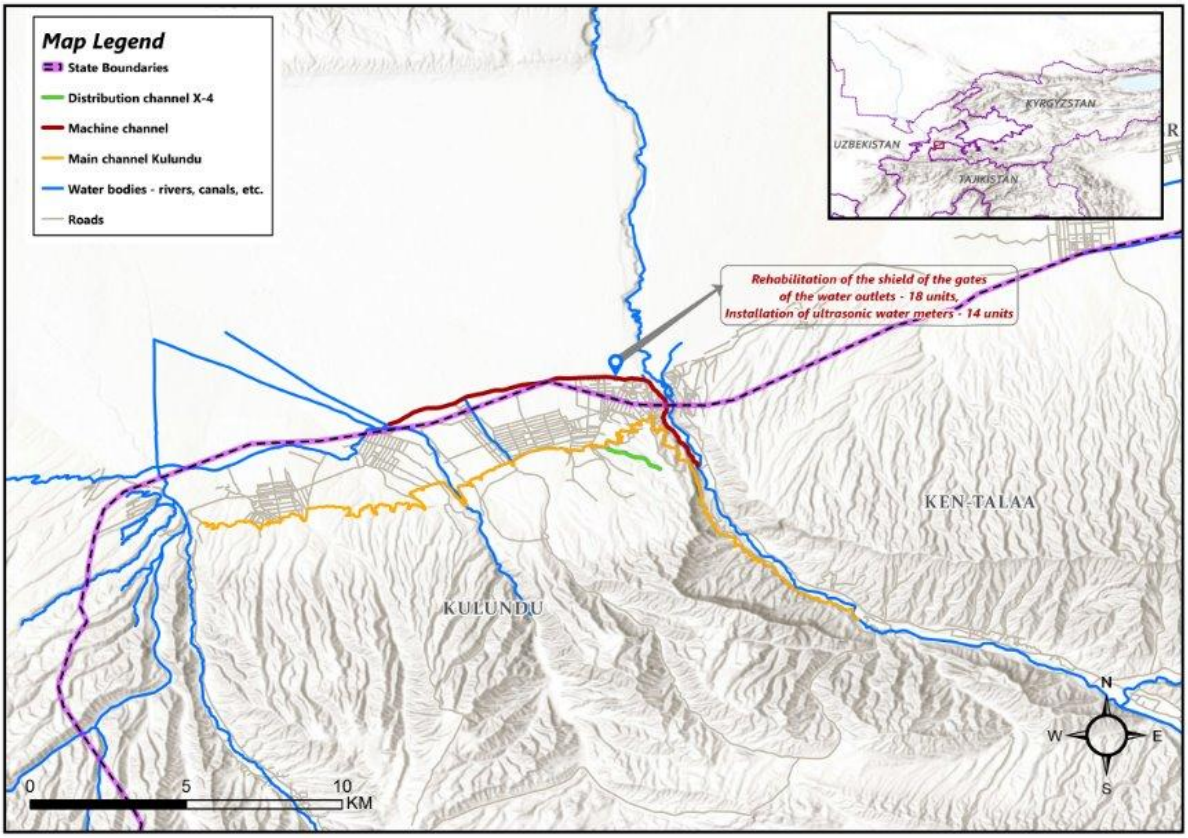
Map 2: Selected infrastructure locations for Magistral Canal, Leylek District, April 2025



Mashine Canal, Kulundu, Leylek District

The Mashine Canal will be equipped with newly designed and fabricated gates and screw components. These will include all necessary accessories and will be constructed using high-quality materials and techniques such as welding, greasing, and aligning. For protection and durability, each component will be coated with two layers of zinc chromate primer followed by two coats of synthetic enamel paint. A key environmentally considerate feature is the installation of solar-powered hydroposts with radar level sensors and GSM/GPRS systems, enabling remote water level monitoring without the need for electricity or fuel-based systems.

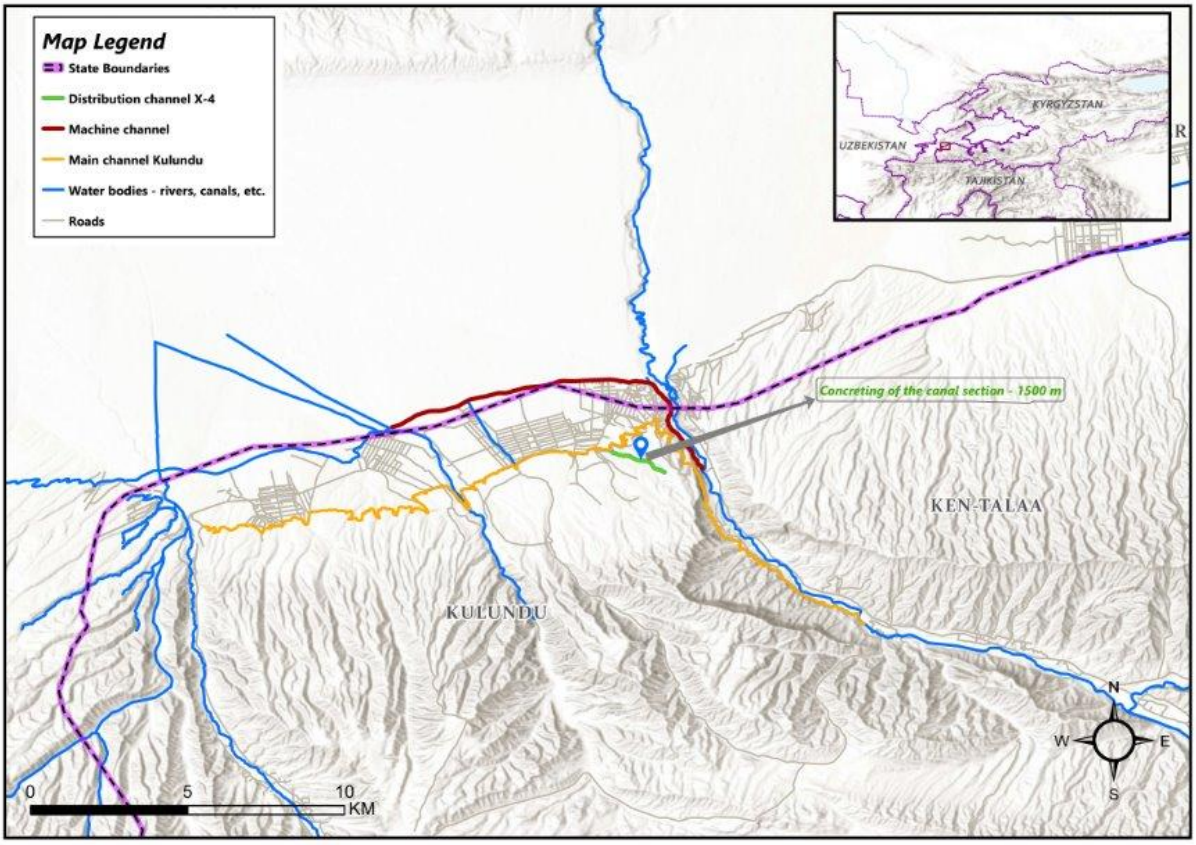
Map 3: Selected infrastructure locations in Mashine Canal, Leylek District, April 2025



Otvodyashiy Canal X-4, Leylek District

The outlet channels will undergo full cleaning and de-silting, with removal of bushes, shrubs, weeds, stones, and other obstructions. All removed materials will be safely transported to a dumping site using appropriate tools and labour. Backfilling will be carried out with earth material compacted using plate vibrators to stabilise the canal structure. The lining of the canal will be completed using in-situ B20 grade cement concrete mixed with 20mm clean, hard, graded aggregates. Preformed joint fillers will be used in the concrete lining, and contraction joints will be sealed with a special hot-pour sealing compound, which includes cleaning grooves and applying primer before sealing.

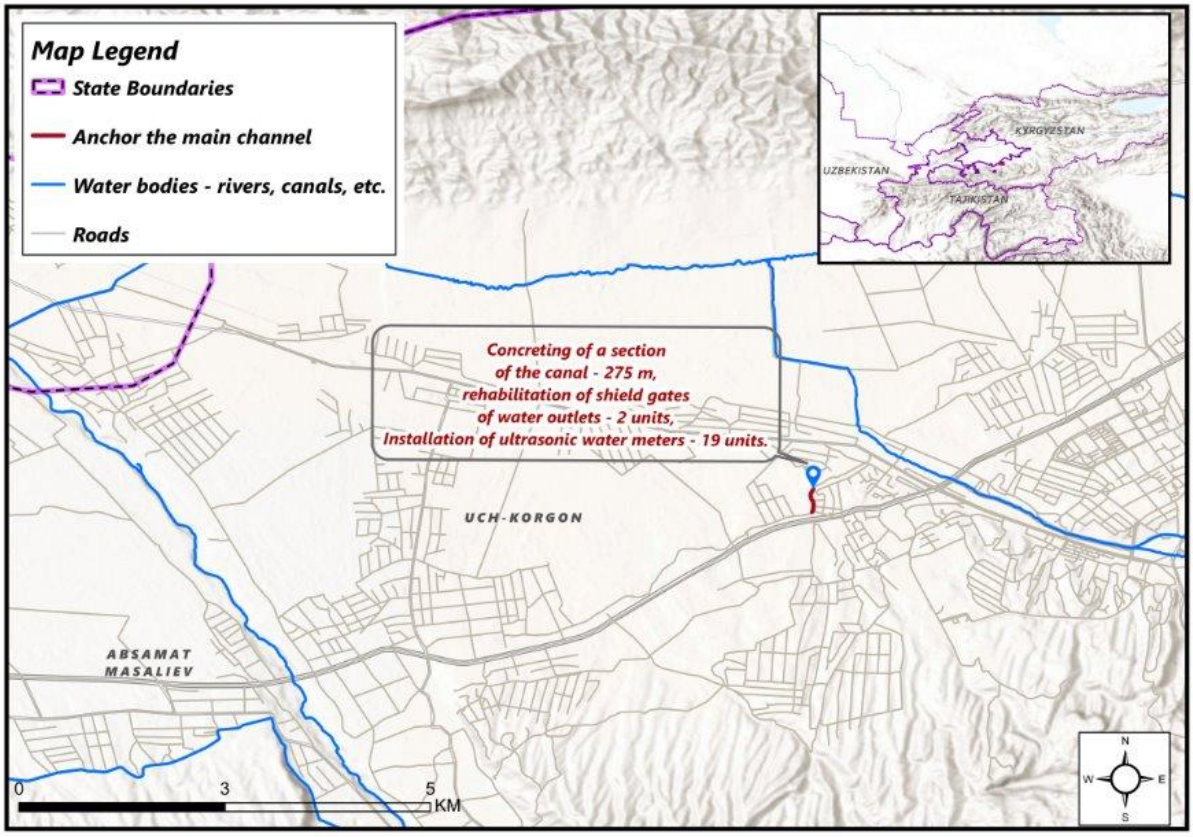
Map 4: Selected infrastructure locations in Otvodyashiy Canal X-4, Leylek District, April 2025



ANCHOR CANAL, KADAMJAY DISTRICT

The Anchor Canal will begin with manual and mechanical de-silting and cleaning, followed by the safe disposal of removed material. The canal bed will be backfilled with earth and compacted in layers of 200mm thickness using a plate vibrator. Lining will be carried out with in-situ B20 grade cement concrete using 20mm aggregates, ensuring durability and proper sealing. Gates and screw parts will be installed, each treated with zinc chromate primer and synthetic enamel paint. Solar-powered hydroposts will be installed to allow for automated water level tracking. Finally, preformed joint fillers and hot-pour sealing compounds will be used for sealing contraction joints, following thorough cleaning and priming.

Map 5: Selected infrastructure locations in Anchor Canal, Kadamjay District, April 2025



TAJIKISTAN

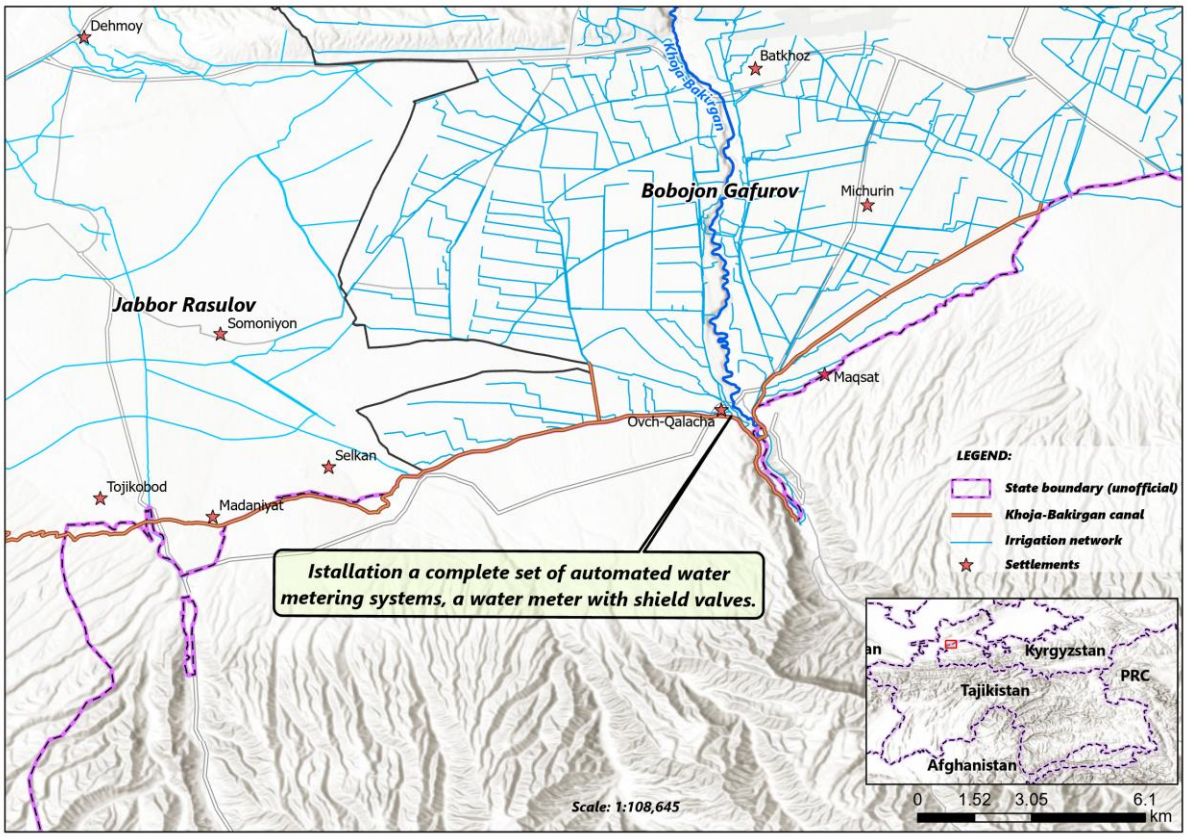
In Tajikistan, of 82 evaluated sites, one was selected. The Infrastructure is a single Hydropost and 4 partially automated solar power gates. Details are shown below. Planned activities include installing solar-powered automated gates, setting up a hydropost cascade, and implementing customised Supervisory Control And Data Acquisition (SCADA) software. Tajikistan: 276,405 beneficiaries; 22.5 million cubic meters annual water savings; 81 cubic meters per beneficiary; total area of 9,121 hectares; cost per hectare €19.93.

ZERO POINT (MAIN HYDROPOST, INCLUDING GATES CASCADE), KHOJABAKIRGHAN CANAL, B. GHAFUROV DISTRICT

The Khojabakirgan Canal will benefit from a modernised and partially automated water regulation system. This includes the supply, installation, testing, and commissioning of solar-powered canal gates that enable manual operation with integrated upstream level and flow meters. The system will feature solar panels, flow meters, level transmitters, and programmable logic controllers (PLC) with GPRS/GSM RTU communication. Additional components include digital and analogue input/output modules, power modules, motors for valve operation, bus bars, power distribution assemblies, main breakers, and connecting cables. These upgrades will be implemented at the Zero Point Hydropost to enhance energy efficiency and remote operability.

Additionally, the project will include the development and deployment of a customised SCADA software system for full automation and control of canal operations. A Command Control Centre will be established, equipped with redundant servers, firewalls, desktop computers, a 100 cm LED display, and colour printers, as well as software development and integration tools. The setup also includes data centre hosting, operator equipment, project management services, and furniture, ensuring a comprehensive and resilient control infrastructure for sustainable water management

Map 6: Selected infrastructure locations in Zero Point, B. Ghafurov District, April 2025



UZBEKISTAN

In Uzbekistan, two sites were chosen from 10 evaluated. In Fergana district, activities involve canal cleaning, reinforced concrete retaining walls, excavation, hydropost installations, and ultrasonic water meters. In Toshloq district, activities include canal cleaning, earthwork, concrete lining, hydropost installations, and water meter setups. This will account for 15,125 beneficiaries; 8.2 million cubic meters annual water savings; 541 cubic meters per beneficiary; total area of 1,444 hectares; cost per hectare €154.79.

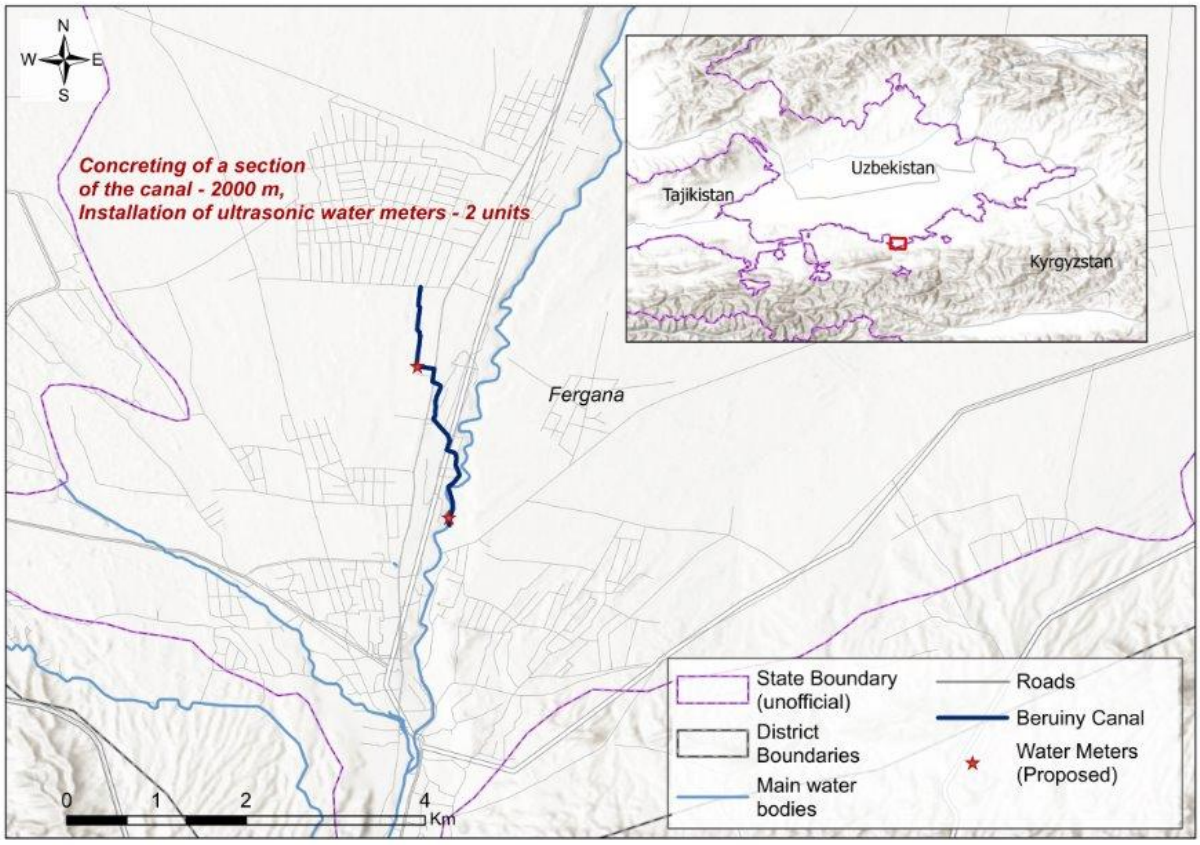
TRUBNY CANAL, FERGANA DISTRICT

In MSG Beruniy, canal rehabilitation will begin with excavation in all types of soil, including soft disintegrated rock. The excavated material will be transported up to 2 km for disposal. Cleaning and de-silting of the canal will be carried out to remove unwanted vegetation and debris, followed by proper backfilling using earth materials compacted in layers with manual and mechanical equipment (plate vibrators).

Concrete lining will be completed using B20 grade cement mixed with 20mm down-sized, clean, hard, graded aggregates. All concrete work includes standard construction steps: batching, mixing, shuttering, compaction, and curing.

Solar-powered hydroposts equipped with radar level sensors and GSM/GPRS communication systems will be installed to ensure automated monitoring of water levels. Additional materials include preformed joint fillers and hot pour sealing compounds to strengthen concrete joints and reduce water seepage.

Map 7: Selected infrastructure locations in Trubny Canal, Fergana District, April 2025



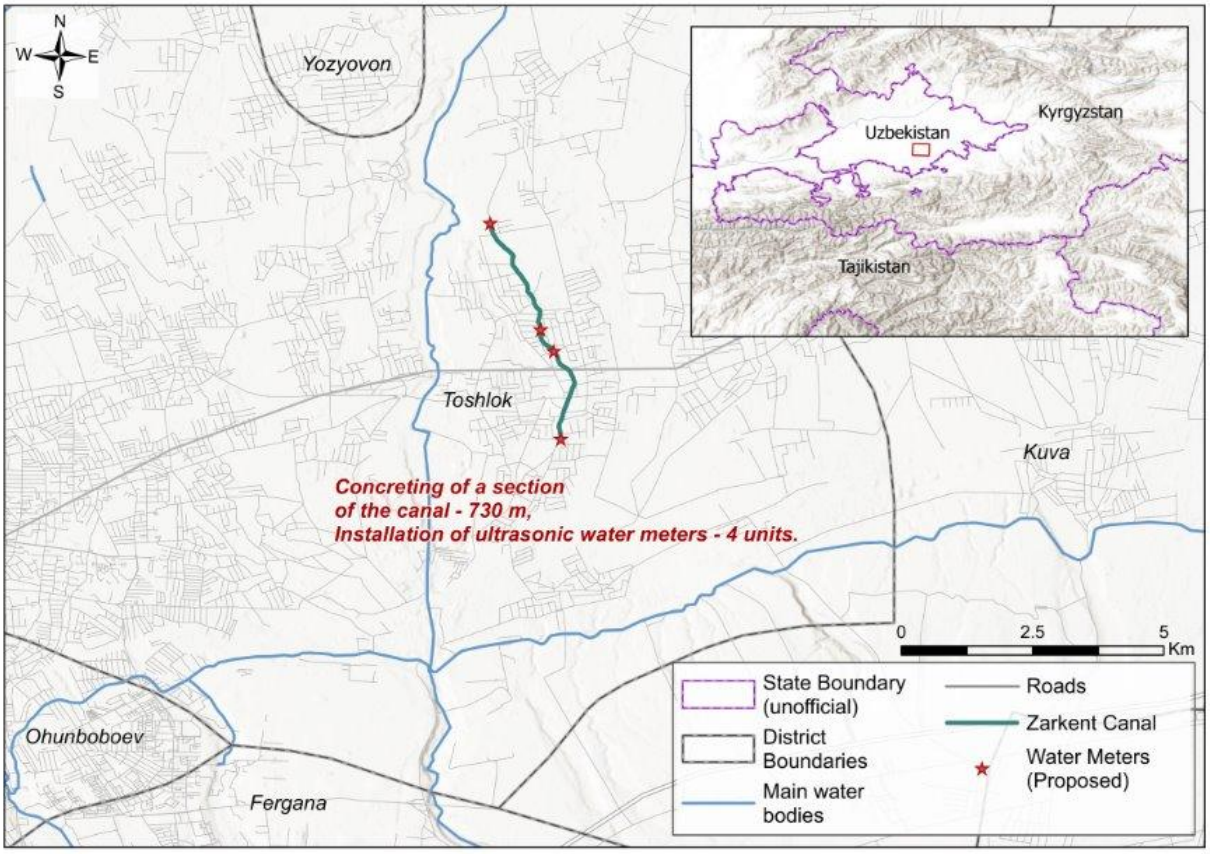
Zarkent Canal, Toshloq District

For Zarkent Canal, initial activities will involve excavation and disposal of soil and debris under both dry and wet conditions. The canal will be cleaned and de-silted to the specified depth. Backfilling will be done with earth, compacted in layers using plate vibrators to maintain structural integrity.

Canal lining will also use in-situ B20 grade cement concrete combined with 20mm graded aggregates, ensuring durable and long-lasting construction. Gates and screw mechanisms will be fabricated and installed with all necessary supports. These will be treated with two coats of zinc chromate primer and synthetic enamel paint for corrosion resistance.

Hydroposts will be installed at several key locations along the canal, supporting real-time water level monitoring through radar sensors and remote communication technology. The canal joints will be reinforced using preformed joint fillers and sealed with hot-applied compounds, including primer coating for enhanced adherence and sealing performance.

Map 8: Selected infrastructure locations in Zarkent Canal, Toshloq District, April 2025



The specific infrastructure types and costs are defined in Table 3 below:

Table 3: Infrastructure to be built, April 2025

Country	District	Location	Canal concreting (km)	Rehabilitate sluice gates (pcs)	Install water meters (pcs)	Rehabilitate hydropost (pcs)	Estimated cost (USD)	Estimated cost (EUR)
Kyrgyzstan	Leylek	Magistral canal Kulundu with hydrotechnical constructions	0	34	14	2	$57,028	€ 51,843
		Mashine canal Kulundu with hydrotechnical constructions	0	18	14	0	$43,800	€ 39,818
		Otvodyashiy canal X-4	1500	0	0	0	$99,538	€ 90,489
	Kadamjay	Magistral canal Anchor	275	2	19	0	$112,827	€ 102,570
Tajikistan	Bobojon Ghafurov	Zero point (Main hydropost)	0	4	0	1	$200,000	€ 181,818
Uzbekistan	Fergana	Canal Trubny MSG Beruniy	2000	0	2	0	$167,789	€ 152,535
	Toshloq	Canal Zarkent MSG Jarkishloq	1000	2	5	0	$76,446	€ 69,496

The implementation of these rehabilitation activities will occur over three phases, with clear timelines and responsibilities, which will take place from August 2025 until the end of February 2026. Information on the schedule comes from Acted's Key Findings and Recommendations document.[10]

Phase 1 (Pre-implementation): Week 1 to Week 8, focuses on key preliminary steps such as obtaining final approval from PATRIP on the selected sites, finalising bidding documents, conducting Environmental and Social Impact Assessments (ESIA) and risk mitigation planning workshops, launching the tender, evaluating bids, and finalising contracts. STREAM's procurement and technical teams, in collaboration with IMPACT (ESIA) and local stakeholders, will manage these crucial initial activities.

Phase 2 (Implementation): Week 8 to Week 20, will involve mobilising resources, equipment, and labour, and executing detailed rehabilitation activities. This will include earthworks, concreting, and canal lining,

[10] Acted, The Rehabilitation of irrigation canals and installation of water Meters in the Fergana Valley STREAM Programme: Key findings and recommendations, April 2024.

and installing flow-measurement equipment. Contractors and STREAM's engineering teams will closely cooperate with local water management authorities to ensure quality and coordination.

Phase 3 (Finalisation): Week 21 to Week 25 includes final quality inspections, testing of installed equipment, training and handover to local operators to ensure sustainability, preparation of final completion reports, and processing of final payments and closeout activities. STREAM and contractors, along with Local Authorities (LAs), will oversee this critical phase to ensure successful project completion.

2.02: Permitting Obligations Associated with this Project

Prior to the ESIA workshop, the project was approved by local authorities in all three countries. While no permitting obligations have been provided or required, Acted received letters of endorsement from local authorities in all three countries on the following dates:

Table 4: Dates of project endorsement by local authorities, February - April 2025

Country	Region	District	Date of Endorsement
Kyrgyzstan	Batken	Kadamjay	07 March, 2025
		Leylek	07 February, 2025
Tajikistan	Sughd	All districts	05 May, 2025
Uzbekistan	Fergana	All districts	25 April, 2025

Final approvals will be given following the submission of final project Terms of Reference (ToR) to local authorities. The full list of permitting obligations associated with the project are listed for each country at the end of the document in Annex 5. 1.

2.03: ESIA Assessment Prepared by:

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METHODOLOGY

3.01: Methodology Selection

To conduct the assessment, IMPACT developed an ESIA methodology that was modified from the Swiss Development Cooperation's CEDRIG toolkit[11] adapted to incorporate PATRIPs specific ESMP requirements. The CEDRIG toolkit is a guidance document designed to facilitate the mainstreaming of climate change, environmental sustainability, and disaster risk reduction considerations for development infrastructure interventions. The toolkit provides a structured approach for identifying hazards that can potentially harm the infrastructure, and any potential negative impacts that the project can have on the local environment and communities, and develop mitigation and adaptation measures

[11] SDC, Climate, Environment and Disaster Risk Reduction Integration Guidance, 2024

to ensure a, "do no harm" approach. These modifications were developed into an independent ToR that was validated by PATRIP in March 2025.[12] The ESIA evaluates these hazards and impacts based on environmental, ecosystem, and social/economic risks and impacts of the programme's activities, which include 1) water infrastructure rehabilitation and 2) water meters instalment. The final results will be integrated into the ESMP in alignment with PATRIP's standards.

Workshops were arranged with key local stakeholders near the locations for each infrastructure component. The workshop lasted one day, and sought to accomplish three key objectives:

1) Introduce the proposed infrastructure projects and key findings of the Technical Feasibility Study (TFS) to the participants;
2) Examine the risks to the infrastructure from the surrounding community;
3) Identify potential negatives impacts of the infrastructure on the surrounding community.

IMPACT developed key criteria to ensure that each workshop included a broad range of stakeholders directly involved in irrigation water infrastructure management and water users, particularly farmers and rural communities can provide information on risks/impacts and mitigation measures, and land management including but not limited: 1) Irrigation Water Engineers and Technicians, Irrigation Water Management Staff; 2) Representatives from Water User Association; 3) Land specialists at district/Local Self Government (LSG); 4) Head of village/ Village Leaders; 5) Farmers (more details in Annex 1: ESIA Facilitation Guide). This table provides a detailed breakdown of the stakeholder groups involved in the assessment process. It highlights their roles and significance, governance levels, the number of participants, and the criteria for their selection. This criterion is defined in Table 5, below:

Table 5: Workshop Participant Selection, 24 April – 14 May 2025:

Stakeholder Stratum/ Participants	Role/Importance	Governance Levels	Number of Participants per location	Selection Criteria and Process
Irrigation Water Engineers and Technicians / Water Management Staff	Management at district level: design, maintain, and manage water infrastructure; develop technical plans and mitigation strategies to address infrastructure challenges and impacts; policy development and implementation on water use.	Oblast/District /LSG	2-3	Identified based on their involvement in the STREAM programme's feasibility study and water rehabilitation projects, with support from water management departments and local programme staff.
Department on water supply/ Water resources management in the Syr Darya River Basin			1-2	
LSG level land specialists	Manage land resources, ensuring sustainable use, overseeing distribution, and advising on policies for long-term sustainability.	District /LSG (KGZ Only)	1-2	With support from target LSG office
Representatives from the social development bodies (Social workers)	Coordinating services and resources to support vulnerable individuals while influencing practices to improve their lives.	District /LSG	1-2	With support from target LSG office, regional social development bodies.
WUAs	Maintain and upgrade irrigation canals at LGS levels, develop irrigation schedules, and represent water users' interests in government discussions and water management programmes.	LSG (KGZ Only)	1-2	With support from regional water management department.

[12] IMPACT, Environmental & Social Impact Assessment, Terms of Reference, Central Asia, March 2025.

Stakeholder Stratum/ Participants	Role/Importance	Governance Levels	Number of Participants per location	Selection Criteria and Process
Head of LSG and specialists responsible for maintaining water infrastructure and land use	Oversee sustainable land use, advise on policies, maintain irrigation canals, develop schedules, and advocate for water users in government programmes.	LSG, oblast level	2-3	
Head of village/ Village activists (including representatives from elders' courts, women groups and vulnerable groups) Mahala community Mirab (UZ)	Provide local governance, knowledge, and collaborate with WUAs on water distribution and community issues.	Village/ Community/Mahala (UZB Only)	2-4	Identified through their leadership roles in the selected villages with programme intervention and collaboration with WUAs and LSGs, Head of village etc. This will ensure female representation.
Farmers	End-users of irrigation water infrastructure; provide grassroots perspectives on water access and agricultural needs.	Village/ community	1-6	Randomly selected from a pool of farmers and water users who have experienced the infrastructure changes, with assistance from WUAs, Head of village/ Village Leaders, LSG office
Total number of participants in each workshop			**9-18**	

Each module sought to ultimately jointly identify the hazards to the infrastructure and negative impacts that the infrastructure's installation may have on the population, and to identify the main mitigation measures that can be integrated into the construction of the infrastructure to ensure project sustainability. Workshops were held with the identified stakeholders in the following locations on the following dates:

Table 6: Dates and Locations of ESIA Workshops, 24 April – 14 May 2025

Location	Country	Workshop Location	Date	Participants
Magistral canal Kulundu with hydrotechnical constructions Mashine canal Kulundu with hydrotechnical constructions Otvodyashiy canal X-4	Kyrgyzstan	Kulundu, Leylek District, Batken Oblast	29/04/2025	22
Magistral canal Anchor		Uch Korgon, Kadamjay District, Batken Oblast	24/04/2025	18
Zero point (Main hydropost)	Tajikistan	Khujand City, Sughd Oblast	06/05/2025	21
Canal Trubny MSG Beruniy Canal Zarkent MSG Jarkishloq	Uzbekistan	Fergana City, Fergana Oblast	14/05/2025	24

Each workshop was organised to last 1 day each and followed a strict questioning route outlined in an ESIA workshop facilitators' guide, which is detailed in Annex 1.

3.02: ESIA Assessment Justification

E&S risks and impacts that need to be further assessed in this report have been identified during the screening and categorisation exercise. The justifications for ESIA are incorporated in the screening questions below:

Table 7: Screening Questions – Part 1

Is the project type listed on PATRIP Foundation Exclusion List?	☐ Yes ☑ No
Does the project require land use change of more than 15 ha cumulated?	☐ Yes ☑ No
Does the project require construction of electrical transmission lines of capacity above 110 kV?	☐ Yes ☑ No
Will the project involve involuntary resettlement?	☐ Yes ☑ No
Is land to be used by the project under dispute?	☐ Yes ☑ No
Does the project cause conversion or degradation of critical natural habitats?	☐ Yes ☑ No
Can the project adversely impact cultural property such as World Cultural Heritage sites, archaeological and/or historical sites, including religious monuments and/or cemeteries?	☐ Yes ☑ No
Conversion of pastures or grazing land to agriculture activities?	☐ Yes ☑ No
Requires use of pesticides under WHO classification Ia or Ib?	☐ Yes ☑ No
Does the project include the construction or rehabilitation of dams or water storages taller than five meters?	☐ Yes ☑ No
Does the project lead to a diversion of water from international/transboundary waterways?	☐ Yes ☑ No

Table 8: Screening Questions – Part 2

Question	Answer and next steps	Comments
Does the project include the expansion of an existing irrigation infrastructure and agricultural land and the accumulated extension area is less than 15 ha?	☑ Yes The project should be categorized in B+ and unless a suitable Environmental and Social Impact Assessment is already available, a Specific E&S Assessment (Annex E & D6) is to be fulfilled including Integrated Pest Management plan by the applicant (via an external E&S Consultant). Should an ESIA be available beforehand, comments on the suitability of the EISA shall be provided. ☐ No	Applies to water meters / hydroposts
Does the project include the rehabilitation of a simple, small-scale and traditionally farmer led irrigation scheme with a total area of more than 50 ha accumulated?	☑ Yes The project should be categorized in B+ and unless a suitable Environmental and Social Impact Assessment is already available, a Specific E&S Assessment (Annex E & D6) is to be fulfilled including Integrated Pest Management plan by the applicant (via an external E&S Consultant). Should an ESIA be available beforehand, comments on the suitability of the EISA shall be provided. ☐ No	Applies to canal rehabilitation

This stage is intended to ensure that the EISA focuses on those issues that are most important for design, decision-making and stakeholder interest and will be subject to a further E&S assessment. The topics triggered are:

As noted in the previous section, the ESIA is designed to accomplish 3 specific objectives:

- Conduct an in-depth context analysis describing environmental (critical climate change-related, environmental, and natural hazards present in the project area), ecosystem (biodiversity ecosystem) and social conditions of the proposed project area to provide a common understanding for the subsequent detailed ESIA.
- Understand, prioritise, and mitigate environmental, ecosystem and social risks of the programme for the communities of intervention.
- Understand, prioritise and mitigate potential negative environmental, ecosystem and social impacts of the programme activities (water infrastructure rehabilitation and water meter installation) to the communities of intervention.

To accomplish these objectives, each ESIA workshop was designed to address three key components:

Table 9: ESIA Workshop discussion components

Order	Component	Description	Timeframe
1	**Risk Assessment**	Identify environmental, ecological, and social risks that could affect the implementation of programme activities.	Morning Workshop Session
2	**Impact Assessment**	Evaluate the potential impacts of programme activities on the environment, biodiversity, and local communities, with a focus on vulnerable groups such as people with disabilities, single-headed households with children, elderly individuals living alone, and women.	Afternoon Workshop Session
3	**Mitigation Planning**	Develop practical and effective measures to mitigate identified risks and adverse impacts.	After Workshop

For each component, participants were divided into 3 thematic groups, based on three broad, macro-level focuses regarding the hazards to and negative impacts from the proposed infrastructure:

Table 10: ESIA Workshop Thematic Groups

Order	Component	Description
1	**Environmental Impacts Focus**	Participants included irrigation engineers and technicians, land and pasture, emergency response specialists. This group concentrated on identifying environmental risks that could hinder activities and assessing how they might impact natural resources.
2	**Ecosystem and Biodiversity Focus**	Environmental protection specialists, along with individuals knowledgeable about local wildlife and ecosystems, evaluated the potential risks and impacts of the programme on biodiversity and ecological integrity.
3	**Socio-Economic Focus**	Social development specialist, village leaders, farmers, women's council members, and civil society representatives analysed the socio-economic implications of the programme, particularly for vulnerable populations.

The Full Workshop Agenda followed is shown in the Facilitator's Index in Annex 1.

3.03: ESIA Compliance

This ESIA aims to help the project to achieve compliance with the E&S standards set in PATRIP Foundation E&S Policy. Those standards are:

- National legal environmental and social requirements (See section 4.11: Legislation).
- KfW Sustainability Guidelines requirements, which encompasses acceptable international standards such as World Bank Group Sustainability Framework as well as relevant Environmental Health & Safety Guidelines for the purpose of the project.

BASELINE CONDITIONS

The following baseline conditions are derived from IMPACT Initiatives' inception phase reporting and the Technical Feasibility Study by WAPCOS and KIBIRA, as well as other sources. Unless otherwise cited, all information comes from the TFS by WAPCOS and KIBIRA, which in turn used information from the IMPACT inception phase reports.

4.01: Purpose

To provide a context within which the impacts of the project can be assessed, a description of physical, biological, human / socio-economic and cultural conditions (as applicable for this assessment) that would be expected to prevail within the project Study Area. The Baseline includes information on all E&S topics that were identified during categorisation as having the potential to be significantly affected by the project. All relevant baseline information is included in the following section 4.1.2, divided into sub-sections by country.

4.02: Sources of Information

This ESIA was based on the following sources of information:[13]

1. The Feasibility Study Report prepared by WAPCOS for the implementation of the programme activities, including detailed field visits was also used.
2. STREAM Baseline Assessment Reports, including the following:
    1. STREAM, Area Based Assessment of Ak-Suu & Isfayramsay Watersheds, Kyrgyzstan, December 2023
    2. STREAM, Area Based Assessment of Kozu-Baglan Watershed, Kyrgyzstan, December 2023
    3. STREAM, Area Based Assessment of Khojabakirghan Watershed, Tajikistan, December 2023
3. National Statistical Committee Information:
    1. National Statistical Committee of the Kyrgyz Republic
    2. Agency on statistics under the President of the Republic of Tajikistan

[13] WAPCOS & KIBERA, Final Feasibility Report – Main Report, Consultancy on Conducting a technical feasibility study for the rehabilitation of irrigation canals and installation of water meters in the Fergana Valley, March 2025.

3. National Statistics Committee of the Republic of Uzbekistan

4. An ESIA workshop with participatory group discussions was also conducted, which is detailed in the next section below.

4.03: ESIA Workshop

Unified methodology was developed for conducting an ESIA workshop for conducting assessment in all three countries (transboundary watersheds in Isfayramsay and Kozu-Baglan/Khojabakirghan).

The objective of the workshop:

1) Assess risks to programme activities: The workshop evaluated potential environmental, ecosystem (biodiversity), and social hazards that could pose risks to programme activities.
2) Assess impacts of programme activities on the environment including biodiversity and its ecosystem and communities (social economic aspects): it examined whether these activities may negatively affect natural resources, ecological balance, or community well-being particularly among irrigation users, vulnerable groups (people with disabilities, single headed families with small children, single elder people women).
3) Provide effective measures to mitigate identified risks and negative impacts.

To facilitate assessment, participants were divided into three subgroups, each focusing on distinct thematic areas (details below). Structured group discussions were conducted, allowing participants to collaboratively analyse issues, exchange perspectives, and document findings. At the conclusion of each session, subgroups delivered presentations summarising their key observations and proposed measures. These presentations served as a basis for collective discussion, enabling the integration of feedback and insights from all participants to ensure a more holistic and inclusive evaluation process.

Details on the group directions and tasks are shown in Table 10 below:

Table 11: ESIA Workshop Group Tasks, April – May 2025

Subgroup	Task	Participants
Environmental	Identify environmental risks to project activities and activities impact to environment and propose technical solutions.	Irrigation water resources engineers and technicians; land, pasture, emergency specialists
Ecosystem / Biodiversity	Assess the risks and impact on the ecosystem and propose conservation and mitigation measures.	Environmental protection specialists; people who is well familiar with local wildlife.
Social & Economic	Analyse the socio-economic risks and impacts and propose measures to ensure social well-being and address potential negative consequences.	Social development specialist; heads of village councils and village activists; farmers; women's councils, CSO.

Details on the workshop activities are detailed by country and workshop, in chronological order, below:

KYRGYZSTAN

ESIA Participatory Workshop on Isfayramsay Watershed (Uch-Korgon Ayil Aimak)

Participatory workshop: ESIA participatory workshop was conducted on 24 April, 2025, in Uch-Korgon Ayil Aimak (AA), Kadamjay District, Batken Region. The workshop aimed to assess the potential environmental and social impacts of the planned activities, namely canal rehabilitation, the installation of ultrasonic water meters, and the construction of new sluice gates.

The workshop brought together 18 participants, including 5 women, representing a broad spectrum of local stakeholders. Participants included (details in List of participants in Annex 2).

- The Chair of the Uch-Korgon Women's Council and representatives of women's councils from neighbouring AA.
- A social development specialist from the AA
- Irrigation water specialists
- Specialists in pasture management, land use, and emergency response
- Farmers and community activists
- Representatives of civil society organisations.

The consultation provided a platform for open dialogue on the potential risks and impacts and mitigation measures associated with the proposed programme activities. Details below in relevant sections.

Site visit: A site visit to the Anchor Canal within the village was conducted on 24 April 2025, with the participation of IMPACT staff (2), two representatives from Acted, and four representatives from District Water Management Authority (RUVH) responsible for canal management. The visit took place after the workshop to gain a better understanding of the situation on the ground.

ESIA Participatory Workshop on Kozu-Baglan Watershed (Kulundu village)

Site visit: A site visit to the Magistral Kulundu Canal, as well as the Mashine and X-4 Outlet Canals, was conducted on 25 April, 2025, with the participation of IMPACT staff, four representatives from Acted, and two representatives from RUVH responsible for canal management. The visit took place prior to the workshop to gain a better understanding of the situation on the ground.

Participatory workshop: The ESIA was conducted for the implementation of canal concreting, rehabilitate sluice gates, install ultrasonic water meters, rehabilitate hydroposts in the Kozu-Baglan Watershed, within the canals that draw water from the Kozu-Baglan River (Mashine Canal, X4 outlet, Magistral Canal). The event was conducted on 29 April, 2025 in Kulundu village, Leylek District, Batken Region with 22 participants, including 4 women, representing a diverse range of local stakeholders from Kulundu and Beshkent AAs, including Chair of Local Kenesh (main decision making body at AA level); Women's Council; Head of villages; social development specialist of the AA; former WUAs representatives; civil society; farmers; pasture and emergency specialists; irrigation water management specialists from district and local levels; environmental expert from Leylek District, local branch of the Ministry on Natural resources, Ecology and Technical Supervision; community activists.

TAJIKISTAN

ESIA Participatory Workshop on Khojabakirghan Watershed

The ESIA was conducted on 6 May 2025 in Khujand, Sughd Region, with 21 participants from:

- Senior and technical staff from the Agency for Land Reclamation and Irrigation (ALRI) at regional and district levels (Sughd Region, B. Gafurov, and J. Rasulov Districts), including department chiefs, sector heads, and specialists
- Representatives of the State Agency "Khojabakirghan Canal", including chief engineers, heads of hydroposts and sectors, and technical specialists from B. Gafurov and J. Rasulov Districts
- Chairpersons of several WUAs from B. Gafurov and J. Rasulov Districts, involved in irrigation water use and local land management
- Heads of river basin and water management organisations, including the Syrdarya River Basin Organisation and Basin Water Management Organisation
- Deputy chairpersons of Jamoats (local municipalities) from Ovchi Kalacha and Gulkhona, representing local governance structures
- The Director of the Healthy Lifestyle Center of J. Rasulov District
- A representative of a Community-Based Organisation (CBO) from Tojikobod village, J. Rasulov District.

UZBEKISTAN

ESIA Participatory Workshop on Isfayramsay Watershed

As part of the ongoing ESIA process for canal rehabilitation and the installation of ultrasonic water meters in Fergana and Toshloq Districts, a stakeholder consultation workshop was held on 14 May, 2025.

The workshop brought together a total of 24 participants, including 5 women, representing a broad range of stakeholder groups. These included Mahalla leaders, Women's Council representatives, social development specialists, farmers, irrigation water specialists from both district and local levels, community activists, and members of civil society organisations. The participants were selected to ensure inclusive representation across sectors and social groups.

To facilitate a focused and participatory dialogue, participants were organised into six thematic working groups, with three groups operating in Fergana District and three in Toshloq District.

4.04: Key Challenges

KYRGYZSTAN

In Kyrgyzstan, two watershed sites were selected and approved by PATRIP on 10 April, 2025. These sites are part of the Kozu-Baglan Watershed (known as Khojabakirghan in Tajikistan), which is shared between Kyrgyzstan and Tajikistan, and the Isfayramsay Watershed, shared between Kyrgyzstan and Uzbekistan. Kyrgyzstan encompasses the upper sections of both watersheds, where the water originates in mountainous valleys.

The terrain in these areas varies: the lower parts are relatively flat and include both irrigated and non-irrigated lands, while the upper regions are predominantly highland areas covered with forests. These upper areas are primarily used as pasture by local communities. While there are extensive irrigation networks derived from each river, most of the irrigation network is in the lower watershed, in Tajikistan and Uzbekistan.

The irrigation canals within these watersheds are predominantly utilised for agricultural purposes in intensively cultivated zones. Land use decisions in these areas are made by landowners and typically involve the cultivation of staple grains, vegetables, and fruit trees, with potatoes being grown in higher elevations.

The target areas for the programme activities contends with three primary challenges: 1) Water scarcity and management, 2) Natural hazards, and 3) Socioeconomic factors. WAPCOS (2025) identified a number of key challenges for the watershed, reproduced from the WAPCOS 2025 report below:

Table 12: Natural Resource Management challenges in Kozu-Baglan and Isfayramsay Watersheds in Kyrgyzstan[14]

Main challenge	Sub-challenge	
Water Scarcity and Management	Declining Water levels resulted is attributed to a combination of factors: Climate Change Irregular Precipitation	A concerning trend of declining water levels in Kyrgyzstan's rivers, particularly the Ak-Suu, Isfayramsay, and Kozu-Baglan rivers, which are crucial for irrigation and livelihoods is observed. This decline is attributed to a combination of factors, including: **Climate Change:** Melting glaciers, a vital source of water for these rivers, are shrinking due to rising temperatures. **Irregular Precipitation**: Kyrgyzstan is experiencing increasingly erratic rainfall patterns, with drier summers and more intense rainfall during the rainy season. This unpredictability disrupts agricultural cycles and exacerbates water scarcity.
	Over-Reliance on Surface Water	The high dependence on surface water for irrigation (98% in the Batken Region) makes communities extremely vulnerable to fluctuations in river flow and precipitation
	Deteriorating Irrigation Infrastructure	The aging and poorly maintained irrigation infrastructure, including canals and reservoirs, results in significant water losses, further straining water resources. The water losses from leaking canals can average around 30%.
	Groundwater Depletion	As surface water becomes less reliable, communities are increasingly relying on groundwater, leading to concerns about the long-term sustainability of aquifers. The Sokh aquifer, a key source for both Kyrgyzstan and Uzbekistan, faces potential over-exploitation.
Natural Hazards	Mudflows	Mudflows pose a significant threat, particularly in the Ak-Suu and Isfayramsay watersheds. The Ministry of Emergency Situations (MoES) has identified numerous houses and roads at risk from mudflows, highlighting the need for preventative measures and preparedness.
	Flooding	Flooding is a recurring problem in Kyrgyzstan, often triggered by heavy rainfall, melting snow, and river overflows. The sources note that climate change is likely to worsen flooding as precipitation patterns become more extreme.

[14] WAPCOS & KIBERA, Final Feasibility Report – Main Report, Consultancy on Conducting a technical feasibility study for the rehabilitation of irrigation canals and installation of water meters in the Fergana Valley, March 2025.

Main challenge	Sub-challenge	
	Landslides	The mountainous topography of Kyrgyzstan makes it highly susceptible to landslides, which can damage infrastructure, block roads, and displace communities. Climate change, with its impact on precipitation and glacial melt, is expected to increase the frequency and severity of landslides.
	Earthquakes	Kyrgyzstan is located in a seismically active zone and experiences thousands of earthquakes annually. While the frequency of high-magnitude earthquakes is relatively low, the potential for devastation remains a concern, necessitating robust disaster preparedness and mitigation measures.
	Drought	Drought is a significant hazard, impacting agriculture and livelihoods across Kyrgyzstan, particularly in rain-fed areas. The sources note that droughts have become more frequent and severe in recent years, likely due to climate change and reduced water availability.
Socioeconomic Factors	Limited access to clean drinking water	A significant portion of the population, particularly in rural areas, still lacks access to clean drinking water
	Gender disparities in water and agricultural resource management	The earlier studies emphasise the unequal roles of women and men in natural resource management, particularly concerning water and agriculture. Women are often excluded from decision-making processes, face barriers in accessing resources and financing, and bear a disproportionate burden in water collection and household chores. This inequality hinders women's economic empowerment and limits their participation in sustainable resource management.

TAJIKISTAN

In Tajikistan, the following sites were selected and agreed with PATRIP on 10 April 2025. All sites are included in the Khojabakirghan Watershed, shared between Kyrgyzstan and Tajikistan, with Tajikistan having the lower part of the watershed, and Kyrgyzstan having the upper and middle parts. The entire area is flat and irrigated, located in the lower watershed where the water from the Khojabakirghan River is used for an extensive widespread irrigation network in B. Ghafurov and J. Rasulov Districts. Most of the crops are gown in local, household level dekhan farms, with a sizeable minority grown on public farms as well. These farms mainly grow cotton and staple grains like wheat and barley.

As noted in the water management section below, climate change has severely affected the available water, and much of the water used for irrigation now comes from groundwater pumps taking water from the Nau-Ispisar aquifer rather than the Khojabakirghan River itself.[15]

The affected area suffers from three key challenges: 1) Water scarcity and management, 2) Natural hazards, and 3) Socioeconomic factors. These challenges are summarised in Table 13 below:

Table 13: Natural Resource Management challenges in Khojabakirghan Watershed, Tajikistan

Main challenge	Sub-challenge	
Water Scarcity and Management	Declining Water Levels:	Tajikistan is witnessing a decline in water levels in its rivers, including the Khojabakirghan River, which is a critical source for livelihoods and agriculture. This is due to a combination of climate

[15] STREAM, Area Based Assessment of Khojabakirghan Watershed Report, December 2023

		change, irregular precipitation, and over-reliance on the river for irrigation and other needs.
	Over-exploitation of Groundwater	As surface water becomes less reliable, Tajikistan is increasingly relying on groundwater for irrigation, leading to the risk of aquifer depletion in the near future. Studies predict that the Nau-Ispisar aquifer, a key groundwater source, could be over-exploited by 2045, leading to a deficit of over 30 million m3 of water.
	Deteriorating Irrigation Infrastructure:	The ageing irrigation infrastructure, including canals, pumping stations, and vertical wells, is in a state of disrepair. This leads to significant water losses, reducing the efficiency of water delivery and exacerbating the water scarcity issue.
Natural Hazards	Mudflows:	Tajikistan is highly vulnerable to mudflows, particularly in the B. Gafurov area. These events cause significant damage to infrastructure and property, disrupting livelihoods and posing risks to communities.
	Flooding:	Changing precipitation patterns and melting glaciers due to climate change are increasing the frequency and severity of floods in Tajikistan. This results in extensive destruction, fatalities, and damage to critical infrastructure, including public health facilities.
	Earthquakes:	While the Sughd Region, where the Khojabakirghan Watershed is located, has a relatively low annual average loss from earthquakes, the risk remains significant. The potential for large-scale destruction and casualties from high-magnitude earthquakes underscores the need for disaster preparedness.
Socioeconomic Factors	Limited Access to Clean Drinking Water:	A significant portion of the population, particularly in rural areas, still lacks access to clean drinking water.
	Gender Inequality:	Despite playing a critical role in agriculture, women in Tajikistan face significant challenges in participating in natural resource management and decision-making processes. This inequality limits their access to resources and opportunities, hindering their economic empowerment and contributing to the overall water management challenges.

UZBEKISTAN

In Uzbekistan, two watershed sites were selected and approved by PATRIP on 10 April 2025. These sites are part of the Isfaysramsay Watershed on Toshlok District, and the Shakhimardan Watershed in Fergana District. Both watersheds are shared by Kyrgyzstan and Uzbekistan, with Kyrgyzstan accounting for the upper and middle parts of the watersheds, and Uzbekistan having most of the lower parts of the watershed. In Kyrgyzstan, the watersheds are managed separately, while in Uzbekistan, a complex system of pumps and water distribution points integrate the water from both rivers into a single, centrally managed irrigation system.[16]

The irrigation canals within these watersheds are predominantly utilised for agricultural purposes and cash crops in intensive irrigated agricultural areas, and is heavily reliant on the irrigation network in order to function properly.

[16] WAPCOS & KIBERA, Final Feasibility Report – Main Report, Consultancy on Conducting a technical feasibility study for the rehabilitation of irrigation canals and installation of water meters in the Fergana Valley, March 2025.

The target areas for the programme activities noted six main challenges: 1) Infrastructure deficiencies, 2) Institutional weaknesses, 3) Technological gaps, 4) Water Scarcity and Management, 5) Natural Hazards, and 6) Socioeconomic challenges. These specific challenges are summarized in Table 14, taken from the WAPCOS report, below:

Table 14: Natural Resource Management challenges in Shakhimardan and Isfayramsay Watersheds in Uzbekistan[17]

Main challenge	Sub-challenge	
Infrastructure Deficiencies	Deteriorated Canals	Many canals, crucial for transporting water to the mahallas, suffer from significant deterioration. The **earthen canals** are susceptible to erosion and water seepage, leading to substantial water loss. Furthermore, the **siltation** in several canals, including the Yoshlik canal, significantly reducing their carrying capacity and hindering water flow. This combination of earthen construction and sediment build-up necessitates costly and time-consuming maintenance efforts, including mechanical cleaning and concrete lining.
	Damaged and Outdated Hydraulic Structures	Numerous instances of damaged and outdated hydraulic structures critical for water management are identified. The examples include "Vodil" Water Distribution Unit, Margilansay Canal, Chimyonsay Canal, Beshalysh Water Distribution Unit, Koratepa 1 Canal and Zarkent Channel.
	Inadequate Water Intake Structures	Several mahallas rely on makeshift or poorly designed water intake structures. These structures often lack proper flow control mechanisms, leading to inefficiencies in water diversion and distribution. For example, homemade water intake structures erected by communities to raise water levels, indicating a lack of adequate infrastructure provision.
Institutional Weaknesses	Lack of Coordinated Water Management	The transboundary nature of the watersheds necessitates coordinated water management between Uzbekistan and Kyrgyzstan. The instances where water intake points are located in Kyrgyzstan, complicating water access and potentially leading to disputes, as seen in the case of the Zhida canal are noted. This lack of a comprehensive and collaborative water management framework hinders effective and equitable water allocation between the two countries.
	Insufficient Maintenance	Lack of regular and comprehensive maintenance of existing irrigation infrastructure is observed in the studies. This neglect contributes to the deterioration of canals, hydraulic structures, and water intake points, exacerbating water losses and increasing vulnerability to damage from natural hazards.
	Limited Enforcement of Water Use Regulations	The instances of unorganised water intake, implying a lack of stringent enforcement of water use regulations are indicated. This uncontrolled water extraction further strains water resources and hinders equitable distribution.
Technological Gaps	Absence of Modern Water Metering Devices	The lack of modern water metering devices as a major technological gap is highlighted. This absence makes it difficult to accurately measure water usage, impeding efforts to implement efficient water allocation, identify areas of excessive consumption, and bill users appropriately. Installing modern metering devices on various canals, ditches, and wells is required to address this gap.

[17] Ibid.

Main challenge	Sub-challenge	
	Limited Automation and Remote Monitoring	Lack of automation and remote monitoring capabilities in managing irrigation infrastructure is highlighted. The reliance on manual control for many structures, such as gate shields, increases labour requirements and response times, particularly during emergencies like mudflows. The report recommends restoring automatic control systems and exploring options for remote monitoring to improve operational efficiency.
Water Scarcity and Management	Inadequate Infrastructure	Aging and poorly maintained infrastructure are observed as a major challenge. Earthen canals, poorly equipped hydraulic structures, and a low level of operation and maintenance lead to significant water losses, reaching up to 70%. Further, there is a need for rehabilitating canals such as the Yoshlik Canal, which has experienced significant siltation, reducing its capacity.
	Lack of Modern Water Metering Devices	The absence of modern water metering devices makes it difficult to accurately measure and monitor water usage. This lack of data hinders efficient water allocation and management practices. Suggestions such as installing modern metering devices on various canals to improve water accounting and management are given.
Natural Hazards	Mudflows	The region is prone to mudflows, which pose a significant risk to the irrigation infrastructure. The instances where mudflows have damaged water intake structures, bridges, and canals have been indicated. For instance, a water intake structure on the Chimyonsay canal, built in the 2000s, was washed away by a mudflow. Instances of mudflows depositing debris in canals, further reducing their capacity and efficiency are indicated.
	Soil Salinisation	It is noted that inadequate drainage systems and inefficient irrigation networks contribute to rising groundwater levels, leading to soil salinisation. This is particularly concerning in the Kuva District, where salinisation affects 25% of irrigated land and groundwater lies close to the surface on almost 50% of irrigated land.
Socioeconomic	Dependence on Agriculture	The Fergana Valley is a major agricultural region, and the livelihoods of many people depend on a reliable water supply for irrigation. Water scarcity directly impacts agricultural productivity and income generation for local communities. It is to highlight the need to improve water supply to support both household needs and farming activities.
	Border Security Measures	The border security measures between Uzbekistan and Kyrgyzstan have impacted the flow of irrigation water. Specifically, the diameter of a pipeline carrying water from the Zhida canal in Kyrgyzstan to the Kurik MSG in Uzbekistan was reduced, leading to frequent blockages and an escalation of tensions between trans-border villages.
	Limited Financial Resources	Implementing the recommended infrastructure improvements and modernizing the irrigation systems require substantial financial investment. The reliance on external funding for essential infrastructure upgrades highlights the potential socioeconomic constraints in addressing water management challenges.

4.05: Geographic and Administrative Context

While the specific locations and details of the planed infrastructure activities are noted in section 1 above, A broader explanation of the context for the locations where the infrastructure is planned is expanded on below:

KYRGYZSTAN

KOZU-BAGLAN WATERSHED

The Kozu-Baglan Watershed – known as Khojabakirghan in Tajik – is one of the most water-stressed in the Fergana Valley. Originating from snow and glacial melt in the Turkestan Mountains, its 120 km river is increasingly affected by climate change. Accelerated glacial melt has disrupted seasonal flows, reducing water availability and delaying supply.

Most of the river's catchment lies in Kyrgyzstan's Leylek District in Leylek District, Batken Region, Kyrgyz Republic. Upon entering Tajikistan, it is diverted by the Plotina Dam into the Khojabakirghan Canal for irrigation in Ghafurov and Jabour Rasulov Districts of the Sughd Region in Tajikistan. The River eventually joins the Syr Darya between the Farhad and Kayrakum reservoirs. Elevations range from over 2,700 m in the upper basin to below 1,000 m downstream. The Sary-Kunjei stream is a key tributary in Kyrgyzstan.[18]

As of late 2023, the watershed area supports over 14,512 households with 64,957 Individuals in 23 villages. The Kyrgyz part of the watershed is contiguous with the local self-government units (called, "Ayil Aimaks" in Kyrgyzstan) of Beshkent, Katran, Ken-Talaa, Kulundu, and Leylek. As of June 2025, following the administrative restructuring of Ayil Aimaks in Kyrgyzstan, Basket and Ken-Talaa were merged, and Layle and Katran were merged, making 3 LSGs that rely on the watershed.

ISFAYRAMSAY WATERSHED

The Isfayram River, stretching 122 kilometres, originates in the Alay Range, where it is known in its upper reaches as Tengizbai. Flowing through the village of Uch-Korgon, where the Anchor main (magistral) canal is located, the river plays a vital role in regional irrigation, supporting over 12,000 hectares of farmland. Its drainage basin spans 2,220 square kilometres, and it forms part of the Great Fergana Canal system. Near Kuvasay, a canal branches off from the river, with several more canals diverting water further downstream. Eventually, east of the village of Kirguli, the Isfayram River merges into the Southern Fergana Canal.

Ak-Suu and Isfayramsay watersheds are located in Kadamajay District, Batken Region of Kyrgyzstan. As of August 2023, the watershed supports over 32,661 households and 144,377 individuals, living in 70 villages (32 are in Ak-Suu, and 38 are in Isfayramsay). Each watershed has 4 LSGs; Alga, Iskhak Polotkhan, Kadamjay, and Kotormo in Ak-Suu, and Aiyrvaz, Maydan, Masaliev, and Uch-Korgon in Isfayramsay.

The Isfayram River is primarily sustained by snowmelt and glacial runoff, with its highest water levels occurring between May and August, and the lowest between December and February. Near the village of Uch Korgan in Kyrgyzstan, where the river begins to spread into an alluvial fan, the average flow rate is 21.1 cubic meters per second. Flowing northward, the river maintains very cold temperatures, and in

[18] TFS final feasibility report annexure 3 – hydrological study report.

some areas along its banks, small tugai forests still thrive, featuring vegetation such as oleaster (djida) and sea buckthorn.

During the summer flood season, Isfayram transforms into a fast-moving, turbulent stream, its waters turning chocolate-brown due to suspended sand and clay particles. The river has a history of natural disasters – notably in 1962 and 1973, when severe mudflows and landslides forced the evacuation of Kuvasay and nearby settlements.

Climate-induced changes alter the river's hydrological regime, complicating water resource management and forecasting, which are critical for regional stability. In July and August, the water discharge in the Isfayramsay River reaches up to 70 m3/s, whereas in winter and early spring, this figure averages around 6 m3/s. Such tenfold fluctuations negatively impact the consistency and uninterrupted supply of irrigation water to farmers.

TAJIKISTAN

KHOJABAKIRGHAN WATERSHED

Dynamics of the Khojabakirghan River, which is the Tajik name for the Kozu-Baglan River after it crosses the border from Kyrgyzstan into Tajikistan, are very similar. Like much of the Syr Darya river basin, Tajikistan has seen a decline in water levels in the Khojabakirghan River, which has affected Agriculture, a critical livelihood in Tajikistan. The decline it due to a combination of factors, including climate change, from which melting glaciers a reduction in snowpack and irregular precipitation patters have led to a decline in 45% of water levels between 2012 and 2023.[19] This has caused severe impacts on crop yields, particularly in rainfed lands, which has increased reliance on the river for irrigation water. This is worsened by deteriorating irrigation infrastructure, including canals, sluice gates, and pumps, which are alleged to lose as much as 30-40% of water, harming water efficiency.

As surface water has declined, authorities have attempted to fill this gap by increasing groundwater consumption. This has led to a risk of aquifer depletion; studies have shown that the Nau-Ispisar Aquifer, the main groundwater source for communities relying on the Khojabakirghan Watershed, may be over-exploited by 2045, leading to a deficit of 30 million cubic meters of water.[20]

The population served by the Khojabakhirgan River is spread over 15 LSGs (called, "Jamaats" in Tajikistan) split between 2 districts. In B. Ghafurov District, there is Dadabai Khomatov, Haidar Uzmonov, Khitevarz, Ismoilk Ovchi-Kalacha, Unchi, Yova, Ghosiyon, Zarzamin, and Chashmasoor (accounting for 91 villages); In J. Rasulov District, there is Gulakandoz, Gulkhona, Somoniyon, and Dehomoy (accounting for 17 villages). In total, the population living in the watershed area accounts for 57,980 households and 408,753 individuals in B. Ghafurov, and 14,441 households and 81,222 individuals in J. Rasulov.

[19] STREAM, Area Based Assessment of Khojabakirghan Watershed Report, December 2023
[20] Cite HELVETAS report here.

UZBEKISTAN

ISFAYRAMSAY WATERSHED

Isfayramsay is a river in Kyrgyzstan and Uzbekistan. Its source is in the Alay Range, where it is called the 'Tengizbai'. The upper reaches of the Isfayramsay Basin are above 2720 m and the lower reaches are at less than 1000 m. The river is part of the Great Fergana Canal system.

Due to its significant use for irrigation, the river no longer reaches the Syr Darya, instead terminating at the Great Fergana Canal, north of Fergana. The main settlement along the river Isfayramsay in Uzbekistan is the city of Quvasoy.

The watershed irrigates 51,531 hectares of land in the Toshlok and Quva Districts of Uzbekistan and the Kadamjay District of the Republic of Kyrgyzstan. More than 490 thousand people live in this territory are citizens of Uzbekistan.

In Uzbekistan, the Isfayramsay waters supports a population of 208,700 people, of which 48,200 are urban residents, as of October 1, 2021). In the region there is 1 city (Toshlok), 51 mahalla gatherings of citizens (similar to LSGs). The population is mainly Uzbek, but there are also Tajiks, Kyrgyz, Russians, Tatars and representatives of other nationalities. The average population density is 465.2 people per 1 km^2. Most of the population lives in rural areas.

SHAKHIMARDAN WATERSHED

The Shakhimardan River (Ak- Suu) is 112 kilometres and covers a basin area of 1,300 square kilometres of which more than 6 thousand hectares are irrigated lands. More than 80,000 people in the watershed rely on water from the Shakhimardan River. The river originates in Shakhimardan on the territory of the Shakhimardan exclave of Uzbekistan where the Aksu and Koksu rivers meet, which in turn originates on the northern slopes of the Alay and Turkestan ranges. The river crosses the Kyrgyzstan/Uzbekistan border at twice, at the village of Orozbekovo at the village of Vuadil. After this, the river is known as Margilansay, and flows through the city of Fergana, the city of Margilan and finally the Great Fergana Canal. Once the river becomes Margilansay, it is linked with the waters of the Isfayramsay River through the Yangiaryk and Lovone canals, and the waters of the Sokh River through the Sokh-Shakhimardan Canal.

The river's waters are entirely used for irrigated agriculture. Like other rivers in the region, the Shakhimardan River is fed by snow and glaciers with the peak of the flood in June. The watershed irrigates 33,097 hectares of land in Fergana Region of Uzbekistan, supporting the livelihoods of over. 1,014,500 people, most of whom live in rural areas and are employed in the agriculture sector.

4.06: Key Biodiversity and Ecosystem Concerns

Given the small and intensively used agricultural areas where the programme activities will be implemented, local authorities and experts in all three countries noted no biodiversity concerns, including endangered species or protected areas in any of the five locations in Uzbekistan, Tajikistan, and Kyrgyzstan. Koppen climate classifications list the Fergana Valley area as being either Cold desert climate (BWk) or semi-arid climate (BSk) climactic zones. Furthermore, the IUCN does not note any Key

Biodiversity Areas (KBAs) in the vicinity of the project.[21] The central Fergana Valley is mainly filed with desert vegetation, such as psammite shrubs, halophytic, tugai, and meadow marsh ecologies. Tree and shrub vegetation is mainly present at the 1,800 – 2,000 meter range.[22] Along the Turkestan range, from which all of the assessed watersheds originate in, xerophilous-shrubbery, grassy steppes, and juniper forests are common. Tugai-type vegetation is common in the lower floodplains of the rivers, and forms in the summer during high temperatures and dryness of the air. These plants are very dependent on the water-fed soil of the river basins, and can vary each year due to changes in water flow and human decisions around water use for irrigation.[23]

While there are no key biodiversity areas of concern where the infrastructure projects are proposed, there are several key biodiversity areas that are nearby, which have a number of protected, rare, and endangered species. These main nature reserves are noted below:

Table 15: Key Biodiversity Areas of Proposed Districts of Intervention, 2025

Country	District	Key Biodiversity Area	Description
Kyrgyzstan	Leylek	Sarkent State Nature Reserve	Located in southern Leylek district, Sarkent State Nature park was established in 2009 and is 39,999.4 square hectares.[24] The water in the park comes from the upper reaches of the Aksu River, which does not feed into the areas that the project is proposed to take place, which is on the Khojabakirghan River. The park's location is located upstream, so any works that would have an effect on canals downstream would not affect water usage or the environment.
		Janggakty Botanical Reserve	Located in Leylek district, this 80 hectare botanical reserve was created in 1975 to preserve the endemic Tulipa affinis.[25]
		Suluktu Botanical Reserve	Located in Leylek district, this 30 hectare botanical reserve was established in 1975 to protect endemic tulip species such as Tulipa Rosea Vved and Tulipa Kolpakowskiana Regel.
	Kadamjay	Surmatash Nature Reserve	Located in eastern Kadamjay district, the Surmatash Nature reserve was established in 2009, and covers 66,194 square hectares, at 2,300 meters where the Tefirmach and Isfayramsay rivers meet.[26] The reserve has fir, apricot, rowan willow, popular, plum, and hawthorn trees. Several rare and endangered animals, including snow leopards, lynx, and the brown bear live there as well.

[21] https://www.keybiodiversityareas.org/sites/search
[22] OBRU, Assessment of socio-economic and environmental characteristics of the areas of the Khojabakirghan sub-basin, 2023 *(unpublished)*.
[23] Ibid.
[24] Kyrgyzstan Department of Biodiversity: Conservation and Specially Protected Natural Areas, 2022
[25] Editorial Office of the Kyrgyz National Republic, Geography of Kyrgyzstan: Encyclopedia Textbook, 2004
[26] Open.kg, Surmatashtsky Municipal Nature Reserve, 2018

Country	District	Key Biodiversity Area	Description
		Chyrandy Botanical Reserve	Located in Kadamjay district, this 500 hectare botanical reserve was created in 1975 to preserve endemic species such as Tulipa rosea and Tulipa Ferganica.[27]
Tajikistan	Konibodom	Kayrakkum Reservoir	The Kayrakkum Reservoir KBA includes it's namesake, a large waterbody in Sughd Oblast, and the surrounding land area. The reservoir is freshwater, and includes the land around it.[28] The environment in the reservoir is divided by the Syr Darya River into right and left banks; on the right bank, the is a semi-desert plain between the Mogaltau foothills and the river, while the left bank is urbanized. Up to 248 bird species have been recorded in the Kayrakkum Reservoir, of which 46 are residents, 34 species o fish, of which 13 are marketable, 11 snakes, 17 lizards, and 1 species of tortoise., and 11 rodents, and over 3,000 plants.[29]
Uzbekistan		N/A	While Uzbekistan does not have specific natural parks or protected areas in Fergana or Quva districts, where the activities will take place, it does have several, "water protection zones" near selected water bodies to protect the local ecosystems arounds them and promote ecological balance.[30] These areas are listed below:[31] - Syrdarya River water conservation Area - Isfaramsay River Water Conservation Area - Shahimardan River water Protection Zone. - Coastal Strip of the Syrdarya River - Isfaramsay Coastal Strip - Shahimardan Coastal Strip

The Critical Ecosystem Partnership Fund (CEPF) notes that additional KBAs including Uzbekistan Sokh and Shakhirmardan Enclaves inside Kyrgyzstan, and Upper Leylek, where the Sarkant Nature reserve is located, and Kayrakkum, where the Kayrakkum Reservoir is located, in Tajikistan. In addition, the Isfayramsay-Shakhimardan KBA (where Surmatash Nature Reserve is located) in Kyrgyzstan has been prioritized by CEPF for support.[32]

[27] National Statistics Committee of the Kyrgyz Republic, Classification system of territorial units of the Kyrgyz Republic, May 2021
[28] https://www.keybiodiversityareas.org/site/factsheet/21861
[29] https://www.keybiodiversityareas.org/site/factsheet/21861
[30] Resolution of the Cabinet of Ministers of the Republic of Uzbekistan, About approval of the Regulations on procedure for establishment of the water protection zones and zones of sanitary protection of water objects in the territory of the Republic of Uzbekistan, 11 December 2019.
[31] Information Center for Biodiversity of Uzbekistan, List of protected natural areas of the Republic of Uzbekistan, 2025.
[32] CEPF, Mountains of Central Asia, 2025.

CEPF noted the following species of concern, which are listed by their country of location, status, and species in the table below. These species were updated using the International Union for Conservation of Nature Red List[33] and National Red Book.[34]

Table 16: Noted Species of Concern in the Fergana Valley Area of Kyrgyzstan, Tajikistan, and Uzbekistan, 2025

OID	Kingdom	Scientific Name	Common name	Status	Country		
					KGZ	TJK	UZB
1	Mammals	Cervus hanglu	Bukhara Deer	EN		✓	✓
2		Equus ferus	Przewalski's Horse	EN			✓
3		Gazella subgutturosa	Goitered Gazelle	VU	✓	✓	✓
4		Marmota menzbieri	Menzbier's Marmot	VU	✓	✓	✓
5		Ovis orientalis*	Urial	VU		✓	✓
6		Panthera pardus	Leopard	VU		✓	✓
7		Panthera uncia	Snow Leopard	EN	✓	✓	✓
8		Vormela peregusna	Marbled Polecat	VU	✓	✓	✓
9		Brandt's Hedgehog	Hemichinus hypomelas	LC	✓	✓	✓
10		Bokhara Horseshoe Bat	Rhinolophus bocaricus	LC	✓	✓	✓
11		Lesser Horseshoe Bat	Phinolophus hipposideros	LC	✓	✓	✓
12		Asian Barbastelle	Barbastella leucomelas	LC	✓	✓	✓
13		European Free-tailed bat	Tadarida teniotis	LC	✓	✓	✓
14		Brown Bear	Ursus arctos	LC	✓	✓	✓
15		Beech marten	Martes foina	LC	✓	✓	✓
16		Eurasian Lynx	Lynx lynx	LC	✓	✓	✓
17		Argali	Ovis ammon	NT	✓	✓	✓
18		Indian crested porcupine	Hystrix indica	LC	✓	✓	✓
19	Birds	Anser erythropus	Lesser White-fronted Goose	VU		✓	✓
20		Aquila heliaca	Eastern Imperial Eagle	VU	✓	✓	✓
21		Aquila nipalensis	Steppe Eagle	EN	✓	✓	✓
22		Aythya ferina	Common Pochard	VU	✓	✓	✓
23		Chlamydotis macqueenii	Asian Houbara	VU	✓	✓	✓
24		Pterocles orientalis	Black-bellied Sandgrouse	LC	✓	✓	✓
25		Pterocles alchata	Pin-tailed Sandgrouse	LC	✓	✓	✓
26		Clanga clanga	Greater Spotted Eagle	VU	✓	✓	✓
27		Columba eversmanni	Yellow-eyed Dove	VU	✓	✓	✓
28		Falco cherrug	Saker Falcon	EN	✓	✓	✓
29		Haliaeetus leucoryphus	Pallas's Fish Eagle	VU	✓	✓	✓
30		Marmaronetta angustirostris	Marbled Teal	VU	✓	✓	✓
31		Neophron percnopterus	Egyptian Vulture	EN	✓	✓	✓
32		Otis tarda	Great Bustard	VU	✓	✓	✓
33		Oxyura leucocephala	White-headed Duck	EN	✓	✓	✓
34		Pelecanus crispus	Dalmatian Pelican	VU	✓	✓	✓
35		Podiceps auritus	Horned Grebe	VU	✓	✓	✓
36		Streptopelia turtur	European Turtle Dove	VU	✓	✓	✓

[33] The IUCN Red List of Threatened Species, 2025

[34] Editorial Office of the Kyrgyz National Republic, Geography of Kyrgyzstan: Encyclopedia Textbook, 2004

OID	Kingdom	Scientific Name	Common name	Status	Country		
					KGZ	TJK	UZB
37		Vanellus gregarius	Sociable Lapwing	CR	✓	✓	✓
38		White stork	Ciconia ciconia	LC	✓	✓	✓
39		Lesser Kestrel	Falco naumanni	LC	✓	✓	✓
40		Peregrine Falcon	Falco pelegrinoides	LC	✓	✓	✓
41		Bearded Vulture	Gypaetus barbatus	NT	✓	✓	✓
42		Himalayan griffon	Gyps himalayensis	NT	✓	✓	✓
43		Eurasian Griffon	Gyps fulvus	LC	✓	✓	✓
44		Cinerous Vulture	Aegypius monachus	NT	✓	✓	✓
45		Ibisbill	Ibidorhyncha struthersii	LC	✓	✓	✓
46		Buteo rufinus	Long-legged Buzzard	LC	✓	✓	✓
47	Reptiles	Phrynocephalus strauchi	Strauch's Toad Agama	VU	✓	✓	✓
48		Testudo horsfieldii	Central Asian tortoise	VU	✓	✓	✓
49		Said-Aliev's Toad Agama	Phrynocephalus saidalievi	VU	✓	✓	✓
50		Transcaspian Desert Monitor	Varanus griseus	LC	✓	✓	✓
51		European Glass Lizard	Pseudopus apodus	LC	✓	✓	✓
52		Tatar Sand Boa	Eryx tataricus	LC	✓	✓	✓
53		Diadem snake	Spalerosophis diadema	LC	✓	✓	✓
54	Fishes	Aspiolucius esocinus	Pike Asp	VU	✓	✓	✓
55		Cyprinus carpio	Wild Common Carp	VU	✓	✓	✓
56		Luciobarbus brachycephalus	Roundhead Barbel	VU	✓	✓	✓
57		Luciobarbus capito	Turkestan Barbel	VU	✓	✓	✓
58	Intertebrates	Parnassius apollo	Mountain Apollo	VU	✓	✓	✓
59		Parnassius autocrator	Pamir Parnassius	VU	✓		
60		Saga pedo	Common Predatory Bush-cricket	VU	✓	✓	✓
61	PLants	Aldrovanda vesiculosa	Waterwheel	EN			✓
62		Ammopiptanthus nanus	legume species	CR	✓		
63		Amygdalus bucharica	Wild Almond	VU	✓	✓	✓
64		Armeniaca vulgaris	Wild Apricot	EN	✓		✓
65		Atraphaxis muschketowi	Shrubby Buckwheat	EN	✓		
66		Betula tianschanica	birch species	EN	✓		✓
67		Calligonum calcareum	smartweed species	CR	✓		✓
68		Calligonum elegans	smartweed species	EN			✓
69		Crataegus darvasica	hawthorn species	CR		✓	
70		Crataegus knorringiana	hawthorn species	CR	✓		
71		Crataegus necopinata	hawthorn species	CR		✓	
72		Korolkov's Tulip	Tulipa korolkowii	NT	✓	✓	✓

4.07: Natural Hazards

All of the assessed locations in all three countries (Kyrgyzstan, Tajikistan, and Uzbekistan) were found to suffer from similar natural hazards. All areas were prone to seasonal mudflows, floods, and sedimentation, especially in spring and summer, often damaging poorly maintained irrigation systems

and public infrastructure (roads, bridges).[35] Strong winds and lightning can damage ultrasonic water meters. Although earthquakes are infrequent, they can be destructive; a large earthquake that occurred approximately 20 years ago was reported to have damaged canal infrastructure.

Natural disasters are a major concern in the area; primarily, seasonal mudflows and flooding during the spring and early summer in B. Ghafurov District can cause damage to irrigation and public infrastructure, particularly when it is not maintained or, in the case of canals, cleaned. This is of particularly concern near rivers like the Khojabakirghan River and its canals. Earthquakes are a noted concern as well, which have the potential to cause significant destruction, though their infrequency and unpredictability make them a lower priority for most of the population; most recent earthquakes have been of lower magnitude and have not been very destructive.

4.08: Water Management and Infrastructure

KYRGYZSTAN

KOZU-BAGLAN WATERSHED

Water management in Kyrgyzstan involves multiple layers of administration, including the RUVH and community level WUAs in each LSG prior to 2024. Beginning in 2024, the Leylek District WUAs have been in the process of being dissolved, with RUVH has assumed full responsibility for irrigation infrastructure management by Fall 2025.

The RUVH is responsible for supplying irrigation water, measuring and distributing allocated volumes using metering devices, conducting annual canal repairs, and resolving water distribution disputes. It also oversees infrastructure maintenance, including canal construction, and collects irrigation fees from farmers and agricultural associations.

Since the dissolution of WUAs in 2024, LSGs have taken on a more active role. Each LSG has a designated municipal representative who coordinates water distribution within the village, particularly for household gardens. This individual, typically a seasonal volunteer from the community, works closely with RUVH – receiving irrigation schedules and collecting water requests from residents to ensure fair and timely distribution. Households rely on both rivers as their primary water source for various needs, including domestic use, even though, as noted in key informant interviews (KIIs), the water is neither treated nor reused.

Small rivers like the Kozu-Baglan irrigate 76% of local farmland.[36] The area depends on canals, rainfall, and groundwater. Rural communities report limited access to clean drinking and irrigation water. In 2013–2022, surface water discharge declined by over 40% due to:

- Poor upstream irrigation infrastructure
- Climate and seasonal variability
- Limited monitoring
- Uneven water distribution

[35] STREAM Area Based Assessment of Kozu-Baglan Watershed Report, Kyrgyzstan, December 2024
[36] Water Resources Services of the Kyrgyz Republic.

Key canals Kulundu Magistral, Mashine, X4-Outlet Canals, and are crucial for irrigation, especially in Kulundu and Beshkent LSGs. A 3–6-meter water protection zone is maintained by RUVH.

List 1: Kozu-Baglan River Challenges (WAPCOS, 2025):

- Aging canal infrastructure causing water loss, reducing irrigation efficiency and increasing maintenance needs.
- Earthquake and landslide hazards, endangering infrastructure and disrupting water systems.
- Significant water loss in Kulundu canal system, responsible for nearly 80% of water discharge in the Kyrgyz Kozu-Baglan system, is affecting water delivery to agricultural lands.
- Poorly concreted canals lead to water loss and leakage, decreasing water availability and damaging surrounding land.

The proposed infrastructure is designed to be implemented at the Kulundu Magistral, Machinnyi and X-4 Outlet canals. Statistics on these canals are summarized below:

Table 17: Planned infrastructure, Kozu-Baglan Watershed, Kyrgyzstan, May 2025

Canals	Length (km)
Kulundu Magistral	22
Mashine	11
X-4 Outlet	1.5

The following key observations were made by WAPCOS and KIBIRA:

- Water loss is a major issue due to aging and corroded infrastructure. Both RVKHA-managed main canals and WUA-managed on-farm canals suffer from leakage, with less than 30% of WUA canals concreted. The Kulundu Magistral Canal, which carries 80% of the system's water, also accounts for 80% of total losses. The X-4 Outlet Canal is in urgent need of repair.
- Around 70% of 3rd and 4th order canals are unlined earthen ditches, especially in WUA-managed areas like Kulundu, where under half of the 136 km network is concreted.
- Limited funding leads to temporary repairs that fail to address deeper structural issues, allowing water loss to continue.

The following recommendations regarding improvements to the water infrastructure in the Kozu-Baglan Watershed based on these observations made by WAPCOS and KIBIRA are noted below:

- Canal Rehabilitation: The existing canal infrastructure needs to be rehabilitated, mainly through concreting of earthen canals due to water loss. The Kulundu Magistral Canal should be prioritised due to its size, importance, and high water loss. In addition, the on-farm networks in Kulundu and Beshkent, which lack concreting, should be further considered as well, and the Teshik 2 canal in Katran needed rehabilitation to restore access to affected areas.
- Improved Water Management Practices: There is a need for automated water accounting with automatic water meters that can improve water monitoring in a transparent manger. Sluice gates further need to be repaired or replaced to ensure efficient use and reduce water loss.
- Capacity Building: Dedicated training programmes for WUAs and communities on water infrastructure management, water distribution, and more efficient irrigation practices are needed to improve local water management within communities.

ISFAYRAMSAY WATERSHED

Similar to Kozu-Baglan, the irrigation infrastructure across the Ak-Suu and Isfayramsay watersheds is in a state of decline, primarily due to aging Soviet-era construction and insufficient rehabilitation efforts. Much of the canal network, originally built with cement, is now deteriorating, leading to significant water losses. On-farm irrigation systems managed by WUAs are particularly affected, with nearly 77% of canals remaining unlined. In areas like Maydan, Uch-Korgon, and Alga, the percentage of unlined canals is alarmingly high, contributing to inefficiencies and water shortages. Despite some maintenance efforts by WUAs and RUVH, the scale of degradation far exceeds their capacity to repair.

Population growth and agricultural expansion are placing additional pressure on already strained water systems. Key canals such as Kojo-Kayir and Nurgaziev lack concrete lining in critical sections, resulting in substantial water losses, especially at the canal ends in communities like Alga and Aiyrbaz. Uch-Korgon LSG is particularly vulnerable, with 87% of its canals unlined yet responsible for 40% of the region's on-farm water discharge. Water volumes in this area have declined by one-third over the past decade, and the Eshan canal is now overextended, irrigating more land than it was designed for. While WUAs have managed to maintain balanced budgets through seasonal tariffs and development loans, the current funding model is inadequate to address the systemic infrastructure challenges.

List 2: Isfayramsay River Challenges (WAPCOS, 2025):

- Water scarcity is a major challenge, with water shortages impacting crop yields, especially in downstream areas.
- Aging infrastructure has led to major water losses, particularly in Kojo-Kayir and Nurgaziev canals, which lack concrete lining.
- Uch-Korgon LSG: 87% unlined canals, 40% of on-farm water discharge.
- Eshan canal is overburdened, irrigating beyond its intended capacity.
- WUAs rely on seasonal tariffs (1–3 som/m3) and hectare-based fees (1,300–2,400 som/ha).
- Funding is insufficient for large-scale infrastructure rehabilitation.
- Water conflicts between upstream and downstream communities were reportedly a major challenge.

Table 18: Planned infrastructure, Isfayramsay Watershed, Kyrgyzstan, May 2025

Canals	Length (km)
Anchor	18.6

The following key observations were made by Acted during the inception phase research and WAPCOS and KIBIRA during the TFS:

- Most irrigation infrastructure dates back to the Soviet era and is now crumbling, leading to water loss and a lack of efficient distribution.
- 77% of WUA-managed on-farm canals are not concreted, leading to high water loss, and water losses reach up to 35% in some areas (e.g., Alga).
- Water scarcity has impacted agricultural yields in many communities, particularly those further downstream of the main canals.
- Pasture degradation and soil erosion are major issues, due to overgrazing of communal pasture areas.
- Sedimentation build up in canals was reported to have reduced canal capacity and efficiency.
- Conflict over water between communities were reported; water flow in Uch-Korgon has dropped by one-third in the last decade.

- Maintenance efforts are reactive and limited to flood damage, not full rehabilitation.

The following recommendations were made by the WAPCOS and KIBIRA team:

- Improved maintenance of canals, including removal of vegetation, restoring of canal shelves, cleaning of sediment, and bank stabilisation.
- Repairing of damaged concrete lining in canals, and protective slabs of concrete to protect against landslides.
- Repairing leads and strengthening the foundation of aqueducts by laying stones or concreting mudflow areas.
- Constructing new emergency discharge facilities and mudflow channels for sediment to run off where relevant.

TAJIKISTAN

KHOJABAKIRGHAN WATERSHED

WAPCOS highlighted the main challenges of the Khojabakirghan River to be declining water flow, which has impacted irrigation and domestic water supplies. This is worsened by aging canal infrastructure, which need additional maintenance and replacement. The overall lack of water has increased reliance on groundwater, leading to concerns about depletion and potential conflicts. Soil erosion and sedimentation are also major issues, worsened by natural hazards such as mudflows, flooding, landslides, and earthquakes.

The proposed infrastructure is designed to be implemented at the point where the Gulyakandoz, Kostakoz, and Novobod Canals meet. Statistics on these canals are summarised below:

Table 19: Planned infrastructure, Khojabakirghan Watershed, Tajikistan, May 2025

Canals	Length (km)
Gulyakandoz	11.00
Kostakoz	2.08
Kostakoz Feeder	7.20
Navobod	1.60
Total	21.88

The following key observations were made by WAPCOS and KIBIRA:

List 3: Khojabakirghan River Challenges (WAPCOS, 2025):

- Aging and corroded infrastructure is identified as the leading cause of water loss in the Khojabakirghan Watershed. Both WUAs and local authorities report a lack of resources for sufficient repairs. Water loss due to this deteriorating infrastructure has been estimated to range from 21% to 40%.
- The Khojabakirghan Canal has experienced corrosion and breakdowns, requiring maintenance and replacement of various components, including metal shields and lifting mechanisms.
- Changes in precipitation patterns and the degraded state of canals contribute to an increased risk of flooding. Overflowing canals, particularly in areas with limited capacity, damage agriculture and infrastructure, requiring costly repairs by WUAs or RUVH.
- As the Khojabakirghan canal is downstream of the Kozu-Baglan River in Kyrgyzstan, and no

water monitoring mechanism are present upstream, there are seasonal tensions related to water distribution and allocation between upstream communities in Kyrgyzstan and Downstream communities in Tajikistan due to a lack of water accounting.

The following recommendations were made by the WAPCOS and KIBIRA team:

- Canals infrastructure is highly corroded and needs to be replaced; this is bet achieved through concreting of earthen and damaged canals.
- Rehabilitation efforts should prioritise the canals with the most significant water loss and those that serve critical agriculture areas.
- Water gates, and other infrastructure should be repaired and replaced to improve efficiency of water use.
- Additional, household level water saving irrigation techniques, such as drip irrigation, should be introduced to reduce water loss and improve on-farm network efficiency.
- Automated accounting systems should be installed, to reduce labour and improve efficiency of water monitoring and distribution.
- Communication between WUAs and district RUVHs and canal management of the Khojabakirghan river should be improved to more effectively manage water distribution and manage conflict resolution over water.
- Training programmes should be introduced to WUAs and communities on water infrastructure management, efficient irrigation, water distribution, and water conservation.

UZBEKISTAN

ISFAYRAMSAY WATERSHED

Water is a lifeline in the Isfayramsay Watershed, sustaining both livelihoods and landscapes across the districts of Toshlok and Quva. The watershed itself is shared between Kyrgyzstan and Uzbekistan, making it a vital transboundary resource. In Uzbekistan, the Isfayramsay provides irrigation to over 51,000 hectares of land, enabling the intensive cultivation of cotton, grain, and other crops central to the region's economy.

Water for irrigation is drawn from a network of canals and reservoirs that form part of the broader Fergana Valley's irrigation infrastructure. Key sources include the Okhunboboyev Canal, branches of the South Fergana Canal, the Karkidon Reservoir, and the Great Fergana Canal named after U. Yusupov. These water sources are crucial not only for agriculture but also for supporting local ecosystems and human settlements.

However, this heavy reliance on irrigation also brings challenges. Water scarcity, especially in dry seasons, can disrupt crop production and strain inter-district and cross-border relationships. The efficiency of irrigation systems remains a concern, with potential losses due to outdated infrastructure, leakage, or suboptimal water management practices. Furthermore, agricultural runoff containing fertilizers and pesticides may pose risks to water quality.

The following canals will be supported under the STREAM project:

Table 20: Planned infrastructure, Isfayramsay Watershed, Uzbekistan, May 2025

Canals	Length (km)
Zarkent	0,73

The following key observations were made by Acted during the inception phase research and WAPCOS and KIBIRA during the TFS:

List 4: Isfayramsay River Challenges (WAPCOS, 2025):

- Irrigation infrastructure has corroded, particularly gearboxes, gate shields, and other key infrastructure are at risk of failures during mudflows.
- Sedimentation has led to siltation build up and has reduced overall canal capacity.
- A lack of automation has increased labour requirements and reduced response times.
- Inadequate maintenance has accelerated the deterioration of canals and hydraulic structures.

The following recommendations were made by the WAPCOS and KIBIRA team:

- Repair of gate shiels with proper seals will improve water flow regulation and reduce leakage. Gate shields at the Polmon hydroelectric unit is critical for this.
- Electrical control panels should be repaired and properly maintained, and moved to locations protected from mudflows and heavy rains.
- Concreting of canals to reduce water loos, particularly the Beshalysh Canal.
- Clean tributaries of silt and vegetation to improve water flow in main canals; recommended in Beshalysh area along Isfayramsay River, along with accompanying hydropost.
- Restore automatic controls systems for gate shields to improve operational efficiency.
- Replace damaged or worn-our gate shields.
- Modern hydroposts should be installed to provide up to date and accurate measurements of water.

Shakhimardan Watershed

The Shakhimardan Watershed plays a similar role for communities in Fergana District to the Isfayramsay River. The watershed mainly serves Fergana District, as well as parts of Toshlok and Quva Districts. As noted above, the water from the Shakhimardan River is integrated into the waters from the Sokh and Isfayramsay Rivers though a complex canal network and water distribution system. The following canals will be supported under the STREAM project:

Table 21: Planned infrastructure, Shakhimardan Watershed, Uzbekistan, May 2025

Canals	Length (km)
Beruiny	2

The following key observations were made by Acted during the inception phase research and WAPCOS and KIBIRA during the TFS:

List 5: Shakhimardan River Challenges (WAPCOS, 2025):

- Mudflows are a major threat to water infrastructure.
- Much of the on-farm network are earthen canals which experience up to 70% water loss.

- Border security measures with Kyrgyzstan can limit water flow, due to reductions in pipe and canal infrastructure size that reduces water flow.
- A lack of transboundary coordination complicates the ability to manage water in canals that cross the border.
- A lack of maintenance has led to accelerated deterioration of infrastructure and water loss.
- There is a lack of organisation around water intake points, which suggests a lack of effective water use regulations.

The following recommendations were made by the WAPCOS and KIBIRA team:

- Canals should be cleaned of sedimentation, particularly in mudflow-prone areas.
- Automated water management systems, such as cardan synchronisation mechanisms that can uniformly rais and lower gates, should be installed to increase water distribution efficiency.
- Gate control infrastructure should be relocated to areas more protected from mudflows and landslides.
- Canals should be concreted to reduce water loss and seepage.
- Damaged hydroposts should be replaced.
- Canal slopes should be reinforced to prevent bank erosion
- Water intake structures should be improved and upgraded to reduce losses.
- Hydroposts should be rehabilitated downstream to increase capacity and alleviate water congestion.

4.09: Socio-Economic Conditions

Kyrgyzstan

Kozu-Baglan Watershed

Research by STREAM and WAPCOS found the staple grain like wheat and barley were primarily grown in rainfed areas, while irrigated lands produce alfalfa, potatoes, corn, fruits, and vegetables; in the highest zones, potatoes dominate. Climate change characterized by reduced rainfall, lower water yields, and rising temperatures has decreased productivity, especially in rainfed regions, increasing dependence on irrigation. Livestock also plays a crucial role forming the backbone of the region's agro-pastoral lifestyle.

Isfayramsay Watershed

Water-related tensions in the Isfayramsay basin intensify during the spring, particularly from March to mid-June, when hydrological fluctuations lead to a significant drop in river levels. This seasonal scarcity often sparks conflicts between upstream and downstream communities. Villages such as Dostuk, Kok-Talaa, and Airybaz, located downstream, frequently face severe water shortages. Meanwhile, upstream settlements in the Maidan and Masaliev Aiyl Aimaks tend to extract more than their fair share of water, prioritising their own agricultural needs and often disregarding the downstream demand. These imbalances escalate minor disputes into serious confrontations.

The situation is further complicated by administrative and demographic challenges. Rapid population growth and the expansion of settlements demand and re-evaluation of existing water distribution policies and quotas. To prevent future conflicts, it is essential to foster inclusive dialogue among all stakeholders – from local farmers to regional authorities – to develop equitable and transparent water-sharing agreements.

Agricultural practices in the region also contribute to the strain. In Masaliev, Maidan, and Airybaz Aiyl Aimaks, water consumption is heavily influenced by the cultivation of high-value, water-intensive crops such as onions, cucumbers, cherries, and peaches. These crops are favoured for their early maturation and strong market demand, but their irrigation needs often exceed sustainable limits. The critical growing period coincides with the spring water shortage, making timely irrigation essential for quality yields. This year, many farmers reported poor harvests and reduced income due to insufficient water, compounded by drought conditions and crop diseases.

The upstream villages, particularly in Masaliev AA, consume a disproportionate share of water for intensive irrigation, leaving downstream communities with limited access. This growing inequity in water distribution fuels competition and social tension, especially during peak agricultural seasons.

TAJIKISTAN

KHOJABAKIRGHAN WATERSHED

The economy of people living in the Khojabakirghan Watershed is primarily based on agriculture. Households cultivate a variety of crops, including for food and fodder, like wheat, cotton, melons, tomatoes, cucumbers, apricots, pears, and apples. Cotton is a major cash crop in the region and is primarily grown for export. Cotton yields have increased in recent years, while cereal grains have fluctuated. Most recently, in 2018, yields were harmed by a major drought in the area. These challenges are likely to increase due to climate change trends.

UZBEKISTAN

ISFAYRAMSAY & SHAKHIMARDAN WATERSHEDS

The economy of the Toshlok and Fergana Districts is heavily rooted in agriculture, with a strong presence of light industry and small-scale enterprises. Both districts have a long-standing agricultural tradition, and cotton remains the cornerstone of local economic life. Vast fields in these areas are dedicated to cotton cultivation, supported by irrigation from the Isfayramsay and other canals.

In Toshlok, the district has a cotton gin, a garment factory, a textile and garment factory, construction organisations, and automobile enterprises. The main branch of agriculture is cotton growing. Sericulture, livestock farming, grain farming, melon and vegetable growing are also developed. There are 11 cooperative farms in the district. Cotton, grain, vegetables, melons, alfalfa, and beets are grown on the arable lands of the Toshlok District. Cattle, sheep, goats, and poultry are bred in collective and private farms in the district. Conditions in Fergana, while not directly assessed in detail, were noted to be similar.

Animal husbandry complements crop farming, with local households raising cattle, sheep, goats, and poultry. Silkworm breeding, a culturally embedded and economically valuable activity, is also practiced

here, contributing to household income and often involving the active participation of women and elderly family members.

In addition to farming, a network of small and micro-enterprises supports the rural economy. These include cotton ginning plants, grain product factories, sewing and confectionery workshops, furniture manufacturing, and automobile services. In Kuva, trade and public services are more developed, with local markets, a shopping centre, and even a pomegranate juice production workshop pointing to modest but growing agro-processing and retail activity.

The relatively high population density in both district (over 465 people per square kilometre in Toshlok) suggests land pressure and high dependence on a limited natural resource base. Nevertheless, the presence of cooperatives and joint ventures indicates an evolving local economy that balances traditional farming with emerging small-scale industry.

4.10: Gender Analysis

KYRGYZSTAN

In the area, traditional gender roles shape how men and women engage with water and natural resources. Men typically handle agriculture and water management, while women focus on household duties, including collecting water often from far distances, which can be unsafe. Women are largely excluded from decision-making due to cultural norms and limited access to land owing and training. Although some women have taken on more active roles especially when men migrate for work, systemic barriers remain.

Women's voices are mainly heard through underfunded women's committees, which focus on social issues rather than resource governance. Despite sharing concerns about water scarcity and climate change, women often lack the tools and opportunities to influence solutions.

TAJIKISTAN

In Tajikistan, Khojabakirghan Watershed covers populations in parts of Bobojon Ghafurov (B. Ghafurov) and Jabour Rasulov (J. Rasulov) Districts. The economy of B. Ghafurov is based on both agriculture and industry, due to the presence of large urban centres like the region's capital city, Khujand. As of late 2022, approximately 66% of the district's gross economy was industry, and 34% in agriculture. Most of the population (70%) continues to work in agriculture. Most agriculture is concentrated in dekhan farms or farms operated by households on long term leases.[37]The district is one of the largest producers of cotton, a major cash-crop in the country, accounting for 16% of total Sughd Region's production. There is also considerable entrepreneurial activity.

In J. Rasulov, gross output of industry and agriculture are similar to B. Ghafurov District. Approximately 88% of the population works in agriculture and is highly reliant on the irrigation network. In Tajikistan, much of the population has migrated abroad; 83% of the migratory population is male, often leaving

[37] Water for Sustainable Development, Assessment of socio-economic and environmental characteristics of the areas of the Khojabakirghan River sub-basin, October 2023.

women to manage businesses and farms, in addition to raising children and managing households, increasing the burden on women.

UZBEKISTAN

In the Toshlok and Kuva Districts of Uzbekistan, which form part of the Isfayramsay Watershed, gender roles appear to reflect traditional patterns common across many rural areas. The population is ethnically diverse, with Uzbeks forming the majority, but with visible communities of Tajiks, Kyrgyz, Russians, and other nationalities. The specific gender-disaggregated data was not available, and the distribution of labour and types of local industries offer important clues about gender dynamics in the region.

The dominance of agriculture and the presence of industries like textile, sewing, and silkworm production suggest that many women in these districts are engaged in those economic activities. Women are likely to play central roles in household-level agriculture, animal husbandry, and sericulture—tasks traditionally associated with female labour in Uzbek rural settings. Meanwhile, the sewing and textile factories in the area provide employment opportunities for women beyond the home, especially in small towns and semi-urban areas.

4.11: Legislation

KYRGYZSTAN

The articles within these laws provide the legal basis for implementing and ensuring civil society and private sector compliance with state requirements for environmental protection and social requirements, impact mitigation, as presented in the table below (WAPCOS, 2025).

Table 22: Legislation on environmental and social protection, Kyrgyzstan

#	Name of Legal Document	Date of Adoption	Last Revision	Key Framework / Relevance
1	Constitution of the Kyrgyz Republic	27.06.2010	05.05.2021	Guarantees equality regardless of gender, race, language, disability, etc. Article 24 ensures equal rights and prohibits discrimination. Article 32 bans propaganda of hatred or superiority. Article 44 ensures the rights of persons with disabilities and the system of social protection.
2	Labor Code	04.08.2004	23.01.2025	Ensures labour rights, favourable working conditions, and legal balance between employees, employers, and state.
3	Land Code	02.06.1999	29.07.2024	Regulates land ownership, use, and protection under state, municipal, and private systems. Provides land rights registration and enforcement.
4	Water Code	12.01.2005	10.12.2021	Governs use and conservation of water resources for sustainable supply and environmental protection.
5	Law on Environmental Protection	16.06.1999	13.06.2024	Establishes environmental policy and legal framework, including Environmental Impact Assessments and protected areas. Prohibits use of resources without a positive state environmental review.

#	Name of Legal Document	Date of Adoption	Last Revision	Key Framework / Relevance
6	Law on Protection of Atmospheric Air	12.06.1999	14.06.2024	Regulates use and protection of air resources.
7	Law on Water	14.01.1994	05.04.2019	Covers use and protection of water bodies and legal compliance in water management.
8	Law on Environmental Expertise	16.06.1999	04.05.2015	Provides legal framework for environmental expertise and EIAs to safeguard environmental rights.
9	General Technical Regulations on Environmental Safety	08.05.2009	08.07.2019	Defines technical norms for environmental safety in production, storage, transport, and disposal of goods.
10	Law on Protection and Use of Plant World	20.06.2001	23.03.2020	Legal foundation for protection, rational use, and restoration of plant biodiversity.
11	Law on Ensuring Fire Safety	13.12.2022	16.01.2024	Technical regulations and fire safety provisions for buildings, products, and public protection.
12	Law on Industrial Safety of Industrial Facilities	02.08.2016	10.01.2023	Ensures safe operation of hazardous industrial facilities and accident mitigation readiness.
13	Law on Chemicalization and Plant Protection	25.01.1999	06.07.2023	Regulates use of chemicals in agriculture, plant protection, and prevention of contamination.
14	Law on the right of Access to Information	29.12.2023	29.12.2023	Ensures everyone's right to access public information and promotes transparency and accountability
15	Law on Access to Information of State and Local Authorities	28.12.2006	29.12.2023	Ensures public access to government-held information and transparency of authorities.
16	Law on Procedure for Considering Citizens' Appeals	04.05.2007	12.02.2025	Provides citizens with the right to appeal to public institutions and regulates their response obligations.
17	Law on Electronic Government	19.07.2017	27.01.2025	Develops informatisation processes and protection of rights in electronic communications with government.
18	Law on State Administration andLocal Self-Government	20.10.2021	04.06.2025	Outlines roles and responsibilities of local governments and the organisation of local governance.
19	Law on Labor Protection	01.08.2003	26.07.2016	Establishes conditions and responsibilities for workplace safety and employee health.
20	Law on Rights and Guarantees of Persons with Disabilities	03.04.2008	23.01.2025	Ensures rights, protection, and integration of persons with disabilities. Promotes accessibility and non-discrimination.
21	Regulation on State Environmental Assessment	—	28.06.2017	Government regulation defining procedures for state environmental assessments in development projects.
22	Regulation on Environmental Impact Assessment (EIA)	—	13.02.2015	Sets out the process and legal requirements for conducting EIAs to assess social, economic, and ecological impacts of planned activities.

#	Name of Legal Document	Date of Adoption	Last Revision	Key Framework / Relevance
23	Regulation on Water Protection Zones and strips of water bodies	07.07.1995	29.07.2022	Establishes zones for water body protection; regulates permitted land use and activities to safeguard water resources.
24	Law on Production and Consumption Waste	15.08.2023	—	Prevents environmental and health risks from waste; encourages reuse of waste as economic resource.
25	Law on Wildlife	17.06.1999	23.03.2020	Regulates protection and rational use of wildlife; ensures biodiversity and habitat conservation.

TAJIKISTAN

The legislation of the Republic of Tajikistan in the field of environmental management consists of a significant number of legislative and regulatory acts, including articles of the Constitution, laws, by-laws, resolutions of the Government of the Republic of Tajikistan (GRT) and international environmental conventions ratified by the Parliament of the Republic of Tajikistan. Below table shows the main legislation in Tajikistan (WAPCOS, 2025).

Table 23: Legislation on environmental and social protection, Tajikistan

#	Name of Legal Document	Date of Adoption	Last Revision	Key Framework / Relevance
1	Constitution of the Republic of Tajikistan	06.11.1994	22.05.2016	Article 13 establishes state ownership of natural resources; Article 12 ensures freedom of enterprise; Article 38 obliges the state to protect public health and the environment; Article 44 mandates all citizens to preserve the environment and cultural heritage.
2	Law on Environmental Protection	22.06.2011	08.06.2022	Core environmental law: establishes standards, liability, environmental emergencies, EIA, economic mechanisms, and the rights of the public to a safe environment. Replaced the 1993 law and integrates enforcement and compliance mechanisms.
3	Law on State Environmental Expertise	16.04.2012	13.11.2024	Requires state review of projects that use natural resources or may harm the environment. All national/local projects must pass environmental expertise.
4	Law on Environmental Monitoring	25.03.2011	13.11.2024	Establishes a unified national environmental monitoring system, including institutional responsibilities and public participation.
5	Law on Protection of Atmospheric Air	28.12.2012	—	Regulates air quality, emissions, ozone protection, and monitoring. Introduces permits, penalties, and best available technologies. Replaces 1996 law.
6	Law on Environmental Audit	26.12.2011	13.11.2024	Provides framework for compliance assessments of enterprises; audits may be state-mandated.
7	Law on Management of Production and Consumption Waste	25.07.2005	—	Governs waste management responsibilities, monitoring, disposal, and sanctions. Requires proper handling of waste during all lifecycle stages.
8	Water Code of the Republic of Tajikistan	02.04.2020	—	Governs use, planning, protection, permitting, and dispute resolution. Encourages sustainability and delegates irrigation management to WUAs.
9	Land Code of the	13.12.1996	22.06.2023	Defines land tenure types, tax mechanisms, dispute

#	Name of Legal Document	Date of Adoption	Last Revision	Key Framework / Relevance
	Republic of Tajikistan			resolution, and sustainable land use rules. Provides for land revocation if use causes degradation.
10	Law on Water Users Associations	02.01.2020	02.01.2025	Regulates organisation and management of local WUAs; promotes efficient water resource use and conservation at community level.
11	Law on Dekhan Farming	15.032015		Provides rights and responsibilities of private farms; mandates payment for utilities, land stewardship, and reporting to authorities.
12	Law on Plant Protection	02.01.2019	20.06.2024	Ensures phytosanitary safety, regulates pesticide use, and promotes food security. Supported by numerous related decrees and regulations.
13	Civil Code of the Republic of Tajikistan	05.01.2008	03.01.2024	Regulates property rights, environmental obligations in civil activities, and liability. Applies to environmental protection unless covered by special laws.
14	Labor Code of the Republic of Tajikistan	23.07.2016	20.06.2024	Prohibits forced labour and discrimination (Articles 7–8); regulates workplace safety (Section 5) and women's labour restrictions (Article 216); provides dispute resolution framework.
15	Law on Freedom of Information	18.06.2008	—	Ensures access to public documents affecting citizens' rights, with exceptions for state secrets. Supports government transparency.
16	Law on Appeals of Individuals and Legal Entities	23.07.2016	03.01.2024	Defines complaint mechanisms and sets review deadlines (15–30 days). Applicable for grievance redress.
17	Law on Local Government Bodies	05.08.2009	04.04.2019	Grants local authorities' responsibility over natural resources, public health, environmental facilities, and oversight of assemblies.
18	Law on Public Associations	12.05.2007	25.06.2021	Permits creation of NGOs for advocacy; regulates international funding and association rights.
19	Law on Public Assemblies, Marches, and Rallies	31.12.2014	—	Requires prior approval for mass gatherings; restricts rights of persons with administrative offenses from organising events.
20	Law on Protection and Use of Historical and Cultural Heritage	03.03.2006	30.05.2017	Prohibits unauthorised construction on heritage sites; regulates preservation and restoration.

UZBEKISTAN

Uzbekistan has strengthened its environmental laws and policies, focusing on sustainable resource use and ecosystem protection. Key principles include integrating economic and environmental goals, shifting to comprehensive ecosystem preservation, and promoting shared societal responsibility for the environment. The nation's Constitution and environmental laws uphold citizens' rights to a healthy environment and outline their associated responsibilities. Below table provides information on laws and legislations in Uzbekistan (WAPCOS, 2025)

Table 24: Legislation on environmental and social protection, Uzbekistan

#	Name of Law	Date of Adoption	Last Revision	Framework of Environmental Protection Laws
1	Constitution of the Republic of Uzbekistan	08.12.1992	30.04.2023	Articles 49, 61, 62, 68. Article 49 guarantees everyone's right to a favourable environment and access to reliable environmental information.
2	Law "On Nature Protection"	09.12.1992	21.10.2021	Establishes legal, economic, and organisational foundations for environmental protection and sustainable development. Includes principles such as state environmental expertise (SEE). Article 12 obliges citizens to use natural resources rationally and comply with environmental requirements.
3	Law "On Water and Water Use"	06.05.1993	30.11.2021	Ensures rational use and protection of water resources, prevention and elimination of harmful water impacts, and protection of the rights of various users including enterprises, farms, and citizens involved in water-related activities.
4	Law "On Subsoil"	23.09.1994	21.04.2021	Regulates use and protection of subsoil resources, supports ecological safety and sustainable development of mineral resources.
5	Law "On Environmental Protection Expertise"	25.05.2000	14.09.2017	Provides the legal basis for mandatory EIA to evaluate effects on the environment and human health before implementation of activities.
6	Law "On Specially Protected Natural Areas"	03.12.2004	08.01.2019	Aims to preserve valuable and unique natural complexes and the genetic fund of flora and fauna. Prevents negative human impact and supports biodiversity conservation.
7	Law "On the Protection and Use of Flora"	26.12.1997	21.09.2016	Regulates conservation and sustainable use of plant resources and their habitats, ensuring biodiversity preservation.
8	Law "On the Protection and Use of Wildlife"	26.12.1997	19.09.2016	Provides legal foundation for sustainable use and protection of wild animals and their ecosystems.
9	Law "On the Protection of Atmospheric Air"	27.12.1996	13.03.2019	Regulates emission standards, ensures air quality, and minimises harmful effects of air pollution.
10	Law "On Waste"	05.04.2002	10.10.2018	Regulates safe handling, recycling, and disposal of waste; prevents environmental and health risks from waste mismanagement.
11	Law "On Environmental Control"	27.12.2013	27.12.2013	Aims to prevent, detect, and address violations of environmental law. Focuses on monitoring environmental conditions and managing factors that could lead to pollution or harm to human health.
	Code of Administrative Responsibility	22.09.1992	29.08.2024	Establishes legal measures for holding individuals and entities accountable for violations of environmental and social protection regulations, including unlawful use of natural resources and failure to comply with ecological and labour standards
	Urban Planning Code	23.05.2021	29.08.2024	Regulates city planning, construction norms, zoning laws, land use, and infrastructure development. Ensures sustainable urban development, safety standards, and compliance with environmental regulations.

#	Name of Law	Date of Adoption	Last Revision	Framework of Environmental Protection Laws
12	Civil Code (CC)	29.08.1996	18.04.2018	Defines legal status in civil relations, property rights, compensation mechanisms (actual damage, lost profits), and conditions for property seizure and termination of rights.
13	Land Code (LC)	30.04.1998	24.07.2018	Regulates land ownership, use, transfer, and seizure for public needs; defines roles of state bodies and compensation mechanisms for land withdrawal.
14	Law No. ZRU-781 on Land Seizure for State Needs	29.06.2022	–	Sets procedures for land seizure with compensation; applies to individuals and legal entities with various tenure types (lease, permanent use, etc.).
15	Cabinet Resolution No. 146 – Land Allocation and Compensation	25.05.2011	–	Approves regulations on land provision for urban and other non-agricultural use; defines compensation for landowners, tenants, and users in case of losses.
16	Cabinet Resolution No. 317 – Cadastral Documentation & Loss Calculation	21.09.2016	–	Designates responsibility to "Uzdaverloyikha" for loss calculations in land seizure cases; focuses on agricultural and forestry losses.
17	Presidential Decree No. 5490 – Creation of Compensation Fund	27.07.2018	–	Establishes a centralised fund for compensating citizens and businesses affected by land seizure for state/public needs; mandates coordination with the Fund.
18	Cabinet Resolution No. 1047 – Use of Centralized Compensation Fund	26.12.2018	–	Regulates fund use to compensate individuals and legal entities for land acquisition under state/public projects.
19	Presidential Decree No. 5491 – Guarantee of Property Rights	03.08.2019	–	Requires open discussion and benefit-cost analysis before land seizure; mandates full compensation including real estate market value and incurred losses.
20	Law No. ZRU-561 "On the Protection of Women from Oppression and Violence"	02.09.2019	–	Regulates protection of women against all forms of violence; defines institutional responsibilities and preventive measures.
21	Presidential Decree No. UP-175 – Social Protection Strategy	25.07.2022	–	Approves the Strategy for Social Protection; aims to expand services, ensure digital transparency, and support vulnerable populations including persons with disabilities.
22	Presidential Decree No. UP-6277 – Poverty Reduction & Financial Support	11.08.2021	–	Enhances financial support to low-income families; supports national and global social protection commitments (e.g. SDGs).
23	Presidential Decree No. 5495 – Improving Investment Climate	01.08.2018	–	Requires land seizure decisions to undergo open discussion; promotes transparency and stakeholder engagement in development processes.

#	Name of Law	Date of Adoption	Last Revision	Framework of Environmental Protection Laws
24	Cabinet Resolution No. 3857 – IFI Project Compensation Rules	–	–	Sets compensation conditions for land and property losses during international donor-funded projects; ensures compliance with IFI safeguard policies.
25	Cabinet Resolution No. 981 – Water Protection Zones	11.12.2019	–	Defines procedure for creating water and sanitary protection zones; regulates activities to prevent pollution and depletion of water bodies.

IMPACT ASSESSMENT

5.01: Impact Assessment Overview

The Impact Assessment section of this report presents the results of the ESIA Workshop, in which participants provided inputs on both 1) The hazards that were likely to harm construction and maintenance of the infrastructure projects, and 2) Any potential negative impacts that the infrastructure could have on the communities where it is installed. As noted in the methodology section, participants in each workshop were divided into three groups, based on difference categories of hazards and negative impacts within a climate change context:

I) **Environmental:** natural hazards, such as earthquakes, flooding, and climate impacts

II) **Biodiversity:** ecosystem and biodiversity concerns, and the wider environment

III) **Social and Economic:** inter-communal relations, conflict, and human and governance related issues.

Both the hazards and negative impacts were addressed in separate sessions. After listing the major hazards and negative impacts and their consequences, participants ranked them in order of likelihood and severity, and from that calculated the overall risk for each hazard to the project, and for each negative impact to the community. Participants then selected the highest risks and provided suggested mitigation measures to that can be implemented, either by the infrastructure implementer, or by local stakeholders, to address these key hazards and negative impacts. Only the most concerning risks and negative impacts, in terms of their likelihood and severity, were selected; those that were not deemed important enough were not included in the final lists of risks and negative impacts. Workshop participants were then asked to provide a list of potential mitigation measures to address how potential impacts from the selected hazards to the infrastructure, and the potential negative impacts of the infrastructure installation on the community, might be addressed, either through mitigation or complete prevention.

The final results are shown in the tables below; Section 5.02 covers hazards to the infrastructure, while section 5.03 covers the potential impacts that the infrastructure may have on the surrounding community. These issue is presented, along with the phase of the project when they are relevant (either construction of the infrastructure or its operation), as well as the potential mitigation measures suggested by the community for each measure.

As most issues were either mentioned by participants as being relevant for the infrastructure in all five locations, or were determined by the assessment team to be relevant for all five project locations, the

hazards and potential impacts are presented as general findings, applicable to all sites. The specific hazards and potential impacts mentioned in each location, including both those selected and not selected, can be found in Annex 3. 1 and **Error! Reference source not found.**. at the end of this document, respectively. The final results represent the primary concerns and solutions, as determined by the communities where the infrastructure will be implemented, in order to ensure a community-lead, "do no harm" approach. the results are presented separately for each country watershed in an itemised format in the section below:

5.02: Risks to Water Infrastructure

The defined risks in the section below outline the potential hazards that may pose risks to the infrastructure, either during or after completion of construction of the infrastructure. This section first covers general issues observed by workshop participants in all or almost all of the watersheds, followed by watershed specific hazards noted afterwards, divided up by each of the five watersheds in three countries. Risks are divided thematically into environmental, ecosystem/biodiversity, and social and economic risks. At the end of each thematic section, proposed mitigation measures to reduce the impacts and harm of key selected hazards are provided, which should be integrated into final Environmental and Social Management Plans (ESMPs) if possible.

General Hazards in All Watersheds

5.02.1 Environmental Hazards

Phase	Hazards	Mitigation Measures
Design	**Earthquakes**: Although infrequent, seismic activity poses a severe risk to canal structures and has had lasting impacts. These can damage sluice gates, water meters, and pipeline joints, disrupting water supply and leading to inaccurate water accounting. A notable earthquake approximately 20 years ago caused structural damage to concrete irrigation canals. Expansion joints and adherence to technical construction standards are needed to improve resilience.	• Ensure canals are constructed with high-quality materials, meeting all technical standards, and include expansion joints to withstand seismic activity.
Construction	**Extreme Temperatures (Heatwaves / Coldwaves):** Temperature fluctuations may cause expansion and contraction of materials, resulting in cracks, reduced meter effectiveness, and shortening infrastructure lifespan, especially in the absence of climate-resilient design and maintenance capacity. Frost can further damage sensors and canal linings, especially when structures are not insulated or drained before winter, compromising meter accuracy and canal integrity.	• Use insulation or thermal protection techniques at critical points to reduce the risk of freezing and ensure continuous water flow. • Install frost-resistant or weatherproof instruments in vulnerable locations. • Regularly inspect and maintain equipment during winter months to prevent failure. • Use high-quality materials that are resistant to excessive expansion and contraction from heat and cold.
Construction	**Mudflows**: Seasonal mudflows and flash floods were cited as frequent and destructive. These events often overwhelm	• Reinforce dams and maintain the main water intake structures in

Phase	Hazards	Mitigation Measures
	canal systems, causing overflows and clogging canals with debris such as sand, stones, and organic matter, disrupting water flow and damaging sluices and hydroposts. If these sluices are not pre-emptively closed, they risk being destroyed by the force of floodwaters At water gates, the absence of mudflow barriers and inadequate drainage and sediment management allows debris to enter the system, potentially blocking water flow.	optimal working condition to ensure reliable and safe operation. • Reduce water volume through sluices to minimise infrastructure stress. • Use proper drainage systems around water meter installations to prevent waterlogging. • Use high-quality, durable, and flood-resistant measuring equipment. • Ensure internet connectivity where data transmission is required.
Operation	**Flooding:** Seasonal heavy rainfall and spring floods in Fergana Region can lead to debris flow and overflow in canals, damaging low-lying water meters and exposing vulnerable infrastructure. Despite the presence of flood barriers, natural floods remain difficult to predict or control, increasing the risk to water infrastructure.	• Promptly close the main water intake structure to reduce water volume in the canal system upon receiving alerts of a mudflow or flood to prevent damage and ensure irrigation system safety. • Conduct regular canal cleaning to prevent sediment buildup and equipment blockages. • Develop an early warning system and maintenance plan for extreme rainfall.
Construction	**Landslides:** The hilly terrain and deforestation in Fergana District increase the likelihood of landslides during rainy seasons, posing a risk to meters and canals built on unstable ground.	• Repairing of damaged concrete lining in canals, and protective slabs of concrete to protect against landslides.
Operation	**Sediment Hazards**: From late May through early September, rapid snowmelt leads to rivers carrying high loads of fine sediment. This sediment clogs canals and hydroposts, interferes with water measurement, and can damage microchips and sensors, leading to inaccurate data or equipment failure.	• Conduct mechanical cleaning early in spring through community mobilisation (e.g., '*Ashar*') to mitigate sediment accumulation. • Construct a sedimentation basin at the canal's head to trap sand and debris. • Physically inspect water flow regularly to ensure proper operation and detect blockages early. • Maintain and clean sluices regularly to avoid blockages and maintain accurate water distribution, particularly in peak sediment periods in June and July.
Construction	**Coastal/Bank Erosion:** Canal banks are gradually eroding, making structures more vulnerable to environmental and mechanical damage from changes in water flow patterns that can contribute to particulate buildup, increasing the risk of	• Apply shoreline stabilisation techniques and implement erosion control measures to protect canal integrity in vulnerable areas.

Phase	Hazards	Mitigation Measures
	infrastructure clogging and reducing the effectiveness of water distribution systems. Long-term use, especially over 20–30 years, results in erosion of concrete canals, weakening infrastructure and increasing water loss.	
Construction	**Lightning:** Lightning might pose a significant risk to electronic monitoring systems.	• Install lightning protection wires when placing new instruments to safely redirect electrical discharges and protect equipment.
Construction	**Hail:** Hailstorms can physically damage water meters and disrupt monitoring functions.	• Use protective covers or enclosures to shield water meters from damage caused by hailstorms.
Operation	**Strong Winds**: Particularly during autumn, strong winds can break tree branches, which then fall into canals and water infrastructure. This not only obstructs water flow but can also damage sensitive equipment like ultrasonic water measuring instruments. Strong winds can physically damage poorly protected water infrastructure, including gates and meters, and in low-trust environments, such damage may be misinterpreted as deliberate interference, further fuelling conflict and suspicion.	• After high wind events, inspect canals – especially those near trees – and clear fallen branches or leaves. Maintain a 3–6 m water protection zone along rivers based on canal size. • Conduct regular inspections to assess potential wind damage and ensure operational integrity. • Equip instruments with protective devices to prevent damage from strong winds and heavy rainfall.
Operation	**Waterlogging from High Groundwater:** Poor drainage and irrigation practices lead to seasonal waterlogging, weakening canal embankments and reducing soil stability.	• Improve canal and drainage design to allow excess water to be efficiently diverted. • Monitor groundwater levels and seasonal rainfall to anticipate waterlogging risks.

5.02.2 Ecosystem/Biodiversity Hazards

Phase	Hazards	Mitigation Measures
Construction	**Wild Tree Growth Near Canals:** The unchecked growth of wild trees along canal banks can lead to root intrusion, which can compromise the structural integrity of canal walls by pushing pieces of them out of place, and creating large	• Only plant tree species with non-invasive root systems to reduce the risk of root-related damage. • Maintain a clear buffer zone by ensuring a safe planting distance from the canal and

Phase	Hazards	Mitigation Measures
	leaks in the canal.[38] Additionally, during windy weather, falling leaves and branches often clog the canals, disrupting water flow and delaying water delivery to users. In Kyrgyzstan, Tree planting within water protection zones is also common and unregulated. These trees can obstruct water flow and hinder routine canal maintenance.	water infrastructure. • Install underground root barriers where necessary to prevent intrusion and protect structural integrity. • Conduct regular inspections and prune or remove hazardous trees. • Raise community awareness on proper tree planting near water facilities.
Operation	**Vegetation Growth in Canals and Hydro posts:** The presence of aquatic and semi-aquatic plants inside canals and hydro posts was reported to reduce water flow efficiency. This vegetation not only clogs the system but also interferes with the accuracy of water volume measurements. Specifically, reeds growing within the canal bed were identified as a major obstruction to water flow. Their dense root systems slow down water movement and increase the risk of sediment accumulation, which can lead to further blockages.	• Perform regular canal weeding and vegetation clearing near infrastructure. • Utilise community-based maintenance methods like *Ashar* or standard Operation and Maintenance (O&M) procedures.
Operation	**Excessive Growth of Aquatic Plants and Biofouling of Structures:** In semi-arid areas, such as lower-watershed areas, nutrient-rich runoff accelerates plant growth in canals, reducing flow and increasing maintenance needs. Aquatic plant growth and biofouling around water meters and canal structures can block sensors, erode linings, and impair the function of water-measuring equipment, especially where silt builds up unchecked.	• Conduct regular canal maintenance and cleaning to remove overgrown vegetation. • Apply upstream erosion control techniques to reduce nutrient and sediment inflow. • Apply environmentally safe herbicides as needed. • Educate farmers on responsible fertiliser use to reduce runoff.
Construction	**Livestock Hazards**: Unsupervised livestock frequently fall into canals, causing blockages and damaging infrastructure. In some cases, the presence of decaying animal carcasses in the water can pose health risks to the community from water contamination.	• Install fences or barriers to prevent livestock from entering areas with water measuring instruments. • Raise awareness in local communities about the risks and consequences of livestock access near canal infrastructure.
Construction	**Moisture Infiltration (Seepage):** Tree roots and poor-quality canal linings can allow moisture to seep into concrete structures, weakening both	• Rehabilitate canals using impermeable lining materials.

[38] PATRIP Representatives observed this phenomena during a field visit in 2024, where tree growth next to the canal had pushed a section of the concrete canal off of its stand, creating a large leak between the connection points of the canal.

Phase	Hazards	Mitigation Measures
	water meters and canal walls and increasing the likelihood of collapse or leakage. Seepage through poorly maintained canal walls and meter bases undermines structural stability, leading to long-term damage to both canal beds and measurement systems.	• Inspect infrastructure routinely for cracks and seepage. • Use concrete and geomembrane linings in critical zones. • Monitor groundwater levels near canals for early warning signs.
Operation	**Bird Nesting and Animal Interference:** Birds and small mammals frequently build nests on exposed water meters, obstructing sensors and contributing to inaccuracies in measurement.	• Monitor equipment for bird nests and notify local authorities for removal and relocation.
Operation	**Gopher Burrows:** Although rare, gophers have been observed digging burrows near earth ditches. These burrows can cause localised water loss by creating underground escape routes for canal water.	• Monitor area for the gopher burrows and notify local authorities for removal.

5.02.3: Socio-Economic Hazards

Phase	Hazards	Mitigation Measures
Operation	**Children's Activities**: Children frequently play in and around irrigation fields, often blocking canals with stones to create makeshift pools for swimming. In some cases, they have damaged sensitive equipment, such as water meters, by throwing stones.	• Raise awareness in schools and communities about the value and function of water meters; consider using tamper-proof or vandal-resistant equipment in high-risk areas.
Design Operation	**Water Theft and Vandalism**: A common issue during the irrigation season is the deliberate theft of equipment and breaking of sluices and water gates by individuals attempting to divert water for personal use. There is overall limited community engagement and a weaker sense of ownership over the infrastructure. These acts of vandalism not only disrupt equitable water distribution but also damage infrastructure. In the absence of formal access points, residents may break holes into canal walls to extract water, causing long-term damage and leakage. This disrupts supply, reduces equity, and undermines trust in water governance.	• Design and construct sufficient official water access points as part of rehabilitation works. • Engage communities in participatory planning to identify strategic access locations. • Monitor and promptly repair any unauthorised breakages to minimise water loss and structural damage. • Strengthen physical protection through fencing and locks on vulnerable assets. • Organise regular patrols or establish community watch groups. • Create a clear system for reporting incidents and enforcing penalties.
Operation	**Conflicts / Social Disputes:** Disagreements over water usage during irrigation seasons have been	• Appoint local water management personnel; establish clear rules for water allocation and gate operations; raise public

Phase	Hazards	Mitigation Measures
	reported near water meters and water gates, sometimes resulting in physical damage to infrastructure. Water scarcity during peak irrigation periods can increase the likelihood of these disputes by increasing competition between community members. Among many communities, there is a prevailing sense of mistrust toward those responsible for water distribution, with accusations of favouritism or mismanagement being common. Sometimes water infrastructure is deliberately damages as a result.	awareness about fair distribution; and include community leaders in conflict mediation and planning. • Improve transparency in water allocation processes and meter readings. • Promote participatory water governance by involving communities in decision-making. • Train local mediators or community leaders to help resolve water-related disputes.
Construction	**Lack of Financial Resources:** Funding shortfalls from both project implementers and local authorities have delayed or left some projects unfinished, especially concerning water meter installations, causing discontent among local populations. These shortfalls threaten timely project execution and infrastructure sustainability. Delays in financing repairs and construction, along with insufficient resources to replace damaged equipment can lead to infrastructure deterioration and service disruption.	• Ensure project budgets include allocations for long-term operation, maintenance, and repairs. • Mobilise co-funding from donors, local governments, or communities. • Strengthen financial planning and introduce timely, transparent financing. • Develop a long-term financial strategy covering maintenance and operations. • Secure funding from local, regional, and international donors or programmes. • Implement cost-sharing mechanisms or affordable user fees. • Improve financial reporting to build trust and attract sustainable financing.
Operation	**Waste Dumping into Canals:** Improper disposal of waste in canals can severely blocks water flow, contaminates water quality, and damages both canal infrastructure and instruments, driven by low community awareness. Water meter readings are disrupted by this, while exposed instruments are sometimes obstructed by nests or debris from local wildlife. This is often driven by low public awareness and the absence of effective waste management systems. In Kozu-Baglan watershed, specifically, Repeated clogging of canals with trash, sediment, and debris has been a persistent issue, with historical disruptions noted in 1990, 2000, 2004, and 2005. Poor maintenance and delayed cleaning	• Organise community awareness campaigns on proper waste disposal and the consequences of canal pollution. • Increase sluice monitoring during the irrigation season (May to August) to prevent clogging and maintain water flow. • Frequently check and maintain ultrasonic water level meters to ensure functionality and accuracy. • Create and follow a maintenance schedule for hydroposts to ensure consistent and accurate water measurements and flow. • Employ dedicated personnel for maintenance, rapid response, and emergency management. • Install protective screens and debris-catching nets at canal inlets to prevent blockages. • Monitor ultrasonic meters regularly and ensure accurate readings.

Phase	Hazards	Mitigation Measures
	have made this issue worse.	
Construction	**Improper Management:** Weak project oversight and lack of local technical expertise have led to repeated design errors and inefficient construction practices.	• Conduct regular inspections and maintenance of concrete surfaces in canals and water gates to prevent structural degradation. • Apply rust-resistant substances (such as protective oils or coatings) to gate surfaces on a scheduled basis to prevent corrosion.
Operation	**Improper Seasonal Use:** Canals are intended for use during the irrigation season, but due to water shortages, authorities sometimes authorise water flow in late autumn and winter. This off-season use can lead to freezing, cracking, and long-term structural damage to the canals.	• Local authorities should develop schedules for water usage, and these should be strictly enforced by local stakeholders.
Construction	**Lack of Skilled Specialists:** Many rural projects face installation and oversight challenges due to limited technical capacity, resulting in poorly functioning equipment and unreliable data. Previous installations have shown poor workmanship and malfunctioning equipment due to the lack of qualified personnel. **Calibration Drift Over Time:** Without regular calibration and maintenance, meters may provide inaccurate readings, especially under fluctuating weather conditions.	• Ensure proper Operation and Maintenance (O&M) training for dedicated staff responsible for the maintenance of infrastructure from stakeholder organizations. • Redesign and formalise the role of the local water coordinator in each village to ensure effective oversight, community engagement, and coordinated decision-making on water management.
Operation	**Lack of Targeted Support for Vulnerable Groups:** In Kyrgyzstan, there is no official system to register or prioritise vulnerable individuals, such as people with disabilities or elderly living alone, for water distribution. Local authorities claim to be aware of those in need and offer informal support vulnerable people. In Uzbekistan, the removal of designated village representatives has made it harder for vulnerable groups to access water, reducing equity in distribution.	• Representatives from local groups should be consulted as part of the operational decision making regarding water allocation.

5.03: Potential Negative Impacts of Infrastructure Rehabilitation

The specified negative impacts noted in the section below outline the potential negative impacts that the infrastructure may have on the surrounding environment or community, either during the process

of construction of the infrastructure, or from the infrastructure after completion of installation. The concerns raised by representatives for each of the five watershed communities where works are proposed were very similar, reflecting a common understanding of the potential negative impacts that water meter installation and canal reconstruction may have on the surrounding environments, ecosystems, and communities, divided thematically into environmental, ecosystem/biodiversity, and social and economic impacts.[39]

To represent this common understanding, the results are presented below as generalized findings of the potential negative impacts, divided by phases of implementation in which the impacts are likely to manifest (construction or operation phases). A final list of proposed mitigation measures to reduce the impacts and harm of key selected negative impacts are provided at the end, generalized and divided by phase of implementation. The specific mitigation measures for each watershed and its surrounding community are defined in the following Stakeholder Engagement and Measurement and Monitoring sections, below.

For a full results of negative impacts for each watershed from each workshop discussion, as well as the overall likely severity of each, please see Annex 4.

POTENTIAL NEGATIVE IMPACTS IN ALL WATERSHEDS

5.03.1 Environmental Impacts

Phase	Negative Impacts	Mitigation Measures
Construction	**Damage to Surrounding Vegetation:** Heavy machinery and construction materials can damage grasses and plants near the canal. This is exacerbated by soil compaction and dust, which degrade soil quality and hinder regrowth. This situation was noted to have occurred previously in the Canal X-4 area of the Kozu-Baglan watershed in. In this case, the top soil restored naturally within approximately 1.5 years. This situation was noted to be a potential negative impact for both the rehabilitation of canals and hydroposts and water sluices. Designated maintenance roads and water protection zones help minimise this impact.	• Schedule construction activities post-harvest (ideally late autumn and winter) to avoid interfering with agricultural operations and wildlife activity. • Limit machinery movement to designated paths to avoid damaging farmland and sensitive habitats. • Use low-impact machinery to reduce soil disturbance and protect wildlife.
Design	**Improper Installation and Maintenance:** Faulty installation or poor maintenance of sluice gates and water management components can result in water loss and hinder efforts to regulate irrigation flow. These technical	• Use high-quality materials during installation. • Conduct routine maintenance, including painting and lubrication.

[39] For a comprehensive list of the results for each watershed from the workshop discussions, including their magnitudes, importance, and overall significance of each likely negative impact, please see Annex 4 of this document. Only the most significant negative impacts are included in this section of final results.

Phase	Negative Impacts	Mitigation Measures
	failures can reduce system efficiency and increase the risk of localised water shortages.	
Construction	**Contamination from Downward Water Flow:** Waste materials carried by downward water flow can lead to localised health risks and affect data accuracy. Regular cleaning and proper maintenance of these installations are essential to prevent contamination and ensure reliable measurements.	• Ensure that all materials used near water sources are non-toxic and cannot contaminate the water supply. • Construction teams must minimise the risk of construction materials entering water channels or being left in flow paths.
Construction	**Construction Waste Leading to Soil and Water Pollution:** Improper disposal of waste from construction activities – such as concrete residue or packaging materials – can degrade nearby soil and contaminate water sources, including farmland. Maintaining a clean construction area and enforcing waste management protocols are essential to minimise environmental harm.	• Crews should thoroughly clean the site after installation to prevent downstream pollution. • Implement strict waste management protocols throughout construction. • Conduct daily site clean-up to prevent accumulation of debris. • Collect, store, and transport construction waste to designated, approved disposal facilities (no on-site dumping or burial). • Provide training to construction workers on proper waste handling and environmental safety.
Construction	**Dust Pollution Affecting Residents and Livestock:** Dry, windy weather can spread dust generated during earthworks across settlements and pastures, impacting human respiratory health and animal welfare.	• Minimise construction noise and vibrations to reduce stress on local fauna. • Establish alternative habitats, such as replanting native vegetation zones along the canal. • Create buffer zones with native plant species to support and protect small wildlife populations.

5.03.2 Ecosystem/Biodiversity Impacts

Phase	Negative Impacts	Mitigation Measures
Construction	**Disturbance to Wildlife:** Construction noise and activity can stress animals and livestock temporarily. The drying of surrounding vegetation due to machinery use reduces shade and forage, worsening local wildlife habitat conditions. In Kozu-Baglan specifically, it was noted that area around Canal X4 is intensively used for agriculture, with limited wildlife presence. However, further downstream, hedgehogs and turtles have occasionally been observed.	• Relocate or restore affected vegetation through compensatory planting in nearby areas. • Remove leftover construction materials from the site. • Schedule construction activities outside of known breeding seasons to avoid disrupting local fauna.

Phase	Negative Impacts	Mitigation Measures
	These species tend to leave the area by autumn, but caution is still advised during construction to avoid disturbing any remaining wildlife.	
Construction	**Ecosystem Damage from Earthworks:** The use of heavy earthmoving equipment during construction may destroy local trees, bushes, and ground-dwelling animals, and birds' nests, resulting in ecosystem fragmentation and habitat loss, affecting local biodiversity.	• Use smaller or specialised machinery to limit damage to surrounding habitats. • Implement emission-reduction measures for construction machinery. • Train machinery operators in environmentally responsible construction practices.
Operation	**Reduced Groundwater Recharge:** Canal concreting reduces natural water infiltration, thereby lowering the groundwater table and affecting nearby ecosystems that depend on subsurface moisture.	• Monitor groundwater levels before and after canal lining to assess changes. • Integrate seepage control measures (e.g. lining with impermeable materials) in the design phase. • Consider using partial canal lining to reduce ecological impact while maintaining functionality.
Operation	**Harm to Small Wildlife from Increased Water Flow:** Post-concreting, water velocity increases may disrupt aquatic microhabitats and pose a threat to small wildlife such as amphibians, reptiles, and invertebrates.	• Design wildlife passages or create shallow edge habitats to support animal crossing and adaptation. • Regulate water flow rates gradually after construction to allow local wildlife to adjust. • Monitor wildlife response and impacts on biodiversity post-construction.
Construction	**Tree Removal Near Canal:** Cutting trees during canal construction may lead to habitat loss and contribute to soil erosion. This can reduce local vegetation cover and affect microfauna dependent on these habitats.	• Implement selective tree removal and avoid unnecessary cutting. • Replant trees or establish green buffer zones after construction. • Conduct a biodiversity impact assessment beforehand to minimise long-term ecological damage.

5.03.3: Socio-Economic Hazards

Phase	Negative Impacts	Mitigation Measures
Construction	**Crop Damage from Construction Machinery:** Rehabilitation work involving canals, hydroposts, and sluices may damage crops in adjacent agricultural plots. Since many of these lands are actively farmed, especially until mid-September, construction should be scheduled outside the growing	• Use smaller or specialised machinery to limit damage to surrounding habitats. • Implement emission-reduction measures for construction machinery. • Train machinery operators in environmentally responsible construction practices.

Phase	Negative Impacts	Mitigation Measures
	season to avoid disruption and potential conflict with farmers.	
 Construction	**Disruption of Water Flow:** Construction activities may temporarily block canal water flow, affecting irrigation schedules and water availability for farmers. This could negatively impact crop yields and cause tension in water-dependent communities, and may lead to disputes between the community and project implementers.	• Schedule construction during the off-peak irrigation season. • Construct temporary bypass channels to ensure uninterrupted water delivery. • Notify local communities in advance of construction activities so they can plan their water use accordingly.
 Construction	**Community Concern about Prolonged Construction:** Water supply may be temporarily interrupted during canal and gate rehabilitation or meter installation activities. Local residents were worried that construction may extend into critical farming periods, negatively impacting crop yields and disrupting their livelihoods. Since many families rely solely on agriculture for income, it is crucial that rehabilitation work be completed between late autumn and early spring to minimise conflict and economic hardship.	• Schedule construction activities between late autumn and early spring to avoid interference with the agricultural calendar. • Maintain clear and timely communication with local farmers to help them align their planting and harvesting plans with the project timeline.
 Construction	**Inconvenience to Local Residents:** Nearby residents may experience disturbances from construction noise, dust, and improper waste handling. These impacts can disrupt daily life and cause discomfort during extended works.	• Strictly follow construction standards and environmental regulations. • Use dust control measures such as water spraying. • Cover construction materials during transport and storage. • Provide regular updates to residents on construction progress, timelines, and potential impacts. • Create windbreaks or temporary barriers where feasible. • Schedule high-dust or noisy activities outside of peak hours. • Limit noisy construction operations to daytime hours to reduce disturbance.
 Operation	**Concerns over Water Meter Accuracy and Functionality:** Community members have expressed concern that newly installed ultrasonic water meters	• Conduct transparent community awareness campaigns on the purpose and benefits of the meters. • Establish and share a clear water distribution

Phase	Negative Impacts	Mitigation Measures
	may inaccurately record usage or break down. This suspicion stems from a lack of familiarity and technical understanding of such devices and the absence of previous measurement tools. The fear of reduced water supply or unfair billing may lead to mistrust in the infrastructure upgrade, and can lead to conflict if not handled appropriately. Transparent communication and public awareness efforts are needed to build trust and clarify how the system works.	schedule.
Operation	**Perceived Inequity in Water Distribution:** There are widespread perceptions that upstream communities receive a disproportionately large share of water. This belief can lead to tensions between upstream and downstream users, especially during water-scarce periods, and may undermine trust in water allocation systems. This may be exacerbated by changes in water distribution once water meters are installed.	• Schedule rehabilitation during the non-irrigation season. • Strengthen monitoring of water distribution to detect and address imbalances. • Adjust water allocations based on actual local needs. • Conduct community consultations to agree on fair and transparent distribution priorities.
Operation	**Impact on Irrigation Regimes:** Prior to concrete lining, farmers had direct and uncontrolled access to canal water. Regulated access post-lining can alter irrigation schedules, potentially reducing agricultural yields in some areas.	• Clearly communicate irrigation schedules to farmers ahead of changes. • Organise meetings to explain the benefits of regulated distribution. • Provide training sessions on water-saving and efficiency practices.
Operation	**Conflicts over Water Payments:** Introduction of water metering may lead to increased charges. Low-income households may find it difficult to afford payments, potentially creating social tension and dissatisfaction.	• Implement a gradual payment system or offer subsidies for vulnerable households. • Carry out awareness campaigns to explain how the water payment system works and its long-term benefits.
Construction	**Road Sharing with Farmers during Harvest:** Farmers often use the same roads along the canals during harvest season.	• Inform farmers in advance about programme activities timelines, access routes, and machinery schedules to prevent disruptions and ensure cooperation. • Hold community meetings to explain the purpose of rehabilitation and water metering, emphasising that fee increases are due to broader economic trends.

Phase	Negative Impacts	Mitigation Measures
Operation	**Mechanical Damage to Water Meters:** Conflicts during the irrigation season, especially over access to limited water resources, can result in physical damage to water meters and associated infrastructure, disrupting operations and necessitating costly repairs.	• Monitor irrigation sites during peak periods. • Protect meters from mechanical damage. • Conduct awareness campaigns on shared resource management.
Operation	**Increased Maintenance Costs:** Regular upkeep of newly installed infrastructure could create long-term financial burdens for farmers and local authorities, especially in the absence of dedicated funding support. In the event of meter malfunction or damage, it may be difficult for users to access timely technical support or replacement, potentially delaying water access or accurate billing.	• Establish maintenance agreements with local service providers to ensure timely repairs and continued functionality of water meters.
Operation	**Child Safety:** Children may play near construction sites and near equipment, and potentially get hurt or damage equipment.	• Install visible warning signs near canals to alert families and children to potential dangers. • Conduct awareness campaigns to educate parents and caregivers about seasonal risks and the importance of supervising children near open water.

Taking these potential negative impacts raised by the community representatives into account, Acted's technical experts developed the following recommendations for mitigation measures to mitigate such negative impacts. The Table below represents the overall recommendations.

5.04: Assessment Outcomes

The overall findings of the assessment found potential hazards and negative impacts raised by local community representatives were found to be relatively similar in each location, with slight nuances in the overall severities and significance of each hazard on and potential negative impact of each project on the surrounding environments and communities. This is mainly due to the relatively small scale of each project; the infrastructure to be constructed includes either the rehabilitation of pre-existing canals, or the installation of water meters and hydroposts at specific point locations. This limited most of the potential hazards to the immediate area around where the infrastructure would be installed or rehabilitated.

As noted in the previous section, the only negative impacts and hazards discussed are those ranked in the workshops by local stakeholders to have a high-enough likelihoods and severities to be of major concern, with the remaining hazards and negative impacts being ignored. For a fill breakdown of each hazard's ranking of likelihood and severity, and which were selected for mitigation and which were not,

please see Annex 3 for Hazards and Annex 4 for Negative impacts at the end of this document. As the specific hazards and negative impacts and their accompanying mitigation measures have been already covered in previous sections, the following discussion highlights the main trends and specific dynamics observed during the workshop discussions:

Impacts on the Environment

Overall, the potential hazards that may pose risks to the infrastructure, as well as potential negative impacts from the infrastructure itself, in each location were found to be very similar, and reflect common hazards faced by many communities, regardless of country, in the Fergana Valley. From an environmental perspective, earthquakes and mudflows were noted to have the potential to damage the infrastructure. To ensure longevity of the infrastructure, high quality materials should be used in the construction, and regular maintenance should be ensured to keep canals, sluice gates, and the areas around water meters and hydroposts clean to ensure their functionality over time. Mudflows in particular were identified as downstream risks that were exacerbated by the build-up of sediment. Sediment build up shrinks the total volume of water passing through the infrastructure and can also damage water monitoring infrastructure if not regularly monitored and cleaned, making mudflows more damaging to infrastructure and the communities around them.

Erosion of riverbanks and the concrete of canals, and rusting metal were also major concerns highlighted by many participants. As much of the current infrastructure has corroded due to a lack of careful maintenance, communities expressed concerns that, without close monitoring, the same thing could happen with newer infrastructure that is constructed as well, highlighting the importance of Operation & Maintenance (O&M) in ensuring that the new construction is maintained, protected, and is sustainable. Protective shielding for equipment is critical to protect it from environmental damage or careless community members.

The potential negative impacts reported by workshop participants were nearly identical between the different workshop participants. From an environmental perspective, most of the community concerns were around maintaining a clean and orderly construction site, and disposing of waste in a responsible manner to avoid construction waste leading to contamination of the surrounding water and soil, and permanent damage to trees and vegetation surrounding the construction site. Dust and noise pollution from construction was a concern as well. After construction, operational impacts were similar; proper maintenance and regular cleaning of the equipment is necessary to keep the installed equipment functional and rehabilitated canals free of clogging materials. The specifics of the proposed measures are detailed in the lists above.

Impacts on the Ecosystem/Biodiversity

From an ecosystem and biodiversity perspective, the main concerns were around the unchecked growth of vegetation; trees and other foliage has been allowed to grow around several of the infrastructure locations; in some cases, trees and root growth has pushed concrete canal segments out of their foundations or broken holes in the side of the canal casing, casing water loss. In addition, unchecked growth of aquatic based plants inside of canals and water infrastructure has caused biofouling, which has reduced water volume, eroded canal linings, and impaired the function of water monitoring equipment; in both cases, such vegetation will need to be removed and the infrastructure monitored and maintained to prevent re-growth.

Ecosystem and biodiversity negative impacts were also noted to be similar, and focus on similar issues to environmental concerns related to unmanaged construction sites, and poor operational

management. Disturbances to wildlife habitats, soil fauna, and aquatic organisms dependent on water carried by rehabilitated infrastructure were all concerns noted. Of particular note was the removal and replanting of trees and large flora, which in many cases have grown close enough to canals that they have pushed pieces of them out of their foundations or broken holes in their sides. Transplanting of trees and other plants will need to be carried out by contractors to ensure that ecosystems are not permanently disturbed.

It was also noted that, by nature of the proposed infrastructure activities both reducing leaks and cleaning aquatic plants from the canals and water management infrastructure, this would harm some pre-existing ecosystems that had come to depend on the dilapidated water infrastructure. In these cases, these impacts were accepted by all stakeholders as necessary, as these outcomes depend upon ecosystems that have come to exist due to the infrastructure being broken and dysfunctional.

Impacts on the Socio-Economic Situation of Communities

Both the environmental and ecosystem/biodiversity hazards worsened the socio-economic hazards identified by workshop participants. This included a number of issues mainly linked to poor maintenance, monitoring, and a lack of management of the canal infrastructure. Unsupervised children were known to throw rocks into canals for fun, and adults were known to dump waste in canals. Both behaviours increased the risk of canal blockages and impaired functionality of water monitoring equipment. In addition, concerns over a lack of adequate financing and skilled specialists to maintain and operate the canals and equipment was raised by most workshop participants; both issues can lead to a lack of adequate maintenance and management, causing inequitable distribution of water, particularly between upstream and downstream communities.

Participants in all of the workshops noted that all of these existing hazards to the infrastructure had the potential to create conflict between communities, particularly between those upstream, who received water first and were presumably less affected by the impacts of various hazards, and those downstream who had to deal with their effects. A perception of inequality in water distribution is already prevalent in most communities, particularly those downstream, which participants noted could only be managed by the skilled technical management and effective communication of the water management staff who would be responsible for operating the infrastructure. Clear and transparent communication, operating and maintenance procedures, and proper construction methods will be critical to achieving this and ensuring that the various hazards to the project are effectively managed.

Fortunately, nearly all workshop participants expressed that they believed that the proposed infrastructure would help to reduce any tensions caused by these hazards, by making them easier to manage. However, the way in which the infrastructure was installed and later operated must be done carefully, and in a way that respects local concerns and livelihoods; otherwise, it could make these concerns worse. For instance, as many households in the selected communities relay on water from the rehabilitated canals for irrigation, construction should occur during the off-season when the water is not needed for irrigation. This is mainly from October to March.

In addition, some people, particularly those in up-stream communities, currently benefit from the lack of water management and measurement, and may be dissatisfied with any changes to water management methods that occur. This will need to be carefully communicated with communities to avoid conflict and frustrations from local water uses. This communication will also be critical for places where water meters are installed, as many people don't trust the meters and believe that they will be used to manipulate the amount of available water unfairly. Any processes around water management should be as transparent as possible to reduce confusion and misinformation for local water users, and should be included in any O&M procedures to ensure that the infrastructure operators do not use the

equipment in a way that can inflame inter-community tensions over water usage.

This approach constitutes a core requirement under the project's do-no-harm and stabilization/peacebuilding framework. Acted will ensure this principle is operationalized throughout implementation and sustained beyond the project's lifetime by presenting and delivering clear mitigation and engagement measures, including training and equipping responsible water authorities with the necessary knowledge, tools, and institutional capacity to manage infrastructure transparently, responsibly, and in a conflict-sensitive manner. In this regard, Acted has already conducted several conflict-sensitivity training and awareness sessions for local communities and water management authorities across all three STREAM countries, providing a solid foundation for trust-building, transparent water governance, and the long-term sustainability of project interventions.

Cumulative Impacts

Workshop participants did not raise significant concerns regarding the compounding effects of other projects. In general, the rehabilitation of canals and installation of water meters and hydroposts is expected by nearly all stakeholders to improve the overall network's functionality and reduce the negative impacts currently felt from the corroding and inefficient existing infrastructure. There were no other major infrastructure projects reported to be occurring in the same areas, and the extensive corrosion and disrepair of the overall irrigation network meant that local stakeholders were happy to have any support in repairing the network and improving information availability of water levels, so long as it is coordinated with local authorities.

Inter-Communal Conflict and Transboundary Issues

Many of the concerns raised by workshop participants over hazards to the project and potential negative impacts of the project were directly or indirectly linked to existing dynamics between upstream and downstream communities. Many workshop participants raised concerns about a general mistrust that many of their community members have of how water is currently allocated though irrigation infrastructure; indeed; socio-economic concerns over equitable water distribution were the main concerns that workshop participants noted would need to be managed, both during the construction and operation & maintenance phases of the project. Downstream communities often perceive upstream communities as taking more water than they are allowed, reducing the amount available for downstream communities; this is often exacerbated by increasing drought and declining water levels in much of region.

While these upstream/downstream dynamics exist within countries, they also exist between countries as well; disagreements over water usage are believed to have contributed to the border clashes between Kyrgyzstan and Tajikistan in 2021.[40] As the construction of infrastructure will take place on canals, rather than the rivers themselves, the impact is likely to be minimal on overall water levels, and, as discussed, countries the rehabilitation of canals and improvement of water monitoring technologies is expected to improve tensions over water allocation, as it will reduce water loss and allow for more accurate and transparent tracking of water usage. However, to ensure that changes in water flow during construction do not have any spillover effects, it is recommended that these plans should be communicated to key stakeholders within each county reliant on the water supply. Stakeholders in each country should be made aware of complementary work being done on the same transboundary watershed, but in different countries, so they are aware of how that work may affect their communities as well, particularly in an upstream/downstream context. Additionally, when fully installed, local stakeholders and their governments should consider methods of sharing data on changes in water flow, and that these changes

[40] https://www.international-alert.org/app/uploads/2022/01/Central-Asia-Climate-Conflict-Rivers-EN-2021.pdf

be communicated to key stakeholders in a timely manner, and data on water flow shared when possible. These communication measures should be integrated into the Environment and Social Management Plans (ESMPs) for each infrastructure, so that transboundary communication regarding the projects and potential impacts are codified.

For data sharing from the water meters, water meters will be selected that feed into existing data management programmes used by each country. All Central Asian countries currently have existing protocols in place to encourage the sharing of data from water meters into multi-national platforms through which other Central Asian countries can access the data on water flow and other hydrometeorological indicators from other countries. However, these are national government-level decisions, which are outside the ability of the project to influence if national stakeholders do not follow the agreed upon data-sharing protocols.[41]

Mitigation Measures

While specific mitigation measures are touched on in the previous and subsequent sections, a number of general recommendations, if applied, will mitigate the potential negative impacts discussed in the following ways:

- National stakeholders will be informed of similar activities from the project occurring in the same watersheds, but on the other side of the border in different countries. This will be incorporated into community awareness campaigns, to ensure that national stakeholders are aware of the other projects happening that may influence water flow and data availability. This will mitigate transboundary concerns over conflict and disagreements between national stakeholders and border communities.
- All projects will be verified by STREAM team and national stakeholder experts to ensure that the construction projects will not cause any unintended consequences for transboundary water sharing. Consultation with national stakeholders has already been conducted through a regional workshop, held in December 2024, in which all projects were jointly discussed with national stakeholders to ensure that all stakeholders were aware of the planned projects and to address any transboundary concerns with the transboundary nature of the planned programmes.
- Designated areas for construction should be established which will limit the impact from construction equipment and waste; construction activities should be limited to these locations. As an additional measure, construction should be limited to post-harvest (autumn-winter) when canal water is not needed and agricultural activities have completed.
- Construction crews should use non-toxic materials and properly dispose of them in designated locations, so they do not contaminate the area or flow downstream to other areas.
- Strict waste management protocols and associated waste management training and qualifications should be established, which will ensure proper storage, transportation, and cleanup of the site, and avoid spreading of waste in the construction area.
- Ensuring buffer zones for community members to keep their wildlife during construction will both reduce the impact of wildlife on the project area and any disturbances from noise and vibrations that may stress livestock and other animals in the area. These zones should be continued during the operational phase to ensure safety of the infrastructure and livestock.
- Relocate and restoring trees and other vegetation that have to be removed during

[41] Cooperation on shared rivers in Central Asia is on the rise but lags behind for transboundary aquifers | UNECE

construction and/or rehabilitation, so that the larger ecosystem is undisturbed while allowing the infrastructure to be built.

- Scheduling construction outside of major fauna breeding seasons to avoid disrupting the ecosystem unnecessarily.
- For water-based animals, the removal from canals will unfortunately be necessary for them to be effective parts of the irrigation network. Regulation of waterflow will give waterborne organisms that remain the ability to adjust to the changes.
- In general, Ecosystem damage can be minimized by using smaller machinery that limits damage, and adopting emission control measures that contractors are aware of and follow. In general, the construction sites are small and even a worst-case scenario is expected to have minimal impact on the surrounding environment.
- To minimize the impact on surrounding farms, construction should be clearly communicated in addition to being conducted on the off-season so that local communities are aware of the trainings, and can be sensitized to the new water monitoring and canal rehabilitation activities, minimizing overall impact on surrounding communities.
- If construction goes overtime, temporary bypass-channels should be constructed to avoid disturbances to irrigation activities.
- Implementing dust control measures, creating temporary barriers when feasible, limiting activities to daylight hours and protecting construction equipment during construction activities will limit the disturbances to local communities.
- Additional trainings and community awareness sessions on water meter usage and function will sensitize communities to their purpose and reduce scepticism of the perceived negative impacts that they may have, particularly in relation to perceptions of unequal water distribution and fears of increasing water fees.
- Detailed instruction and training on Operation and maintenance procedures will ensure that stakeholders are able to ensure that the infrastructure functions as intended and lasts for a long time with minimal repairs, ensuring a sustainable response. Agreements with local service providers should be made by local stakeholder ahead of time to ensure that any repairs can be made quickly and efficiently.
- Coordination between the community. Local stakeholders, and the contractors is critical to ensuring that construction and operation of infrastructure is not controversial and can be completed efficiently.
- Installing visible warning signs and awareness campaigns can help to keep children away from the infrastructure and safe, as well as reduce opportunities for them to harm the infrastructure.

The specific Mitigation measures recommended for each infrastructure location are noted in abstract in the preceding section, and in specific for each infrastructure location in the," Stakeholder Engagement" and "Measurement and Monitoring" sections below. The Stakeholder Engagement section outlines the specific stakeholders responsible, disaggregated by Hazard Risk and Negative Impact measures, and the Measurement and Monitoring section summarizing the combined mitigation measures with accompanying suggested indicators.

STAKEHOLDER ENGAGEMENT

As part of the ESIA, stakeholder engagement key findings were developed according to the PATRIP ESIA Guidelines, in which stakeholders are able to provide their inputs on potential mitigation measures and technical solutions to the risks and negative impacts explored in the previous section. Because of the interactive and collaborative methodology utilised by the STREAM team, which relied entirely on community inputs and engagement to develop mitigation measures, the tables in this section instead represent a summary of the suggested mitigation measures developed above, along with the relevant local stakeholders that would be responsible for the measure, and further technical inputs from the Acted team.

The results are included in tables below, which are categorised by the overall concerns noted in each watershed, as well as separate, watershed-specific concerns. The tables combine the risk and potential impacts into a single table. The overall risks and potential impacts are issues raised by workshop participants in all 5 watersheds, while those specific to particular watersheds are listed in lists specific to their watersheds. However, even if these concerns were only noted by community members in specific watersheds, they may be relevant to the other watershed locations as well, and are integrated into the mitigation measures for each site in the following section. The final list of stakeholder concerns, responsible stakeholders, and proposed responses from Acted technical specialists are listed in the following section.

No local stakeholders raised any transboundary concerns related to the project, reflecting the dynamic in the Fergana Valley in which transboundary issues are typically managed between national level stakeholders. However, the projects were discussed by national and region-level stakeholders in a regional workshop held in December 2024 in Tashkent, Uzbekistan. This workshop brought together stakeholders from all three countries, including the local water management experts. These meetings raised and addressed key transboundary issues related to the projects, which are included in the stakeholder concerns tables below.

Overall Risk and Potential Impact Measures

Table 25: Stakeholders Engagement in Risk Measures, All Watersheds

#	Concern	Suggestion	Stakeholder	Responses by Acted
1	Concerns about mudflows and flooding damaging the infrastructure.	It is crucial to promptly close the main water intake structure upon receiving information about a mudflow or flood event, in order to prevent damage.	KGZ: RUVH TJK: ALRI	Since there is already designated staff for canal monitoring and an early warning system from the Hydromet Agency on weather conditions in certain areas, this measure can be implemented with minimal additional cost. Acted will provide ALRI with instructions and recommendations for the operation and maintenance of the installed infrastructure.

#	Concern	Suggestion	Stakeholder	Responses by Acted
		To effectively trap debris and sand, a sedimentation basin should be rehabilitated/cleaned at the head of the Mashine canal. The current sedimentation basin lacks the capacity to adequately settle water during high flow and sediment loads.	KGZ: RUVH TJK: ALRI UZB: Acted; Water Delivery Service	High impact and feasibility but high cost. Necessary for long-term resilience. Comes with complexity.
2	Concerns about flooding clogging the infrastructure with sediment.	Conduct regular maintenance and cleaning of canals to prevent blockages	Water Delivery Service, Mahalla Leaders; Local Activists; Local authorities (LAs)	Moderate cost and feasible; high impact. Currently performed by Water Delivery Service.
3		Mobilise early *Ashar* campaigns annually *to* clean sluices. Ensure adequate cleaning tools and scheduling during high sediment months. Train local staff on routine inspections and establish checklist. Develop monthly maintenance calendar.	KGZ: RUVH TJK: ALRI	Local communities actively support *Ashar*, which is usually organised in the spring to prepare for the irrigation season. LAs work closely with RUVH and local communities, maintaining a well-established relationship among all stakeholders. To build on this collaboration, it is important to further strengthen engagement through awareness-raising activities aimed at promoting shared responsibility, improving communication, and enhancing understanding of irrigation management. In addition, Acted will deliver trainings on the maintenance of newly established equipment and data management. It is recommended that local communities be informed in advance about these sessions to ensure broad participation and local awareness.
4	Trash accumulation without proper disposal may pollute the worksite.	Conduct awareness campaigns among local residents about proper waste disposal, including where to collect trash and the consequences of pollution. Perform regular	KGZ: RUVH /LA TJK: ALRI	Cost-effective and high impact, particularly during peak flow months. RUVH will collaborate closely with LAs, who in turn will engage with local communities to ensure effective implementation and community involvement.

#	Concern	Suggestion	Stakeholder	Responses by Acted
		inspections and cleaning of canals. Ensure consistent monitoring of irrigation systems, especially from May to August during the irrigation season. Regularly check the ultrasonic water level meter, as such meters were not previously installed. Establish a consistent maintenance schedule to ensure the long-term functionality of the irrigation infrastructure. Install protective nets/screens and debris catchers (TJK only)		Acted will deliver trainings on the maintenance of newly established equipment and data management. ALRI will perform regular inspections and canal cleaning using assigned staff and will incorporate trash monitoring tools to enhance upstream and transboundary awareness. Acted will discuss with ALRI regarding the installing protective nets/screens and debris catchers.
5	Rehabilitation work may take longer than expected, causing delays and disruptions and disrupt farming cycles.	The work should be scheduled for late autumn and completed by early spring to ensure it does not interfere with planting or harvesting periods. Clear and timely communication with local farmers regarding the project timeline is essential to allow them to plan accordingly.	Kyrgyzstan: Community members, farmers, RUVH, LA, Acted TJK: Construction Implementer; Acted	Acted will work in close collaboration with the RUVH and LA to inform them about the timing and scope of water infrastructure rehabilitation activities and ensure that the community is also properly informed in advance. Acted will inform RUVH and farmers in advance to ensure coordinated planning and implementation.
6	Machinery and vehicles may damage topsoil or farmland near canals	Limit machinery movement to designated paths and use low-impact equipment within the allocated water protection zone.	RUVH / Acted	Acted will collaborate with RUVH and local authorities to align activities with local needs and post-harvest timing. The rehabilitation works on the water infrastructure will be carried out from late autumn and completed by March.
7	Farmers may use canal roads during harvesting season, causing interference	Inform farmers in advance to establish access routes; schedule rehabilitation after harvest season to avoid disruption.	RUVH / Acted	Acted will collaborate with RUVH and local authorities to align activities with local needs and post-harvest timing. The rehabilitation works on the water infrastructure will be carried out from late autumn and completed by March.

#	Concern	Suggestion	Stakeholder	Responses by Acted
8	Trees near canals threaten water infrastructure	Keep the water protection zone clean; inspect and clean it regularly.	RUVH / LA	RUVH / LA is currently clearing the zone of trees and illegal structures. This will be done before Acted starts the irrigation rehabilitation. RUVH will continue monitoring. Local Ecology committees will issue ecology expertise for the site and legal directives for activities associated with ecological threats to infrastructures, under task 1.
9	Tree roots threaten canal and measuring instruments	Plant only trees with non-invasive root systems; maintain a buffer zone between trees and the canal; install underground root barriers	Acted; Contractor; Water Delivery Service; Mahalla Leaders; Local Activists	Moderate cost, moderately feasible, and high impact. Tree planting, buffer zone maintenance, and underground root barriers will be implemented collaboratively. Underground root barriers installation will be discussed with Water Delivery Service. Local Ecology committees will issue ecology expertise for the site and legal directives for activities associated with ecological threats to infrastructures, under task 1.
10	Community conflicts over water allocation	Improve transparency in meter readings; engage communities in participatory water management; train mediators or community leaders	Water Delivery Service; Mahalla Leaders	Low cost, high feasibility, high impact. Awareness-raising activities will be conducted by the Water Delivery Service with Mahalla Leaders and Local Activists to improve meter reading and water allocation transparency.
11	People may fear that water measuring instruments could limit usage, give incorrect readings or limit their water usage.	Clearly explain how the instruments function to ensure trust and transparency (KGZ) Public Awareness Campaigns: Clearly communicate that rising water fees are part of broader national inflationary trends and not directly caused by the installation of water meters or infrastructure rehabilitation (TJK)	KGZ: RUVH / Acted TJK: Construction Implementer; Acted; Local authorities UZB: Acted; Contractor; Water Delivery Service; Mahalla Leaders	Acted will provide RUVH with instructions and recommendations for the operation and maintenance of the installed infrastructure and data management. Acted in close collaboration with the RUVH and LA will discuss the community awareness campaigns.

#	Concern	Suggestion	Stakeholder	Responses by Acted
12	There may be concerns about ultrasonic water measuring instruments limiting access or providing inaccurate readings because only mechanical meters are being used.	Clear communication about the functionality of the instruments is essential to ensure transparency and build trust within the community.	Local farmers and water users, community leaders or elders, RUVH, LA, Acted	Acted will provide RUVH with instructions and recommendations for the operation and maintenance of the installed infrastructure and data management. Acted in close collaboration with the RUVH and LA will discuss the community awareness campaigns.
13	Rehabilitation activities could negatively impact wildlife and ecosystems	Use low-impact machinery and schedule work in late autumn to avoid peak wildlife activity.	KGZ: RUVH / Acted UZB: Contractor; Mahalla; Water Delivery Service	Acted will schedule work after wildlife leaves the area, typically late autumn. Local Ecology committees will issue ecology expertise for the site and legal directives for activities associated with threats of infrastructures to ecology (wildlife), under task 1.
14	Rehabilitation work might disrupt water supply	Conduct infrastructure rehabilitation during the non-irrigation season.	Acted / RUVH / LA	Work schedule has been agreed upon with RUVH and LA to avoid disruption.
15	Machinery may go off-road and damage topsoil as well as nearby farmers' crops.	Schedule construction activities post-harvest. Begin work late autumn when most crops are harvested, ensuring minimal disruption. Limit machinery movement to designated paths and avoid entering farmland or sensitive wildlife habitats.	Farmers, irrigation water managers, land specialists, Acted	Work will be carefully scheduled in close collaboration with the RUVH and LA, prioritising implementation after the harvest season.
16	Perception that upstream communities receive more water than downstream areas	Organise awareness-raising activities among local communities.	RUVH / LA	RUVH and LA will jointly lead awareness campaigns to address this perception.
17	Waste, cement, concrete, rock, and sack debris disposed during construction	Strictly control waste management during construction; implement daily clean-up; Collect, store, and transport waste to approved	Contractor; Mahalla; Water Delivery Service	The Contractor will strictly follow the rules and norms. Activities will be monitored by Acted and Mahalla.

#	Concern	Suggestion	Stakeholder	Responses by Acted
		disposal sites (no on-site burial); Provide training for workers on proper waste disposal.		
18	Waste from the construction site may cause soil degradation or water pollution	Construction activities should be limited to a small and clearly demarcated construction site. All construction materials should be thoroughly cleaned up at the conclusion of the infrastructure construction.	Construction Implementer; Acted	Local Ecology committees will issue ecology expertise for the site and legal directives for activities associated with threats to ecology, under task 1.
19	Dumping of waste into canals may pollute water.	1. Install and regularly clean waste-catching nets in the canal; 2. Conduct awareness campaigns among local residents and businesses to discourage dumping	Acted; Contractor; Water Delivery Service; Mahalla Leaders; Local Activists	1. High cost for nets (feasible and high impact); Low cost, high feasibility, and high impact. Awareness campaigns will be organised by the Water Delivery Service in collaboration with Mahalla Leaders and Local Activists to reduce illegal dumping. Local Ecology committees will issue ecology expertise for the site and legal directives for activities associated with threats to ecology, under task 1.
20	Unequal water distribution after water measuring installation	Strengthen monitoring of water distribution	Mahalla; Water Delivery Service	Acted will provide LAs with instructions and recommendations for the operation and maintenance of the installed infrastructure and data management. Acted in close collaboration with the LAs will discuss the community awareness campaigns.
21	Unequal water distribution after water measuring installation	Conduct community consultations to prioritise water allocations		Acted will provide LAs with instructions and recommendations for the operation and maintenance of the installed infrastructure and data management. Acted in close collaboration with the LAs will discuss the community awareness campaigns.

#	Concern	Suggestion	Stakeholder	Responses by Acted
22	Cutting of trees and bushes causing small animal habitat loss	Implement reforestation or greenbelt planting after construction	Mahalla; Water Delivery Service	The Contractor will follow national rules and legislation and discuss with LAs. Local Ecology committees will issue ecology expertise for the site and legal directives for activities associated with threats to ecology, under task 1.
23	People may think that payment for water usage could increase	Conduct public awareness campaigns and community meetings to clarify that price changes are due to inflation, not meters.	RUVH / Acted	RUVH will conduct awareness raising activities to address concerns and communicate transparently.
24	Negative impacts on surrounding grass and plants	Schedule construction to avoid peak growing seasons if possible	Acted; Contractor, Mahalla; Water Delivery Service	Activities will be implemented from late autumn to the end of winter.
25	Minimise construction noise and vibration where feasible	Acted; Contractor; Mahalla; Water Delivery Service	The Contractor will strictly follow the rules and norms.	Minimise construction noise and vibration where feasible
26	Lack of transboundary data sharing from water meters leads to national-level conflicts between stakeholders over transboundary water allocation.	Water management stakeholders can be re-connected though community dialogues. Water sharing protocols include data sharing platforms that all national hydrometeorological agencies can access.	District Water Management Authorities; Hydromet agencies.	Acted facilitated inter-agency dialogues between local and national stakeholders in a December 2024 workshop. Water sharing agreements require data sharing at national level. Local stakeholders can be supported in understanding how to access this information.
27	Infrastructure may change the amount of water available in the watershed, leading to transboundary conflict.	Water meters should be installed at critical points to track water availability on both sides of the border. All stakeholders should be informed of all projects occurring in all countries sharing the watershed ahead of time, so communities can be	Local authorities; Acted, Local water managers, community leadership.	Conduct regional workshops to introduce key stakeholders in different countries to each other, and inform them jointly of the planned projects. Support information and awareness campaigns for communities to know that the projects will not affect their livelihoods negatively.

#	Concern	Suggestion	Stakeholder	Responses by Acted
		informed of the planned projects. Community awareness campaigns should be designed to sensitize communities of planned changes and ensure they are aware these will not affect their livelihoods.		

KYRGYZSTAN WATERSHED RISK AND POTENTIAL IMPACT MEASURES

Table 26: Stakeholder Engagement Risk and Potential Impact Measures, Kozu-Baglan Watershed, Kyrgyzstan

#	Concern	Suggestion	Stakeholder	Responses by Acted
1	Lightning	Install lightning protection and integrate with design standards.	Acted/ RUVH	Cost is reasonable and feasible. High impact. Acted will discuss with RUVH for technical alignment.
2	Strong winds	After strong winds, it is necessary to inspect all canals located near large trees and remove any fallen branches and leaves that may have entered the canals. Regular inspections of the hydropost should also be conducted.	RUVH	Currently, work is underway to clear the water protection zone, ranging from 3 to 6 metres along the rivers, depending on the size of the canal.
		Install shields and review placement sites for protection.	Acted/ RUVH	Acted will discuss the setting protection equipment with RUVH and take action.
3	Children under 7 may fall into the canal and face serious danger	Install visible warning signage near the canal and implement community awareness campaigns for parents and caregivers.	RUVH / Acted	Acted will discuss awareness and signage with RUVH.

Table 27: Stakeholder Engagement Risk and Potential Impact Measures, Isfayramsay Watershed, Kyrgyzstan

#	Concern	Suggestion	Stakeholder	Responses by the Acted
1	Children under 7 years old are at risk of falling into the canal and being carried away by the current.	Warning Signage: Place visible warning signs near the canal to alert families and children about the risks. Inform parents and caregivers about the season, dangers of open canals and the importance of supervising young children near water.	Parents and caregivers, local community members, LA, schools and kindergartens, health services, RUVH, Acted	The measure is highly feasible and impactful but moderately costly. Acted in close collaboration with the RUVH and LA will discuss the setting warning signage and conducting community awareness campaigns.
2	Improper installation and maintenance	Ensure the use of high-quality materials and regular maintenance when installing water gates (e.g., painting, lubrication).	Acted / RUVH	The TFS incorporated international standards. Acted and RUVH will ensure compliance on-site during infrastructure rehabilitation.
3	Water meter shows wrong data or might be broken	Conduct awareness campaigns to explain the benefits of accurate water distribution and establish a clear water distribution schedule.	Acted / RUVH / LA	Acted will train RUVH on equipment use and data handling. RUVH and LA will hold awareness sessions. Communities engage regularly through LSG meetings and Ashar.
4	Water meter mechanical damage	Ensure monitoring by water authorities and protect meters from mechanical damage. Conduct community awareness campaigns.	Acted / RUVH / LA	Acted / RUVH will consider installing protective devices. Community campaigns will be led in close collaboration with RUVH / LA.

Tajikistan Watershed Risk and Potential Impact Measures

Table 28: Stakeholder Engagement Risk and Potential Impact Measures, Khojabakirghan Watershed, Tajikistan

#	Concern	Suggestion	Stakeholder	Responses by Acted
1	Vegetation growth inside of infrastructure can break or clog the infrastructure.	Regular cleaning/weeding around water infrastructure	ALRI	Ashar practices exist, but machinery and access are limiting factors.

2	Downward water flow carries waste materials that can lead to health risks	Ensure that materials that come in contact with water are not contaminants and don't have the possibility to poison the water supply.	Construction Implementer; Acted	Acted will engage in discussions regarding materials for the water infrastructure and will incorporate the recommendations and budget outlined in the TFS
		Construction crews should clean the site thoroughly after the installation is complete.	Construction Implementer; Acted	The contractor will comply with all construction regulations and legal norms related to public health and safety.

Uzbekistan Watershed Risk and Potential Impact Measures

Table 29: Stakeholder Engagement Risk and Potential Impact Measures, Shakhimardan Watershed, Uzbekistan

#	Concern	Suggestion	Stakeholder	Responses by the Acted
1	Flooding can overflow and damage surrounding farmland.	Build or reinforce canal embankments and overflow devices	Acted, Water Delivery Service; Contractor	Moderate cost and feasible; high impact. This activity is crucial for reducing flood risk and protecting water infrastructure. Acted will implement these measures as far as possible and depending on the availability of funds, in coordination with Water Delivery Service recommendations.
		Develop an early warning system and maintenance plan for extreme rainfall events	Water Delivery Service; Mahalla Leaders	High cost; moderately feasible; high impact. LAs will coordinate.
		Use proper drainage systems around water meter installations to prevent water accumulation	Acted; Water Delivery Service	Acted will discuss implementation with Water Delivery Service.
3	Lack of financial resources	Develop a clear financial plan that includes long-term maintenance and operational costs. Mobilise local, regional, and international funding sources. Implement cost-sharing arrangements or water user fees	Water Delivery Service; Mahalla Leaders	Water Delivery Service and Mahalla leaders can jointly initiate and develop financial plans.
4	Improper management	Conduct training and capacity-building for management teams	Acted in collaboration with Water Delivery Service;	Acted will deliver trainings to LAs on data collection and management. LAs in their turns will make decisions.

#	Concern	Suggestion	Stakeholder	Responses by the Acted
			Mahalla Leaders	
		Engage local experts and specialists during design and evaluation	Acted; LAs	Acted will be in close collaboration with Water Delivery Service, Mahalla Leaders
5	Pollution and inconvenience to local residents during construction, noisy activities	Strictly follow construction standards and regulations	Contractor	High cost; low feasibility; moderate benefit. Requires permits and financial planning. The Contractor will follow national rules and legislation and discuss with LAs.
		Use dust control measures like water spraying	Contractor	To be implemented during construction.
		Cover construction materials during transport and storage	Contractor	The Contractor will follow national rules and legislation and discuss with LAs to ensure safety and compliance.

Table 30: Stakeholder Engagement Risk and Potential Impact Measures, Isfayramsay Watershed, Uzbekistan

#	Concern	Suggestion	Stakeholder	Responses by Acted
1	Extreme cold in winter affects canals	Use insulation or thermal protection techniques at critical points to reduce freezing risk and ensure water flow continues	Acted; Contractor; Water Delivery Service	Moderate cost, feasible, and high impact. Acted will coordinate closely with the Water Delivery Service to apply insulation or thermal protection at freezing points.
		Install frost-resistant or weatherproof instruments and regularly inspect and maintain them during winter months	Acted; Contractor; Water Delivery Service; Mahalla Leaders; Local Activists	Moderate cost, feasible, and high impact. Acted will discuss with the Water Delivery Service.
2	Residents break canal walls to access water	Design and build sufficient official water access points; involve community in planning; monitor and repair unauthorised breakages promptly	Acted; Contractor; Water Delivery Service; Mahalla Leaders	Community engagement in planning will be fully coordinated with the Water Delivery Service and Mahalla Leaders to ensure relevance and feasibility of water access points. They will conduct regular monitoring, enabling prompt repairs of unauthorised breakages. This ensures high feasibility and immediate impact.
3	Waterlogging from high groundwater or wetlands	Improve canal design for drainage; monitor groundwater levels; promote water-efficient irrigation	Acted; Water Delivery Service; Mahalla Leaders	Technical designs will be prepared by Acted in consultation with Water Delivery Service. Water Delivery Service and Mahalla Leaders will be responsible for regular monitoring and promote efficient irrigation practices.

#	Concern	Suggestion	Stakeholder	Responses by Acted
4	Livestock intrusion damages water instruments	Install fencing/barriers; raise community awareness	Acted; Contractor; Water Delivery Service; Mahalla Leaders	Acted will coordinate technical aspects with Water Delivery Service to install livestock barriers. Water Delivery Service and Mahalla Leaders will organise awareness campaigns to reduce livestock-related risks.
5	Negative impacts on animals that get too close to the infrastructure and cause damage.	Establish alternative habitats (e.g. planting new vegetation zones) near the canal to support small wildlife	Contractor; Mahalla, Water Delivery Service	Activities will be implemented from late autumn to the end of winter.
		Implement buffer zones with native vegetation.	Contractor; Mahalla; Water Delivery Service	Activities will be implemented from late autumn to the end of winter.
6	Disruptions to local residents during construction	Implement dust suppression (e.g. water spraying); Limit noisy activities to daytime hours; Provide regular updates to residents about construction schedules and expected impacts.	Acted; Contractor; Mahalla; Water Delivery Service	The Contractor will strictly follow the rules and norms. Activities will be monitored by Acted and Mahalla.

MANAGEMENT AND MONITORING

Following the stakeholder engagement process, IMPACT consulted Acted's STREAM programme experts on the mitigation measures, and selected the most relevant and salient mitigation measures, which were reviewed and used to develop a management and monitoring plan for each selected measure. Each measure includes the stakeholders that are responsible, monitoring methods, and suggested indicators for tracking progress. These results are presented in the format of the Environmental and Social Management Plan (ESMP) template provided by PATRIP in it's Environment and Social Policy Guidance.[42] The results will be integrated into the ESMP for each infrastructure. The following Management and Monitoring plans are divided by country, watershed, and infrastructure type. Risks and negative impacts are integrated into the same table and measures to simply the suggested inputs. These final inputs will be reviewed by the STREAM programme team for their feasibility, and integrated into the individual ESMPs for each project. The following tables are organized by general inputs suggested for all projects in all five locations, followed by watershed-specific measures:

[42] PATRIP Foundation, Environmental and Social Policy, December 2023.

Table 31: Common Management and Monitoring Measures, and Indicators

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
WATER METERS					
Preparation (conception, planning)	Project Design	Water meters should be constructed from high quality materials, with regular maintenance provided after installation (Painting, lubrication, etc.)	Contractor	Design Documents (feasibility study)	Project planning documents
	Project Design	All infrastructure and equipment that is constructed must be resilient to the weather and damage from natural hazards, such as storms, hail, flooding, or extreme head and cold. The following activities should be implemented to ensure that water meters are kept in working order: - Installation of protection wire near water measuring elements, to divert lighting strikes away from equipment. - Installation of protective devices (covers or enclosures) for water measurement devices to protect them from the elements.	Contractor	Design Documents (feasibility study)	Project planning documents
	Indigenous People Stakeholder Engagement	Local stakeholders and their communities may not trust the functionality of the water meters, as it will change their water allocations and associated fees. To ensure the installation of water meters is accepted and trust built, stakeholders must be engaged on the functionality and installation of water meters. In addition, many changes in water meter trends are likely to be due to rising inflation, rather than changes in water fee regimes. - The functionality and accuracy of ultrasonic water meters need to be clearly explained to users. - Public awareness campaigns can be used to clearly communicate issues related rising water fees. - Fee changes should be communicated as being part of national inflation trends, and not due to the meters themselves. - Water meters should be made as transparent and available to community members as possible. Community members should be trained as mediators or community leaders identified.	Implementing Partners	Grievance Mechanism Trainings Records Project Reporting	Review of Grievance register
Implementation / Construction	Community Health & Safety	If water meters are damaged in any way, or displaying incorrect information, this will need to be managed by local stakeholders effectively: - Authorities should conduct proactive, transparent awareness campaigns that clearly explain the benefits of accurate water distribution There should be monitoring of the equipment by water authorities. Water meters should be protected from mechanical damages. Awareness campaigns among local	Implementing Partner and users	Observations Grievance Mechanism.	Random site inspection Review of Grievance register

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
		communities should also be conducted if any damages occur.			
	Water Resources Protection	Water management stakeholders should receive full training on the water distribution equipment to ensure its successful operation. This should also include community consultations to prioritise water allocation for stakeholders using the canal.	Implementing Partner	Trainings Records Project Reporting	Check Training records Project planning documents
Operation	Community Health & Safety	Mudflows and flooding are common occurrences in all watersheds. These hazards will remain major concerns following the completion of the project to maintain the project infrastructure and ensure proper functioning of the infrastructure though correct usage and maintenance of the infrastructure. The following activities are recommended: - Water intakes structures should be promptly closed upon receiving information about mudflow or flood events to prevent damage. - Regular maintenance and canal cleaning should be conducted by responsible stakeholders to prevent canal blockages. - Mobilize Ashar campaigns annually to clean sluices and reduce sediment build up.	Implementing Partners and Users	Grievance Mechanism. Trainings Record.	Review of Grievance register Check Training records
CANALS					
Preparation (conception, planning)	Project Design	Mudflows and flooding are common hazards in all of the watersheds, which often cause additional debris to enter the canal infrastructure, leading to sedimentation build up and blocking the canals. The following activities are recommended: - Water managers should promptly close the main water intakes for the canal upon receiving information about a mudflow of flood event, to prevent damage. - To avoid sediment, build up, the sediment basins at the head of each canal being rehabilitated should be cleaned.	Implementing Partner	Observations	Random site inspection
Implementation / Construction	Community Health & Safety	Regular maintenance of canals should be conducted to remove sedimentation, clean out trash, and remove any blockages to water flow. Additional techniques can be developed to support this: - Mobilizing early Ashar campaigns on an annual basis to clean sluices. This should be coordinated with awareness campaigns. - Ensuring adequate cleaning tools and scheduling during months of high sedimentation.	Implementing Partner and Users	Observations. Grievance Mechanism. Trainings Record.	Random site inspection Review of Grievance register Check Training records

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
		- Training local staff on routine inspections and establishing checklists to track this. - Development of monthly maintenance calendars.			
	Occupational Health & Safety	All work should be scheduled during periods where it does not disrupt major activities, including agricultural activities that require irrigation in the communities. Most agricultural activities are in late spring to early autumn, so activities should be scheduled for late autumn to early spring. Any updates, delays, or changes in the construction plans should be clearly communicated to farmers and community leadership ahead of time.	Contractor	No work conducted between 10pm and 7 am. Grievance Mechanism.	Random site Inspection. Review of filed grievances. Review of timesheets of workers
	Occupational Health & Safety	All construction machinery should be used to limit damage to the areas surrounding the construction areas as much as possible. The following measures should be taken to ensure this: - Limit machinery movement to designated paths and use low-impact equipment within specific construction zones. - Inform farmers in advance to establish access routes. - Schedule rehabilitation in later autumn and winter after harvest season and after periods of peak wildlife activity. Low-impact machinery should be used to avoid disturbing the surrounding areas.	Contractor	Observations.	Random site inspection
	Biodiversity and Natural Habitats	Trees near the canal rehabilitation may harm the water infrastructure, as growth over time may damage the canal by breaking holes in them or displacing canal pieces. - Trees in the area should be replanted further away from the infrastructure. - A buffer zone should be established around the infrastructure, where new trees should not be planted. - Plant trees with non-invasive root systems. - Discuss the installation of underground root barriers. • Implement reforestation or greenbelt planting after construction. • Local Ecology committees will issue ecology expertise for the site and legal directives for activities associated with threats to ecology, under task 1.	Contractor	Observations. Dedicated relocation areas.	Random site inspection
	Community Health & Safety	Conflicts between communities can emerge when water when they do not feel they are receiving the water amounts that they deserve. This is particularly problematic between upstream and downstream communities.	Implementing Partner and Users	Grievance Mechanism.	Review of Grievance register

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
		Communication on water levels should be communicated regularly to avoid challenges. Awareness raising campaigns should be organized among local communities to combat the perception of unequal water distribution.			
	Noise and vibration impacts	Noise and vibrations from construction should be minimized whenever feasible. This should be done by not conducting construction activities between 10pm and 7am, particularly near residential areas.	Contractor	No work conducted between 10pm and 7 am. Grievance Mechanism.	Random site Inspection. Review of filed grievances. Review of timesheets of workers
Operation	Waste Management	Trash accumulation should be managed so that trash buildup does not block or damage the canal. The following activities can support this: - Conduct awareness campaigns among local residents about proper waste disposal, including where to collect trash and the consequences of pollution. - Perform regular inspections and cleaning of canals. Ensure consistent monitoring of irrigation systems, especially from May to August during the irrigation season. - Establish a consistent maintenance schedule to ensure the long-term functionality of the irrigation infrastructure. - Install protective nets/screens and debris catchers (TJK only)	Implementing Partner and Users	Dedicated storage areas in place. Waste Manifests.	Random site Inspection. Review of waste inventories.
	Waste Management	Build-up of waste materials during the construction process must be strictly managed. This includes the following activities: - Daily clean-ups of construction materials, including cement, concrete, rock, and sack debris disposed of f during construction. - Waste should be transported to approved disposal sites. - No on-site burial should be performed. - Training should be conducted for workers on proper waste disposal. - Waste-catching nets should be installed in the canals during the construction period; these nets should be regularly cleaned. • Awareness campaigns should be conducted with local residents and businesses to discourage dumping in the canals. • Local Ecology committees will issue ecology expertise for the site and legal directives for activities	Contractor	Dedicated storage areas in place. Waste Manifests.	Random site Inspection. Review of waste inventories.

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
		associated with threats to ecology, under task 1.			

Table 32: Management and monitoring measures and indicators, Kyrgyzstan

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
WATER METERS					
KOZU-BAGLAN WATERSHED					
Preparation (conception, planning)	Project design	Strong winds are common in the Kozu-Baglan/Khojabakirghan watershed and precautions should be taken to limit damage to the infrastructure. Shields should be installed to protect equipment from damage from winds. Regular inspections of hydro posts should also be conducted.	Contractor and Users	Design Documents (feasibility study)	Project planning documents
ISFAYRAMSY WATERSHED					
No Additional Mitigation Measures					
CANAL					
KOZU-BAGLAN WATERSHED					
Implementation/Construction	Occupational Health & Safety	To reduce the risk of Children playing around the infrastructure and falling into the canals, or being carried away by the current, the following should be conducted: - Warning signs should be placed near the canal to alert parents and children about risks. - Parents and caregivers should be informed about the construction and the dangers of children playing in the area.	Implementing Partner and Users	Observations. Grievance Mechanism.	Random site Inspection. Review of filed grievances.
Operation	Occupational Health & Safety	Strong winds are common in the Kozu-Baglan/Khojabakirghan watershed and precautions should be taken to limit damage to the infrastructure. After strong winders, it is necessary to inspect all canals located near large trees and remove any fallen ranches and leaves that may have entered canals.	Implementing Partner and Users	Observations. Grievance Mechanism.	Random site Inspection. Review of filed grievances.
ISFAYRAMSY WATERSHED					
Implementation/Construction	Occupational Health & Safety	To reduce the risk of Children playing around the infrastructure and falling into the canals, or being carried away by the current, the following should be conducted: - Warning signs should be placed near the canal to alert parents and children about risks. Parents and caregivers should be informed about the construction and the dangers of children playing in the area.	Contractor and Users	Minutes of Meeting. Observations.	Random site Inspection. Review of filed grievances.

Table 33: Management and monitoring measures and indicators, Tajikistan

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
WATER METERS					
KHOJABAKIRGHAN WATERSHED					
Implementation / Construction	Biodiversity and Natural Habitats	Regular weeding and maintenance should be conducted around the water infrastructure to ensure that build-up of vegetation in and around water infrastructure does not clog or damage the structure. - This can be managed though Ashar community practices.	Users	Observations.	Random site Inspection.
	Water Resources Protection	Downward water flow carries waste materials that can lead to health risks, in both local and transboundary contexts. This can be managed in the following ways: - Ensure that materials that come in contact with the water are not contaminants and will not poison the water supply. - Construction crews should clean the site thoroughly after the installation is complete.	Contractor	Observations	Random site Inspection.

Table 34: Management and monitoring measures and indicators, Uzbekistan

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
WATER METERS					
SHAKHIMARKAN WATERSHED					
Preparation (Design, Planning)	Water Resources Protection	Proper drainage systems should be installed around water meters installations to prevent water accumulation and long-term damage to equipment.	Contractor	Design Documents (feasibility study)	Project planning documents
	Water Resources Protection	Clear financial plans are needed and should include long-term maintenance and operational costs. These should identify local, national, and international funding sources, and incorporate cost-sharing arrangements or water user fees. Maintenance agreements should be signed with local service providers ahead of time to ensure prompt repairs in the case of infrastructure damage.	Implementing Partner	Project reporting.	Project planning documents
	Project Design	Extreme cold and other temperature extremes can damage canals over time by causing cracking in concrete and damage to infrastructure. To limit damage to infrastructure, the following should be incorporated into the project design: - Water monitors should include frost-resistant or weatherproof instruments and regularly inspect and maintain them during the winter months.	Contractor	Design Documents (feasibility study)	Project planning documents
Implementation / Construction	Biodiversity and Natural Habitats	Livestock intrusion is a potential challenge in the Fergana Valley, as livestock can damage water instruments and canal walls. To manage this, the following should be incorporated: - awareness campaigns should incorporate livestock management as an important issue.	Implementing Partner and Users	Minutes of Meeting. Observations.	Check Minutes of Meeting Random site Inspection.

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
		Fences/barriers should be installed to block livestock from reaching the infrastructure.			
	Emissions (Dust, noise, gases)	Pollution and dust from the construction may inconvenience local residents. To manage this, dust control measures like water spraying should be implemented, and construction materials should be covered during transportation and storage.	Contractor	Observations.	Random site Inspection.
ISFAYRAMSAY WATERSHED					
Preparation (Design, Planning)	Water Resources Protection	Proper drainage systems should be installed around water meters installations to prevent water accumulation and long-term damage to equipment.	Contractor	Design Documents (feasibility study)	Project planning documents
	Project Design	Extreme cold and other temperature extremes can damage canals over time by causing cracking in concrete and damage to infrastructure. To limit damage to infrastructure, the following should be incorporated into the project design: Water monitors should include frost-resistant or weatherproof instruments and regularly inspect and maintain them during the winter months.	Contractor	Design Documents (feasibility study)	Project planning documents
Implementation / Construction	Biodiversity and Natural Habitats	Livestock intrusion is a potential challenge in the Fergana Valley, as livestock can damage water instruments and canal walls. To manage this, the following should be incorporated: - awareness campaigns should incorporate livestock management as an important issue. Fences/barriers should be installed to block livestock from reaching the infrastructure.	Implementing Partner and Users	Meeting Minutes. Observations.	Check Minutes of Meeting. Random site Inspection.
	Emissions (Dust, noise, gases)	Pollution and dust from the construction may inconvenience local residents. To manage this, dust control measures like water spraying should be implemented, and construction materials should be covered during transportation and storage.	Contractor	Observations.	Random site Inspection.
CANAL					
SHAKHIMARKAN WATERSHED					
Preparation (Design, Planning)	Project Design	Flooding can cause overflowing of canal embankments and damage to the surrounding area and crop lands. The following methods can help to reduce flood mitigation: - Building and reinforcing canal embankments is critical to mitigate this. - Early warning systems can be developed to alert stakeholders to extreme rainfall events.	Contractor	Design Documents (feasibility study)	Project planning documents
	Project Design	Extreme cold and other temperature extremes can damage canals over time by causing cracking in concrete and damage to infrastructure. To	Contractor	Design Documents (feasibility study)	Project planning documents

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
		limit damage to infrastructure, the following should be incorporated into the project design: Insulation or thermal protection should be included at critical points to reduce the freezing risk and ensure water flow continues.			
	Project Design	Waterlogging from high groundwater tables is a potential problem in the Fergana Valley. To manage this, the following should be included in project design: - Improved canal design should include adequate drainage. - Groundwater levels should be monitored for inundation. Water efficient irrigation methods should be promoted for the surrounding community.	Contractor and Users	Design Documents (feasibility study)	Project planning documents.
Implementation / Construction	Water Resources Protection	Clear financial plans are needed and should include long-term maintenance and operational costs. These should identify local, national, and international funding sources, and incorporate cost-sharing arrangements or water user fees.	Implementing Partner	Project reporting.	Project planning documents
	Water Resources Protection	Trainings on management and capacity building should be clearly included in Operation & Maintenance plans, to ensure that local actors can properly operate and maintain the infrastructure after the end of the project. - Local experts and specialists should be involved in project design and evaluation.	Implementing Partner	Trainings Record. Minutes of Meeting. Project Reporting.	Check Training records Check Minutes of Meeting
	Community Health & Safety	Conflicts over water may lead to residents breaking canal walls in order to access waters. Key methods to mitigate these concerns should include: - Official water access points should be developed and shared with community members. - Communities should be part of the planning to identify the main access points. - Stakeholders must monitor and repair unauthorize breakages as quickly as possible.	Implementing Partner and Users	Observations. Grievance Mechanism.	Random site Inspection. Review of filed grievances.
	Water Resources Protection	Livestock intrusion is a potential challenge in the Fergana Valley, as livestock can damage water instruments and canal walls. To manage this, the following should be incorporated: - awareness campaigns should incorporate livestock management as an important issue. - Fences/barriers should be installed to block livestock from reaching the infrastructure.	Implementing Partner and Users	Meeting Minutes. Observations.	Check Minutes of Meeting. Random site Inspection.
ISFAYRAMSAY WATERSHED					

Phase	Topic	Mitigation Measure	Responsibility	Means of Verification	Monitoring procedure
Preparation (Design, Planning)	Project Design	Flooding can cause overflowing of canal embankments and damage to the surrounding area and crop lands. The following methods can help to reduce flood mitigation: - Building and reinforcing canal embankments is critical to mitigate this. Early warning systems can be developed to alert stakeholders to extreme rainfall events.	Contractor	Design Documents (feasibility study)	Project planning documents.
	Project Design	Extreme cold and other temperature extremes can damage canals over time by causing cracking in concrete and damage to infrastructure. To limit damage to infrastructure, the following should be incorporated into the project design: Insulation or thermal protection should be included at critical points to reduce the freezing risk and ensure water flow continues.	Contractor	Design Documents (feasibility study)	Project planning documents.
	Project Design	Waterlogging from high groundwater tables is a potential problem in the Fergana Valley. To manage this, the following should be included in project design: - Improved canal design should include adequate drainage. - Groundwater levels should be monitored for inundation. Water efficient irrigation methods should be promoted for the surrounding community.	Contractor and Users	Design Documents (feasibility study)	Project planning documents.
Implementation / Construction	Water Resources Protection	Trainings on management and capacity building should be clearly included in Operation & Maintenance plans, to ensure that local actors can properly operate and maintain the infrastructure after the end of the project. Local experts and specialists should be involved in project design and evaluation.	Implementing Partner	Trainings Record. Minutes of Meeting. Project Reporting.	Check Training records Check Minutes of Meeting. Project planning documents.
	Water Resources Protection	Livestock intrusion is a potential challenge in the Fergana Valley, as livestock can damage water instruments and canal walls. To manage this, the following should be incorporated: - awareness campaigns should incorporate livestock management as an important issue. Fences/barriers should be installed to block livestock from reaching the infrastructure.	Implementing Partner and Users	Meeting Minutes. Observations.	Check Minutes of Meeting. Random site Inspection.

ANNEXES

Annex 1: ESIA Facilitation Guide

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) OF STREAM PROGRAMME

INTRODUCTION and METHODOLOGY

To address climate change challenges affecting natural resource management in the watersheds of the Fergana Valley, Acted, IMPACT, and International Alert, with support from USAID and the PATRIP Foundation, launched the STREAM programme in 2022.[43]

The Environmental & Social Impact Assessment (ESIA) is a part of the STREAM programme aims to prevent or minimise environmental and social risks associated with programme's activities – 1) water infrastructure rehabilitation including gate shield, 2) water meters instalment and 3) repairing existing hydroposts (hereinafter referred to as "programme activities"). Its focus is on enhancing environmental and social benefits of programme implementation, ensuring long-term sustainability, safeguarding community living conditions, and promoting sustainable natural resource management. The assessment identifies, mitigates, and monitors risks while facilitating continuous improvements in the programme's environmental and social performance.

The assessment will cover the following regions (details of the programme activities according to the Technical Feasibility Study (TFS) findings in below Annex 1. 1.):

- **Kyrgyzstan**: Leylek and Kadamjay Districts, Batken Region
- **Tajikistan**: Spitamen, J. Rasulov, and B. Gafurov Districts, Sughd Region
- **Uzbekistan**: Fergana and Toshloq Districts, Fergana Region.

Annex 1. 1: Detailed Program Activities for ESIA

#	District name	Canal Name	Planned Activities				
			Canal Section Concreting (m)	Rehabilitation of Gate Shields (units)	Installation of Water Meters (units)	Repair of Existing Hydro Post (units)	Canal Location (Lat, Long)
Kyrgyzstan							
1	Kadamjay	Main Canal Anchor	275	2	19		40.259817 N, 72.0988 E
2	Leylek	Machine Canal Kulundu		18	14		40.062041 N, 70.810824 E
3	Leylek	Outlet Canal H-4	650				40.054764 N, 69.404943 E

43 Concept note. Sustainable Transboundary Resource Allocation Mechanism for Peace (STREAM for Peace). ACTED.

4	Leylek	Main Canal Kulundu		34	14	2	40.105245 N, 69.651432 E
Total			**925**	**54**	**47**	**2**	
Tajikistan							
1	B. Gafurov	HBK	2400	5	5		40° 5'54.02" N 69°41'27.06" E
Uzbekistan							
1	Fergana	Beruniy MSG Canal Trubniy	2000		2		40°11'32.5"N 71°44'03.9"E
2	Tashlak	Jarkishloq MSG Canal Zarkent	730		4		40.493388° 71.832881°

Within the STREAM programme, IMPACT, in close collaboration with Acted and its local partners, will conduct the ESIA to inform the ESMP required for infrastructure implementation by the PATRIP Foundation. IMPACT's involvement in this process adds accountability to the TFS findings, ensuring thorough stakeholder consultation and maintaining AAP. The ESIA, both as contractual obligation and a commitment to a 'do no harm' approach, identifies and mitigates risks affecting communities.

Assessment Process

The ESIA will be conducted following the completion of the TFS and will include a participatory workshop with local stakeholders (the Framework in Annex 1. 2). The process will align with the SDC's Climate, Environment, and Disaster Risk Reduction Integration Guidance (CEDRIG) toolkit,[44] customised to meet PATRIP's specific ESMP development requirements.[45] In compliance with PATRIP's Environmental and Social Policy, the ESIA has been carefully planned to reflect Acted's 'do no harm' approach. This approach focuses on minimising or preventing potential negative environmental and social risks associated with programme activities, such as irrigation water infrastructure rehabilitation including rehabilitation of gate shields**,** the water meters installation and repair of existing hydroposts (details in Table 1).

Annex 1. 2: Framework for Conducting a Participatory Workshop

Objective of the participatory workshop	The participatory workshop will assess potential risks associated with the programme's activities, focusing on environmental, ecosystem, and social impacts in the programme area. Participants will evaluate climate change-related hazards, biodiversity and ecosystem risks, and the effects on community livelihoods and social conditions. Key discussions will address potential negative impacts of water infrastructure rehabilitation and water meter installation, ensuring risks are identified and strategies developed to mitigate them. Through active stakeholder engagement, the workshop aims to foster sustainable and inclusive solutions for the intervention areas.

[44] SDC, Climate, Environment and Disaster Risk Reduction Integration Guidance (CEDRIG) Tool
[45] Environmental and Social Assessment Template, Annex E, 2021

When	14-16 April 2025
Duration	1 day in one location
Who	Facilitator/Lead: IMPACT/Acted, facilitators Participants: from min. 9 to max. 18 people per location (for details see Annex 1. 3)
Materials	Hall, catering, transportation allowance, agenda, presentation slides, markers, sticky notes, pens, handouts, posters of programme site maps, flip chart papers, white flip board/stand, masking tapes, printed ground rules for participation in A3 format, printed Table 2 and 3 with preliminary filled out parts "Hazards and their consequences" in bigger format, stickers
Outputs	Draft ESIA factsheet inputs, suggestions to the ESMPs. 3 workshop facilitators (1 to deliver presentation from Acted or IMPACT, 1 to facilitate the discussion; 1 for taking notes). Questions for participants (from DSAG) to facilitate subgroup work.

Data Collection Methods

The participatory workshop will assess the potential environmental risks, including critical climate change-related, environmental, and natural hazards in the programme area; ecosystem risks, such as biodiversity and ecosystem impacts; and social risks to the programme's activities as well as potential negative impacts of the programme's activities on the environment, ecosystems, and the social conditions of communities in the intervention areas.

The ESIA will employ:

1. **Secondary data collection (SDR):** In-depth context analysis, review of relevant reports, including the programme's inception phase reports: Areas Based Assessment reports (ABA) and report on TFS. IMPACT will conduct SDR in close collaboration with Acted based on the ABA and TFS reports prior to the ESIA workshops on hazards and their potential consequences. The findings will be presented at the beginning of the participatory workshop to support primary data collection.
2. **Primary data collection**: A participatory workshop with beneficiaries to gather insights on risks and impacts from their perspectives.
3. **Outputs and Integration**: The collected data will inform the ESMP, ensuring alignment with PATRIP's standards. This structured approach ensures that the STREAM programme remains environmentally sustainable, socially inclusive, and responsive to the needs and concerns of the communities while adhering to the 'do no harm' principle to develop effective mitigation measures.

The sampling strategy for selecting workshop participants will be based on the programme's water infrastructure interventions, specifically targeting areas where rehabilitation including gate shields, water meter installations and repairing of existing hydro post have been planned. Participants will be selected from 2 LSGs in Batken, 5 LSGs in Sughd, and 3 districts in Fergana. These locations were chosen because they have been directly impacted by the programme's activities, ensuring that the selected participants are positioned to provide relevant feedback regarding the interventions. The workshop will be conducted in 4 locations, with a 1-day workshop in each location: 2 in Kyrgyzstan, Batken Region; 1 – Tajikistan, Sughd Region and 1 – Uzbekistan, Fergana Region.

The participants in the workshops will include a broad range of stakeholders directly involved in irrigation water infrastructure management and water users, particularly farmers and rural communities can provide information on risks/impacts and mitigation measures, including and not limited: 1) Irrigation Water Engineers and Technicians, Irrigation Water Management Staff; 2) Representatives from River Basin Council; 3) Representatives from WUAs; 4) Land specialists at LSG; 5) Head of village/ Village activists; 6) Farmers (more details in Annex 1. 3). This table provides a detailed breakdown of the stakeholder groups involved in the assessment process. It highlights their roles and significance, governance levels, the number of participants, and the criteria for their selection.

Annex 1. 3: Sampling Criteria by Stakeholder Roles

Stakeholder Stratum/ Participants	Role/Importance	Governance Levels	Number of Participants per location	Selection Criteria and Process
Irrigation Water Engineers and Technicians / Water Management Staff	Management at district level: design, maintain, and manage water infrastructure; develop technical plans and mitigation strategies to address infrastructure challenges and impacts; policy development and implementation on water use.	Oblast/District/LSG	2-3	Identified based on their involvement in the STREAM programme's feasibility study and water rehabilitation projects, with support from water management departments and local programme staff.
Department on water supply/ Water resources management in the Syr Darya River Basin			1-2	
LSG, district level Environmental Specialists	Manage land resources, ensuring sustainable use, overseeing distribution, and advising on policies for long-term sustainability.	District / LSG (KGZ)	1-2	With support from target LSG office
Representatives from the social development bodies (Social workers)	Coordinating services and resources to support vulnerable individuals while influencing practices to improve their lives.	District / LSG	1-2	With support from target LSG office, regional social development bodies.
WUAs	Maintain and upgrade irrigation canals at LSG levels, develop irrigation schedules, and represent water users' interests in government discussions and water management programmes.	LSG (KGZ)	1-2	With support from regional water management department.
Head of LSG and specialists responsible for maintaining water infrastructure and land use	Oversee sustainable land use, advise on policies, maintain irrigation canals, develop schedules, and advocate for water users in government programmes.	LSG, oblast level	2-3	
Head of village/ Village activists (including	Provide local governance, knowledge, and collaborate with WUAs on	Village/ Community/Mahala	2-4	Identified through their leadership roles in the selected villages with

Stakeholder Stratum/ Participants	Role/Importance	Governance Levels	Number of Participants per location	Selection Criteria and Process
representatives from elders' courts, women groups and vulnerable groups, who are knowledgeable about the challenges related to irrigation water management and use in the community)	water distribution and community issues.			programme intervention and collaboration with WUAs and LSGs, Head of village etc. This will ensure female representation.
Mahala community MURAB (UZ)				
Farmers	End-users of irrigation water infrastructure; provide grassroots perspectives on water access and agricultural needs.	Village / community	1-6	Randomly selected from a pool of farmers and water users who have experienced the infrastructure changes, with assistance from WUAs, Head of village / Village Leaders, LSG office
Total number of participants			9-18	

Limitations:

Consider possible limitations of the assessment regarding:

- Methodology: sampling (Limited access to the target population may lead to potential bias or gaps in representation (e.g., seasonal works affecting participant availability).
- Context: Certain regions or populations may be difficult to reach due to geographic isolation or security concerns. Stakeholders may withhold critical information due to social or cultural sensitivities, leading to incomplete data.
- Logistics: Limited timeframes may restrict in-depth data collection or follow-ups with participants. Insufficient funding or human resources could limit the scope of the assessment. Some local procedures for document approval may be time-consuming, potentially causing delays in meeting deadlines.

During the workshop, the facilitation team (IMAPCT staff, facilitators) will provide technical leadership and guidance to the workshop participants through a series of activities in which they will identify programme risks and impacts to contribute to the programme long term sustainability to the community needs.

The facilitation team will facilitate the discussions, as well as record the information produced following the activities indicated in this tool. The final outputs of the workshop will be the written tables of responses from participants with sticky notes adjusting consequences and adding risks and impacts (Table template 4, 5).

Short findings on assessing the potential environmental, ecosystem and social risks to the programme's activities and its impact will be entered to the Annex 1. 4.**Error! Reference source not found.** The tables e nsures consistency in discussions, simplifies decision-making, and documents outcomes in a clear,

actionable format. Below Annex 1. 4 demonstrates possible preliminary risks findings from the ABRA and TFS for presenting risks and consequents (A1, A2).

Table Risk perspective (Annex 1. 4) from A3 to A7 will be filled out by workshop participants, other parts (A1, 2 and A 8-9 and comments) will be completed by IMPACT in close collaboration with Acted after the workshop. The table is a structured tool that guides participants through a systematic process to:

1. Identify and evaluate hazards (A1) affecting water infrastructure and water meters and assess their consequences will be worked out by IMPACT.
2. Assess their vulnerabilities (A3), likelihood (A4), and significance (A5).
3. Select high-priority risks for mitigation (A6).
4. Develop and prioritise actionable mitigation measures (A7).

Annex 1. 4: Table Risk perspective

Programme activities	**Step A1**	**Step A2**	**Step A3**	**Step A4**	**Step A5**	**Step A6**
	Hazards	Consequences	Vulnerabilities	Likelihood	Significance	Selected risks
WIR						
WM						
REHP						

5. Note: The risks should be identified for each item. WIR – water infrastructure rehabilitation, gates shields; WM – water meters, REHP – repair of existing hydro post.

Selected risks (from step A6)	**Step A7**	**Step A8**	**Step A9**	Comments
	Potential measures	Score for measures	Selected measures	
		Will be done after outside of the workshop by IMPCAT and Acted	Will be done after outside of the workshop by IMPCAT and Acted	

The Impact perspective (Annex 1. 5) guides participants through a systematic process to assess programme activities impact to environmental, ecosystem, and social-economic aspects to ensure a holistic evaluation. Potential negative impact (B1); Significance (B2); Selected impacts (B3); Potential measures (B4) will be worked out during the workshop and other parts (B 5-7) by IMPACT after the workshop based on the obtained data during workshop.

Annex 1. 5: Impact perspective

Component of the programme	**Step B1** **Potential negative impact**	**Step B2** **Significance**	**Step B3** **Selected impacts**
IMPACT ON ENVIRONMENT			
WIR			
WM			
REHP			
IMPACT ON ECOSYSTEMS			
WIR			
WM			
REHP			
IMPACT ON SOCIAL, ECONOMIC ASPECTS			
WIR			
WM			
REHPP			

Component of the programme	Step B4 Potential measures	Step B5 Score for measures (optional)	Step B5 Selected measures	Comments
WIR				
WM				
REHP				

After each workshop a "Lessons learned" meeting will be held. All facilitators including IMPACT, Acted team will participate in this meeting to discuss the main lessons learned of each community discussion and whenever necessary the tool will be adapted to help facilitate the future community discussions.

IMPACT team will translate all information obtained from workshop and will share with assessment officer for data processing. Assessment officer will use the information on the tables 4, 5 to triangulate the data on the ESIA. The workshop information will be reviewed by assessment officer and cleaned after consultation with country coordinator and prepared to integration with ESMP.

The information to the ESMP will be completed with a series of consultations with Acted team that will take place after the workshops based on the information needed to finalise the report on ESIA and ESMP.

IMPACT will lead on development of the final product by graphic editing the final report into a document format fit-for-advocacy which will be shared with implementing partners Acted and other partners organisations specified in the programme national partner's agreement, and specific individuals and groups within the community as determined by the national partner. However, more important than the final output itself is the process by which we will engage communities and local stakeholders, empowering them to formulate their own vision and adapting the response modalities to their recommendations (before and during the discussions).

Structure of ESIA workshop

- ESIA: description of the objective of the workshop and how ESIA findings will be to consolidate to the ESMP required by PATRIP.

Presentation of inception period report findings, TFS for water infrastructure rehabilitation and water meters installation. The presentation will delve into a comprehensive approach to addressing water management challenges in the region, beginning with a preliminary assessment to set the stage including profiling the watersheds, examining their size, topography, land use, and water quality to understand their unique characteristics. Within these watersheds, specific sub-river basins will be prioritised, focusing on areas most in need of intervention based on water scarcity, pollution, and ecological importance.

From there, the discussion moves into the technical assessment and proposed interventions. This involves evaluating specific sites to determine their suitability for water-saving measures. The presentation will also highlight measurement tools and methods for monitoring water usage and evaluating the impacts of these measures.

The narrative then shifts to the critical aspect of operation, maintenance, and community involvement. Strategies for the long-term operation and upkeep of water-saving technologies will be discussed, emphasising the importance of sustainability. To complement these technical efforts, awareness information will be outlined to educate local communities on water conservation practices and the broader importance of sustainable water management.

The presentation will ultimately aim to pinpoint water-stressed regions, propose practical and effective water-saving solutions, monitor and evaluate the outcomes, and foster community engagement. By weaving together these elements, it will offer actionable insights into both the challenges and opportunities for achieving sustainable water management in the region.

In addition, the presentation will introduce the data collection approaches.

- Name of the programme
- Time Frame
- How to implement
- Who benefits
- Where
- What are the resources needed
- Estimated cost of the programme

Structure of the team for the workshop

IMPACT, Acted will work together in each of the 4 locations identified by Acted to collaboratively facilitate the discussions. Team members (1 IMPACT, 1 Acted, 1 facilitator) will team in up to share the duties and responsibilities of the workshop facilitation among them and be able to benefit from their different level of competencies.

The role of facilitators will be to:

- Welcome participants
- Briefly introduce yourself and other facilitators
- Present the intended goals of the workshop
- Clearly explain the objective and procedure of each of the different activities of the workshop
- Facilitate the discussions and participation during the group works.
- Oversee the workshop to make sure that all the groups are moving forward and ensure the workshop follows the planned schedule
- Support the community members during the different activities when needed, providing further explanation and clarifications

The output of each community discussion will be an ESIA framework filled out with identified risks and impacts, along with recommended mitigation measures for both.

The final output will be a collection of ESIA Factsheets summarising the identified risks, impacts, and recommended mitigation measures from each community discussion. These findings will be integrated into the final ESMPs with the help of Acted.

General Recommendations for Facilitators:

- **TAKE TIME**: This approach is new for the participants, and it can be intimidating to participate. Take the necessary time to explain the objectives and process of each exercise of the workshop. Take time to listen to any concern and question asked and give them the necessary space to think during the process. Some people need more time to answer your questions; they deserve to receive this time.
- **BE FLEXIBLE**: This is a new activity for us so it's difficult to anticipate what is going to work well or not. Be flexible during the workshop: if you think participants need more time for an exercise adjust your agenda; if some concepts are easier to understand than expected reduce the time spend on the explanation; if there is confusion during group work bring everyone back in plenary to re-explain.
- **LEARN**: At the end of each day take time with your team to review what went well or not during the day and what we should do differently the next time. Consider the feedback provided by the participants after the workshop. It is also important to exchange information with other programme officers in other areas where ESIA community discussions are taking place to learn from each other. Lessons learned calls will be scheduled on a regular basis to share the information and lessons learned between all teams in the four locations.
- **BE HONEST and CLEAR**: Remember the objective and the role of IMPACT, Acted, facilitators in the process are to facilitate the discussion they are not participants. Take some time during the introduction to clearly communicate the objectives and limitations for this programme: we should avoid promising all proposed programmes will be developed, as we do have limited budget, capacities and limitations based on the programme mandate.

Workshop Working Hours:

The workshop will continue for 6 hours and 30 minutes: from 10:00 to 17:30.

Subtract 1 hour for lunch;

Subtract 20 minutes for coffee break.

a. **Workshop Introduction**: The workshop begins with an overview of its objectives, agenda, and key topics on identified hazards and their consequences. This session sets the stage, emphasising the importance of collaboration and open communication for productive brainstorming and decision-making.
b. **Brainstorming Session Using Guided Questions**: Participants engage in a structured brainstorming session where facilitators use guided questions to stimulate ideas and insights to encourages participants to think critically about risks and impacts of programme activities, generating a wide range of perspectives and ideas.
c. **Discussion**: This interactive session allows participants to review the collected ideas, discuss potential measures, and provide feedback.
d. **Selection of Measures**: In the final session, participants prioritise and select the most viable and effective measures from the documented ideas. This selection process includes scoring or ranking options based on criteria alignment with programme objectives.
e. **Collecting and Documenting Input**: In this session, all contributions from the sessions will be systematically recorded for later review.

Annex 1. 6: Agenda

Time	Activities	Phases of the Tools	Minutes
09:50 – 10:00	Registration of participants		10
10:00 – 10:05	Opening Remarks		5
10:05 – 10:10	Objective of the Workshop		5
10:10 – 10:40	Introductions and presentation of the context analysis obtained from the ABRA and TFS on hazards and their possible consequences	A1, A2	30
10:40 – 12:00	Risk Assessment and Vulnerability Analysis	A3, A4, A5	80
12:00 – 12:30	Selection of Risks to be Treated	A6	30
12:30 – 13:00	Identification of Potential Measures	A7	30
13:00 – 14:00	Lunch		60
14:00 – 14:30	Assessment of Potential Negative Impacts	B1	30
14:30 – 15:30	Estimation of Significance	B2	60
15:30 – 16:00	Selection of Most Significant Impacts	B3	30
16:00 – 16:20	Coffee Break		20
16:20 – 17:20	Identification of Potential Measures	B4	60
17:20 – 17:30	Wrap-Up and Feedback, Closure		10

The facilitator responsible for notetaking will distribute stickers and pens and other items to participants at the beginning of the workshop.

Facilitator's Role

I) Preparation

1. Understand the Workshop objectives:

Part 1: Risks to Programme Activities

Objective: To identify and evaluate the risks that may hinder the implementation and success of programme activities.

Risk Identification and **potential consequences** of the hazards will be prepared by IMPACT and Acted in advance before the workshop, and findings presented at the beginning of the workshop.

The facilitator should get prepared on narrating discussions on:

Identify vulnerabilities (A3): For each potential consequence on the project (Step A2), identify the vulnerabilities explaining the causes behind the consequences.

Estimate likelihood (or extent(A4): Estimate the likelihood of occurrence of each of the identified hazards based on the past and future trends.

Estimate risk significance (A5): Risk is a combination of consequences for the project (Step A2) and likelihood (Step A4). Estimate the significance of the risks for the project (high/medium/low) with the help of the matrix provided below.

Select risks to be treated (A6): Analyse for all the risks identified in the previous steps and select the most important risk to be treated.

Identify potential measures (A7): Discuss and identify potential measures to reduce the risks selected in Step A6. Reducing the vulnerabilities identified under Step A3 helps in identifying measures.

Part 2: Programme Activities' Impacts on the Environment

Objective: To assess and minimise the negative impacts of programme activities on the environment, ecosystems, and local communities.

Impact assessment part consists of 4 parts to be discussed.

Impact Identification (B1):

Task 1. *Identify the most relevant programme activities (water infrastructure rehabilitation and water meter instalment) that could have a negative impact on the environment, ecosystem, social aspects and that could create new or exacerbate existing risks.*

Task 2: *Specify the potential negative impacts (maladaptation) for each of the identified activities. Furthermore, think about components that could lead to maladaptation.*
Estimate significance (B2): *Estimate the significance of the potential negative impacts identified in the previous step (describe the magnitude and the importance).*

The two key characteristics of negative impacts that should be considered in determining significance are "magnitude" and "importance". Magnitude assesses quantifiable factors such as the size or the extent of an impact. Importance relates to the subjective degree of disturbance according to the sensitivity or vulnerability of the system. Other factors such as the duration of the impact, its frequency, probability, or degree of reversibility, can help in estimating the overall significance.

Workshop Outcomes

By the end of the workshop, participants will have:

- A comprehensive understanding of the risks to the programme activities such as water infrastructure rehabilitation and water meter installation and their possible impact to environmental, ecosystem, and social impacts specific to the affected locations.
- Developed a prioritised list of mitigation measures, with an evaluation of their feasibility.
- Actionable recommendations to enhance programme resilience and sustainability.

2. Understand the Tables Structure:

– Familiarise yourself with the steps working this tables 2, 3 and whole working agenda, subgroup division sessions and group discussions.
– Please note that the following part of the workshop will involve data collection through the division of participants into subgroups.
Outcome: At the conclusion of the subgroup discussions, participants will present their findings. The insights from each group will be integrated to create a comprehensive approach to mitigating environmental, social, and economic risks, ensuring the programme's success while prioritising sustainability and community well-being.

– Ensure you understand key terms like "hazards," "vulnerabilities," "likelihood," and "significance etc."
3. Prepare Materials:
– Print or display the table for all participants.
– Provide examples for each step to clarify expectations.

4. Invitation: Ensure that participants include, as much as possible, the representatives listed in the Annex 1. 3**Error! Reference source not found.**.

- During the workshop:

5. Facilitators should contribute to facilitate the discussion – if enough staff is available, one could be present in each group, otherwise staff should move between the groups to assist all during the exercise. The staff does not have to share their technical knowledge but should encourage participants to talk and discuss together and move through do the described steps.
6. Facilitators should encourage the discussion but not limit or intervene to guide it. You can help the participants to reformulate and/or combine the proposed causes if you think they might need some help. Facilitators can also contribute to make sure all groups are moving forward and do not get stuck on side discussions.
   If there are several groups that have finished the exercise, we can have them assist other groups with their challenges. This will allow the slower groups to have time to finish.

09:50 – 10:00	**Registration of participants**
10:00 – 10:05	**Opening Remarks**

- If possible, propose to a key representative of the community to do a welcome introduction and have some opening remarks.
- Have participants go around and introduce themselves.
- Present the main objective of the workshop and set the ground rules for participation.

10:05 – 10:10	**Objective of the workshop**

Session Objectives	To outline the main objective of the workshop and highlight the printed ground rules for participation. Ask participants to raise any questions and clarify these before starting the workshop.
Time	5 minutes
Resources Needed	Hall, catering, transportation allowance, presentation slides, markers, sticky notes, pens, handouts, posters of programme site maps, flip chart papers, white flip board/stand, masking tapes, printed ground rules for participation in A3 format.

IMPACT staff will clearly explain the overall objective, the expected output, and an overview of the limitations – it is important to be transparent from the beginning of what we can and cannot accomplish to manage the expectations of the participants.

Context of the presentation:

- The inception period reports findings, TFS for water infrastructure rehabilitation and water meters installation, potential hazards and their potential consequences.

Engagement Commitments:

This workshop is just as much about the process of working together, as it is about the end product. The ESIA should be "owned" and implemented by everyone present in the workshop as well as Acted and IMPACT.

Community leaders and representatives must commit to engage, to the greatest extent possible, and contribute to build this response plan, according to the needs and preferences of the community members.

Community members must commit to engage with representatives and leaders to advocate to have their needs represented. Community members should also make the leaders/representatives responsible and accountable for developing a plan that is in agreement with the needs of the population.

Ground Rules:

Ask participants to help you come up with ground rules for the workshop. Ground rules can be written down on a paper that would be place somewhere where everyone can see it. They should include at least:

- No phones, be present at the meeting
- Punctuality
- Give everyone a chance to speak
- Listen actively when others are speaking
- Everyone's input is equally valued
- Active participation is encouraged

The "Parking Lot" flip chart page

The parking lot is a flip chart page that will be placed on a location visible to all participants of the workshop. Facilitators will write here the comments/questions/suggestions of the participants that cannot be addressed and considered at the moment these are raised. The purpose of this is to ensure the discussion does not deviate from the topic; and at the same time, it allows all comments to be considered and addressed. The parking lot acknowledges the value of the issues raised by writing these down and ensures that these will be followed up when relevant or when there is extra time for side comments.

Ice Breaker: Appreciative Interview

Please note to participants that they will be divided into 2-3 subgroups based on their areas of expertise during the workshop. These subgroups will focus on examining environmental (hazards), ecological (ecosystems), and societal factors. At the end of the discussions, one member from each subgroup will present their findings.

10:10 – 10:40	**Introductions and presentation of the context analysis obtained from the AB and TFS on hazards and their possible consequences**

Session Objectives	1. To present the findings of the context analysis obtained from the ABRA and TFS; 2. Hazards and their possible consequences (in each place). This presentation aims to provide a clear understanding of the identified area situation mostly on natural resources and risks and their implications, serving as

	a foundation for further discussion on risks and impacts and targeted mitigation strategies.
Time	30 minutes
Resources Needed	Programme or, presentation slides, markers, sticky notes, pens, handouts, posters of programme site maps, flip chart papers, white flip board/stand, masking tapes

The presentation is divided into 2 parts:

1). General information of programme activities' focusing on its environmental and social impacts. We will explore key areas, including:

- **Watershed Analysis:** Profiling watersheds and identifying prioritised sub-basins based on hydrological, climatic, and ecological factors.
- **Infrastructure Planning:** Examining the location and type of infrastructure, considering their potential environmental and social implications.
- **Regulatory Framework:** Analysing the necessary permits required for programme activities (if needed) and their current status.
- **Environmental and Ecosystem Sensitivity:** Assessing the project area's types and ecosystems.
- **Socioeconomic Considerations:** Evaluating the demographic, cultural, and social aspects of the programme area, including potential community challenges.

By thoroughly examining these areas, we aim to ensure the programme sustainability and minimise its negative impacts on the environment and local communities.

2). After presenting the key findings in each sector, hazards and their possible consequences (in each place grouped hazards that result in similar types of damage or challenges (e.g., landslides, mudflows, and floods causing infrastructure damage) will be presented for further discussions. Below Annex 1. 7 and potential consequences (A2) in Annex 1. 8**Error! Reference source not found.** will be presented for further discussion.)

Annex 1. 7: Identified hazards (A1) and potential consequences Step A2

Area of Affect	Hazard(s)	Potential Consequences
Environmental	Extreme weather events	Structural damage to infrastructure, overflow of canals, loss of water control, and disruption of irrigation schedules.
	Earthquake	Restricted access to sites; damage to pipelines and meters; major rehabilitation needs; disruption of water services.
	Debris and litter accumulation	Blockage of water flow, increased maintenance needs, and damage to gate mechanisms.
	Temperature fluctuations	Expansion and contraction of materials, cracks in infrastructure, reduced lifespan of equipment, and increased maintenance needs.
	Bank Cutting Erosion, Hydrographic Feature Changes	Loss of riverbanks; exposure of buried pipes; sedimentation in water sources; reduced functionality of systems; adaptive measures.
Ecosystem	Aquatic vegetation overgrowth, biofouling	Inaccurate readings from water meters, reduced water flow, increased maintenance needs, and structural damage to gate shields.

Area of Affect	Hazard(s)	Potential Consequences
	Invasive species (e.g., mussels, aquatic plants)	Blockage of water intakes, damage to gate mechanisms, increased maintenance costs, and reduced operational efficiency.
	Waterlogging of soil	Weakening of infrastructure foundations, increased collapse risk, disruption of water flow control.
Social-Economic	Lack of funding for maintenance and upgrades, unpaid water bills, and high repair costs	Deterioration of infrastructure, reduced water flow efficiency, increased leakage, financial instability for service providers, and higher long-term repair costs.
	Mismanagement, poor technical capacity	Inefficient allocation of resources, increased operational costs, poor service delivery, failure to meet user needs, improper installation, increased risk of breakdowns, and reduced user trust.
	Vandalism, theft, and conflicts over water access	Damage to programme activities, disruption of water flow, increased repair costs, inequitable water distribution, increased social tension, and reduced lifespan of infrastructure.

After the presentation of A1 and A2, the facilitator moves on to the next section, A3.

10:40 – 12:00	**Risk Assessment and Vulnerability Analysis (SO2, A3, A4, A5)**

Session Objectives	**Objectives:** To guide participants in identifying vulnerabilities, estimating the likelihood (or extent) of hazards, and assessing the significance of identified risks (Step A2).
Time	80 minutes
Resources Needed	Programme or, presentation slides, markers, sticky notes, pens, handouts, posters of programme site maps, flip chart papers, white flip board/stand, masking tapes

Facilitators should guide participants in identifying vulnerabilities and their root causes for each potential project consequence (Step A2) presented in previous section. The table 5 will be basis for this section. This step is essential for determining mitigating measures in subsequent stages to minimise risks associated with programme activities. Participants should be divided into two subgroups: one focusing on environmental and ecosystem hazards and the other on social and community hazards.

The facilitator begins by explaining that vulnerabilities are conditions or factors that increase susceptibility to the adverse effects of identified hazards. For each possible consequence (e.g., a problem or negative impact) that might affect programme activities, participants are encouraged to:

1. **Examine the Consequences:** Review potential issues or negative impacts on programme activities.
2. **Identify Weak Points:** Determine what makes the programme vulnerable to these issues. Ask, "*Why could this happen?*" For example, if flooding could delay construction, vulnerabilities might include poor drainage or building in a flood-prone area.

To ensure a thorough assessment, participants are asked to evaluate vulnerabilities for both pre- and post-hazard consequences. This includes activities such as water infrastructure rehabilitation and water meter installation. The facilitator ensures that the process is clear and comprehensive, enabling participants to develop actionable insights.

Divide Participants into Subgroups

- Group 1: Focus on Environmental Hazards.
- Group 2: Ecosystem Hazards.
- Group 3: Focus on Social and Economic Hazards.

Task 2: Identify Vulnerabilities

1. Ask participants to determine why these consequences occur. Encourage them to explore:
2. Guide each group to link vulnerabilities to specific project activities and hazards' consequences.

Examples of Vulnerabilities:

Flooding**:**

- Limited capacity for rapid debris removal, delaying restoration of services.
- Insufficient slope stabilisation measures near critical infrastructure.

Each group will:

1. Review the consequences of hazards identified in Step A2.
2. Identify vulnerabilities linked to these consequences.

Facilitation Tips

- **Encourage Collaboration:** Allow participants to share examples and align their findings across subgroups.

Output

By the end of the session, each group should:

1. Identify and document vulnerabilities for each hazard and consequence.
2. Present findings to the larger group for feedback and validation.

Next step:

The facilitator introduces the purpose of the session, explaining that participants will assess the likelihood of occurrence of each identified hazard based on past experiences and future trends.

3. The facilitator explains the revised categories for likelihood and their time ranges:

We will classify hazards based on how frequently they occur:

- **Very Likely:** Happens every few years i.e. in less than 5 years.
- **Likely:** Happens once every 5-10 years.
- **Unlikely:** Happens once in a generation i.e. in 20-30 years.

4. Structured Questioning. The facilitator systematically goes through each hazard, asking:

How often have you observed or experienced listed hazard in programme area? Would you classify it as very likely, likely, or unlikely based on the past trends and your knowledge?

5. To make the process efficient, the facilitator can ask for specific examples or data if participants seem uncertain.

Example: "For heavy rainfall leading to floods – does it occur every year, once every 3–5 years, or once every 10 years or more? Based on this, how would you classify its likelihood?"

6. The facilitator uses a visible medium (flip chart, shared screen, or whiteboard) to record:

- The hazard being assessed.
- The agreed likelihood category (e.g., very likely, likely, unlikely).

- Any supporting evidence or notes shared by participants.
  Example table for documentation:

Hazard	Likelihood occurrence	Evidence/Notes
Flood	Very Likely	Frequent events due to heavy rainfall
Drought	Likely	Observed water shortages every 5–10 years
Earthquake	Unlikely	Rare in this region

7. **Validate and Finalise** After completing the list, the facilitator asks if anyone have additional insights or evidence that might change any of these classifications; revisit any disagreements or uncertainties. Adjustments can be made if needed. The facilitator summarises the findings.

Next step: To assess and prioritise the risks to the programme activities by evaluating the likelihood of occurrence and consequences of identified hazards, using a simple risk matrix to determine the significance of each risk (low, medium, or high).

Risk is a combination of the consequences for the programme activities (Step A2) and likelihood (Step A4). Estimate the significance of the risks for the programme act as high, medium, or low using the following matrix (see below Template Matrix for Estimating Risk Significance).

High Risk (Significance):

Risks that can lead to significant disruption of water services, long-term damage to infrastructure, or significant community harm. Examples:

- Repeated flooding causing structural failure of water infrastructure or meters.

Medium Risk (Significance):

Risks that moderately impact maintenance operations but are manageable with timely interventions. Examples:

- Short-term disruptions to water access during maintenance activities.

Low Risk (Significance):

Risks that are unlikely to cause notable harm or disruption to infrastructure or communities. Examples:

- Temporary inconvenience from maintenance activities in less critical areas.

3. **Present the Risk Matrix** Share the matrix visually, either on a flipchart, whiteboard, or digital screen

	Slightly Harmful	Harmful	Extremely Harmful
Very Likely	• Medium Risk	• High Risk	• High Risk
Likely	• Low Risk	• Medium Risk	• High Risk
Unlikely	• Low Risk	• Low Risk	• Medium Risk

3. Define the Categories

- **Likelihood of occurrence**: Use the categories already established (e.g., likely, unlikely, highly unlikely).

- **Consequences**: Refer to the identified consequences from Step A2 (slightly harmful, harmful, extremely harmful) **Error! Reference source not found.**.

Annex 1. 8: Hazard Rating Framework: Assessing Impact Across Key Dimensions

Consequences	Impact Significance	Environmental Effects	Ecosystem Effects	Social Effects
Slightly Harmful	Low, localised, or short-term effects.	Slight clogging; minor cleaning or maintenance required to restore function.	Slight ecosystem effect; Programme activities remains functional with minor cleaning or maintenance.	Slight reduction in accuracy or efficiency; minor repairs or recalibration needed to restore function.
Harmful	Medium, broader, or longer-term effects that require intervention.	Reduced accuracy or efficiency; recalibration or part replacement may be needed.	Moderate ecosystem effect; reduced accuracy in readings; may require cleaning, recalibration, or repair.	Reduced accuracy and efficiency; increased maintenance needs; potential recalibration or part replacement required.
Extremely Harmful	High, widespread, or irreversible effects.	Severe damage or destruction; programme activities may require full replacement or reconstruction of supporting structures.	Severe ecosystem effect, structural damage, or malfunction; water meter may require complete replacement or major repair.	Major malfunction or complete failure; programme activities may require full replacement or extensive repair.

4. Walk through an example

For example, consider the hazard of flooding:

- If flooding is **very likely** and the consequences are **extremely harmful** (e.g., water infrastructure damage and water contamination), the risk is classified as **High Risk**.
- If flooding is **unlikely** and the consequences are **slightly harmful**, the risk would be **Low Risk**.

Hazard	Likelihood	Consequences	Risk Level (Significance)
Flood	Very Likely	Extremely Harmful	High Risk
Landslide	Likely	Harmful	Medium Risk
Drought	Unlikely	Slightly Harmful	Low Risk

4. Facilitate Group Discussion

For each hazard, ask participants to:

- Review the likelihood of occurrence category assigned in Step A4.
- Consider the significance of consequences identified in Step A2.
- Locate the risk level on the matrix.

Use guiding questions:

For [specific hazard], what is the likelihood of occurrence based on Step A4? What are the consequences identified in Step A2? Based on these, where does it fall on the matrix?

5. Record Results in Real-Time

6. Print out below Annex 1. 9 in advance to document the results:

Annex 1. 9: Potential Consequence of the Hazards: Assessing Impact Across Environmental, Ecosystem (Biodiversity), and Social Dimensions

Area of Affect	Hazard(s)	Potential Consequences	Likelihood of occurrence	Significance		
				Slightly Harmful	Harmful	Extremely Harmful
Environmental	Extreme weather events	Structural damage to infrastructure, overflow of canals, loss of water control, and disruption of irrigation schedules.	Likely			
			Unlikely			
			Highly Unlikely			
	Earthquake	Restricted access to sites; damage to programme activities; major rehabilitation needs; disruption of water services.	Likely			
			Unlikely			
			Highly Unlikely			
	Debris and litter accumulation	Blockage of water flow, increased maintenance needs, and damage to gate mechanisms.	Likely			
			Unlikely			
			Highly Unlikely			
	Temperature fluctuations	Expansion and contraction of materials, cracks in infrastructure, reduced lifespan of equipment, and increased maintenance needs.	Likely			
			Unlikely			
			Highly Unlikely			
	Bank Cutting Erosion, Hydrographic Feature Changes	Loss of riverbanks; exposure of buried pipes; sedimentation in water sources; reduced functionality of systems; adaptive measures.	Likely			
			Unlikely			
			Highly Unlikely			
Ecosyster	Aquatic vegetation overgrowth, biofouling	Inaccurate readings from water meters, reduced water flow, increased maintenance needs, and structural damage to gate shields.	Likely			
			Unlikely			
			Highly Unlikely			
			Likely			

Area of Affect	Hazard(s)	Potential Consequences	Likelihood of occurrence	Significance		
				Slightly Harmful	Harmful	Extremely Harmful
	Invasive species (e.g., mussels, aquatic plants)	Blockage of water intakes, damage to gate mechanisms, increased maintenance costs, and reduced operational efficiency.	Unlikely			
			Highly Unlikely			
	Waterlogging of soil	Weakening of infrastructure foundations, increased collapse risk, disruption of water flow control.	Likely			
			Unlikely			
			Highly Unlikely			
Social-Economic	Lack of funding for maintenance and upgrades, unpaid water bills, and high repair costs	Deterioration of infrastructure, reduced water flow efficiency, increased leakage, financial instability for service providers, and higher long-term repair costs.	Likely			
			Unlikely			
			Highly Unlikely			
	Vandalism, theft, and conflicts over water access	Damage to programme activities, disruption of water flow, increased repair costs, inequitable water distribution, increased social tension, and reduced lifespan of infrastructure.	Likely			
			Unlikely			
			Highly Unlikely			
	Mismanagement, poor Technical capacity	Inefficient allocation of resources, increased operational costs, poor service delivery, failure to meet user needs, improper installation, increased risk of breakdowns, and reduced user trust.	Likely			
			Unlikely			
			Highly Unlikely			

7. Validate and Finalise

The facilitator will ask participants if the risk levels feel accurate based on their experiences and knowledge and invite anyone to suggest changes or provide further evidence.

12:00 – 12:30	Selection of Risks to be Treated (SO2, A6)

Session Objectives	Objectives: Analyse for all the risks identified in the previous select the ones which still need to be prioritised and treated
Time	30 minutes

Resources Needed	Presentation slides, markers, sticky notes, pens, posters of programme site maps, flip chart papers, white flip board/stand, a flip chart with created table on significance of the hazards

The facilitator mentions that after reviewing the potential risks and vulnerabilities identified in the previous steps, it is now time to focus on selecting the risks that require attention and action. The goal is to identify which of these risks need to be actively managed to ensure the success of the programme activities.

The facilitator then asked participants to vote on the risks that need to be treated and to record the identified risks according to their level of impact.

12:30 - 13:00	**Identify Potential Measures (SO2 A7)**

Session Objectives	Objectives: Guide participants through the process of discussing and identifying potential measures to reduce the risks identified in Step A6, focusing on reducing vulnerabilities and utilising local knowledge and coping strategies.
Time	30 minutes
Resources Needed	Presentation slides, markers, sticky notes, pens, posters of programme site maps, flip chart papers, white flip board/stand, a flip chart

This session will include subgroup discussions, with the facilitator's role being to keep the conversation focused and on track, encourage balanced participation, and ensure key insights and decisions are documented for follow-up actions. There will be three subgroups: Environmental; Ecosystem, Socio-Economic Aspects.

The vulnerabilities identified in Step A3 will guide the selection of appropriate measures. Consider local knowledge and coping strategies when identifying mitigation measures:

1. Leverage Local Knowledge and Coping Strategies

- Encourage participants to share examples of how the community has managed similar risks in the past.
- Highlight the importance of local strategies such as:
  - Social mobilisation – Community collective action in response to sudden disruptions (e.g., repairing irrigation channels).
  - Mutual aid systems – Informal networks providing support during crises.

2. Explore Potential Measures

Guide the group to brainstorm and evaluate different measures to reduce vulnerabilities. Potential measures could include:

- Structural measures – Improving infrastructure such as irrigation systems, flood barriers, and drainage networks.
- Non-structural measures – Developing early warning systems, improving weather forecasting, and providing training on disaster preparedness.
- Ecosystem-based measures – Restoring natural barriers (e.g., tree planting) to reduce flood and landslide risks.

- Social measures – Strengthening community networks, enhancing access to emergency services, and supporting local governance.

3. Promote Inclusive Decision-Making

- Encourage participants to consider how the proposed measures will impact different social groups and address inequalities.
- Facilitate consensus-building to ensure that the selected measures are realistic, sustainable, and supported by the community.

13:00-14:00	**Lunch**

The facilitator announces lunch.

IMPACT PERSPECTIVE SESSION

The impact perspective helps identify significant negative impacts the programme activities may have on environmental, ecosystem and social, economic impacts, as well as potential opportunities to mitigate these impacts. Workshop participants will work through steps B1 to B4 to capture and analyse the results in a provided table.

14:00 -14:30	**SO3 Participatory Workshop on Assessing the Impacts of Programme Activities** **Assess potential negative impacts** (B1)

Session Objectives	The objective is to guide participants in 1) identifying programme activities that could negatively affect the environment, ecosystem and have negative social-economic impacts may exacerbate existing risks and 2) define specific negative impacts for each programme activities.
Time	30 minutes
Resources Needed	Presentation slides, markers, sticky notes, pens, posters of programme site maps, flip chart papers, white flip board/stand

The facilitator explains task of the sessions ask group to review the programme activities and consider both direct and indirect impacts. Encourage participants to think about how project activities might either directly worsen environmental conditions or contribute to greater exposure risks.

The facilitator will ask participants divide into three groups as at the beginning of the workshop.

- **Group 1:** Focus on **Environmental Impacts**. Discuss the potential environmental consequences and how they can be mitigated.
- **Group 2:** Focus on **Ecosystem Impacts.** Programme activities impact to biodiversity and its ecosystem and how they can be mitigated.
- **Group 3:** Focus on **Social and Economic Impacts**. Discuss how the programme activities might affect communities, economies, and livelihoods, and identify mitigation strategies to reduce these impacts.

Outcome:

- Each group should provide a list of programme activities, potential impacts, and corresponding mitigation strategies in their respective categories. The results will be compiled into a table for further analysis and action planning.
  For example:
    - **Environmental impacts:** Canal construction may disrupt natural water flow and groundwater levels. Leakage or poor maintenance can lead to waterlogging and soil degradation.
    - **Ecosystem impact:** Canals may alter natural habitats, affecting aquatic and riparian species; Water meters and gates may reduce water flow to wetlands and downstream ecosystems; fragmentation of aquatic habitats due to canal barriers.
    - **Social and economic implications:** Water tariffs from metering can burden low-income households; displacement and loss of access to traditional water sources due to canal construction.

14:30 - 15:30	**Estimate Significance (SO3 B2)**

Session Objectives	The objective is to assess how significant the negative impacts identified in the previous tasks are, using the key characteristics of "magnitude" and "importance."
Time	60 minutes
Resources Needed	Presentation slides, markers, sticky notes, pens, posters of programme site maps, flip chart papers, white flip board/stand

The facilitator explains the objective of the session and how to measure the significance of impact in 3 aspects: environmental, ecosystem and social aspects using below guidance and ask participants stay in the same places in three subgroups environmental, ecosystem and social aspects. Encourages participants to think about how serious the impact is, considering the vulnerability of the system or community involved.

Facilitator will guide participants in understanding how to assess the significance of potential negative impacts by focusing on two primary characteristics – magnitude and importance – and incorporating additional factors such as duration, frequency, probability, and reversibility.

Estimate the significance of the potential negative impacts identified in the previous step.
When assessing the significance of negative impacts, two key characteristics should be considered: magnitude and importance.

- Magnitude evaluates measurable factors such as the scale or extent of an impact. For example, this could involve quantifying the number of households affected by disputes over water access and affordability due to the installation of water meters.
- Importance reflects the perceived degree of disruption based on the sensitivity or vulnerability of the affected system. For instance, the social stress caused by inequitable water distribution might be considered highly important in communities with pre-existing inequalities or limited resources.

Other factors, such as the duration of the impact, its frequency (e.g., recurring conflicts over water access may not only impact livelihoods but also affect relationships between upstream and downstream communities. Understanding these dynamics could be critical for ensuring sustainable and conflict-sensitive interventions), probability of occurrence, or potential reversibility, can also help estimate the overall significance.

Below an example for estimating the significance of these risks.

1. Environmental Impacts

Significance: High

If infrastructure improvements fail to integrate natural hazards, such as flood-resistant designs, they could increase community vulnerability to extreme weather events, leading to maladaptation.

Likelihood: Very likely to likely

Given the increasing frequency of extreme weather events due to climate change, the failure to plan for future scenarios makes these risks highly likely.

Overall Significance: High

- Climate-related impacts affect both short-term operations and long-term sustainability, making it critical to address them during the project's design phase.

Evaluate Impact Significance Using Baseline Conditions

Evaluate the magnitude of each potential negative impact, using baseline environmental and social conditions as a reference.

Discussion on how each impact affects sensitive resources or receptors (e.g., water sources, public), assessing significance relative to the community and environment.

2. Ecosystem Impacts

Significance: Moderate to High

- Programme activities may alter natural water flow, fragment aquatic habitats, and reduce water availability to wetlands, threatening species diversity and ecosystem balance.

Likelihood: Very likely

- Without proper safeguards (e.g., erosion control, biodiversity management), these impacts are highly probable due to the scale of construction and operational changes.

Overall Significance: High

- Long-term damage to aquatic ecosystems, reduced biodiversity issues could be difficult to reverse if left unmanaged.

3. Social and Economic Impacts

Significance: Medium to High

The affordability of water services due to metering could increase economic hardship, especially for low-income groups, reducing access to water. This can exacerbate inequality in already vulnerable communities.

Likelihood: Medium to High

Financial pressures related to water tariffs (if consumption-based tariffs are introduced) are common where metering has been introduced for vulnerable groups.

Overall Significance: High

- If not managed, the social impacts could generate public resistance to the project, compromising its sustainability.

Analyse Likelihood of Each Impact

Discussion on the likelihood of each identified impact, drawing on historical data, risk models, or expert input where available.

Estimate the probability of each impact occurring during the programme implementation, helping identify which impacts are most likely to materialise.

Assess Sensitivity of Affected Resources and Receptors

Consider the sensitivity of impacted resources or receptors, accounting for factors like ecological importance, economic value, or cultural significance.

Discuss how the vulnerability of these resources or receptors could increase the effects of certain impacts, particularly on vital ecosystems or community health.

Rank Impacts by Combined Significance and Likelihood

Assign combined significance and likelihood scores for each impact, creating a ranking that reflects the most significant risks.

Prioritise impacts based on these scores, focusing on those with both high significance and high likelihood to guide risk mitigation efforts.

Assessment and Prioritisation Matrix pattern

Impact Type	Significant	Likelihood	Overall Significance
Environmental Impacts	High	Medium	High
Ecosystem impacts	Medium-High	Medium-High	High
Social and Economic Impacts	Medium to High	Medium-High	High

Demonstrate the Process with a Matrix

Introduce a significance matrix to combine the factors:

Magnitude	Importance	Significance
High	High	High
High	Low	Moderate
Low	Low	Low

Ask participants to assign ratings (e.g., high, moderate, low) based on evidence or qualitative judgment.

15:30 - 16:00	**Select Most Significant Impacts (SO3 B3)**

Session Objectives	The objective is to select most significant impacts
Time	30 minutes
Resources Needed	Presentation slides, markers, sticky notes, pens, posters of programme site maps, flip chart papers, white flip board/stand, printed table for documentation

The facilitator explains the objective and guides the participants.

Review all potential negative impacts and their assessed significance from the previous steps. Focus on impacts with high magnitude or importance, or those with prolonged, frequent, or irreversible consequences that still require targeted action.

16:00-16:20	**Coffee break**

The facilitator announces 20 minutes coffee break.

16:20 - 17:20	**Identify Potential Measures (SO3 B4)**

Session Objectives	The objective is to identify impacts are the most critical and should be prioritised for mitigation or management
Time	60 minutes
Resources Needed	Presentation slides, markers, sticky notes, pens, posters of programme site maps, flip chart papers, white flip board/stand, Printed table for documentation

Participants will brainstorm mitigation options across two categories:

- **Improving existing processes and practices.**
- **Adding new components to mitigate impacts.**

The facilitator explains the purpose to brainstorm and identify practical mitigation options to reduce negative impacts while enhancing positive outcomes.

1. Provide Guidelines for Brainstorming:
    a. Remind participants to focus on actionable solutions.
2. Review Identified Negative Impacts
3. Present a summary of previously identified impacts in three categories:
    a. Environnemental (e.g., construction disturbances).
    b. Ecosystem (e.g., habitat encroachment).
    c. Socio-economic (e.g., temporary supply disruptions).
4. Facilitator's Role:
    a. Briefly discuss the significance of each impact.
    b. Set the stage for brainstorming mitigation options.
5. Group Discussion:
    a. Review all suggestions.
    b. Combine similar ideas and eliminate infeasible ones.

4. Final Ranking

To rank the options, assign scores (e.g., 1 to 3) to each criterion for every mitigation option, then calculate a weighted score. You can prioritise criteria based on context (e.g., higher weight for impact in life-saving measures). Ensure workshop participants reach a consensus on the greatest impacts before moving forward. The ranked options can be presented as follows:

Mitigation Option	Cost (1-3)	Feasibility (1-3)	Expected Impact (1-3)	Total Score	Rank
Option A	2	3	3	8	1
Option B	1	2	3	6	2
Option C	3	1	2	6	3

By the end of the session, participants will have a clear, prioritised list of practical mitigation options to address the identified impacts, ensuring a sustainable and community-centred approach the programme activities.

17:20-17:30	**Wrap Up and Feedback, Closure**

Facilitator:

1. **Summarise Key Outcomes:**
    - Briefly review the main points discussed during the workshop.
    - Highlight key decisions made.
    - Acknowledge contributions from all participants.
2. **Express Gratitude:**

Thank you for your valuable contributions. Your insights and collaboration have laid a strong foundation for the next steps. We look forward to continuing this work together.

Annex 2: List of Participants for ESIA Workshops

KYRGYZSTAN

Annex 2. 1: List of Participants, Uch Korgon Workshop, Kadamjay District, Kyrgyzstan, 24 April 2025

№	Name	Organisation	Position	Contact details
1	Bakirova Kizinarkan	Women's council	Head of Women Council	222109980
2	Muminjanov Mahamatjan	Uch-Korgon Aiyl Okmotu (LSG)	Pasture inspector	550311174
3	Abduraimov Shavkat	A. Masaliev Aiyl Okmotu (LSG)	Mirab	555174377
4	Bakirov Abdumomun	A. Masaliev Aiyl Okmotu (LSG)	Mirab	778067359
5	Asatulloev Iskandar	A. Masaliev Aiyl Okmotu (LSG)	Mirab	772846642
6	Karataev Amiraga	Uch-Korgon Aiyl Okmotu (LSG)	Water engineer	773424560
7	Teshebaev Sharif	District Water Management Authority (RUVH)	Hydromet engineer	554043484
8	Artikof Shuhrat	District Water Management Authority (RUVH)	Head of the Hydromet department	778260100
9	Habibullaev Hamidulla	"Taza Suu" municipal enterprise	Head of the Department	772378637
10	Djuadbbaeva Lolahon	Women's council	Obstetrician	550160463
11	Isakov Bahramjon	Uch-Korgon Aiyl Okmotu (LSG)	Land specialist	556252649
12	Murzaev Janybek	Uch-Korgon Aiyl Okmotu (LSG)	Farmer	7777699445
13	Mamytova Aychurok	Uch-Korgon Aiyl Okmotu (LSG) Women's Council	Head of Women Council	778650645
14	Urakova Dildora	Uch-Korgon Aiyl Okmotu (LSG)	Social department specialist	778121303
15	Isakov Akylbek	Kadamjay District Water Management Authority (RUVH)	Head of the Repair and Construction Department	7777583940

16	Ashimov Kubanychbek	Uch-Korgon Aiyl Okmotu (LSG)	Emergency Situations specialist	222070207
17	Orozbekov Suymonbek	Kadamjay District Water Management Authority (RUVH)	Head of Water Users Department	777215014
18	Kanybekova Aizada	Public foundation "Aruuzat"	Director	779898057

Annex 2. 2: List of Participants, Kulundu Workshop, Leylek District, Kyrgyzstan, 29 April 2025

№	Name	Organisation	Position	Contact details
1	Mamasaliev Sydyk	Leylek District Water Management Authority (RUVH)	Head of the Department	770493163
2	Sadykov Srajidin	Leylek District Water Management Authority (RUVH)	Head of the Department	776091282
3	Kalbekov Akjol	Leylek District Water Management Authority (RUVH)	Head of the District	770316717
4	Shamshiev Kubatbek	Leylek District Water Management Authority (RUVH)	Observer	776240272
5	Saidov Karimberdi	Leylek District Water Management Authority (RUVH)	Hydraulic engineer	224220671
6	Shakirov Asylbek	Ken-Talaa Aiyl Okmotu (LSG)	Village Head	703333020
7	Abdullaev	Kulundu Aiyl Okmotu (LSG)	Village Head	777190627
8	Bektemirova Zamira	Kulundu Aiyl Okmotu (LSG) Women Council	Head of Women Council	772736968
9	Navruzova Diloram	Leylek District Water Management Authority (RUVH)	Lead specialist	778202300
10	Jusupova Marziya	Kulundu Aiyl Okmotu (LSG)	Social department specialist and executive secretary	773639768
11	Paizullaeva Dinara	Leylek District Water Management Authority (RUVH)	Specialist	222970041
12	Jumanov Ulanbek	Kulundu Aiyl Okmotu (LSG)	Specialist	778957622
13	Toroev Aidarali	Kulundu Aiyl Okmotu (LSG)	Deputy head	772181030

14	Abdurahmanov Kamaliddin	Kulundu Aiyl Okmotu (LSG)	Engineer	776143434
15	Hamraev Abdiwali	Independent Consultant	Project Engineer	779015510
16	Ilmiyanov A.R	Kulundu Aiyl Okmotu (LSG)	Farmer	777245893
17	Sattarov T.S	Kulundu Aiyl Okmotu (LSG)	Farmer	226747480
18	Dosov A.A	Kulundu Aiyl Okmotu (LSG)	LSG Head	776001976
19	Tillabaev Shabdan	Leylek District Department of Ecology	Inspector	773389095
20	Mavlyanov S	Water Users Department	Engineer	779389095
21	Yrysov K	International village	Head of the district water management authority	553189000
22	Narkozuev Atabek	Leylek District Water Management Authority (RUVH)	Hydraulic engineer	220919404

TAJIKISTAN

Annex 2. 3: List of Participants, Khujand Workshop, Sughd Region, Tajikistan, 6 May 2025

№	Name	Organisation	Position	Phone
1	Khojiev Kh.	Agency for Land Reclamation and Irrigation of Sughd Region	Specialist	92-705-04-49
2	Abdullozoda Muyassara	Agency for Land Reclamation and Irrigation of Sughd Region	Department chief	92-736-9925
3	Boboev Abdunabi	Syrdarya River Basin Organisation	Chairman	92-770-69-84
4	Ustoev Yu.	Basin Water Management Organisation	Chairman	92-783-11-26
5	Sultonov D.	State Agency "Khojabakirghan canal" of Sughd Region	Chief engineer	92-771-01-35
6	Shukurov Ahmadjon	Ovchi Kalacha Jamoat B. Gafurov District	Deputy Chairman	98-899-3-332
7	Hakimova M.	State Agency "Khojabakirghan canal" of Sughd Region	Specialist	92-774-93-39
8	Otamurodzoda T.	Gulkhona Jamoat J. Rasulov District	Deputy Chairman	92-777-08-91

9	Abduvoidov Odiljon	Agency for Land Reclamation and Irrigation of J. Rasulov District	Specialist	77-703-38-57
10	Mamajonov M.	State Agency "Khojabakirghan canal", B. Gafurov District	Head of sector 1	92-770-16-20
11	Sultonov A.	State Agency "Khojabakirghan canal", B. Gafurov District	Head of hydroposts	
12	Bobojonov Ahmadjon	State Agency "Khojabakirghan canal", B. Gafurov District	Specialist	93-556-06-36
13	Vakhobov Abdurasul	Agency for Land Reclamation and Irrigation of B. Gafurov District	Specialist	
14	Rahmonberdiev Saidjon	WUA "Obi ravoni Kalacha", Ovchi Kalacha Jamoat of B. Gafurov District	WUA Chairman, engineer- land surveyor of Ovchi Kalacha Jamoat	918-91-77-89
15	Yuldoshev Ehsonjon	WUA "Obi Zuloli Kalacha", B. Gafurov district	WUA Chairman	98-708-01-58
16	Huseynov Abduvali	WUA "Mirzobahodur", B. Gafurov District	WUA Chairman	
17	Karimov Salim	Agency for Land Reclamation and Irrigation of J. Rasulov District	Head of sector	92-761-37-87
18	Kalandarov Furkat	State Agency "Khojabakirghan canal", J. Rasulov District	Head of sector 2	92-946-66-86
19	Khasanov M.	WUA "Yarmi Purfayz", J. Rasulov District	WUA Chairman	92-728-36-45
20	Khudoiberdieva Nargiza	Healthy Lifestyle Center of J. Rasulov District	Director	92-958-92-50
21	Ikromov Ahror	Tojikobod village J. Rasulov District	CBO chairman	92-721-01-09

UZBEKISTAN

Annex 2. 4: List of Participants, Fergana Workshop, Fergana District, Uzbekistan, 14 May 2025

№	Name	Organisation	Position	Telephone
1	Mirzayev Shokhrukh	Syrdarya-Sokh ITXB	Chief Specialist in Water and Advanced Technologies	94-5558880
2	Saymatov Jurabek	Syrdarya-Sokh ITXB	Head of Water Supply Service Coordination Department	93-9802004
3	Azizov Akhmadullo	Fergana District DM	Hydraulic Engineer	91-6869474
4	Yusupov Kabr	Fergana District DM	Hydraulic Engineer	97-9551700
5	Shovkat Yildoshev	Toshloq District DM	Chief Specialist	90-5619681
6	Fazliddin Muminov	Toshloq District DM	Specialist	90-5326825
7	Abdukodir Karimov	Isfayram-Shohimardon Total	Specialist	93-0482288
8	Nazarova Gulsina	NNO-Chehra	Director	95-0620508

9	Hamidova Gulshan	Centre for Supporting Civic Initiatives	Specialist	93-9766776
10	Qurbanova Qimmatkhon	Association for Supporting Children and Families	Specialist	93-6447722
11	Mirzaev Ravshan	MFIs of The Flash	Mahalla Chairman	90-2300719
12	Nazarova Muqaddamkhon	MFIs of The Flash	Mahalla Women's Activist	91-6632740
13	Jalolov Ulugbek	MFIs of The Flash	Mahalla Youth Leader	
14	Mirzakarimov Muhammadali	MFIs of The Flash	Mahalla Activist, Elder of Zarkent Street	
15	Komilov Akmal	Beruniy MSG	Mahalla Chairman	
16	Samatova Saida	Beruniy MSG	Mahalla Activist	
17	Tursunov Nasibillo	Beruniy MSG	Orchard Owner in Mahalla Area	
18	Tursunov Sherzod	Beruniy MSG	Orchard Owner in Mahalla Area	
19	Under Confirmation	Fergana District Hokimiyat	Specialist on Social Issues	
20	Under Confirmation	Fergana District Hokimiyat	Agricultural Specialist	
21	Under Confirmation	Kuva District Hokimiyat	Specialist on Social Issues	
22	Under Confirmation	Kuva District Hokimiyat	Agricultural Specialist	

Annex 3: ESIA Risk Assessments

KYRGYZSTAN

Annex 3. 1: Risk Assessment, Kozu-Baglan Watershed, Leylek District, Kyrgyzstan

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Environmental group						
Earthquake	Canal	**Medium**	**Medium**	**Medium**	There was an earthquake once, 20 years ago, which damaged the concrete canals.	
Drought, abnormally hot days	Canal	**High**	**High**	**High**	Recently, droughts have been occurring frequently, and the canal concrete is cracking, which eventually leads to seepage and water loss.	
Mudflows	Canal	**Medium**	**Medium**	**Medium**	The canal gets clogged with sand, stones, and dirt, and people were unable to get water in the years 1990, 2000, 2004, and 2005.	✓
Mudflows, flooding	Sluices	**Medium**	**Medium**	**Medium**	Trash, sand, and dirt clog the system or can even break sluices entirely.	✓
Mudflows, flooding	Hydropost	**Medium**	**Medium**	**Medium**	The well of the hydropost gets clogged with small stones and dirt, making it difficult to determine the water volume.	✓
Strong wind	Canal, hydropost, water meters, sluices	**Medium**	**Medium**	**Medium**	Strong winds can break off trees and branches, which may clog canals, hydroposts, water meters, and sluices-potentially causing significant damage. These issues were especially common during the autumn season.	✓

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Flooding	Canal, sluices	**Medium**	**Medium**	**Medium**	The canal often becomes clogged with sand, stones, and dirt. If sluices are not closed in advance of a flood, they can be damaged or even destroyed by the force of the water.	
Sediment hazard	Canal, hydropost, water measuring instruments, sluices	**Medium**	**High**	**High**	During the summer, rapid snowmelt causes river water to become heavily polluted with fine particles and sand. This leads to sedimentation and frequent clogging, posing a serious threat to irrigation infrastructure (canal and sluices and hydroposts). The issue typically begins around 20 May and continues until 1 September. In June and July, particularly hot months, the continuous flow of dirty meltwater and sand consistently clogs the canals. Although there is no direct physical damage, water meters may display inaccurate data due to sediment interference.	✓
Lightning	Water measuring instrument (newly added)	**Medium**	**Medium**	**Medium**	This can damage microchips, distort data, or even completely break the equipment.	✓
Frost / Mismanagement of irrigation infrastructure	Canal	**Medium**	**Low**	**Medium**	Irrigation canals are intended to operate only during the irrigation season and should remain dry during the rest of the year. However, due to the overall lack of water for agricultural needs, authorities sometimes allow water to be released into the canals during autumn and winter. In cold weather, this water freezes, causing cracks in the canal structures. Over time, this leads to seepage and significant water loss.	
Social-economic group						
Children playing in the field may damage the instrument	Water measuring instrument	**High**	**High**	**High**	There wasn't an ultrasonic water level meter yet, but there was a previous incident where children threw stones at the water meter and damaged it.	

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Children may clog canals with stones while playing	Canal	**High**	**High**	**High**	Children often play in the fields, block canals with stones, make a pool, and swim.	
People may break sluices to steal water	Sluices	**Medium**	**High**	**High**	Often occur people may break sluices to steal water	
Conflict during irrigation season	Sluices	**High**	**Medium**	**Medium**	Conflicts due to water scarcity often occur during the irrigation season, and people break the water gates	
Lack of trust	Sluices, water meters	**High**	**Medium**	**Medium**	It often happens that people believe those responsible for water distribution are deceiving them – either by not providing water on time or by supplying too little.	
Unauthorised planting of trees in water protection zones	Canal	**Medium**	**Low**	**Medium**	When people see open spaces, they often plant trees on their own initiative.	
People may build homemade bridges over canals	Canal	**High**	**Medium**	**Medium**	Almost everyone living near the canal has built makeshift wooden bridges inside the canal to drive their livestock across. They find it more convenient than using the designated bridge. However, these bridges are often poorly constructed, sometimes break, and both the owners and their livestock have fallen as a result.	
Trash accumulation in canals	Sluices, canals, water meters	**High**	**High**	**High**	People throw trash not in landfills but mainly into canals. Trash accumulation in canals and sluices can lead to blockages, potentially causing damage to sluices and water measuring instruments.	✓

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Lack of targeted support for vulnerable populations: the absence of an official registration system for water distribution to vulnerable populations (disabled individuals, elderly living alone) may lead to these individuals being overlooked or facing greater challenges in accessing essential water resources, increasing their vulnerability.	Canals, water measuring instruments	**High**	**High**	**High**	Social facilities such as school and kindergarten plots receive water preferentially; vulnerable populations (disabled individuals, elderly living alone) are not officially registered for water distribution. There are no special provisions for vulnerable individuals for receiving water. Note: During the meeting, the social protection specialist of the Kulundu LSG noted that there are no official benefits for persons with disabilities and the vulnerable population. She requested that representatives of the LSG and the head of the local council consider this issue. They responded that a formal letter from the Social Protection Department addressed to the Minister of Social Protection is required. A representative of the municipal organisation added that they are aware of all those in need and prioritise them for assistance, but there is no official document granting them any benefits.	
Livestock released without supervision may fall into canals,	Sluices, canals, water meters	**High**	**Medium**	**Medium**	It often happens that livestock released without supervision fall into canals, which can result in their death and blockages in the canal system.	

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
die, clog canals, and damage sluices and meters; decaying animal corpses may spread diseases						
In order to steal water, people might damage the water infrastructure	Canal, water meters, sluices	**Medium**	**Medium**	**Medium**	Water theft with damaging water infrastructure is a frequent occurrence, especially when there is a water shortage during the irrigation season.	
Wildlife group						
Growth of wild trees near the canal	Concrete canal	**Medium**	**Medium**	**Medium**	During windy weather, leaves and branches often fall into the canal, clogging it and preventing people from receiving the required amount of water on time.	
Growth of reeds inside the canal	Concrete canal	**Medium**	**Medium**	**Medium**	The growth of reeds inside the canal obstructs the flow and slows down water movement.	
Growth of vegetation inside canals and hydroposts	Water meters, hydroposts, canals	**Medium**	**Medium**	**Medium**	Vegetation growing inside canals and hydroposts clogs the system, reduces water flow, and negatively affects the accuracy of water volume measurements.	
Rare cases of gophers digging burrows near ditches	Earthen ditches (Jeraryks)	**Medium**	**Low**	**Medium**	In rare cases, gophers dig burrows near the ditches, which has led to water loss.	

Annex 3. 2: Risk Assessment, Isfayramsay Watershed, Kadamjay District, Kyrgyzstan

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Environmental group						
Earthquake	Anchor canal rehabilitation	**Medium**	**High**	**High**	Canals should be built in high quality with meeting all technical requirements and there should be built expansion joint.	✓
Sands and rocks	Anchor canal rehabilitation	**Medium**	**Medium**	**Medium**	The absence of regular cleanings of irrigation canals led to blockages and reduced water flow efficiency.	✓
Metal rust	Water gates	**High**	**Medium**	**Medium**	It might happen if water gates are not maintained properly, especially when rust resistance substances are not used on time.	✓
Mudflow	Water gates	**High**	**High**	**High**	It appears due to the lack of the mudflow barriers that are supposed to prevent mudflow enter the canal.	✓
Lightning	Water meters	**Medium**	**High**	**High**	Lightning occurs in this region and may damage electronic devices due to the absence of mitigation measures such as grounding systems.	✓
Flooding	Water gates	**Medium**	**Medium**	**Medium**	It is difficult to predict or mitigate natural hazards despite having flood saving walls.	
Hail	Water meter	**Medium**	**Medium**	**Medium**	Hail might damage the water meters.	✓
Heavy rainfall	Anchor canal rehabilitation	**Medium**	**Medium**	**High**	Heavy rainfall triggers mudflow that can destroy canals and people's crop.	✓
Coastal erosion	Anchor canal rehabilitation	**High**	**Low**	**Low**	Coastal erosion is destroying canal shores and making it vulnerable to other hazards.	✓
Concrete erosion	Anchor canal rehabilitation	**Medium**	**High**	**High**	Erosion happens around 20-30 years.	✓
Ecosystem/biodiversity group						

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Seaweed growth	Anchor canal rehabilitation	**Medium**	**Low**	**Medium**	Canals should be cleaned from seaweeds and other vegetation regularly.	
Growth of grass	Anchor canal rehabilitation	**High**	**Low**	**Low**	Extensive growth of seaweeds or other plants will prevent measurement devices working properly.	✓
Garden trees	Anchor canal rehabilitation	**Medium**	**Medium**	**Medium**	There wild trees are growing. Canals safe zones on sides should be protected from planting trees and vegetation.	✓
Growing of underwater plants	Water meter	**Medium**	**Low**	**Medium**	Due to the excessive growth of seaweed or other aquatic plants, water flow is obstructed, and the water meter device is incorrectly labelled.	✓
Social economic group						
Conflicts/social disputes	Water meter	**High**	**Medium**	**Medium**	Conflicts occasionally arise during the irrigation season over water use.	✓
Insufficient funding for project completion	Water meter	**Medium**	**Medium**	**Medium**	Insufficient funding has resulted in incomplete or delayed commencement of work. If the project remains unfinished by the start of the irrigation season, it may lead to dissatisfaction among the locals.	
Children might destroy devices	Water meter	**Medium**	**Medium**	**Medium**	The destruction of devices is due to dissatisfaction among people over the use of it.	✓
Payment disruptions for water-use	Water meter	**Medium**	**Medium**	**Medium**	If people do not pay, there won't be salary payments for employees of water authorities.	✓
Conflicts/social disputes	Water gates	**High**	**Medium**	**Medium**	Conflicts occasionally arise, during which individuals may damage or destroy water gates.	✓
Unattended livestock	Anchor canal rehabilitation	**Medium**	**Medium**	**Medium**	Usually, locals release livestock freely. They lack awareness about the impact on irrigation systems.	✓
	Water gates	**Medium**	**Medium**	**Medium**		

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
	Water meter	**Medium**	**Medium**	**Medium**		
Lack of support for disabled and elderly residents	Anchor canal rehabilitation	**Medium**	**Medium**	**Medium**	A designated person in the village used to manage water distribution and assist vulnerable residents. Since the role was removed, conditions have worsened.	✓

TAJIKISTAN

Annex 3. 3: Risk Assessment, Khojabakirghan Watershed, B. Ghafurov District, Tajikistan

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Environmental group						
Flooding; mudflows	Sluices	**High**	**High**	**High**	N/A	✓
Flooding; mudflows	Water meters	**High**	**Medium**	**Medium**	N/A	✓
Earthquakes	Water meters	**Low**	**High**	**Medium**	N/A	
Earthquakes	Sluices	**Low**	**Low**	**Low**	N/A	
Earthquakes	Water meters	**Low**	**High**	**Medium**	N/A	
Water shortages; droughts	Sluices	**Low**	**Low**	**Medium**	N/A	✓

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Water shortages; droughts	Water meters	**Low**	**Low**	**Medium**	N/A	✓
Heatwaves / Coldwaves	Water meters	**Low**	**Low**	**Medium**	N/A	✓
Environmental group						
Growth of vegetation inside canals and hydroposts	Water meters	**Medium**	**Medium**	**Medium**	N/A	✓
Social-economic group						
Conflict during irrigation season	Sluices	**Low**	**Low**	**Low**	Conflict are not common issues between neighbouring communities	
Conflict, distrust	Lack of trust	**Low**	**Low**	**Low**	Conflict are not common issues between neighbouring communities	
Strong winds	Sluices	**High**	**Low**	**Medium**	Strong winds can blow debris and damage or clog infrastructure	✓
Strong winds	Water meters	**High**	**Low**	**Medium**	Strong winds can blow debris and damage or clog infrastructure	✓

UZBEKISTAN

Annex 3. 4: Risk Assessment, Shakhimardan Watershed, Fergana District, Uzbekistan

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Environmental group						
Flood	Canal, Water measuring instrument	**High**	**Medium**	**High**	Seasonal heavy rainfall in Fergana; historical cases of debris flow in canals; Flood events in spring; vulnerable locations of water meters near low-lying areas.	✓
Landslides	Canal, Water measuring instrument	**Medium**	**Medium**	**Medium**	Fergana's hilly terrain; Deforestation due to agriculture and settlements; Soil movement during rainy seasons; some meters placed on unprepared ground.	
Tree Root Intrusion Near Canal	Canal, Water measuring instrument	**Medium**	**Medium**	**Medium**	Water meters often installed near houses and gardens; Old trees planted nearby; Some canals pass near residential areas with dense tree planting.	✓
Livestock Near Canal	Canal; Water measuring instrument	**Medium**	**Medium**	**Low**	Common practice of grazing animals near irrigation infrastructure.	
Waste accumulation	Water Measuring Instrument, Canal	**Medium**	**High**	**Medium**	Waste disposal challenges in rural Fergana districts; Frequent littering observed; Debris often collects near meters during repairs or maintenance.	✓
Earthquake	Water Measuring Instrument, Canal	**Low**	**Medium**	**High**	Fergana Region lies in seismic zone; past tremors have caused canal damage; Earthquakes in the region have previously damaged small infrastructure, including water meters.	
Social-economic group						
Lack of financial resources	Canal, Water measuring instrument	**Medium**	**Medium**	**High**	Budget constraints were frequently reported in stakeholder meetings; financial bottlenecks can lead to project delays.	✓
Improper management	Canal, Water measuring instrument	**Medium**	**High**	**High**	Observed issues with project management teams lacking local expertise; Repeated design flaws during previous construction.	✓

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Limited technical capabilities	Canal, Water measuring instrument	**Medium**	**Medium**	**Medium**	Reports from previous projects noted poor installation quality and frequent equipment malfunctions.	
Disputes (conflicts)	Water measuring instrument	**Medium**	**Medium**	**Low**	Stakeholders highlighted procurement delays and conflicts over responsibility for water meters.	
Vandalism and theft	Canal, Water measuring instrument	**Medium**	**Medium**	**Medium**	Documented cases of equipment theft and misuse in nearby districts; Lack of community policing noted.	✓
Lack of user trust	Water measuring instrument	**Medium**	**Low**	**Low**	Previous surveys found users were often unaware of meter functions and maintenance responsibilities.	
Unpaid water bills	Canal, Water measuring instrument	**Medium**	**Medium**	**Medium**	Workshop participants noted high levels of non-payment and disputes over water pricing.	
Planting trees along canal banks	Canal, Water measuring instrument	**High**	**Medium**	**Medium**	Satellite imagery and field surveys revealed unplanned planting along canal banks; Maintenance teams confirmed difficulties.	
Installation of illegal pumps	Canal, Water measuring instrument	**Medium**	**Medium**	**Medium**	Evidence of unauthorised pump installations was reported by irrigation authorities; Disputes arose over equitable supply.	
Ecosystem, Biodiversity group						
Excessive growth of aquatic plants	Canal	**Low**	**Medium**	**Medium**	Common in semi-arid zones like Toshloq where nutrient-rich runoff from agriculture enters canals; Lack of regular cleaning exacerbates plant growth.	✓
Invasive species (e.g., aquatic weeds, molluscs)	Canal	**Medium**	**Medium**	**Medium**	High water table in Toshloq due to irrigation practices; Lack of drainage; Seasonal rainfall contributes to waterlogging around canal structures.	
Biofouling of structures (aquatic plants or biofouling)	Water measuring instrument	**High**	**Medium**	**Medium**	Livestock grazing is common in Toshloq villages; Canals lack fencing or barriers; Local communities rely on open canal access for watering livestock.	

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Moisture infiltration (seepage)	Canal, Water measuring instrument	**Medium**	**Medium**	**High**	Trees planted too close to canal structures; root systems can undermine concrete; Common in areas where tree planting is done for shade/windbreaks.	✓
Garbage dumping into the canal	Canal	**Medium**	**Medium**	**High**	Birds and small mammals may build nests on exposed instruments; Can obstruct sensors or cause data inaccuracies. Frequent in rural areas like Toshloq with high biodiversity.	✓

Annex 3. 5: Risk Assessment, Isfayramsay Watershed, Toshloq District Uzbekistan

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Environmental group						
Earthquake	Canal	**Low**	**Medium**	**Medium**	Fergana Region is a seismically active area; older canal sections may have been built without earthquake-resistant design or with low-quality materials. If the canal is not earthquake-resistant, it can lead to cracking of the canal concrete.	
	Water measuring instrument	**Low**	**Medium**	**Medium**	Instruments not meeting seismic standards may suffer structural damage during strong earthquakes.	
Drought / Water scarcity	Canal	**Medium**	**Medium**	**Medium**	Fergana Valley faces seasonal water shortages; poor water governance and climate variability further reduce water availability.	

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Extreme wind, snowstorm, thunderstorm	Water measuring instrument	**Medium**	**Low**	**Low**	Devices exposed to harsh weather conditions can malfunction due to lack of weatherproofing and physical damage.	
Extreme weather conditions	Canal	**Medium**	**Medium**	**Medium**	Intense heat, rain, and wind can weaken canal infrastructure, especially if maintenance is poor or protection is lacking.	
	Water measuring instrument	**Medium**	**Medium**	**Medium**	Extreme weather can affect accuracy and lifespan of instruments, especially if exposed or not regularly maintained.	
Extreme cold in winter	Water Measuring Instrument, Canal	**Medium**	**Medium**	**Medium**	Frost can damage sensor components, especially if not insulated or drained before winter.	✓
Calibration drift over time	Water Measuring Instrument	**Medium**	**Low**	**Low**	Inaccurate data can result from lack of regular calibration and routine maintenance under fluctuating climate conditions.	
Dumping of waste into canals	Canal	**Low**	**High**	**High**	Community awareness is low; solid waste observed in some canal sections, leading to blocked flow and water quality issues.	✓
Tree growing near the canal	Canal	**Medium**	**High**	**High**	Tree roots near canal walls can crack or lift concrete; some sites in Toshloq have trees planted dangerously close to canal infrastructure.	✓
Social-economic group						
Lack of skilled specialists and low qualification of existing staff	Canal & Water Measuring Instrument	**High**	**Low**	**Medium**	In many rural or remote areas, water projects suffer from the absence of properly trained staff, resulting in incorrect installation, weak oversight, and data inaccuracies.	

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Accumulation of waste during construction	Canal	**Medium**	**Medium**	**Medium**	Construction teams sometimes leave materials or debris behind due to lack of supervision and weak environmental practices, leading to local dissatisfaction.	
Water theft	Canal & Water Measuring Instrument	**High**	**Medium**	**Medium**	Unauthorised water tapping is common in areas with low enforcement or water scarcity. It causes supply disruptions and reduces trust in water management.	
Lack of funding	Canal & Water Measuring Instrument	**High**	**Medium**	**High**	Delays in financing lead to postponed repairs or incomplete construction; limited resources also prevent replacement of broken equipment or damaged parts.	✓
Children may clog canals with stones while playing	Canal	**Medium**	**Low**	**Low**	In open, unsupervised areas, children playing near canals may throw stones inside, causing water blockage and requiring frequent maintenance.	
Trash may clog canals, break instruments	Canal	**Medium**	**Low**	**Medium**	Improper waste disposal is common where community awareness is low. This leads to physical damage and performance issues in canals and installed equipment.	
Community conflicts	Canal & Water Measuring Instrument	**High**	**High**	**High**	Tensions over water access or meter readings often result in physical damage to infrastructure and breakdowns in cooperation between users and authorities.	✓
Residents break holes in canal walls to access water	Canal	**Medium**	**High**	**High**	If canals lack formal water access points, residents may break the concrete to draw water, leading to long-term damage and higher maintenance costs.	✓
Ecosystem, Biodiversity group						

Hazard	Project Activity	Likelihood	Consequence	Risk Level	Notes / Evidence	Risk to be treated
Excessive growth of aquatic plants	Canal	**High**	**Medium**	**Medium**	Common in semi-arid zones like Toshloq where nutrient-rich runoff from agriculture enters canals; Lack of regular cleaning exacerbates plant growth.	✓
Waterlogging from high groundwater or wetlands	Canal	**Medium**	**High**	**High**	High water table in Toshloq due to irrigation practices; lack of drainage; seasonal rainfall contributes to waterlogging around canal structures.	✓
Livestock intrusion into canal	Canal	**Medium**	**Medium**	**Medium**	Livestock grazing is common in Toshloq villages; canals lack fencing or barriers; local communities rely on open canal access for watering livestock.	✓
Tree roots growing under or near canal	Canal	**Medium**	**Medium**	**Medium**	Trees planted too close to canal structures; root systems can undermine concrete; common in areas where tree planting is done for shade/windbreaks.	
Bird nesting or animal interference	Water Measuring Instrument	**High**	**Low**	**Low**	Birds and small mammals may build nests on exposed instruments; can obstruct sensors or cause data inaccuracies. Frequent in rural areas like Toshloq with high biodiversity.	
Soil erosion from surrounding lands	Canal	**High**	**High**	**Medium**	Unstable slopes or poor vegetation cover around canals; heavy rainfall and irrigation runoff can transport soil into canals; sediment buildup increases maintenance needs.	
Invasive species (e.g. aquatic weeds, molluscs)	Canal & Water Measuring Instrument	**Medium**	**Medium**	**Medium**	Can be introduced through construction equipment or upstream water; aquatic weeds can clog instruments and canals; monitoring and management often lacking in rural areas.	

Conflict during irrigation season	Sluices	**Low**	**Low**	**Low**	Conflict are not common issues between neighbouring communities	
Conflict, distrust	lack of trust	**Low**	**Low**	**Low**	Conflict are not common issues between neighbouring communities	
Strong winds	Sluices	**High**	**Low**	**Medium**	Strong winds can blow debris and damage or clog infrastructure	✓
Strong winds	Water meters	**High**	**Low**	**Medium**	Strong winds can blow debris and damage or clog infrastructure	✓

Annex 4: ESIA Negative Impact Assessments

KYRGYZSTAN

Annex 4. 1: Impact Assessment, Kozu-Baglan Watershed, Leylek District, Kyrgyzstan

Project Activity	**Step B1**	**Step B2**			**Notes / Justification**	**Step B3**
	Identified Negative Impact	**Magnitude**	**Importance**	**Significance Level**		**Selected impacts**
Canal X4	During the rehabilitation of the canal, machinery and vehicles may go off the designated roads and damage the topsoil in adjacent areas.	**Low**	**Low**	**Low**	These canals were built in the 1980s, and there were observations that the topsoil layer had been disturbed. However, it was restored within approximately 1.5 years. Therefore, the work should be started and completed outside the vegetation period, in the autumn.	✓

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
Hydropost, sluices	A similar situation may occur during the rehabilitation of other water infrastructure as well.	**Low**	**Low**	**Low**	There is a water protection zone along the canal, as well as designated roads for canal maintenance.	✓
Canal, hydropost, sluices	The machinery may damage crops of local farmers whose plots are located around the canals.	**Low**	**Low**	**Low**	The area around the canal is located within agricultural lands that are intensively used. If the work begins before the harvest is completed (by mid-September, most of the crops are harvested), there could be conflicts, as both the rehabilitation work and farming activities may interfere with each other.	✓
Canal, water meters, hydropost, sluices	Farmers during harvesting season may use the same road along the Canals	**Low**	**High**	**High**	The road within the water protection zone serves both farmers and company construction machinery. Therefore, it's vital to plan all work after the harvesting period and coordinate closely with farmers to ensure uninterrupted operations.	✓
Canal, water meters, hydropost, sluices	Rehabilitation and construction activities could have a negative impact on wildlife.	**Low**	**Low**	**Low**	The area is intensively used for agricultural purposes, and there is little wildlife near Canal X4. However, further downstream, near the Kulundu Canal, hedgehogs and turtles are occasionally spotted. By the time the harvest season begins, these animals tend to leave their territories, and by autumn, they are generally not seen in the area. Nonetheless, it is still important to be mindful of any potential disturbance to wildlife, especially during construction and rehabilitation activities.	✓

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
Canal X4	Children under 7 years old may fall into the canal, and the water could carry them away, as they are unable to get out on their own.	**Low**	**High**	**High**	This could happen when the water levels are high.	✓
Canal, water meters, hydropost, sluices	People may think that the payment for water usage could increase.	**Medium**	**Medium**	**Medium**	Overall, payments are increasing, not only in the water usage sector. This is part of the country's policy, with annual price hikes driven by inflation. However, these increases are not related to the installation of water meters or the rehabilitation of water infrastructure.	✓
Water meters	People may think that water meters could limit their water usage or provide inaccurate readings.	**Medium**	**Medium**	**Medium**	Since people have not previously seen or used ultrasonic water measuring instruments, there may be concerns that these devices could limit their water usage or provide inaccurate readings. Their unfamiliarity with the technology may lead to mistrust, as they might fear that the instruments could malfunction or provide false data, affecting their access to water.	✓
Canal, water meters, hydropost, sluices	There are no discounts or other preferential benefits for vulnerable people.	**Medium**	**Medium**	**Medium**	The payment is getting high, and even though vulnerable individuals pay on time, they are unable to receive water at a convenient time during the day. Previously, there was an official policy to vulnerable people that allowed them to receive water during daylight hours. A discussion took place, and it was noted that an official letter asking an official policy to vulnerable people that allowed them to receive water during daylight hours should be sent to the relevant departments of the Ministry of Labor, Social Protection, and Migration of the Kyrgyz Republic on behalf of the LSG. However, this is no longer the case, and those responsible for water distribution are	

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
					now making decisions independently, which may lead to confusion, especially for outsiders who may not be aware of the changes. It would be beneficial to formalise this practice.	
Canal, water meters, hydropost, sluices	There is concern that the work will begin and take a long time to complete.	**High**	**High**	**High**	People may worry about this due to various reasons. Therefore, we strongly request that the work be scheduled for late autumn and completed by early spring, to avoid disrupting agricultural activities. For many locals, crop farming is their only source of income, and they heavily rely on agricultural production.	✓

Annex 4. 2: Impact Assessment, Isfayramsay Watershed, Kadamjay District, Kyrgyzstan

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected Impact
Anchor canal rehabilitation	Trees that were planted in canal rehabilitation areas would be cut off	**Medium**	**High**	**High**	Protected zone of the canal should be protected	✓
Water gates	If the gates are not installed properly (opening and closing mechanism) it will lead to an increase	**Medium**	**Medium**	**Medium**	Gates should be maintained on time.	✓

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected Impact
	in water volume and it is difficult to control water current.					
Anchor canal rehabilitation	Fear among people that they might get insufficient water because before there was not any measurement devices after device installation people suspect they might get less water.	**Medium**	**Medium**	**High**	This issue can be resolved within the community. Raising awareness campaigns should be conducted.	✓
Water gates	Fear among people that they might get insufficient water because before there was not any measurement devices after device installation people suspect they might get less water.	**Low**	**Medium**	**High**	This issue can be resolved within the community.	✓

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected Impact
Water gates	During gates installation water distribution might disrupt.	**Medium**	**High**	**High**	The gates might create dispute among communities like someone gets more water others less.	✓
Water gates	Upstream dwellers receive more water therefore less water comes to downstream communities.	**Medium**	**High**	**High**	The gates might create dispute among communities like someone gets more water others less.	✓
Water meter	Fear among people that they might get insufficient water because before there was not any measurement devices after device installation people suspect they might get less water.	**Low**	**Medium**	**High**	This issue can be resolved within the community.	

TAJIKISTAN

Annex 4. 3: Impact Assessment, Khojabakirghan Watershed, B. Gharufov District, Tajikistan

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
Water meters; sluices	Downward water low carries waste materials that can lead to health risks.	**Medium**	**High**	**High**	Need for regular cleaning; the area surrounding the water meters and sluice gate installation should be kept clean to prevent local contamination and ensure accurate data collection.	✓
Canal, hydropost, sluices	The machinery may damage crops of local farmers whose plots are located around the canals.	**Medium**	**High**	**High**	The area around the canal is located within agricultural lands that are intensively used. If the work begins before the harvest is completed (by mid-September, most of the crops are harvested), there could be conflicts, as both the rehabilitation work and farming activities may interfere with each other.	✓
Water meters; sluices	Waste from the construction site may cause soil	**Low**	**Medium**	**Medium**	The area around the construction site should be kept clean and any waste generated should be properly disposed of, to avoid contaminating the wider area, which may include farm land.	✓

	degradation or water pollution.					
Water measuring instruments	People may think that water measuring instruments could limit their water usage or provide inaccurate readings.	**Medium**	**Medium**	**Medium**	Since people have not previously seen widespread use, there may be concerns that these devices could limit their water usage or provide inaccurate readings. Their unfamiliarity with the technology may lead to mistrust, as they might fear that the instruments could malfunction or provide false data, affecting their access to water. Effective public messaging around the construction is necessary.	
Canal, water measuring instruments, hydropost, sluices	There is concern that the work will begin and take a long time to complete.	**High**	**High**	**High**	People may worry about this due to various reasons. Therefore, we strongly request that the work be scheduled for late autumn and completed by early spring, to avoid disrupting agricultural activities. For many locals, crop farming is their only source of income, and they heavily rely on agricultural production.	✓

UZBEKISTAN

Annex 4. 4: Impact Assessment, Shakhimardan Watershed, Fergana District, Uzbekistan

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
Environmental group						
Canal	Cutting of trees near the canal.	**High**	**High**	**High**	Trees may need to be removed during canal construction, potentially impacting local habitats and contributing to soil erosion.	✓

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
Canal	Pollution and inconvenience to local residents during construction.	**Medium**	**Medium**	**Medium**	Disturbance to humans and animals; Possible stress on livestock. Drying of surrounding plants worsens habitat conditions for local wildlife.	✓
Canal	Dust pollution impacting residents and livestock.	**Medium**	**Medium**	**Medium**	Dry and windy conditions can cause dust to spread over large areas, affecting human health and livestock well-being.	✓
Water meter & Canal	Waste generation during construction (cement, concrete, debris)	**Low**	**Medium**	**Low**	Pollution of the surrounding environment due to inadequate waste management; Lack of proper construction site housekeeping; Potential soil and water contamination.	
Social-economic group						
Water measuring instrument	Unequal water distribution after water measuring installation.	**Medium**	**High**	**High**	During repairs and operations, uneven water supply can occur (e.g. some areas get 10% water while others get 30%). This creates conflicts among users.	✓
Canal	Impact on local farmers' irrigation regime.	**Medium**	**Medium**	**Medium**	Before concrete lining, farmers accessed water freely; after lining, supply is regulated. This change can affect irrigation schedules and yields.	✓
Water measuring instrument	Conflicts over water payments.	**Medium**	**Medium**	**Medium**	Low-income households may struggle to afford new water charges, leading to social tensions.	
Canal	Conflicts with residents during canal repair work.	**Medium**	**High**	**Medium**	Construction interruptions may temporarily halt water supply, affecting agriculture and causing disputes.	✓

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
Canal	Maintenance costs	**Medium**	**High**	**Medium**	Regular monitoring, maintenance, and repair of the canal and water measuring instruments can create financial burdens for farmers or local communities.	
Ecosystem, Biodiversity group						
Canal	Reduced soil infiltration leading to a decline in earthworms and insects.	**Medium**	**Low**	**Medium**	Reduced filtration from canal concrete can lower groundwater recharge and affect soil fauna like worms and insects, which help maintain soil health.	
Canal	Cutting of trees and bushes causing small animal habitat loss.	**Medium**	**Medium**	**High**	Tree and bush removal during construction can destroy bird nests and animal burrows, disrupting local biodiversity.	✓
Canal	Loss of aquatic plants during canal concreting.	**Medium**	**Medium**	**Medium**	Canal lining can remove aquatic plants, disrupting the aquatic ecosystem and affecting biodiversity.	
Canal	Damage to local ecosystems during earthworks.	**Medium**	**Medium**	**Medium**	Earthmoving equipment can damage trees, bushes, and small animals, leading to ecosystem disruption.	✓

Annex 4. 5: Impact Assessment, Isfayramsay Watershed, Toshloq District Uzbekistan

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
Environmental group						

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
Canal	Negative impacts on surrounding grass and plants.	High	High	High	Heavy machinery and construction materials can damage vegetation; Additional impact from soil compaction and dust.	✓
Canal	Negative impacts on animals near the canal	High	High	High	Disturbance to humans and animals; Possible stress on livestock. Drying of surrounding plants worsens habitat conditions for local wildlife.	✓
Water meter & Canal	Waste, cement, concrete, rock, and sack debris disposed during construction.	Medium	Medium	Medium	Pollution of the surrounding environment due to inadequate waste management; Lack of proper construction site housekeeping; Potential soil and water contamination.	✓
Social-economic group						
Canal	Water flow disruption during construction.	Medium	High	High	Construction may temporarily block water flow, disrupting the irrigation regime and limiting water availability in the canal area.	✓
Water measuring instrument	Conflicts over increased water charges after installation.	Medium	Low	Low	Introduction of water meters may lead to higher water charges, causing community dissatisfaction.	
Water measuring instrument	Uncertainty during periods when the water meter is not functioning.	Low	Medium	Medium	When the meter is not working, uncertainty about water usage arises, leading to potential billing disputes.	
Canal	Disruptions to local residents during construction	Medium	Medium	Medium	Construction noise, dust, and waste disposal can cause inconvenience to nearby residents.	✓

Project Activity	Step B1	Step B2			Notes / Justification	Step B3
	Identified Negative Impact	Magnitude	Importance	Significance Level		Selected impacts
Canal	Damage to nearby residential structures	**Medium**	**High**	**High**	Houses, barns, toilets, and other structures near the canal could be damaged or demolished if built too close.	
Water measuring instrument	Difficulty in repairing the water meter	**High**	**High**	**Medium**	If the meter breaks, it may be difficult to get timely repairs.	✓
Ecosystem, Biodiversity group						
Canal	Impact of canal concrete lining on surrounding land.	**Medium**	**Medium**	**Medium**	Reduced groundwater infiltration, leading to lower groundwater levels.	✓
Canal	Damage to vegetation around the canal during construction.	**Low**	**Medium**	**Medium**	Construction equipment may damage nearby vegetation, affecting local ecosystems.	
Canal	Negative impact of canal concreting on local crops.	**Low**	**Medium**	**Medium**	Loss of natural canal bed and surrounding vegetation during construction, affecting adjacent crops.	
Canal	Harm to small wildlife from increased water flow.	**Medium**	**Medium**	**Medium**	Higher water velocity after concrete lining may negatively affect small animals in the ecosystem.	✓

Annex 5: Permitting Obligations for Projects

KYRGYZSTAN

Annex 5. 1: Permitting Obligations, Kyrgyzstan

No.	Stage	Name	Type of service	Who issues the document and who organizes the work?
1	Contracting	Tender for the selection of a Contracting Organization	Tender announcement and others procedures for determining the contractor	Acted Kyrgyzstan.
2		Post tender period with the winning organization	Contract	Acted Kyrgyzstan.
3	Design	For design and estimate documentation (ПСД / PSD)	Collection of primary necessary initial data on objects according to the technical specifications (location of the object, type and kind of structure, access roads, hydrology, geology and other data necessary for design work).	Acted Kyrgyzstan. Contractor, Kadamjay and Leylek RUVH
4		For design and estimate documentation (ПСД / PSD)	Conducting the necessary topographic work on the rehabilitated structures	Contractor
5		Design and estimate documentation (ПСД / PSD)	Development of the Design and Estimate Documentation (PSD);	Contractor
6		Official conclusion of the State Ecological Expertise to the Design and estimate documentation (ПСД / PSD) 3-5 pages	Conducting a State Environmental Expertise of the developed project;	State Ecological Service of the Kyrgyz Republic. Contractor.
7		Official permission to carry out construction work according to the design and estimate documentation. (1-2 pages of the official form)	State Architecture Conclusion for Design and Estimate Documentation	State Architecture – verification according to the general plan.
8		Registration for quality control of works. Inspection schedule. Order, permission for the next stage of work.	Conducting a State Expertise of the developed project and obtaining permission to carry out construction work.	State Architectural and Construction Supervision (GASK) is a supervisory organization . Contractor.

No.	Stage	Name	Type of service	Who issues the document and who organizes the work?
9	Engineering & Geological	N/A	Conducting hydraulic testing of constructed structures with the participation of the working commission created by the State Architectural and Construction Inspectorate , as well as checking water meters in accordance with the EAEU standard.	Commission of the State Architectural and Construction Inspectorate, Acted, Engineer of Kadamjay and Leylek RUVH.
10		N/A	Conducting test measurements of installed water meters with the participation of the working commission of the created GASK	Commission of the State Architectural and Construction Inspectorate, Acted, Engineer of Kadamjay and Leylek RUVH.
11	Construction	N/A	Introduction of construction and installation works according to the developed design and estimate documentation. (Concreting of the section and water outlet structures in the canal, installation of irrigation water meters and their integration with the base of the Kadamjay and Leylek RUVH;	Contractor.
12		N/A	Quality control of the used building materials, equipment, quality and volume of work performed.	GASK, Contractor, Acted, Engineer of Kadamjay and Leylek RUVH.
13		Official act of transfer of the object being rehabilitated.	Handing over the facility by drawing up an Acceptance and Transfer Certificate for the completed facility for operation by the organization.	Commission of the State Architectural and Construction Inspectorate, Acted, Engineer of Kadamjay and Leylek RUVH.
14		N/A	Elimination of the Working Committee's comments	Contractor.

TAJIKISTAN

Annex 5. 2: Permitting Obligations, Tajikistan

No.	Stage	Name	Type of service	Who issues the document and who organizes the work?
1		Pre-tender activities	Selection of the object, coordination with the donor and key partners, conducting a Feasibility Study.	Acted Tajikistan MEWR ALRI

	Preparatory period			
2			Collection of primary necessary initial data on objects according to the technical specifications (location of the object, type and kind of structure, access roads, hydrology, geology and other data necessary for design work). (Technical Feasibility Study completed by WAPCOS).	Acted Tajikistan MEWR ALRI
3	 Contracting	Tender for the selection of a Contracting Organization	Tender announcement and others procedures for determining the contractor	Acted Tajikistan.
4		Post tender period with the winning organization	Contract	Acted Tajikistan.
5	 Design	For design and estimate documentation (ПСД / PSD)	Site handing over to contractor, (Close the water in the canal during construction and installation work, access roads,). Obtaining permission to visit and carry out construction and installation work in the border zone.	Institution “Kanal Khojabokirgon” Contractor
6	 Engineering & Geological	Registration for quality control of works. Inspection schedule. Order, permission for the next stage of work.	Conducting a State technical Expertise of the developed project	Acted Tajikistan. MEWR BWO Syrdaryo, ALRI Sughd oblvodkhoz, Administration of the State Institution “Kanal Khojabokirgon”
7	 Construction	Construction and installation works	Site preparation, additional construction work to adapt the canal bed for the installation of water meters and sluice gates.	Contractor
8		Construction and installation works	Internet access in the area where water metering equipment is installed	Administration of the State Institution “Kanal Khojabokirgon”
9		Construction and installation works	Installation, Fine tuning, Commissioning	Contractor
10		Official act of transfer of the object being rehabilitated.	Handing over the facility by drawing up an Acceptance and Transfer Certificate for the completed facility for operation by the organization.	Acted Tajikistan MEWR BWO Syrdaryo, ALRI Sughd Oblvodkhoz, Administration of the State Institution “Kanal Khojabokirgon”
11			Elimination of the Working Committee's comments	Contractor.

UZBEKISTAN

Annex 5. 3: Permitting Obligations, Uzbekistan

No.	Stage	Name	Type of service	Who issues the document and who organizes the work?
1	Contracting	Tender for the selection of a Contracting Organization	Collection of Primary Initial Permitting Documents (PIPD) required as a basis and permission for design, development of Design and Estimate Documentation (DED) with ESMP, project examination, introduction of construction and installation works, installation of irrigation water meters and their integration with the Ministry of Water Management database, Ruz.	Acted Uzbekistan
2		Contracting with a Contracting Organization	Contract	Acted Uzbekistan
3	Design	Collection of Primary Initial Permitting Documents (PIPD)	This service is performed by contacting and applying through the integrated government platform: my.gov.uz	State Public Services online site with affiliated ministry or agency
4		Urban development plan of the site (UDPS)		Issued by the State Unitary Enterprise "Uzshaharsozlik LITI" or "Uzshaharsozlikloyiha"
5		Technical Conditions (TC)	Water supply and sanitation, electricity (if a pumping station or alarm system is planned), and communication (if there is dispatching).	Technical specifications are issued by the relevant government agencies.
6		Architectural Planning Task		Issued by the regional architecture service
7	Engineering & Geological	Geodetic survey (topographic plan in M 1:500, 1:1000)	Verified by a licensed organization	State Geodetic and Geological Service
8		Geological surveys	Mandatory when laying channels deeper than 2 m	State Geodetic and Geological Service
9		Hydrogeological data	Groundwater depth, drainage conditions - performed by the organization HYDROGEOLOGY	State Service for Hydrogeological Research
10		Analysis and calculation of aquifer balance	Water volume, seasonal regime, drains	State Service for Hydrogeological Research
11		Environmental assessment (EA)	Issued by the State Committee on Ecology, mandatory for intervention in the natural environment	Committee for the Protection of Ecology and the Environment.

No.	Stage	Name	Type of service	Who issues the document and who organizes the work?
12	Construction	Expertise of the developed design and estimate documentation	Positive expertise conclusion by contacting the Contractor through the integrated portal mygov.uz	Regional branch of the state examination of projects under the Ministry of Architecture and Housing Construction of the Republic of Uzbekistan
13		The contractor begins construction and installation work by notifying government agencies	Permission to begin construction and installation works.	To commence construction and installation work is obtained by the Contractor by submitting a notification to government agencies through the integrated portal my.gov.uz