MOLDOVA - SUSTAINABLE WATER SUPPLY (IRRIGATION) PROJECT

Non-technical summary (NTS)

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MOLDOVA - SUSTAINABLE WATER SUPPLY (IRRIGATION) PROJECT

Table of Contents

ILLUSTRATIONS

Figures

Tables

1 Project description

The Moldova – Sustainable Water Supply (Irrigation) Project is being developed by the Government of Moldova (GoM) with the technical assistance of the European Bank for Reconstruction and Development (EBRD) to support climate-resilient and inclusive agricultural development in the country.

The project aims to rehabilitate two centralized irrigation systems (CIS):

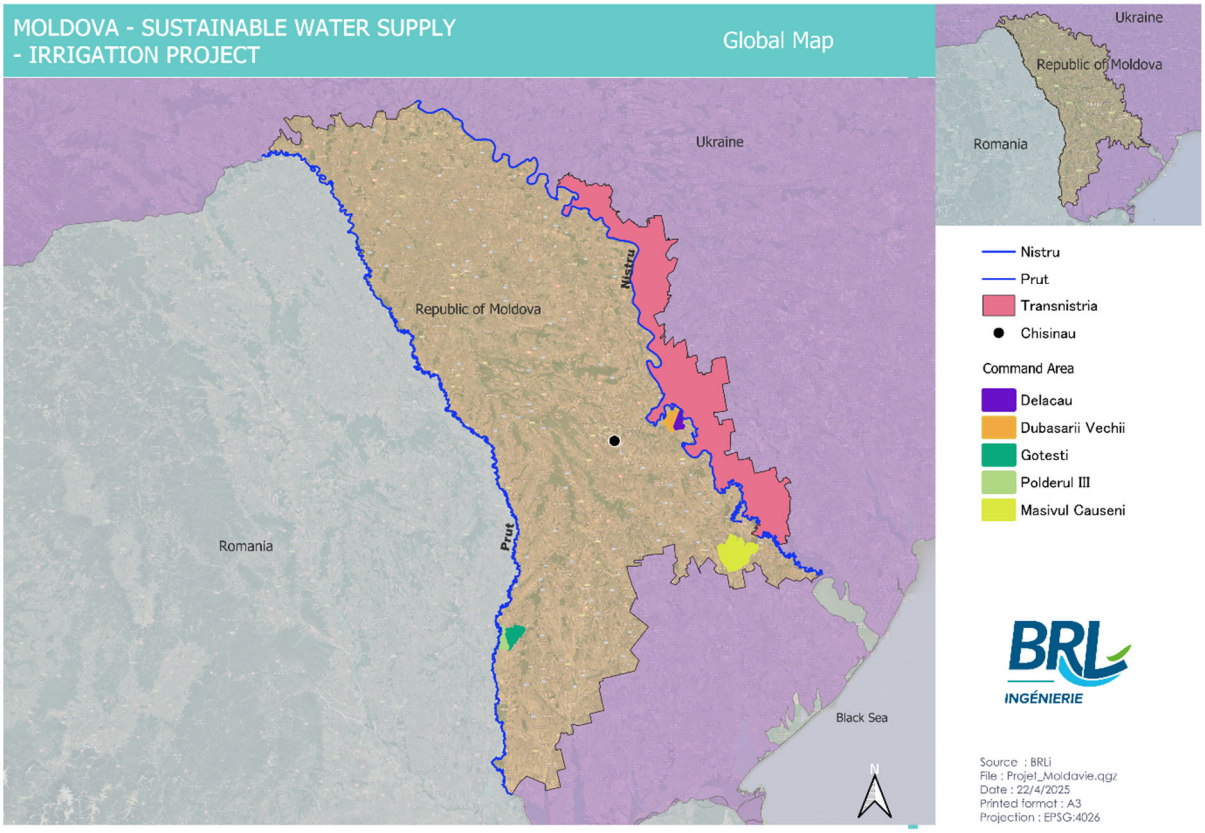
I. **Masivul Căușeni,** and

II. **Puhăcenii de Sus**

Both CIS are located along the Nistru River, which together represent significant potential for irrigated agriculture in the country. For each centralized irrigation system several rehabilitation scenarios (project alternatives) have been assessed and are described in detail in the feasibility study (FS).

The rehabilitation works will be complemented by capacity-building activities for farmers and Water Users Associations (WUAs), focusing on promoting crop diversification, valuing irrigation water, adopting sustainable agricultural practices, and ensuring the sustainable operation and maintenance of infrastructure. Dedicated activities to strengthen the institutional framework are also planned.

Figure 1-1: Project area



Note: the Gotesti site, which was initially envisaged as part of the project, has been abandoned

1.1 Masivul Căușeni

1.1.1 Selected scenario

Following consultations with the WUA, MAFI, ANIF and EBRD, scenario 4Bis (initially scenario 3) was selected as the preferred option for the Masivul Căușeni scheme, as outlined in the Inception Report. This scenario was chosen based on its strong technical feasibility and cost-efficiency.

Technically, Scenario 4Bis offers an optimized and compact network design that makes efficient use of existing infrastructure, requiring only targeted rehabilitation rather than full reconstruction. Its layout reduces energy consumption and improves operational manageability, particularly in relation to the area's topography and water delivery needs.

Economically, Scenario 4Bis presents the most favourable cost-benefit ratio, delivering irrigation services to high-potential agricultural zones while minimizing capital and operational expenditures.

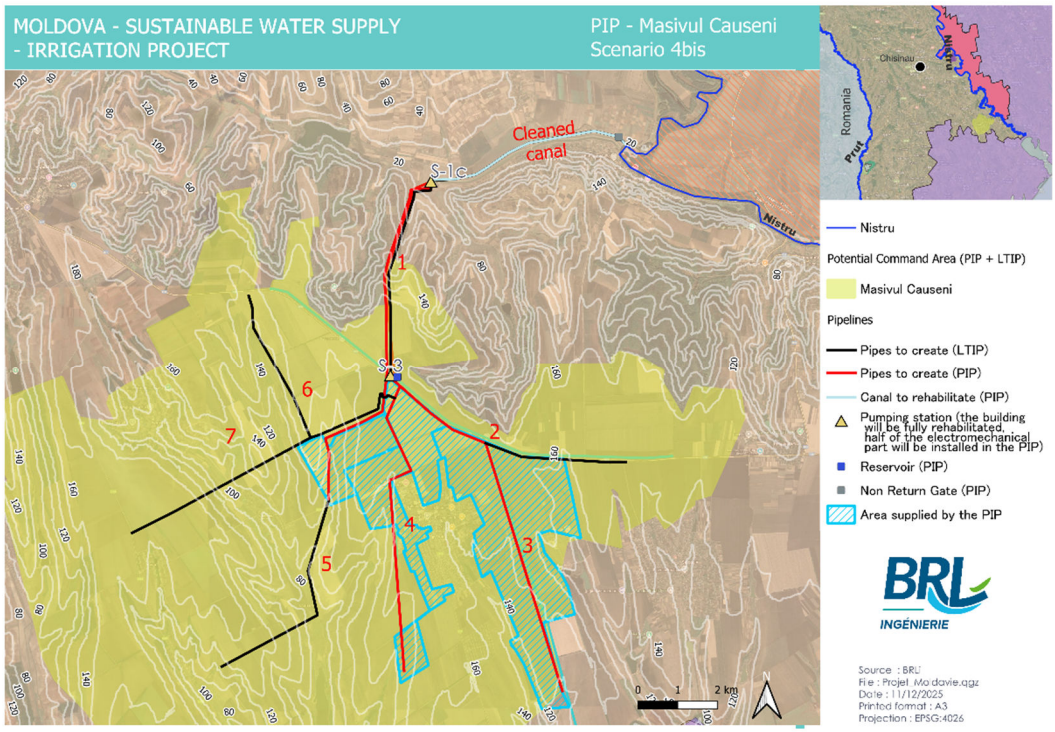
Scenario 4Bis

- Retain the canal, create a non-return valve and establish a new pumping station near S-1.
- Renovate the pipeline between S-1 and S-3 with a dual pipe; this discharge pipe will supply station S-3, while directly supplying branches 5 (thanks to the favourable topography).
- Keep the S-3 building and its reservoir to supply branches 2, 3, 4, 6 and 7.

This scenario considered short-term water requirements only (i.e. with a hydromodule of 0.65 l/s/ha instead of 0.95 l/s/ha).

The choice between construction or rehabilitation will be decided later in the study. For now, the price is based on a new construction.

Figure 1-2: Masivul Căușeni CIS - Scenario 4Bis Design



1.1.2 PIP technical presentation

The PIP has been defined for scenario 4Bis and includes the rehabilitation and development of the following infrastructure:

- Rehabilitate the water intake of the canal with a non-return gate, and clean the canal
- Construction of the pumping station S-1: The intake from the canal and the building will be fully reconstructed, and about half of the new electromechanical part will be installed.
- Rehabilitation of the pumping station S-3: The building will be fully rehabilitated, and about half of the new electromechanical part will be installed.
- Rehabilitation of the reservoir
- Creation of main discharge pipe ("Branch 1" on the map), only one of the two planned
- Creation of Branch 3 and 4, and part of Branch 2 and 5
- Half of the secondary network will be installed

1.2 Puhăcenii de Sus

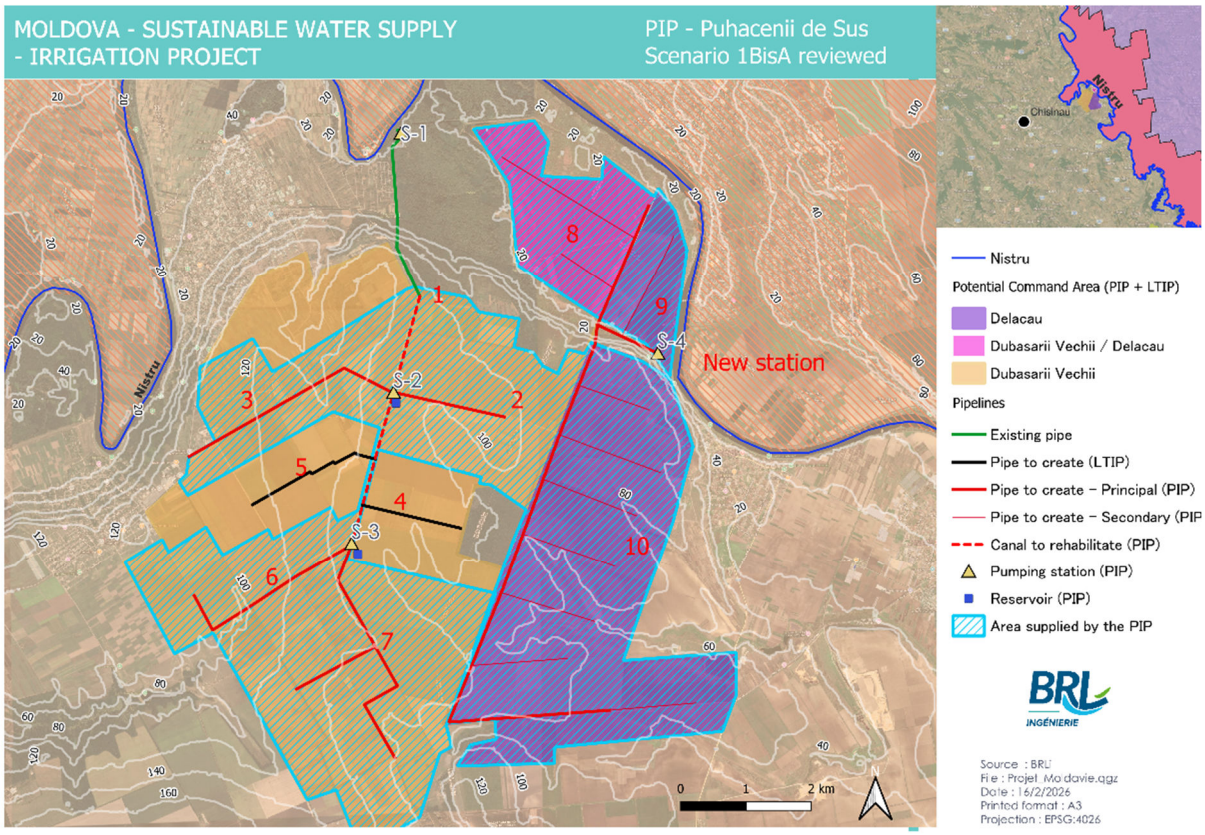
1.2.1 Selected scenario

Following discussions with the WUA, MAFI, ANIF and EBRD, Scenario 1bisA reviewed for the Puhăcenii de Sus scheme have been proposed. This decision is based on a combination of technical feasibility, economic efficiency, and institutional considerations. This scenario proposes a dual-network approach, allowing independent operation by the Dubăsarii Vechi and Delacău Water Users' Associations.

Scenario 1BisA Reviewed:

- Dubasarii Vechi area:
  - Maintain the existing water intake and the S-1 pumping station and add the necessary pumps.
  - Maintain the main pipeline between S-1 and S-2 (high stage); maintain pumping stations S-2 and S-3 with the installation of the necessary additional pumps; maintain the canal between S-2 and S-3; and create secondary branches to irrigate the new service area
- Delacău area:
  - Creation of a new pumping station (S-4),
  - Creation of main branch and a secondary network

Figure 1-3: Puhăcenii de Sus CIS - Scenario 1BisA Reviewed Design



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NB : The secondary network has been illustrated in the figure (thin red line) in accordance with the WUA's request; however, it has been costed on a lump-sum basis for the secondary network as a whole, rather than on a branch-by-branch basis.

1.2.2 PIP technical presentation

The PIP has been defined for scenario 1BisA Reviewed and includes the rehabilitation and development of the following infrastructure:

- Dubasarii Vechi area: pumping station upgrades (adding new pumps in pumping stations S-1, S-2 and S-3), two new reservoirs (about 40,000 m3 near S2 and about 30,000 m3 near S3), canal rehabilitation (cleaning and lining with geomembrane), priority branch replacements (2, 3, 6 and 7) and a secondary network covering 3,000 ha.
- Delacău area: creation of a new pumping station (S-4), priority branch replacements (8, 9 and 10) and a secondary network covering 1,900 ha.

2 Background

2.1 Rationale of the project

Moldova's agriculture sector is highly vulnerable to climate variability. Severe droughts in last years highlighted the fragility of the existing systems and the need for strategic investment in irrigation infrastructure to support productivity, food security and rural livelihoods.

The selected CIS perimeters have been prioritized based on technical feasibility, institutional readiness, and demand for high-value crop production. Each CIS presents distinct institutional and operational challenges:

- Puhăcenii de Sus CIS (Criuleni/Anenii Noi Districts): Partially operational. The Dubăsarii Vechi WUA irrigates ~ 1,900 ha using solar-powered systems. However, governance tensions have emerged with the establishment of a parallel WUA in Delacău. This second WUA does not have any infrastructure under its management.
- Masivul Căușeni CIS (Căușeni District): The largest in scope but inactive. The Kiziil WUA is in early stages of institutional development. Current irrigation is based on informal wells and low-quality water resources.

The project comprises technical, institutional, economic, environmental and social assessments to define viable rehabilitation and modernization plans for each system.

Designs aligned with mid-century climate projections and promoting efficient, on-demand irrigation delivery.

2.2 Compliance with relevant environmental and social laws

2.2.1 Environmental and Social Assessment

An independent Environmental and Social Due Diligence (ESDD) of the design and construction of the CIS has been undertaken as part of FS and in accordance with EBRD's Environmental and Social Policy 2019, and its Performance Requirements, EU standards and Good Industry Practice (GIP).

The gaps identified have been used to develop an Environmental and Social Action Plan (ESAP) for implementation, which contains actions required to be implemented to align the Project delivery with EBRD requirements.

The Environmental and Social Action Plan outlines a comprehensive set of actions that must be implemented before and during the construction phase to ensure full compliance with national regulations and EBRD Performance Requirements. These actions cover a wide range of topics, including permitting and regulatory compliance, detailed environmental and social impact assessments, management planning, and stakeholder engagement.

The ESAP highlights the need for capacity building, especially for the Project Implementation Unit (PIU) and for the development of an Environmental and Social Management System (ESMS). A significant focus is placed on strengthening institutional capacity through the recruitment of environmental and social specialists.

Then it highlights the necessary finalizing project-specific Environmental and Social Management Plan (ESMP), Stakeholder Engagement Plan (SEP) and Resettlement Framework (RF) going along with development of site-specific E&S management plans (e.g., worker grievance mechanism, biodiversity management, health and safety, traffic, labour and working conditions, resettlement and livelihood restoration). All these elements will have to be included in future project development, integrating detailed mitigation and monitoring measures into project design, and ensuring contractors meet robust E&S requirements.

Furthermore, systematic stakeholder engagement and the deployment of an accessible Grievance Redress Mechanism (GRM) are critical elements to maintain transparency and social acceptability.

Overall, the assessment demonstrates that while the project framework is in place, more detailed studies, management plans, and institutional reinforcements still need to be developed and operationalized during final design approval, to ensure the two irrigation rehabilitation projects meet international best practices and EBRD standards.

2.3 Baseline environmental and social conditions

2.3.1 Physical environment

The climate is characterized as temperate continental. The precipitation levels are noteworthy, as there is rainfall even during the most arid month. More than 500 mm of precipitation falls annually. However, climate change is expected to impact water availability and agricultural productivity, making the development of irrigation critical for the agricultural sector.

The Puhăcenii de Sus CIS's project is part of Lower Nistru Plateau, which consists mainly of sedimentary formations such as clays, sands, and marls. These characteristics create soils appropriate for field crops and vegetables. The geomorphology of Masivul Căușeni is characterized by relatively flat to gently undulating terrain formed by loess and sedimentary formations. All these areas are subject to compaction and erosion.

Concerning water resources, Dniester River is the most important resource. This waterway is considered as moderately polluted due to agricultural runoff, domestic discharge and upstream pressure and provide a reliable water resource for the development of irrigation. A World Bank study published in 2020 assessed the availability of water resources under several scenarios of water uses and climate changes and concluded positively on the potential for further development of the irrigation sector.

2.3.2 Biological environment

The project areas are located near a protected area: Ramsar site ("Lower Dniester"). Furthermore, perimeters of Emerald Network on the Dniester River ("Dubăsarii Vechi", "Lower Dniester") are also located near the project areas.

The habitat and flora inside the project area include mostly modified landscape with agricultural land, patches of natural vegetation and riparian vegetation along Dniester River. Natural and semi-natural areas provide essential refuges for local flora.

Concerning fauna, the mosaic of habitats in the area supports a rich assemblage of species typically associated with riverine and agroecosystems. These include amphibians, waterbirds, terrestrial mammals or invertebrates. The project areas also host species listed as Endangered (EN) or Critically Endangered (CR) on the ICN Red List.

Part of study areas might be considered as critical habitats.

2.3.3 Socio-economic environment

Masivul Căușeni CIS is located in the southern part of the Republic of Moldova and is part of the Southern Development Region (SDR/ADR SUD). The region comprises 294 localities. The administrative centre of the region is the city of Cimislia. The South Development Region has the lowest industrialization level compared to other areas in Moldova, with agricultural land covering 74% of its territory.

Puhăcenii de Sus CIS is associated with Criuleni district being part of Centre Regional Development Agency. The Centre Regional Development Agency oversees 13 districts in central Moldova, encompassing 329 territorial administrative units, including 14 cities and 315 villages/communes, with a total of 598 localities. The region spans 10,734 km², making up 31% of Moldova's total area. As of 2019, it had a population of 982,700, with a density of 91.5 people/km² and an urbanization rate of 19.8%

Agriculture is a cornerstone of Moldova's economy, with the country's fertile chernozem soils covering 75% of its territory, making it ideal for both annual and perennial crops. These soils, especially in the northern districts, benefit from diverse microclimates, enhancing crop production capabilities. All CIS areas of the projects present a farm size structure that is divided between very small-scale and large-scale operations. The number of medium-sized farms is quite low in all locations, with little indication of active expansion in that category given the financial and physical barriers (access to water) for further development.

2.4 History of the Project development and planning

2.4.1 Project preparation

This irrigation infrastructure rehabilitation project forms part of a broader national initiative launched several years ago to enhance agricultural resilience and improve water resource management. Initially, a wide range of candidate sites was identified at the national level based on the need to modernize irrigation systems, their agricultural development potential, and their strategic role in local economies. From this long list, two sites were prioritized due to their strategic importance, the extent of infrastructure degradation, and their potential for operational improvement.

In a second stage, different intervention scenarios were developed for each preselected Centralised Irrigation Scheme (CIS) to assess their technical and operational feasibility. This analysis considered site-specific factors such as water availability, the condition of existing hydraulic infrastructure, and institutional arrangements for operation and maintenance, while also drawing on lessons learned from similar irrigation rehabilitation projects supported by the Agence Française de Développement (AFD) and the World Bank (WB). This comparative assessment made it possible to identify the most realistic and cost-effective options, while ruling out technically or economically unviable solutions.

In parallel, consultations with key stakeholders, including national and local authorities, water user associations, and rural communities, were carried out to validate the technical assumptions and ensure alignment with local needs. Although environmental and social aspects—such as the proximity of sensitive areas, land-use constraints, and potential livelihood impacts—were considered at this stage (addressed in greater detail in dedicated sections of this NTS).

At this point, the project remains at the feasibility stage, where the technical, institutional, and preliminary environmental and social parameters have been defined to guide the next steps. These findings will need to be further refined and validated **during the detailed design phase**, which will include advanced engineering studies as well as full environmental and social assessments and management plans.

2.4.2 Analysis of alternatives

2.4.2.1 Puhăcenii de Sus CIS

Regarding water sources, there are no viable alternatives to using water from the Dniester River. The project infrastructure has been designed to minimize potential impacts on the physical environment and local communities. Similarly to other sites, several alternatives to the proposed project design have been evaluated:

- No intervention: Under a no-intervention scenario, the situation in the project area would largely remain unchanged, with irrigation limited to the functional command area currently operated and maintained by the Dubasarii Vecchi Water Users Association (WUA). While the WUA might gradually expand the irrigated area over time, farmers who currently lack access to irrigation services risk facing significant impacts in the coming years, potentially leading to farm bankruptcies. Furthermore, the area is already characterized by significant disparities between large farms served by the centralized irrigation system (CIS) and small and medium-sized farms located too far from existing water delivery points. A no-intervention scenario would likely exacerbate this gap.
- Extension of infrastructure and construction of a new pumping station for the Delacău area: This alternative was examined but there are concerns due to the potential environmental impacts associated with building a new pumping station. From environmental perspectives, this scenario is inconsistent with the project objective of minimizing the scale of interventions.

Table 2-1: Summary of comparative analysis (Puhăcenii)

	Technical-Economic	Social	Environmental
No intervention	No immediate costs; irrigation remains limited; potential long-term economic decline for farmers lacking water access.	Farmers without access remain vulnerable; risk of farm bankruptcies; widening inequalities between large and small/medium farm.	No new impacts; continued pressure on land and water resources; risk of soil degradation and drought vulnerability persists
Rehabilitation of infrastructures + Separate system for Delacău	New infrastructure required but more cost effective; more complex system to operate and maintain	Improves water access for Delacău farmers; addresses social disparities; better equity but issue of area 8 (in Dubasarii Vechi) will require additional resolution.	Environmental impacts from building new infrastructure; potential risks to habitats and nearby communities
Rehabilitation of infrastructures, keeping only one water intake	Less cost-effective; uses existing infrastructure; easier operation and maintenance.	Gives the possibility to serve the Delacău area from existing facilities; supports community needs sustainably but do not solve the latent conflict between Delacău and Dubasarii Vechi	Lower environmental footprint; limits impacts from new structures; focuses on upgrading existing facilities and extending them.

2.4.2.2 Masivul Căușeni CIS

Regarding water sources, there are no viable alternatives to using water from the Dniester River. The project infrastructure has been designed to minimize potential impacts on the physical environment and local communities. Similarly to other sites, several alternatives to the proposed project design have been evaluated:

- No intervention: Under a no-intervention scenario, farming systems in this area would become increasingly vulnerable to droughts. This region is the driest in Moldova, and due to the distance from water resources and the elevated terrain, farmers currently depend solely on rainfall and poor-quality local water sources. Without intervention, there would likely be a decline in crop diversity and a reduction in the number of active farmers. Only the largest farms would be able to continue investing to sustain production, focusing on the most drought-resilient and high-value crops, and implementing technologies to improve local water quality. Such a scenario would fail to meet the needs of farmers or align with national agricultural development priorities.
- Alternative locations for the water intake point: Various options for relocating the water intake point were examined. However, due to environmental constraints in the area, including flood risks and proximity to residential areas, it was concluded that retaining the current intake location and focusing on cleaning and rehabilitating the canal is the most suitable solution.

Table 2-2: Summary of comparative analysis (Masivul)

	Technical-Economic	Social	Environmental

No intervention	No immediate costs; increasing vulnerability of agriculture; risk of economic decline and farm closures.	Farmers face higher drought risks; likely reduction in small and medium farms; only large farms can continue investing; social inequity grows.	No new impacts; continued land degradation and over-reliance on poor-quality local water; drought vulnerability remains
New water intake	Technically challenging; higher investment needed; less cost-effective.	Could improve access in new areas; potential social resistance near new site	Higher environmental risks due to flood-prone zones and proximity to residences; habitat disturbance possible (in RAMSAR site)
Rehabilitation of existing infrastructures	More cost-effective; uses existing infrastructure; lower technical risk; better aligns with available budget.	Addresses local demand	Lower environmental footprint; avoids impacts from new construction but still issues

3 Environmental and Social Due Diligence

3.1 E&S process carried out and integration with design

This irrigation infrastructure rehabilitation project has been assessed from an environmental and social (E&S) perspective to ensure its compliance with international standards and best practices.

As part of the feasibility stage, a comprehensive E&S analysis was conducted, combining a desk review of the project design with field visits to each of the two selected sites. These visits allowed the team to observe the physical and social context, identify sensitive environmental receptors such as protected areas or watercourses, and better understand the local socio-economic dynamics, including agricultural practices and land use patterns.

In parallel, stakeholder consultations were carried out with national and local authorities, water user associations, agricultural producers, and community representatives. These discussions made it possible to gather perceptions on potential project risks and opportunities, document concerns from affected people, and integrate local knowledge into the identification of key environmental and social issues (see below).

On this basis, the assessment highlighted the main E&S challenges that must be addressed during project design, such as biodiversity sensitivity, land tenure and potential economic displacement, community health and safety, labour and working conditions, and water governance risks. These findings were used to inform the preliminary project design and to prepare the required E&S documentation, including the Environmental and Social Due Diligence (ESDD), Stakeholder Engagement Plan (SEP), Non-Technical Summary (NTS), the preliminary Resettlement Policy Framework (RPF), and an Environmental and Social Action Plan (ESAP) defining priority measures to strengthen risk management and institutional capacity.

The project can be classified as Category B, but additional studies are strongly recommended, in particular: critical habitat assessment (CHA), biodiversity management plan (BMP), and integrated water resource management study (IWRM). It will also be subject to a national impact assessment in accordance with Moldovan regulations.

3.2 Engagement with stakeholders

During the feasibility stage, a structured stakeholder engagement plan (SEP) was drafted and implemented to ensure that the proposed irrigation rehabilitation project was developed in a transparent, inclusive, and environmentally and socially responsible manner. The consultations were organized around three main stakeholder groups: institutional and governmental agencies, local and technical stakeholders, and development partners.

At the institutional level, the Ministry of Agriculture and Food Industry (MAFI), the National Agency for Land Improvement (ANIF), and the Ministry of Environment (MoE) were engaged through individual meetings to gather reliable data, present the project concept, and ensure alignment with national policies, environmental strategies, and regulatory frameworks. Specific sessions were held with agencies such as *Apele Moldovei* on water resource availability, and with the Environmental Agency to clarify permitting procedures and discuss preliminary environmental and social risks. Ministries responsible for health, labor, and social protection were partially consulted to identify key social considerations, including worker safety and the inclusion of vulnerable groups. Targeted discussions also took place with the Gender Equality Division to integrate gender perspectives into the project design.

At the local level, consultations aimed to capture on-the-ground realities and ensure community-level acceptability. Meetings were held with **local authorities** to obtain their political and technical support, identify ongoing development projects, and discuss potential land-use and infrastructure implications. Engagement with **Water User Associations (WUAs)** and agricultural producers was extensive, combining focus group discussions, participatory mapping, and interviews to better understand water demand, technical challenges, and social conflicts around irrigation management. Through previous mentioned meetings, preliminary interactions also took place with **affected landowners and users** to map areas of potential disruption and discuss compensation principles, although these remained informal at this stage. Vulnerable groups were reached through adapted consultation methods to ensure their specific constraints and risks were considered, while local communities were partially engaged to gather their concerns on potential E&S impacts.

Finally, development partners and technical stakeholders were consulted to ensure the project's alignment with international good practices. The EBRD was kept informed through strategic meetings and technical briefings to confirm compliance with its Environmental and Social Policy and identify key governance and inclusion risks early on. Other development partners such as the World Bank and AFD were partially consulted to share lessons learned from similar projects and explore opportunities for synergies or co-financing.

Overall, the engagement at the feasibility stage was implemented mainly through bilateral meetings, focus groups, and technical workshops, supported by project briefs, maps, and environmental and social baseline information.

These consultations have been instrumental in refining the understanding of site-specific environmental and social issues and in identifying the mitigation measures and design adaptations to be considered for the selected CIS.

4 Summary of environmental and social Impacts, and Mitigation Measures

4.1 Potential impacts

4.1.1 Construction phase

The construction phase primarily generates temporary but significant impacts. On the social side, it can bring positive effects through the creation of short-term jobs, as well as economic stimulation due to increased demand for materials, construction works or logistics services. These job opportunities and local income generation may also contribute to reducing rural-to-urban migration by offering viable livelihoods.

However, several environmental and social risks must be considered. There is a risk of soil and water contamination in the event of accidental spills, poor waste management, or improper storage of materials. Local biodiversity may be affected by such accidental pollution as well as by equipment installation, especially in the projected projects that take place near or in sensitive ecosystems such as protected areas, wetlands or water bodies. Land acquisition for rehabilitation works may lead to temporary land use changes with some impact on livelihoods if not properly planned and compensated. Earthworks, demolition, and equipment installations are typically associated with noise and air pollution from machinery. Lastly, occupational health and safety issues must be addressed to reduce the risk of accidents, particularly in rural areas where awareness and safety training may be limited.

Table 4-1: Impact summary (construction phase)

	Risk and impacts	Value of AC	Intensity	Extent	Duration	Significance	Measures
Physical environment	GHG Emissions	High	Low	Regional	Temporary	Minor	• Pollution prevention & management plan including measures to reduce **equipment** Mobilization & related Management
	Earth movement	High	Medium	Local	Temporary	Minot	• Biodiversity management plan including restoration process with soil restoration (Respect for the original order of soil horizons seed collection and replanting)
	Accidental pollution of soil	High	Medium	Local	Temporary	Minor	• Pollution prevention & management plan including
	Accidental pollution of water	High	High	Local	Temporary	Moderate	• Pollution prevention & management plan
Biological environment	Accidental pollution	Low to High	High	Local	Temporary	Moderate	• Pollution prevention & management plan
	Habitat alteration	Low to High	Medium	Local	Temporary to Permanent	Moderate	• Biodiversity management plan with biodiversity assessment, ecologist before works to enable specific avoidance, and several mitigation measures
	Wildlife disturbance	Low to High	Low	Local	Temporary	Minor	• Pollution prevention & management plan
	Critical habitats	High	Low	Local	Temporary to Permanent	Minor - Moderate	• Creation of wetlands in existing or planned basins • Planted of wooded areas
Socioeconomic environment	Reduced migration	High	Low	Local	Temporary	Minor	• Labour management plan with local recruitment procedures
	Risks of conflicts	High	Medium	Local	Temporary	Minor	• Stakeholder management plan with grievance redress mechanism • Resettlement action plan and restoration of livelihoods
	Health and safety risks	High	Medium	Local	Temporary	Minor	• Labour management plan with dedicated OHS measures
	Risks of forced labour and child labour	High	Low	Punctual	Temporary	Minor	• Labour management plan with specific measures
	Increased vulnerability	High	Medium	Local	Temporary	Minor	• Resettlement action plan and restoration of livelihoods
	Gender risks	High	Medium	Local	Temporary	Minor	• Gender action plan
	Landscape alteration	Low	Low	Local	Temporary	Minor	• /
	Cultural heritage alteration	Low To high	Low	Punctual	Permanent	Minor	• Cultural heritage management plan (with chance finding procedures)
	Local employment and revenue generation	High	Low	Local	Temporary	Minor	• Labour management plan with local recruitment procedures
	Land acquisition & resettlement	High	Medium	Regional	Temporary to Permanent	Moderate	• Resettlement action plan and restoration of livelihoods
	Risks of deterioration of infrastructures	Moderate	Medium	Local	Temporary	Minor	• All administrative procedures with networks managers • Community health and safety management plan
	Increased demand of local services	Moderate	Low	Local	Temporary	Minor	• Community health and safety management plan
	Degradation of living environment	Low	Medium	Punctual	Temporary	Minor	• Pollution prevention & management plan with dedicated measures for noise and air pollution

	Negative		Minor		Moderate		High
	Positive		Minor		Moderate		High

4.1.2 Operation phase

Once infrastructure is rehabilitated, the operation phase is expected to deliver long-term structural benefits. Functional irrigation improves agricultural productivity, stabilizes yields, and enhances the resilience of rural communities to climate variability. It also contributes to better knowledge on soil and water resource management, as modernized systems tend to be more efficient with dedicated training, reducing losses and optimizing usage. Socially, this can lead to increased farming incomes directly or indirectly and improved local food security.

Nevertheless, some potential negative effects must be monitored. If not properly regulated, intensified agriculture may lead to high water withdrawal, increased use of agrochemicals (fertilizers, pesticides), which can degrade soil and water quality. Moreover, unequal access to irrigation water or competing demands between users could trigger local tensions if governance and water distribution mechanisms are not well defined.

Finally, during the operational phase, the impacts on biodiversity and habitats will be reduced by respecting mitigation measures such as the installation of protective grids at pumping stations for fish, and the prohibition of taking water from rivers if the level of the e-flow is below the critical threshold for the proper functioning of ecosystems.

Table 4-2: Impact summary (operation phase)

	Risk and impacts	Value of AC	Intensity	Extent	Duration	Significance	Measures
Physical environment	GHG Emissions	High	Low	Regional	Temporary	Minor	/
	Better soil management	High	Low	Punctual	Permanent	Minor	• Irrigation management plan with extensive training
	Soil degradation	High	Medium	Local	Temporary to permanent	Moderate	• Irrigation management plan with extensive measures, training and awareness • Pest and Pesticide Management Plan
	Water quantity	High	Medium	Local to regional	Temporary	Moderate to High	• Irrigation management plan with extensive training and awareness
	Water quality alteration	High	Medium	Local to regional	Temporary	Moderate	• Irrigation management plan with extensive measures, training and awareness • Pest and Pesticide Management Plan
Biological environment	Local increased biodiversity	Low to high	Low	Local	Permanent	Minor	• / (monitoring of restoration and hedgerows…)
	Habitat alteration	Low to high	Medium	Local to regional	Temporary	Minor	• Irrigation management plan • Pest and Pesticide Management Plan
	Wildlife disturbance	Low to high	Low	Local	Temporary /Permanent	Minor	/
	Critical habitats	High	Low	Local	Permanent	Minor	/
Socioeconomic environment	Reduced rural-urban migration	High	Low	Local	Temporary	Minor	• Irrigation management plan to ensure inclusivity
	Risks of conflicts	High	Medium	Local	Temporary /Permanent	Moderate	• Irrigation management plan with adequate governance
	Health & safety improvement	High	Low	Punctual	Permanent	Minor	• /
	Gender risks	High	Low	Punctual	Permanent	Minor	• Irrigation management plan to ensure inclusivity • Gender action plan
	Landscape alteration	Low	Low	Punctual	Temporary	Minor	/
	Job creation on farms	High	Low	Punctual	Permanent	Minor	/
	Increase agricultural and household income	High	Medium	Local	Permanent	Moderate	/
	Emergence of agro and small businesses	High	Low	Punctual	Permanent	Minor	/
	Increased resilience to climate change	High	Medium	Regional	Permanent	Major	/
	Risk of insufficient readiness of the agricultural Supply Chain	High	Medium	Regional	Temporary to permanent	Moderate	• Irrigation management plan
	Infrastructure improvement (solar)	Low	Low	Punctual	Permanent	Positive	/

	Negative		Minor		Moderate		High
	Positive		Minor		Moderate		High

4.2 Mitigation and management measures

4.2.1 Administration requirements

The project will require numerous administrative procedures including a national ESIA because of its transboundary nature and the use of water for irrigation. If the Environmental Agency does confirm the need to conduct an Environmental Impact Assessment for proposed activities (the Environmental Agency should decide on the basis of the Preliminary Environmental Assessment for each CIS), a special notification of a potentially affected party regarding the proposed activity in accordance with Article 3 of the Espoo Convention on environmental impact assessment in a transboundary context shall be issued (Ref.: Law #86/2014 on environmental assessment, Art. 12, and Interstate agreements on transboundary waters in force).

4.2.2 Mitigation measures

Mitigation measures proposed for the CIS construction phase shall be executed by the construction contractor (CC). The requirements outlined in this chapter aim to assist the CC in developing its own Constructor's Environmental and Social Management Plan (CESMP).

Table 4-3: Measures

Components	Construction	Operation
People & community	**Labour management plan:** terms and conditions of employment, equal opportunity and non-discrimination, prohibition of child and forced labour, occupational Health and safety, worker grievance mechanism, training and awareness, monitoring, auditing and reporting	/
	Pollution **prevention & management plan:** management of noise and air pollution, management of hazardous and non-hazardous waste, management of chemicals and hazardous materials, accidental spills management	/
	Gender action plan: inclusive and safe employment opportunities for women, safe working environment and basic facilities, prevention of GBV, community safety and social cohesion, accessible grievance redress mechanism, gender-disaggregated monitoring	**Gender action plan:** increased participation of women in irrigation governance, improved access of women to irrigated land and services, capacity building for women in water and farm management, reduced exposure to gender-based violence (GBV) or exploitation, increased time savings and income opportunities for women, gender-equitable cost-sharing
	Community health and safety management plan: risk assessment and baseline analysis, specific measures	
	Stakeholder management plan	**Stakeholder management plan**
Livelihoods	**Resettlement & livelihood plan:** legal and institutional framework, Consultation and Participation, Grievance Redress Mechanism (GRM), implementation arrangements and budget, monitoring, evaluation and reporting	**Capacity building plan for farmers:** training and dedicated activities ensuring that farmers are able to connect to the rehabilitated system and make a profitable and sustainable use of water.

Components	Construction	Operation
Culture	**Cultural heritage management plan:** baseline analysis (during ESIA), community engagement, avoidance and mitigation measures, training and awareness, chance finds procedure, monitoring and reporting, grievance mechanism	/
Biodiversity	**Biodiversity management plan:** baseline analysis, implementation of environmental monitoring (before, during, and after work), specific measures, restoration process, Invasive species	**Pest and Pesticide Management plan:** good practice in irrigation, reduce chemical reliance, use of agrochemical, establishment of buffer zones, drainage control structures and vegetated strips, monitoring system
		Irrigation management plan: governance and inclusivity, water management, soil management, supply chain management

4.2.3 Monitoring and supervision

Monitoring of the project activities will be undertaken to:

- Establish that the various phase-related ESMP(s) have been prepared and are being implemented;
- Ensure the Project is implemented in compliance with national requirements and AFD Environmental and Social Standards;
- Continuously monitor changes to baseline environmental conditions during construction and, as relevant, operation;
- Review construction activities and provide information on environmental monitoring to local authorities, if required; and
- Implement corrective actions if required, if proposed mitigation measures are unable to eliminate/reduce potential construction related impacts provided in ESMP.

Each monitoring step shall be the responsibility of key management personnel defined in the Monitoring Plan. They will have the power to adjust and modify operating conditions if monitoring results indicate that such corrective measures are required. Depending on situations, supervisor is: the project's owner, the Construction Contractor, the WUA, the farmers, the ANIF or the road managing institution.

The project will be implemented by a project implementation unit (PIU). The internal PIU that will be established will consist of one team comprising several experts. Each expert will have clear role and responsibilities to ensure efficient project coordination and oversight in line with EBRD and other IFIs standards. The staff will be issued from the relevant stakeholders: Ministry of Agriculture and food Industry (MAFI), National Agency for land improvement (ANIF), Agricultural and Rural Advisory Centre (ARAC), Ministry of Environment. Depending on the availability of human resources in these institutions, new specialists may be hired. International technical assistance will provide support to the PIU. **The technical assistance will include an environmental specialist and a social specialist, among others**.

The Construction Contractor must appoint one Environmental & Social Manager (ESM) and a Health & Safety Specialist (HSS), whose duties throughout the construction period will be primarily connected to environmental and social management and health and safety on sites. These representatives will coordinate with the Project's owner and other project's stakeholders the implementation, supervision, reporting, and follow-up action regarding the ESMP.

A key component of the success of the E&S over the Project phases depends on effective capacity building and the training of all Project employees, including Contractors and sub-contractors and the WUA members.

Three main types of trainings will be provided during the implementation of the project: a) training conducted by Project's owner and CC environmental and social staff for workers and inhabitants during the conduction of the works (construction phase) and b) training conducted for WUA members and farmers to build their capacity to manage the irrigation system once it is rehabilitated and develop sustainable irrigation and agricultural activities.

A record of all measures required to address environmental and social impacts and issues as well as monitoring and supervisory activities associated with these are consolidated in tabular form below.

Table 4-4: Mitigation & Management plan (construction phase)

Measure	Monitoring	Timeframe		Responsibilities
Labour management plan	Labour management plan available including local recruitment plan and OHS requirements compliance: documentation with identification of risks and procedures, equipment and logistics Incl. inspection to check Log, Visitors Log, Emergency Response Plan (including fire), Accident Log, works permits, etc. as required by Regulation regarding the Organization of the occupational safety activities at working place and risks prevention approved by Governmental Decision # 95 of 05.02.2009 – Monitorul Official, #34-36, 2009, art. 138	Construction	Before work starts.	Construction Contractor (and Project's owner)
	Checklists with written employment contracts specifying job description, wages, work hours, leave, and termination conditions	Construction	Monthly	Project's owner (and CC)
	Local content: Number of employed persons from local communities.	Construction	Continuous	Construction Contractor
	Local content for supply chain: part of construction budget allocated to local suppliers	Construction	Continuous	Construction Contractor
	Part of employees with verified age documentation	Construction	At hiring / Quarterly review	Construction Contractor
	Number of reported incidents of child/forced labour	Construction	Monthly	Construction Contractor and project owner
	Checklists covering PPE use, and grievance handling	Construction	Monthly	Construction Contractor
	CC training (for workers) in Health, Occupational Safety, Environment	Before commencement of work on site	Once	Project's owner, Labor Inspection
	Number of incidents or accidents.	Construction	Monthly	Construction Contractor
	Number of workers complaints	Construction	Monthly	Construction Contractor
	Part of complaints solved	Construction	Monthly	Construction Contractor
Resource efficiency, pollution prevention and management plan	GHG emissions criteria in the selection process of the construction contractor and other services providers	Before construction	At the moment of the preparation of the tendering documents	Project's owner for preparation – AFD for validation of tendering documents
	Resource efficiency, pollution prevention and management plan available with procedures to mitigate resource efficiency and emissions	Before construction	Before construction	Construction Contractor
	Anticipated existence of a water metering system at the water intake and in each key point of the system	Construction	Before acceptance of works	Project's owner
	Effective installation of variable speed drive	Before works acceptance		Project's owner (and CC)
	Visual inspections of air emissions (e.g. smoke from equipment). Air quality monitoring if conditions considered necessary.	Construction	Close to build areas As triggered by valid complaints	Project's owner and Construction Contractor
	Noise monitoring if necessary	Construction	Close to build areas As triggered by valid complaints	Project's owner and Construction Contractor
	Available waste management plan	Construction	Before construction works	Construction Contractor
	Quantity of waste generated by Project activities. This monitoring parameter will include: the nature of the waste, method of disposal, descriptions and locations of disposal sites, the destination and environmental authorizations of the companies taking back the waste (case of external treatment)	Construction	Monthly	Construction Contractor
	Visual inspection of hazardous materials storage areas.	Construction	Weekly visual inspection	Construction Contractor (and inspection by project owner)
	Visual inspection of waste storage areas (including).	Construction	Weekly visual inspection	Construction Contractor (and inspection by project owner)
	Regular inspection to ensure that all measures identified to protect soil and water resources are effectively implemented by the CC Visual inspection for pollution of soil and surface watercourses e.g. sediment runoff, presence of oil film in surface watercourses.	Construction	Daily during works on or near water bodies	Construction Contractor (and inspection by project owner)
	Accidental spills (number, volume/surface area)	Construction	At each spill	Construction Contractor
Gender action plan	Employment opportunities: Recruitment records, HR reports	Construction	Monthly	Construction Contractor
	Safe working environment: site inspection logs, grievance records	Construction	Throughout construction period	Construction Contractor (and inspection by project owner)
	GBV: Training logs, GBV incident reports	Construction	Within 1st month; refresh every 3–6 months	Construction contractor (site Managers, Occupational Health & Safety Officer)

Measure	Monitoring	Timeframe		Responsibilities
	Community safety and social cohesion: meeting reports, community feedback forms	Construction	Initial mobilization + quarterly	PIU social expert, Local Authorities
	Number and type of complaints resolved	Construction	Established before mobilization	PIU Social expert
	M&E reports, gender audit findings	Construction	Monthly updates	PIU Monitoring & Evaluation (M&E) Team
Community health and safety management plan	Community health and safety management plan available including traffic management plan	Construction	Before construction	Construction Contractor
	Number of drivers trained.	Construction	Monthly	Construction Contractor
	Occurrences of accidents and incidents as a result of the project which affect public safety; the frequency and severity of such occurrences will be recorded.	Construction	Monthly	Construction contractor
	Road condition monitoring	Construction	Before and after completion of work	road managing institution
	surface area of roads rehabilitated	Construction	End of construction phase	Construction contractor
	Number and duration of restrictions on access to basic infrastructure and services	Construction	Continuous	Construction contractor
Resettlement & Livelihood restoration plan	RAP/LRP available before work begins	Construction	Before construction works	Project's owner
	Signature of agreements with PAPs	Construction	Before construction works	Project's owner
	Number of PAPs compensated and amounts paid	Construction	Before construction works	Project's owner
	Monitoring the right-of-way clearance process	Construction	Before construction works	Project's owner
Biodiversity management plan	BMP available, based on inventories	Construction	Before construction works	Project's owner
	Implementation of environmental monitoring with inspection (before, during, and after works)	Construction	Before construction works	Project's owner
	Effective training of CC workers	Before construction	Before construction works start	Construction Contractor
	Footprint and land-clearing monitoring	Construction	Continuous	Construction Contractor (and inspection by project owner)
	Monitoring site restoration	Construction	End of construction works	Construction Contractor (and inspection by project owner)
Cultural heritage management plan	Number of found artefacts, cultural heritage	Construction	During periods of excavation works	Construction Contractor (and inspection by project owner)
Stakeholder management plan	Number of stakeholders meetings held.	Construction	As set out in the SEP	Project's owner and Construction Contractor
	Number and type of grievances to identify patterns and to ensure that all received complaints are addressed.	Construction	As necessary	Project's owner

Table 4-5: Mitigation & Management plan (operational phase)

Measure	Monitoring	Timeframe		Responsibilities
Pest and pesticides management plan	Number of people trained on safe pesticide use and Integrated Pest Management	Operation	Yearly	WUA
	Pe**st infestation levels before and after treatment** *(e.g., % crop damage, pest population density)*		Yearly	WUA
	Monitoring of soil quality and agrochemical use		Every two years	WUA, done by Authorized laboratories (RCAP, Institute of Pedology, etc.)
	Level of soil moisture, using tensiometers		Daily during the vegetation period	WUA
Irrigation management plan	Energy consumption / Amount of water pumped ratio	Operation	Yearly	WUA
	Energy produced by solar panels		Yearly	WUA
	Yearly GHG emissions estimation		At the end of the first year	Project's owner
	Monitoring of soil quality and agrochemical use.	Operation	See above	
	Level of soil moisture, Using tensiometers			
	Monitoring of the pumped water volumes and flow	Operation	Yearly	Project's owner and WUA
	Monitoring of the pumped water volumes / water volumes used (paid) by farmers ratio		Yearly	Project's owner and WUA
	Monitoring of the flow released from the upstream dam to adapt the water pumping and comply with environmental requirements for the Nistru River and threshold (no pumping if River flow is below this level)		Daily in period of irrigation	WUA
	Monitoring the effectiveness of restoration (vegetation and tree compensation measures + invasive species spreading)	Operation	One year post construction and after 3 and five years	Project's owner
	Effective maintenance of infrastructures to avoid any disturbances and pollution		Yearly	ANIF
	Employment creation	Operation	Yearly	WUA/ANIF
Gender action plan	Increased participation of women in irrigation governance: attendance records, membership lists	Operation	Within first 6 months of operational phase	Project Implementation Unit (PIU), ANIF
	Improved access of women to irrigated land and services: Allocation records, farmer surveys	Operation	Yearly	ANIF
	Capacity building for women	Operation	1–2 times per year	Training Providers, NGOs, Women's Business Associations
	Records of GBV outreach, number of cases addressed		Within first 3 months, ongoing refresher	Social expert
	Increased time savings and income opportunities for women: project-supported business plans, income tracking		Year 1–2	MAFI, Economic Development Agencies, WUA, Farmer Groups
	Gender-equitable cost-sharing: Fee structure review, household-level feedback		Prior to full operation	Water User Associations, PIU
Stakeholder management plan	Effective implementation of engagement activities and capacity building activities for farmers and WUA.	Operation	Yearly	Project's owner
	Number and type of grievances to identify patterns and to ensure that all received complaints are addressed.	Operation	As necessary	Project's owner

5 Communications

5.1 Stakeholder engagement plan

As mentioned previously, a SEP has been prepared for the Project, which identifies relevant stakeholders, defines communication channels and future engagement activities to be carried out prior to and throughout the two CISs upgrading project.

The SEP contains a stakeholder identification table where all relevant stakeholders are identified, detailing their role and interest. If there are stakeholders who are not included in the SEP, they can get in contact with MAFI/ANIF to receive information about the Project and be added to the stakeholder engagement programme.

The SEP aims at summarising the methods and activities that will be implemented to inform stakeholders, in an inclusive and timely manner, during preparation and implementation stage. The SEP includes a programme of immediate consultation and engagement activities required to address current stakeholder concerns, as well as regular consultation and disclosure activities throughout the Project life cycle. In addition, the SEP has a Project-specific grievance mechanism, the details of which are provided in the next section.

5.2 Grievance mechanism

Grievance Redress Mechanism (GRM) will be implemented to ensure that the Client remains responsive to any concerns or complaints from affected stakeholders and communities. Special attention will be given to training the designated staff responsible for managing the mechanism. The GRM will cover all relevant stakeholders, including members of the public, local residents, NGOs, and other interested parties. A separate worker grievance mechanism will be available for all Project workers, including contractors and subcontractors.

The Stakeholder Engagement Plan (SEP) developed for this Project provides full details of the GRM. The GRM will operate through three management levels to ensure accessibility and escalation if needed:

- Level 1 (Local Level)**:** Complaints can first be submitted to the mayor, who will collect grievances from residents and notify the project's social specialist, unless there is a conflict of interest.
- Level 2 (ANIF)**:** If not resolved locally or in case of municipal involvement, complaints can be escalated directly to ANIF via an online platform, email, postal mail, or telephone.
- Level 3 (MAFI/EBRD)**:** If necessary, grievances can be further escalated to the Ministry of Agriculture and Food Industry (MAFI) or the EBRD for final consideration.

All grievances will be acknowledged within 10 working days, with a formal response provided within 30 working days. At all times, complainants may also seek legal remedies in accordance with national laws and regulations.

5.3 Contact details

Contact information for general enquires and grievances are as follows:

- online Platform: - https://anif.gov.md/comunicare-publica
- e-mail: cancelaria@anif.gov.md
- postal address: ANIF, strada Grenoble 193, Chișinău MD-2043, Republica Moldova
- by telephone: +373 22 82-08-21

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