Project Document

Project Title

Hydro-infrastructure rehabilitation to mitigate vulnerability to climate-driven extreme events in the Republic of Moldova

Country / Region:

Republic of Moldova

Planned project execution period:

1 December 2023 – 30 November 2027

Applicant:

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Legal status, year of founding: **Development Agency**
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Person, in charge of the project: **Silvia Pana-Carp, Programme Analyst, Energy, Environment and Climate Change Cluster**

Local Project Partner:

Name: **n/a**
Legal status, year of founding:
Address:
Telephone number, e-mail:
Person, in charge of the project:

Financing (Euro)

Project budget (total)	Requested grant ADC	Contribution in cash by the applicant	Contribution(s) from third parties – public sector LPAs
100%	100%	5%	5%
4,389,315.78	**3,960,396.06**	208,759.74	220,160.00

List of Abbreviations

AAM-	Agency “Apele Moldovei”
AWP-	Annual Work Plan
CBO-	Community-based organizations
CO-	Country Office
DIM-	Direct Implementation Modality
DRR-	Deputy resident Representative
DPC-	Direct Project Costs
ECMWF-	European Centre for Medium-range Weather Forecast
EIA-	Environmental Impact Assessment
EIB-	European Investment Bank
EECCC-	Energy, Environment and Climate Change Cluster
EFAS -	European Flood Awareness System
EPTATF -	Eastern Partnership Technical Assistance Trust Fund
EW-	Early Warning
FFEWS -	Flashflood/flood forecasting Early Warning System
FFDS-	Flash Flood Detection System
GCF-	Green Climate Fund
IFIs-	International Financial Institutions
IPSA-	International Personnel Service Agreement
IWRM-	Integrated Water Resources Management
LPAs-	Local Public Authorities
M&E-	Monitoring and Evaluation
MoEnv-	Ministry of Environment
NCCAP-	National Climate Change Adaptation Programme
NDC -	Nationally Determined Contribution
NGOs-	Non-governmental organizations
NPSA –	National Personnel Service Agreement
O&M-	Operation and Maintenance
RR-	Resident Representative
SDC -	Swiss Development Cooperation
SDGs-	Sustainable Development Goals
SHS -	State Hydro-meteorological Service
SOP-	Standard Operating Procedures
UNDP-	United Nations Development Programme
WFD -	EU Water Framework Directive
WMO-	World Meteorological Organization

1. Summary

Impact: *Contribute to strengthened resilience of Moldovan population to the intensifying climate-related extreme weather events, such as floods, that causes loss of life and property damage.*

Project objective: *strengthen the national and local technical, institutional and policy capacities for managing run-off from extreme climate-driven events to prevent flooding*

Climate change is projected to increase the occurrence of intense rainfall events in Moldova with potential consequences for damaging flooding, given the country's rolling topography and current land use patterns. The majority of Moldova's rural population lives in small towns located in these watersheds, which are often found in low lying areas and other areas at risk of flooding as a result of heavy rains.

According to the evidence-based data[1], women are more vulnerable to natural hazards than men. In Moldova, a number of statistical indicators reveal the demographic and socio-economic differences between rural and urban population. Specifically, rural older women face reduced access to facilities, poor quality of services, who "survive" given the reduced opportunities to generate income needed for subsistence (low pensions, heavy land/farm works).[2]

On average, under climate change, rainfall will become (with 66% probability) more frequent, either in absolute terms or as a proportion of total precipitation, that is, less precipitation with a higher proportion of heavy rain events. In summer, the frequency of wet days is projected to decrease, and the intensity of extreme events is projected to increase. These changes in heavy rainfall events have implications for damage to lives, crops, livestock, the key sectors of the economy and property through flash floods, hail storms etc. Under current climate change projections, more frequent and intense precipitation days and an increase in the number of extreme rainfall events are projected. Potentially damaging and life-threatening river floods are expected to intensify.

Given that over 4,000 small and medium reservoirs and ponds have been constructed, the structural integrity of dams and weirs is therefore critically important in any long-term national climate change adaptation strategy. Most dams were designed in the former Soviet republic using empirical formulas based on the hydrological and climatological conditions of more than 30-40 years ago. As such, no climate change allowances were made during the design of these dams. As well, an unknown number of dams have been built ad hoc by individuals or communities without any proper design and/or permit.[3]

[1] General Recommendation No. 37 on Gender-related dimensions of disaster risk reduction in the context of climate change. CEDAW/C/GC/37

[2] https://statistica.gov.md/newsview.php?l=ro&idc=168&id=6767

[3] The number of dams in Moldova is disputed. Based on some sources there are more than 7,000 dams (ongoing inventory of dams by national experts), while others estimate the number of dams at around 4,000 (General Inspectorate of Emergency Situations).

At the same time, the State Hydro-meteorological Service (SHS) monitoring capacities are insufficient to assess local-level hazards and vulnerabilities with sufficient precision, and the current early warning system for flooding is weak. SHS monitoring stations are unevenly distributed, with the vast majority found on the two largest border rivers (Prut and Dniester), leaving the interior under-served. The network of stations cannot adequately detect fluvial and flash flood risk, and hazard maps are out of date. The state institutions - the State Hydro-meteorological Service (SHS) and the Agency "Apele Moldovei"(AAM) - charged with hazard analysis and risk assessments currently lack the technical capacities to carry them out effectively, and they have no hydrological or hydraulic modelling capacities which is limiting the efficient flood forecasting.

Compounding vulnerability from the threat of flooding, local governance institutions have insufficient capacities for effective flood risk and water resources planning and management at the sub-basin level. Local governance institutions and community stakeholders lack the organizational and technical capacities to carry out participatory integrated water resource management and flood risk assessment and management. Under the provisions of Water Law No. 272 of 2011, some elements of integrated water resources management at local level have been delegated to sub-basin committees. While sub-basin committees have been established, they meet irregularly, have no long-term strategy for engaging local land users in analysis and planning, and their links with local water users' groups and other land use regulatory institutions are weak or non-existent. Water users' groups lack the support they need to ensure adequate capacities for appropriate maintenance of private and public hydro-infrastructure.

Against this background, the project is proposing a set of measures aimed at strengthening the country's adaptation to climate-driven flood risk through a two-pronged approach. The first will build the essential national hydro-meteorological monitoring and early warning systems, including the institutional capacities to manage and operate them countrywide. The second one, will apply an integrated water resources management (IWRM) approach to 5 key watersheds that will produce knowledge and institutional capacities for rehabilitation of high-risk hydrotechnical infrastructure, as well as increased participation by local stakeholders in water governance.

With these measures the project will put in place knowledge, capacity, infrastructure, policy and regulatory frameworks to enable a long-term impact of country's enhanced capabilities to manage the run-off from extreme climate-driven rainfall events to prevent flooding that causes loss of life and property damage. The following are the project outcomes and outputs of the project:

Outcome 1: Increased capacities of the relevant national and local authorities to respond effectively to extreme water-related events

Output 1.1: Strengthened hydro-meteorological monitoring network for effective river basin management
Output 1.2: Flash-flood/flood forecasting and early warning system established and operational

Outcome 2: Enhanced security of the vulnerable rural population in key watersheds from potential failure of flood control infrastructure

Output 2.1. Methodology, protocol and standards for safe operation of hydro-technical infrastructure developed
Output 2.2: High risk dams identified in 5 pilot sites, conditions analyzed, and remedial measures identified with priority high risk dams rehabilitated

Outcome 3: Enhanced capacity of the local authorities and empowered community stakeholders to participate actively in governance of integrated water resources management for flood control

Output 3.1: Flood risk and water resources planning, and management instruments are available and put at use at the local level

The project will have several categories of target groups such as, firstly, the local population from the pilot areas who are directly exposed to the flood-related hazards, namely, those living in flood-plain areas or having agricultural land and/or economic activities in these areas.

The number of the latter however cannot be identified at this stage, given that it requires a combination of data sources, tools and methodologies such as modeling, risk assessment, emergency planning etc which currently are not available. All these tools will be developed during the project implementation, and the number of directly flood exposed people will be identified and available for monitoring in the 3rd year of the project implementation period. Given these circumstances it is proposed to operate with the number of beneficiaries totaling **65,880 people** in the pilot areas, and later the number to be refined when the necessary tools are available for precise estimation.

Out of this total number of 65,880 beneficiaries it has been identified that there is a minimum of 520 single-parent families, 2,750 individuals with disabilities, and 8,000 senior citizens who will be targeted especially during the development of the local level flood risk management plans and planning of activities pertaining to early warning and response during emergency situations. These are socially vulnerable people.

Another target group is the Local Public Authorities from the selected pilot regions. As the custodians of the hydro-technical infrastructure, they bear the responsibility to ensure their proper operation and maintenance in order to mitigate the flood risks.

The next target group of the project is the central public authorities such as the Ministry of Environment with its subordinated institutions, that is, the Agency “Apele Moldovei” and the State Hydrometeorological Service who will benefit from instruments and knowledge to better understand the flood-related risks, prevent and prepare for these.

The last target group of the project is the private sector who rent the hydra-technical infrastructure form the LPAs and who have the role of water users. It is important to involve these people in the communication over this project in order to raise their awareness on the importance of maintaining the water reservoirs in proper order and act as an active partner in flood risk planning and management. It is expected that these target groups would participate in the project’s capacity building events, and development of the flood risk management plans.

2. Background / context

2.1. Analysis of the relevant national and sectoral policies

This proposal is a direct response to the priorities espoused in the 2030 National Development Strategy of Moldova which acknowledges the intensifying frequency of natural hazards, such as drought and floods. It is aligned with the General Objective no. 10 “Ensuring a healthy and resilient environment”, target 1 “ensuring resilience to climate change through reduction of climate change risks”. The Strategy argues that due to the high dependence of the economy and rural communities on agricultural sector, Moldovan society is extremely vulnerable to climate change. Climate change affects all areas of the development of the state. Most sectors are vulnerable to climate change and suffer from extreme events that are frequently recorded in the country. The strategy identifies the

most vulnerable group of the population to floods, namely those who live in floodplains, have agricultural plots and production in flood risk areas. As priority measures, the strategy provides for the improvement of the monitoring system for environmental quality and natural extreme events, as well as the introduction of IWRM principles for all river sub-basins.

The project is also aligned with the National Climate Change Adaptation Programme until 2030 (NCCAP 2030) and its Action Plan, which aims towards reduced vulnerability and increased resilience to climate change, through systemic transformations in all priority adaptation sectors, by establishing a strong enabling environment and clear direction for effective and coherent climate change adaptation processes across all relevant sectors. In particular, the Programme, promotes the Mainstreaming of Climate Change Adaptation and Disaster Risk Reduction in the sectoral strategic and investment planning at national and local levels (Specific Objective 4 (SO)), by improvement of hydro-meteorological monitoring system to track key physical processes (Measure 4.2.4), development of early warning systems and mechanisms for disaster risks communication (Measure 4.2.3), which are to be addressed by the current Project. Additionally, the NCCAP 2030, provides for increased resilience of the priority adaptation sectors, by climate proof investments and reduction of the disaster risk and negative impacts of the climate hazards (SO 5). For the Water Management Sector (Activity 5.6), this is to be achieved inclusively by rehabilitation of Flood / Flash flood control infrastructure (Measure 5.6.12) and by establishment of the hydrological posts on main Prut and Dniester tributaries, with their respective equipment, and manpower securing (Measure 5.6.13).

In addition, the project will contribute to the Environmental Strategy, that covers the period 2014-2023 which under the Specific Objective 6(a) aims at proper management of water resources, and integration of the climate change adaptation measures into all sectors of the national economy. The Concept of the Environmental Strategy till 2033 stipulate the importance of the adaptation to climate change, reducing the risks from the nature-related disasters, thus the project will also contribute to the new environmental policy once being approved.

The project will also contribute to the Program on Prevention and Management of the Emergency Situations for 2022-2025 to the Specific Objective 2.1 - Operationalization till 2025 of the national early warning system by supporting the development of the flash floods early warning systems in the selected river basins.

Further on climate change, the Second Nationally Determined Contribution (2020) incorporates the adaptation efforts, addressing priority sectors and cross sectoral efforts that includes timely delivery and accessibility of high-quality climate risk information, including early warning systems, extending the integration of climate adaptation measures on the local level, community-based adaptation, improving disaster risk management and promotion resilient development of urban communities.

The Strategy on Water Supply and Sanitation for the year 2014-2030 in line with the National Adaptation Strategy focuses on the protection of water resources from climate change threats.

The Water Law is a fundamental piece of legislation that proclaims and defines IWRM in the Republic of Moldova. The Water Law (2011) provides directions for the efficient management, protection and use of surface waters and groundwaters, integrating the EU Water Framework Directive principles into the national legislation. The law establishes mechanisms for the protection of waters, water rights of main stakeholders, states the importance of protection of the surface and groundwaters, aqua-ecosystems and prevents the degradation of fresh water. The law articulates the IWRM principles through the development and implementation of successive River Basin Management Plans, as well as through the development of basin and sub-basin Drought Management Plans and Flood Risk Mitigation Plans.

The *Association Agreement between the Republic of Moldova and the European Union* (Association Agreement) ratified in 2014 aims at developing and strengthening international cooperation to combat climate change by delivering concrete measures at national, regional and international level to harmonize water legislation with the EU Water Framework Directive (WFD). This includes the development of River Basins Management Plans and adoption of the IWRM approach to water resources management and flood protection towards which this project aligns.

In that sense, two River Basins Management Plans were developed: the Management Plan of the Dniester River Basin District in 2014 and in 2015, the Management Plan of the Hydrographic Basin for the Prut River 2016 – 2021.

Later, Flood Risk Management Plans for Danube-Prut and Black Sea River Basin District and for Dniester River Basin District were developed and approved by GD Nr.562 from 31.07.2020. The Plans require among others important measures for: elimination flood risks by strengthening infrastructure for flood protection; development of detailed flood hazard and risk maps; inventory of existing dams; development of criteria for a comprehensive assessment of the status of ponds on small rivers and a methodology for identifying ponds for liquidation; modernization of the national monitoring system to improve hydrological forecasts; development and approval of flashflood management methodology.

Further on the legislative side, the *Law on the Principles of Urbanism and Territorial Settlement (1996)* contains provisions for the rehabilitation of large reservoirs for increased flood protection within the context of urban plans and land-use planning plans, while the Regulation on flood risk management contains provisions for enhanced flood risk prevention and preparedness.

The National Decentralisation Strategy requires completion and approval of the national land management planning, as well as developing, updating regional and local land management planning. This can contribute to better management of flood prone areas and lands.

This proposal has been developed with guidance from the United Nations Development Programme for Moldova and the Country Programme Document for 2013-2027 and will contribute to Outcome 4. By 2027, institutions and all people of Moldova benefit from and contribute to green and resilient development, sustainable use of natural resources and effective gender-responsive climate change action and disaster risk management.

The project will also help to implement some of the SDGs, in particular SDG 13 “Climate actions” and will also in different way to contribute to the achievement of such SDGs as No. 5 “Gender equality” and No. 11 “Sustainable Cities and Communities.”

The proposed project is consistent with the 2022-2024 Framework Strategy of the Austrian Development Cooperation with the EU Eastern Partner Countries: the Republic of Armenia, Georgia, the Republic of Moldova and specifically with Thematic Focus Area – Sustainable rural development, with a particular focus on water management, environmental protection and climate change adaptation and mitigation. This project will also aim to improve coordination between all relevant institutions in Moldova’s water sector for integrated cooperation in, and among, the national, regional and local levels as well as between institutions; the project will assist in improving functionality of the system by eliminating fragmentation of institutional responsibilities, overlap of competencies and planning weaknesses.

2.2. Characteristics of the intervention environment

Moldova is a small-sized, landlocked country in Eastern Europe, with a total area of 33,846 square kilometres and with usual resident population of 2,597,107, where women prevail with 52 percent. According to the evidence-based data[4], women are more vulnerable to natural hazards than men.

Moldova borders with Romania to the south and west, and Ukraine to the north and east. The western border follows the Prut River, and its southern border extends almost to the Black Sea coast. Moldova's geographic relief is hills and flatland areas with uplands mostly in the central part of the country. The absolute altitudes are within the range of 429m (Balanesti Hills) and 4m above sea level in the Nistru floodplain (Palanca village).

Moldova is a parliamentary republic. The parliament exercises the legislative powers and the Government executive powers. The Government oversees the domestic and foreign policy of the country and manages the central public administration currently consisting of 14 ministries. The Ministry of Environment is the central public authority responsible for policy development in the area of environment and climate change, as well as for the water resources management. The subordinated institution Agency "Apele Moldovei" (AAM) implements the state policy in the field of water management, while the State Hydro-meteorological Service (SHS) implements national policy in the field of hydrometeorology, makes hydrological, climatic, and meteorological forecasts and provides relevant information to government and the public, and issues warnings about hazards.

Moldova is a unitary country with 2 levels of local government and following the adoption of the National Decentralization Strategy in 2012, the Local Public Administration of both levels (primaria and raions) received enhanced competencies for decentralized local development, planning and provision of services for the benefit of the local people. The current early warning system for flooding is weak and the local governance institutions have insufficient capacities for effective flood risk and water resources planning and management at the sub-basin level.

The country is organised into 32 districts/raions, plus the municipalities of Chisinau and Balti, the Autonomous Territorial Unit of Gagauzia and the breakaway region of Transnistria. The majority of the population, 57%, is concentrated in rural areas and depends on agriculture. Specifically, rural older women face reduced access to facilities, poor quality of services, who "survive" given the reduced opportunities to generate income needed for subsistence (low pensions, heavy land/farm works).[5]

Moldova has a temperate continental climate that is mainly formed by the Atlantic air mass from the west and the Mediterranean air mass from the southwest. It is characterized by relatively mild winters with little snow, long warm summers beginning with intense periods of rainfall followed by lengthy periods of low humidity.

It is highly vulnerable to climate variability and change, which bring droughts, late spring frosts, hail, floods and severe storms. Increasingly erratic weather patterns have resulted in loss of life and income through rising food and energy prices.

Drought is a major risk, and catastrophic droughts impact the country every 7 years, prior to 2007, the State Hydrometeorological Service of Moldova (SHS) reported that northern Moldova experienced a drought once every ten years on average, central Moldova once every five to six years,

[4] General Recommendation No. 37 on Gender-related dimensions of disaster risk reduction in the context of climate change. CEDAW/C/GC/37

[5] https://statistica.gov.md/newsview.php?l=ro&idc=168&id=6767

and southern Moldova once every three to four years. In the last two decades, however, droughts have been more severe and frequent.

Climate change could also potentially increase the frequency and magnitude of flooding. In 2008, floods from torrential rains caused 120 million USD in damage to houses, bridges and roads and flooded 7,500 hectares of agricultural land.[6] While precipitation is expected to decrease by the 2040s, rainfall events are expected to be larger. Almost half of all Moldovan communities are located in flood-prone areas and approximately 45,000 ha (approximately 2% of agricultural land) have a history of being waterlogged.[7]

Water resources management in Moldova mostly follows an Integrated Water Resources Management (IWRM) approach that ensures that all water resource typologies are taken into account when developing national policies and decisions on water management and protection. The responsibility for defining strategies and policies for the water sector is shared among several government ministries as follows:

- Ministry of Environment is a main responsible governmental body creating a policy framework for IWRM, including coordination with neighbor countries for transboundary waters.
- Agency "Apele Moldovel" subordinated to MoEnv is responsible for the implementation of the state policy in the field of water resources, flood protection and is the principal national water management authority which regulates the crucial surface water related relationships.
- Agency for Geology and Mineral Resources is responsible for monitoring of groundwater level and quality and coordination of groundwater use and protection.
- Environmental Agency is an administrative authority subordinated to MoEnv responsible for the implementation of the state policy in the areas of Environmental Assessment and Ecological Expertise.
- Environmental Protection Inspectorate ensures enforcement of the environmental policies through the monitoring and control procedures on the ground.
- General Inspectorate for Emergency Situations under the Ministry of Internal Affairs, in accordance with its mandate, is responsible for the protection of the population and of the property in exceptional situations, including from weather and water related risks.

The biggest surface water source, the Nistru River, whose basin covers about 67% of Moldova's territory, has an average annual discharge of 9.6 km^3. The other main source is the Prut River, whose basin covers 24% of the territory, with an average annual discharge of 2.4 km^3. All other inland rivers have an average annual water discharge of about 1.2 km^3.[8] Over the years, the natural water regime in the river basins has been modified by the construction of dams and reservoirs – designed to prevent floods, trap sediment and provide water for agricultural, industrial and household consumption.[9]

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[6] WHO. 2008. Floods in Moldova, Romania, and Ukraine; Ministry of Environment and Natural Resources. 2009. Second National Communication of the Republic of Moldova Under the UNFCCC

[7] World Bank. 2013. Reducing the vulnerability of Moldova's Agricultural Systems to Climate Change: Impact assessment and adaptation options. World Bank: Washington, DC

[8] Ministry of Environment and Natural Resources. 2009. Second National Communication of the Republic of Moldova Under the UNFCCC

[9] 65% – 70% of total water is used for industrial heating and cooling and for hydropower production, 15% – 20% for drinking and domestic purposes, and 5% – 10% for irrigation (UNDP. 2009. Climate Change

The main water sources feeding the rivers are rainfall (90%) and snowfall (10%). In summer the water levels in rivers – and in particular in small rivers – can rise considerably after storm rainfall, sometimes causing disastrous floods.[10] In recent years, reduced rainfall, an increasing number of seasonal (winter) thaws,[11] increasingly torrential rain events that cause flooding, and increased water use have amplified and exacerbated the natural cycle.

2.3. Harmonization

The project will promote partnerships between civil society, and local and national government for the analysis of hydro-infrastructure gaps and needs, the prioritization of rehabilitation activities, and potential implementation, together with local communities of the flood risk management plans. This participatory approach will build local ownership of the emergency plans and hydro-infrastructure improvement processes in the pilot communities. A primary purpose of this project is to produce knowledge and generate lessons from pilot site activities that can be used in the design of the follow-on flood risk reduction investment program to be taken over by the Government of Moldova and potentially, IFIs. The technical analysis of hydro-infrastructure integrity and remedial measures in the pilot sites, including prioritization and costing, will produce important lessons for a national program, particularly as evidence for the realistic budgeting of investment in dam and dyke renovation or removal. At the same time, the national scale project activities – inventory of hydro-infrastructure, flood hazard analysis, etc. – will increase knowledge of key elements vital to the design and implementation of a countrywide flood risk reduction program.

Under the provisions of Water Law No. 272 of 2011, some elements of water resources management at local level have been delegated to sub-basin committees. To date, sixteen sub-basin committees have been established with the responsibility of consulting with relevant local authorities about local water resources management within the sub-basins. A primary task of these committees is the development of sub-basin flood risk management plans.

The project will cooperate with the basin committees for the Prut and the Dniester (which are under the aegis of “Apele Moldovei” Agency), and with numerous sub-basin committees established at the initiative of civil society on a number of small rivers. The goal of cooperation will be defined as a wider involvement of civil society in the problems of flash floods and river floods, the safety conditions of the local population, nature and economy from the impact of floods and risks from hydraulic infrastructure, as well as the formation of a nationwide discussion platform of basin communities on flood risk.

Towards this end, the following are the competencies of the relevant national and local stakeholders with whom the project will establish collaborative approaches.

The **State Hydro-meteorological Service (SHS)** is the agency in Moldova responsible for monitoring the state and evolution of hydro-meteorological conditions and environmental quality. The primary purpose is to protect the population and economy from dangerous hydro-meteorological

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in Moldova. Socio- Economic Impact and Policy options for Adaptation. National Human Development Report 2009/2010. New York, NY: United Nations Development Programme)

[10] Ministry of Environment and Natural Resources 2013. Third National Communication of the Republic of Moldova under the United Nations Framework Convention on Climate Change. Ministry of Environment and Natural Resources of the Republic of Moldova: Chișinău

[11] Frequent and long-term thaws/warm spells, in particular in the Southern region, cause the melting of slightly frosted soil and decrease the availability of snow water resources during the spring melt

phenomena and from environmental pollution. It has a Hydrological Center which performs systematic monitoring of the state of evolution of the hydrological regime of surface waters in the country's hydrographic network, develops forecasts and warnings on the onset of the hydrological phenomena, supervises and methodologically coordinates observations. In terms of transboundary waters, there is an agreement between Hydro-meteorological services from Ukraine, Romania and Moldova on the procedures for daily transmission of information from water level posts, including warnings on potential floods.

Agency "Apele Moldovei" is the main authority responsible for water management and of the land under the water fund of the Ministry of Environment. AAM is managing the surface water bodies (some big artificial reservoirs) and the hydro-technical infrastructure (only flood protection dams which are along the rivers). The Agency participates in development and implementation of the flood risk management plan, as well as of the River Basin Management Plans for both River Districts in Moldova (Dniester and Prut-Danube-Black Sea). The Agency also support and lead activities of the two River Basin Committees.

The **General Inspectorate of Emergency Situations (GIES)** is the civil protection authority in Moldova and the primary agency responsible for communication and dissemination of warnings from SHS and for ex post response. The GIES is also responsible for education and training as part of the flood risk prevention and to ensure that early warnings are successfully delivered to the intended recipients in a timely and understandable manner. Response to the emergency situations is a primarily responsibility of the GIES, in a current setup. GIES has some staff on the ground that monitor the flood risk situation and keep close communication with the SHS on the matter.

The **Local Public Authorities** (LPAs) from the target area are the key actors in the disaster risk reduction at the local level. They have an important role in the prevention, work with the local population and being the first response line once the disaster happens. Once LPAs receive warnings from the GIES, it is their responsibility to notify and warn the population.

Participating institutions and government authorities will coordinate at watershed level through the development and implementation of watershed or basin flood management plans, formulated with local stakeholder participation, which not only identify the local risks and response measures but also clarifies such aspects as prevention, preparedness, monitoring and early warnings. Local authorities, through these management plans, will be empowered to pressure national institutions and agencies to fulfil their responsibilities under the plans in a coordinated manner. By coordinating these institutions at watershed level, local authorities will ensure non-duplication of efforts, achievement of practical institutional synergies. Local authorities will lead watershed management and governance coordination, including development of lessons learned and subsequent policy inputs during local level dialogues with national and other authorities According to the Governmental Programme for prevention and management of the Emergency and Exceptional Situations for 2022-2055[12] the national risk assessment methodology is to be developed in 2025, that will be the opportunity to clarify the clear distribution of the responsivities including flash flood risk management on the national level.

Furthermore, both SHS and AAM are undergoing reforms as part of the overall reorganisation of the environmental sector as a result of the functional and institutional review of all institutions pertaining to this area, to eliminate overlapping competencies, and guarantee that each has a distinct

[12] https://www.legis.md/cautare/getResults?doc_id=134815&lang=ro

role and mandate. The review has identified the capacity needs of the central public authorities in the environmental sector that require further improvements. As a follow-up, UNDP is supporting the reform for the SHS through the National Adaptation Planning Process-2 (GCF) which will ultimately provide improved climate services to the end-users through improved hydro-meteorological monitoring network and analytics, while the reform of the AAM is being carried out through the Project "Supporting Moldovan Authorities in the Sustainable Management of the Dniester River" (Sweden) where the AAM will be further responsible for the coordination of the process for development of the water management sector and of the hydro-technical constructions in order to prevent floods.

It is a momentum on which this projewct will build to ensure a better coordination between these institutions and the project team will capitalise on that during the implementation of the project by strengthening the roles and responsibilities of the respective institutions in flood risk management.

In addition, the National Adaptation Planning Process-2 is supporting the Ministry of Environment in operationalizing the Climate Change Commission, which acts as a national-level coordination mechanism for climate-related concerns. This is another mechanism that the project management team will tap into to ensure a collaborative approach for project implementation.

The project design is aligned with the results of these assessments and, in addition to the GCF and Sweden projects, it is proposing complementary measures for strengthening the capacities of these institutions for flood risk planning and management.

3. Intervention Design

3.1. Target group, beneficiaries and local partners

The project will have several categories of target groups such as, firstly, the local population from the pilot areas who are directly exposed to the flood-related hazards, namely, those living in floodplain areas or having agricultural land and/or economic activities in these areas. This is well in line with the definition given in the 2030 National Development Strategy of Moldova which says that "the strategy identifies the most vulnerable group of the population to floods, namely those who live in floodplains, have agricultural plots and production in flood risk areas. As priority measures, the strategy provides for the improvement of the monitoring system for environmental quality and natural extreme events, as well as the introduction of IWRM principles for all river sub-basins".

The number of the latter however cannot be identified at this stage, given that it requires a combination of data sources, tools and methodologies such as modeling, risk assessment, emergency planning etc which currently are not available. All these tools will be developed during the project implementation, and the number of directly flood exposed people will be identified and available for monitoring as of 3rd year of the project implementation period. Given these circumstances it is proposed to operate with the number of beneficiaries totaling **65,880 people** in the pilot areas, and later the number to be refined when the necessary tools are available for precise estimation.

Out of this total number of 65,880 beneficiaries it has been identified that there is a minimum of 520 single-parent families, 2,750 individuals with disabilities, and 8,000 senior citizens who will be targeted especially during the development of the local level flood risk management plans and planning of activities pertaining to early warning and response during emergency situations. These are socially vulnerable people.

Another target group is the Local Public Authorities from the selected pilot regions. As the custodians of the hydro-technical infrastructure, they bear the responsibility to ensure their proper operation and maintenance in order to mitigate the flood risks. While the project will provide the missing expertise and technologies, it is the LPAs who would be the beneficiaries of knowledge, tools and capacities for flood risk management and will act as the interface with the local population for this project.

The next target group of the project is the central public authorities such as the Ministry of Environment with its subordinated institutions, that is, the Agency "Apele Moldovei" and the State Hydrometeorological Service who will benefit from instruments and knowledge to better understand the flood-related risks, prevent and prepare for these.

The last target group of the project is the private sector who rent the hydra-technical infrastructure form the LPAs and who have the role of water users. It is important to involve these people in the communication over this project in order to raise their awareness on the importance of maintaining the water reservoirs in proper order and act as an active partner in flood risk planning and management. It is expected that these target groups would participate in the project's capacity building events, and development of the flood risk management plans.

Table 1. The targets groups and the number of beneficiaries of the project

Target group	Ultimate benefits	Number of people
Local population in pilot areas (Copaceanca, Solonet, Bahu, Ialgug and Lapusna watersheds)	-secured dams and dykes -enhanced understanding of early warnings and adequate response to these -mapping of flood risks and enhanced knowledge of flood risk reduction measures	65,880 people[13] with reduced expose to floods 90 people trained in flood risk management and early warnings
Socially vulnerable population	- secured dams and dykes -enhanced targeting of vulnerable population for reach out during early warnings	In the target areas, a minimum of 520 single-parent families, 2,750 individuals with disabilities, and 8,000 senior citizens will gain from the measures implemented
LPAs	--secured dams and dykes	

[13] The total population living in the Solonet pilot area comprised of Radoaia, Heciul Nou, Singerei Noi, and Bilicenii Noi communities is more than **14,603** from where 51 % are women and 49 % men. The total population living in the pilot area Lapusna and comprising Iurceni, Cristesti, Boltun, Secareni, Pascani, Mingir communities, and villages Tomai, Voinescu and Sarata-Razeni is more than **19,790** out of which 50 % are women and 50 % men. The total population in Copaceanca pilot area, covering Vasileuti, Mihaileni, Riscani,and Nihoreni communities, is more than **17,892** from which 52 % are women and 48% men. The total population living is Bahu pilot area comprised of Community Saseni (village Bahu), Bogzesti, Budai and Vasieni is more than **5,792** from which 49% are women and 51% are men. The population of Ialpug pilot area is more than **7,803** people equally divided between men and women. Communities Ialpujeni, Javgur, Tomaiul Nou and Caracui village are a part of the pilot area.

The number will the revised as of 3rd year of implementation and the modeling and risk assessment will enable estimation of the number of people living in floodplain areas, as well as people who have agricultural lands and/or economic activities in these areas.

	-enhanced understanding of early warnings and adequate response to these -mapping of flood risks and enhanced knowledge of flood risk reduction measures -clarified roles between the LPAs and private sector which rent the hydro-infrastructure safeguarding the local communities' territories from flash floods.	72 people (3 per community * 24 LPA)
Central Public Authorities	-legal instruments and methodologies in place to ensure dam safety - knowledge on weather&hydrological monitoring and flash flood detection system and hydraulic and hydrological monitoring, risk modeling and assessment, radar data gathering and processing, dam and weirs safety assessments -coordinated approach for flood risk management	50
Private sector	-secured dams and dykes -enhanced understanding of early warnings and adequate response to these	5

Target group and beneficiaries, including composition and figures, selection criteria; specific needs and constraints of each group.

This project will develop the resilience of a pilot cohort of communities who are highly vulnerable to the consequences of climate-driven rainfall variability and extreme weather events, particularly the risks associated with fluvial and flash floods in their watersheds. Project activities have been identified and prioritized through consultations with local communities, authorities and staff members of key institutions, including Agency “Apele Moldovei” responsible for water resources management and policy implementation in Moldova; the State Hydrometeorological Service (SHS), responsible for monitoring of river flows and weather; the General Inspectorate of Emergency Situations responsible for early warnings and disaster prevention and response; the Ministry of Environment responsible for policy and legal frameworks drafting and promotion, Local Public Authorities- responsible for local planning and warmings, local population, the end beneficiaries of the improved watershed management and others. The selected activities under this project follow on the reform of the central public authorities in the environmental sector, the needs assessments undertaken under other past and ongoing initiatives (described further in the Section 2.3. Harmonisation), and other main policy

frameworks as described in priority actions as per the Section 2.1.Analysis of the relevant national and sectorial policies).

Following these consultations, the pilot communities were selected based on the following criteria:

- The catchment area should be reasonable to demonstrate the effects of climate change adaptation measures applied during implementation, with a coverage between 50 and 150 km2;
- The area must be historically subject to flash-flood events, and encompass several important characteristics, such as: slope steepness, shape (curvature) of the slope, permeability of soils, landcover pattern;
- The pilot area should contain a flood risk zone (floodplain);
- Flash floods and river floods pose a threat to settlements and important economic objects, including past experience of such events in the region;
- High density of dams and reservoirs;
- Number of beneficiaries within the pilot area;
- Status of dams and complexity of hydrological network;
- Willingness of local authorities to participate in the project activities.

Relevance to constraints, needs and interests of the target group and beneficiaries.

The economic benefits of this project is considerable when calculating the costs associated with recovery of the economic utility of productive resources affected by flooding. The costs of flood damage are expected to grow considerably as hydro-infrastructure continues to age without renovation, illegal or ad hoc infrastructure continues to fail, and climate-driven extreme rain events grow in intensity and frequency. This project will provide the data required for estimates of potential costs avoided with heightened security from infrastructure improvement. Information gathered from analysis of this experience at the five pilot sites will inform the design of a follow-on investment phase to be financed potentially by the IFIs. Potential economic benefits can be then estimated for the nation as a whole.

Social benefits accrue with the participation of local watershed stakeholders in the analysis of infrastructure integrity and climate change impacts on the watershed hydrological cycle. Effective participation and collective action build social capital, which is a prerequisite for the equitable formulation and effective implementation of community flood/flashflood risk management plans and participation in flood mitigation activities. Community participation in the development of these plans will strengthen local governments and community organizations.

Participation of target group and beneficiaries in planning and implementation

The project will carry out flood risk reduction activities in the pilot sites with the aim of generating lessons from on-the-ground experience with participatory sub-basin planning and implementation of project activities. This will involve analysis and application of methodologies for broader stakeholder participation. Pilot site activities related to planning and implementation of project activities, will be assessed to identify cost-effective methods and processes that can be replicated in other sub-basins as part of the prospective national program. The project's collaborating institutions – SHS, the General Inspectorate for Emergency Situations, "Apele Moldovei" Agency, Ministry of Environment – will work together to coordinate and carry out pilot site activities; relationships and capacities developed, coordination mechanisms established, and the lessons learned from implementation of the project will all provide a foundation for longer term sustainability of collaborative efforts.

Overview of key stakeholders, their interests and potential participation in the proposed project, any consultations undertaken with them.

Several rounds of consultations were held in the first stage of proposal development to identify project priorities. Primary national level stakeholders consulted include the Ministry of Environment; Agency "Apele Moldovei"; State Hydrometeorological Service; and the General Inspectorate for Emergency Situations. These institutions assisted in the identification of project priorities in line with their needs and strategic directions and provided available datasets for identification of pilot areas.

During the first stage of proposal development several study visits were done at the local level to determine interest of the communities in addressing the issue of flash flood hazards. This involved discussions with local experts and authorities to obtain their views on possible measures to address identified risks. Participants involved in these two consultations represent various sectors: policy makers, academia, practitioners.

The total number of consulted people is 100, among which 40 are women and 60 men. Involvement of the women's organizations (including members of Platform for Gender Equality, Women NGO from the region) in the project design has helped to identify relevant gender issues within the country's social context and prepare gender-sensitive implementation and monitoring of the project.

Another round of consultations was organized at the local level after identification of pilot sites. During the preparation phase representatives from mayoralties were involved in the process of data collection and presented information about their localities: socio-economic data, information about risks from natural and man-made disasters and environmental concerns.

At the same time, technical visits to each of the pilot areas were organized. During these field surveys, the consultants met with mayors and village councilors in all localities, worked in conjunction with local land engineers, and most importantly with farmers and owners (owners / tenants) of dams and local water bodies.

All stakeholders consulted and involved in the conceptualization of this project proposal will be further engaged during implementation, however, at this stage their interest and ownership has already been secured.

Public consultations for the project proposal were held in multiple stages, beginning in 2020. In October 2021, public meetings took place in all five pilot regions. The main objective was to validate the project ideas on the local level, to have in-depth discussions with the representatives of the local communities on the "soft", and "hard" components envisaged in the project proposal. Public consultation events were organized in a participatory manner. During the presentation, participants came with the question and then the moderated discussion (mainly on gender, knowledge, behavior and environment aspects) was organized that gave the participants possibility to express their views, ideas, and concerns. The important conclusions derived by the public consultations are:

- Based on the results of the public consultations project idea and proposed activities are supported by the communities from the areas;
- Before the implementation of the infrastructure activities the technical design should be done;
- Awareness raising activities are an important part of the work, and should be done in the project localities;
- While identifying measures gender aspects should be taken into consideration to focus on those vulnerable groups from the localities.

As the project progressed into its development phase, further consultations were conducted at the national level during April-May 2023. These involved discussions with the Ministry of Environment, State Hydrometeorological Service, and the General Inspectorate for Emergency Situations. Additional discussions were also carried out with representatives of Local Authorities from the target communities.

See Appendix 8 for the list of consulted stakeholders.

3.2. Problem analysis and analysis of local potentials

Moldova is highly vulnerable to climate variability and change, which bring droughts, late spring frosts, hail, floods and severe storms[14]. Increasingly erratic weather patterns have resulted in loss of life and property as well as loss of income through rising food and energy prices. One of the most severe droughts on record occurred in 2007, affecting 75–80 percent of the population and resulting in significant damage to the economy. The following year, floods from torrential rains caused $120 million in damage to houses, bridges and roads and flooded 7,500 hectares of agricultural land.[15] The people of Moldova are already experiencing the impacts of climate change with more frequent droughts, heavy rains and flooding, and other severe weather events.[16]

Water resources are particularly sensitive to climate change, in terms of both quantity and quality[17]. According to estimations, the surface water resources that are available could decline by 15-20 percent by 2020. Thus, secure supply for all water users will be threatened by climate-related change in water resources already in the 2020s.

Currently, the heaviest rainfall occurs in early summer and again in October, often in the form of heavy showers and thunderstorms causing erosion and river silting. On average, under climate change, rainfall will become (with 66% probability) more frequent, either in absolute terms or as a proportion of total precipitation – less precipitation with a higher proportion of heavy rain events. In summer, the frequency of wet days is projected to decrease, but the intensity of extreme events is projected to increase. These changes in heavy rainfall events have implications for damage to lives, crops and property through flash floods, hail storms, erosion, slope instability and reduced ground water recharge. Under current climate change projections, more frequent and intense precipitation days and an increase in the number of extreme rainfall events are projected. Potentially damaging and life-threatening river floods are expected to occur at least once in ten years.

Over 40% of the country's towns and villages are exposed to flooding under conditions of intense rainfall. On small rivers, heavy rains can form a flood within 2-3 hours with flash floods occurring due to topographic and climatic conditions; almost yearly, heavy rains result in local floods with inundation of agricultural lands and settlements.[18] At the same time, rural stakeholders need access to water for irrigation, fish production and recreation, and ponds are found on watercourses throughout Moldova.

[14] ibid
[15] ibid
[16] World Bank Climate Knowledge Portal
[17] FAO. 2015. AQUASTAT Country Profile – Republic of Moldova. Food and Agriculture Organization of the United Nations (FAO). Rome, Italy
[18] UNDP 2019

Over 4,000 small and medium reservoirs and ponds have been constructed for irrigation purposes, flow regulation and fishing pools[19]. Most are small impoundments for local use with a surface area of up to three ha. Larger reservoirs in the northern and central part of the country are used mainly for seasonal regulation of water, while in the south they serve for inter-annual distribution due to the region's greater water deficiency. This hydro-infrastructure also helps in managing the volume and velocity of flows of flood water downstream, including through flood storage.[20]. Although the topography of Moldova is not very dramatic in terms of gradient, high intensity rainfall leads to a very high risk of flash-floods.

The structural integrity of dams and weirs is therefore critically important in any long-term national climate change adaptation strategy. Most dams were designed in the former Soviet republic using empirical formulas based on the hydrological and climatological conditions of more than 30-40 years ago. As such, no climate change allowances were made during the design of these dams. As well, an unknown number of dams have been built ad hoc by individuals or communities without any proper design and/or permit.[21]

Ownership of the dams may be either public or private, and proper maintenance may be lacking. Reliable information on technical conditions of dams and reservoirs is often absent, while that which is available is mainly outdated. A national inventory of dams has been initiated, however this process is still in progress, and available information is fragmentary and incomplete. Around 50% of the reservoirs have fixed overflow weirs which means that downstream flow will only occur when the reservoir is full. About 40% of the dams have gates, thus allowing regulated downstream flow; the remaining 10% do not have structures, and downstream flow only occurs when the dams are overtopped. In light of the high number of dams, it is not uncommon to find them in cascade i.e. more than one dam on a watercourse. There have been numerous examples of dam breaching in Moldova both individually and in cascade. According to rough estimates, around 20% of dams constructed on small rivers are either broken or simply do not operate properly.

The risk is high of dams breaching from a synergistic combination of climate-driven and management factors: more intense and heavier climate-driven rainfall events; outdated dam design and construction based on climate conditions and analysis from the last century; uneven and unregulated maintenance and management of dams, and accelerated pond siltation from unsustainable land use. If dams fail – particularly if they fail in cascade - the results can be catastrophic in terms of property damage and loss of life. Four watersheds experienced dam breaching in 2019, one of them leading to the breaching of four additional dams in cascade.

Nevertheless, if appropriately operated and managed within climate risk-informed watershed management strategies, the dams of Moldova could be used for seasonal and long-term regulation of stream and river flows to reduce the risk of flash and fluvial flooding while maintaining sufficient water for irrigation, where needed.

A national-scale approach is required to effectively reduce the vulnerability of rural Moldovans to climate-driven fluvial and flash floods. This must include renovation and operation of risk management systems that permit institutional decision makers to identify flood hazards, alert local stakeholders of impending floods, and ensure the safety of flood control infrastructure, specifically dams and dykes in vulnerable watersheds. As well, the institutions responsible for official permitting,

[19] The number of dams in Moldova is disputed. Based on some sources there are more than 7,000 dams (ongoing inventory of dams by national experts), while others estimate the number of dams at around 4,000 (General Inspectorate of Emergency Situations).
[20] Fernandez, Juan; *Interim narrative report on implemented activities*: Support development of a project to the Adaptation Fund (AF) addressing extreme climate-induced water-related events in Moldova
[21] Fernandez, Juan

maintenance and monitoring of hydro-infrastructure require stronger capacities to be able to carry out these functions effectively.

Barriers to the establishment and implementation of a national approach to climate-driven flood vulnerability reduction include:

1. State Hydro-meteorological Service monitoring capacities are insufficient to assess local-level hazards and vulnerabilities with sufficient precision, and the current early warning system for flooding is weak.

The **State Hydro-meteorological Service (SHS)** monitoring stations are unevenly distributed, with the vast majority found on the two largest border rivers (Prut and Dniester), leaving the interior under-served. The network of stations cannot adequately detect fluvial and flash flood risk, and hazard maps are out of date. The state institutions - the State Hydro-meteorological Service (SHS) and Agency “Apele Moldovei” - charged with hazard analysis and risk assessments currently lack the technical capacities to carry them out effectively, and they have no hydrological or hydraulic modelling capacities. There is currently no flood forecasting platform in SHS or the Agency “Apele Moldova”.

SHS is currently undergoing an institutional reform to enhance its capacities, a reform that will be finalized in 2023-2024 and with objectives of primarily enhancing the hydrological network and strengthening its capacities to manage and administer the network and other factors. SHS currently has a total staff of 261, including 42 and 100 observers respectively for hydrological and weather stations, as well as 7 technical staff. SHS is responsible for assessing droughts, strong winds and extreme temperature hazards, as well as flood hazard to some extent, although no formal hazard or risk assessments are undertaken within this department. Flood risk assessment at hydro-technical infrastructures is officially the responsibility of AAM, while SHS prepares daily bulletins regarding hydrological forecasts and is responsible for hydrological monitoring.

For monitoring, SHS has a network of 50 automatic weather stations (AWS) and 53 hydrological stations (30 of them automatic). All of them send information in real-time, although how this information is used is unclear. The meteorological station system is maintained by the company that deployed the AWS (Adasa), and all the information is on a single system. The hydrological stations, however, are from different manufacturers, which leads to problems in the data processing because the data have to be maintained and managed using different databases. SHS has also an upper air station and a C-Band dual polarization radar, and they seem to have problems with equipment in the operation, data processing and maintenance.

The main problems regarding the monitoring network are the maintenance of the network, the rapid turn-over of qualified staff, the maintenance and operations of the hydrological network and the density and location of measurements. In terms of forecasting, SHS receives information from a COSMO model implemented in Romania and also from the European Centre for Medium-range Weather Forecast (ECMWF), although in both cases no data are received, just images. SHS has both SYNERGYE and Meteofactory, although they are not fully implemented and more training and capacities would be needed to fully reach a complete and optimal utilization of both MFI platforms.

The criteria for warnings are established in SHS at three different levels, with warnings issued on their website as well as disseminated to specific stakeholders. For hydrological forecasts, SHS also receives information from Romania and Ukraine for the trans-boundary rivers (the Dniester and the Prut), and they also receive information from EFAS (European Flood Awareness System). Moldova is also covered by the South East Europe FFG (Flash-flood Guidance) System, although no information is sent from Moldova to feed the system, and SHS did not participate in establishing the system. It should be added that a new weather forecasting system is being implemented in South East Europe under a WMO project that will enhance the forecasting capabilities of SHS.

An analysis of gaps and issues in forecasting indicated that satellite or weather radar information is not being fully utilized for forecasting purposes, due to problems with data processing and lack of capacities for fully utilizing the new weather forecasting model to be implemented.

The **General Inspectorate of Emergency Situations (GIES)** is the civil protection authority in Moldova and the primary agency responsible for communication and dissemination of warnings and for ex post response.

While communication and dissemination are currently done using currently available resources, the GIES is considering using a more robust communication system using SMS and mobile phones to cover the entire territory. A feasibility study on early warning system is currently ongoing with support from the International Telecom Union. SHS sends information to GIES whenever there is a warning, but this information is poor, especially from a geographical perspective. At this moment, the warnings are sent by region, with the country divided into north, mid and south regions. As such, this limits the response capability of GIES. A general lack of resources limits their response to some warnings, although they have units in all districts. In vulnerable municipalities, whenever a warning is received (by email), it is disseminated using mobile or landline phones throughout the communities.

2. The status of the country's dams and other hydro-infrastructure is incomplete and out-of-date.

The main flood risk to communities stems from the declining state of dams and dykes. While an inventory of Moldova's hydro-infrastructure was initiated in 2019 only about half of the country was surveyed, before it was stopped due to lack of funding. The age of the dams, their "pre-climate change" design, and their lack of systematic maintenance make this an urgent priority.

Currently, no reliable data exists on even the number of dams nor is there precise information on technical conditions of the flood defence infrastructure, i.e., dams and dykes along rivers and creeks. Depending on the source, the number of existing dams varies from 4,000 to 7,000, and many of them were built without design documentation. As such, they lack "passports"/design and construction documents, and for the majority of old dams the documentation is apparently lost. At the same time, there are also gaps in legislation, and enforcement of laws and regulations is weak regarding land ownership, use of land adjacent to rivers and lakes, commissioning of hydro-technical installations, etc.

In general, the country has a sufficiently developed mechanism to ensure the procedures for the construction, repair and reconstruction and elimination of any hydraulic structures and facilities, including dams and flood banks. Any new construction, significant reconstruction and liquidation of a hydraulic structure, requires obtaining an Urban Development Certificate, coordination with various authorities and departments (local authorities, sanitary, fire, environmental agencies, land cadastre, etc.). Authorized engineers, selected as a result of competitive process will carry out design work and all design documentation must be verified both in accordance with construction standards and environmental protection according to the existing national legislation. Authorized contractors must carry out construction and repairs. However, several dams on small streams and streams were built without such measures. Subcontractors will be chosen through an open tender procedure, ensuring that all qualified bidders have an opportunity to participate. The Terms of Reference will include all necessary legal provisions for carrying out the specified tasks. Since the Local Public Authorities are the owners of the infrastructure assets, they will be tasked with securing all required permits. Additionally, they will oversee the execution of the infrastructure projects.

One of the reasons for this is the lack of a clear and clearly formulated concept of the safety of hydraulic structures in the country. A “dam safety” law was drafted but never passed through parliamentary hearings. Accordingly, there are no proper instructions and guides and rules of "good practice" for maintaining hydraulic facilities in proper technical and safe condition. Accordingly, the owners and operators of dams are not fully involved and know how to check the safety of dams, and most importantly, the authorities, both local authorities and central authorities (Agency “Apele Moldovei”, for example), do not require this from them. At the same time, neither the” Apele Moldovei” Agency nor the GIES have the human, instrumental and financial capabilities to inspect such facilities independently and on a regular basis.

In 2019, an inventory of dams and reservoirs was initiated under the SDC/ ADA project (particularly, under on-going assignment “Collecting field data for the State Register of Hydro-technical Infrastructures”). The purpose of this inventory is to collect basic data in the field on these hydro-technical installations and enter the information obtained into the Register of Hydro-technical Infrastructure. Unfortunately, funds available for the assignment only covered only half of Moldovan territory (i.e., primarily the northern and, partially, central parts). Thus, under the current assignment, dams located in the remaining central and southern parts of the country will be inventoried from funding mobilised by UNDP from Sweden under the project *“Supporting the Moldovan authorities in the sustainable management of the Dniester River”*. Consequently, complete information on the dams of Moldova will be available, particularly in regard to their technical status and their capacities for water accumulation in reservoirs, which is vital when considering management of the projected climate risks, including both floods and droughts. Of equal importance is the urgent need to identify dams constructed illegally by private farmers, communities, and businesses the majority of which were built without permits or even proper engineering design. A rough estimate of the share of such installations is around 5% of the total; it is critical to determine their risk of failure.

Flood protection dykes are mainly located within the floodplains of the lower sections of rivers in the southern part of the country. Information about the dykes is also fragmentary. “Passports” for this type of flood defence infrastructure do not exist, and there is no information about dykes in the Register of Hydro-technical Infrastructures. The total length of flood protection dykes in Moldova is over 3,000 km. These include the large dykes on the Dniester and Prut rivers, and the many smaller dykes on the other rivers within Moldova. Dykes are maintained by Agency “Apele Moldovei”, except very few portions with a total length of about several hundred km, maintained by local authorities. Dykes are generally maintained better but sometimes are also in poor conditions due to the same reasons (use the dykes as a local road, not regular cutting of trees and the dykes slopes, no reparation after high water events, etc.)

In the absence of this information, no credible investment proposals can be made to repair or decommission the country’s dams. There are an estimated 4,000 to 7,000 dams in Moldova. Without improved enforcement of stronger laws and regulations, the management of hydro-infrastructure cannot be trusted to reduce climate-driven risk of flooding.

In relation to huge number of dams constructed mainly 50-60 years ago, only 38 from total number, are currently owned by Agency of Public Property. Several tens of small dams constructed on rivers flowing in forested areas are managed by Forestry Agency Moldsilva, and the rest of dams is owned by either local public authorities (majority) or private persons. Not even one from above mentioned owners do not have sufficient technical and financial capacities to properly monitor dams' safety conditions.

3. Local governance institutions have insufficient capacities for effective flood risk and water resources planning and management at the sub-basin level

Local governance institutions and community stakeholders lack the organizational and technical capacities to carry out participatory integrated water resource management and flood risk assessment and management. Under the provisions of Water Law No. 272 of 2011, some elements of water resources management at local level have been delegated to sub-basin committees. To date, 16 sub-basin committees have been established with the responsibility of consulting with relevant local authorities about local water resources management within the sub-basins. A primary task of these committees is the development of sub-basin flood risk and drought management plans.

While sub-basin committees have been established, they meet irregularly, have no long-term strategy for engaging local land users in analysis and planning, and their links with local water-users' groups and other land use regulatory institutions are weak or non-existent. Water users' groups lack the support they need to ensure adequate capacities for appropriate land use practices and maintenance of private and public hydro-infrastructure. To date, no sub-basin plan has yet been developed by any sub-basin committee, in part because of absence of experience in the participatory preparation of flood and drought water management plans, and in general, due to a lack of knowledge and understanding of climate change-induced risks and impacts on water resources.

Other factors that affect the abilities of governance authorities to manage climate risk in the sub-basins include:

- Poor awareness of sub-basin committees, local authorities, specialists and the rural population in general regarding climate change and its consequences for local water resources, including flooding and drought;
- Lack of experience by local authorities in identifying priority measures to address hydrological droughts, carry out flood preparedness activities, and define and implement proper allocation of available water during drought;
- Weak participation of water users, public authorities and local specialists in planning water resources management, including low levels of interaction at the sub-basin level.

3.3. Strategic Approach & Methodology

In preparation of this proposal, detailed ecological, socio-economic, environmental and social safeguards, and gender assessments were carried out to establish baselines and develop management plans to maximize positive impacts and minimize risk. The project will work to enhance vulnerable communities' resilience in the pilot sites and create necessary policy enabling environments at local, and national levels. Each site – landscape and communities – has been subject to vulnerability assessments; detailed identification of appropriate adaptation interventions; further policy reviews and gap analysis to align the project with relevant government plans and policies; updated institutional capacity needs assessments; and detailed integrated flood risk management planning involving extensive consultations with stakeholders and potential partners to ensure project ownership and support. Against this background, the project is proposing a set of measures aimed at strengthening the country's adaptation to climate-driven flood risk through a two-pronged approach. The first will build the essential national hydro-meteorological monitoring and early warning systems, including the institutional capacities to manage and operate them countrywide. The second will apply an integrated water resources management approach to five key watersheds that will produce knowledge and institutional capacities for rehabilitation of high-risk hydrotechnical infrastructure, as well as increased participation by local stakeholders in water governance.

With these measures the project will establish the knowledge, capacity, infrastructure, and policy and regulatory frameworks to strengthen the country's capabilities to manage run-off from extreme climate-driven rainfall events and prevent the flooding that causes loss of life and property damage.

This two-pronged approach is based on and aligned with internationally recognized best practice in watershed management, as well as locally generated evidence and experience of integrated water resources management. This project will enhance multi-sectoral institutional coordination among resource-use ministries and agencies to achieve a more harmonized approach to reducing flood risk from climate-driven extreme weather events. As described above, the project builds on and is consistent with national development plans, sector policies and climate change adaptation strategies and plans.

The project will strengthen ownership and responsibility for watershed management by those most affected by flood risk i.e. local landholders, dam owners, local authorities through their participation in consultations and discussions regarding flood risks and hazards, as well as remedial or mitigation measures. Women's vulnerability to flood risk has been particularly analyzed, and a Gender Action Plan has been developed to enhance women's resilience to extreme climate events. Participation by local stakeholders in watershed governance will strengthen ownership of project objectives and activities, affecting both the impact potential of the project as well as its sustainability.

Physical investments (including running costs) are anticipated to be minimal over the short to medium term, given the nature of the infrastructure to be renovated and it is based on a cost analysis conducted at the preparation phase by a technical specialist. Over the longer term, physical investments will be maintained by local authorities in collaboration with the participating national institutions and agencies through budgetary appropriations, such as the SHS for the monitoring stations, AAM and LPAs for the hydro-technical infrastructure.

The proposal will also follow the findings of the Project "Management and TA Support to Moldova Flood Protection", carried out by the EIB in the framework of the European Neighborhood Policy which had as an objective to develop a countrywide flood management Master Plan and an Investment Programme, funded by EPTATF (Eastern Partnership Technical Assistance Trust Fund).

Further, this project builds on the results of the SDC/ADA Project "Strengthening the institutional framework in the water and sanitation sector in the Republic of Moldova" and will expand the analysis and the policy reforms initiated in the framework of this project.

Please see Appendix 4 for the Environmental and Social Impact Assessment and Management Plan and Appendix 5 for the Gender Assessment.

3.4. Data base for analysis and design

The information and data referenced in the development of this project include reports and analyses from multiple sources. These include gazetted legislative documentation (e.g. http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=355945), selected World Bank and EBRD reports, analysis of similar proposal for other donors/funds (ex. Adaptation Fund) relevant to watershed management and Moldovan conditions, and a variety of consultancy reports.

See Appendix 6 for the List of referenced documents.

4. Intervention logic

The project proposed here is designed to address the above barriers and reduce the vulnerability of communities in rural watersheds to increasing climate-driven flood risks.

This project proposes to establish the foundations for national scale flood risk management through two complementary approaches: in the first, the project will strengthen the SHS and early warning systems by reconditioning key infrastructure, adopting state-of-the-art software, and building staff capacities to manage and operate these systems. By the end of the project, the government of Moldova will have the ability to monitor and make localized weather predictions and to alert local authorities and other stakeholders in a timely fashion to potential disaster risk. In the second, complementary approach, five high-risk watersheds will be targeted for specific short and long-term risk-reduction measures, including rehabilitation of hydrotechnical infrastructure. By the end of the project, stakeholders in each watershed will have developed plans to rehabilitate dams and other hydrotechnical infrastructure and then implemented the highest priorities. Implementation of these activities in the five watersheds will, aside from the direct benefits to stakeholders, generate increased knowledge and lessons that will inform design of the follow-on national upscaling program as well as provide inputs to policy and regulatory reform. At the same time, experience in the five watersheds will lead to greater institutional capacities at the Ministry of Environment to plan and manage upscaling overall.

The following is the Theory of Change diagramme:

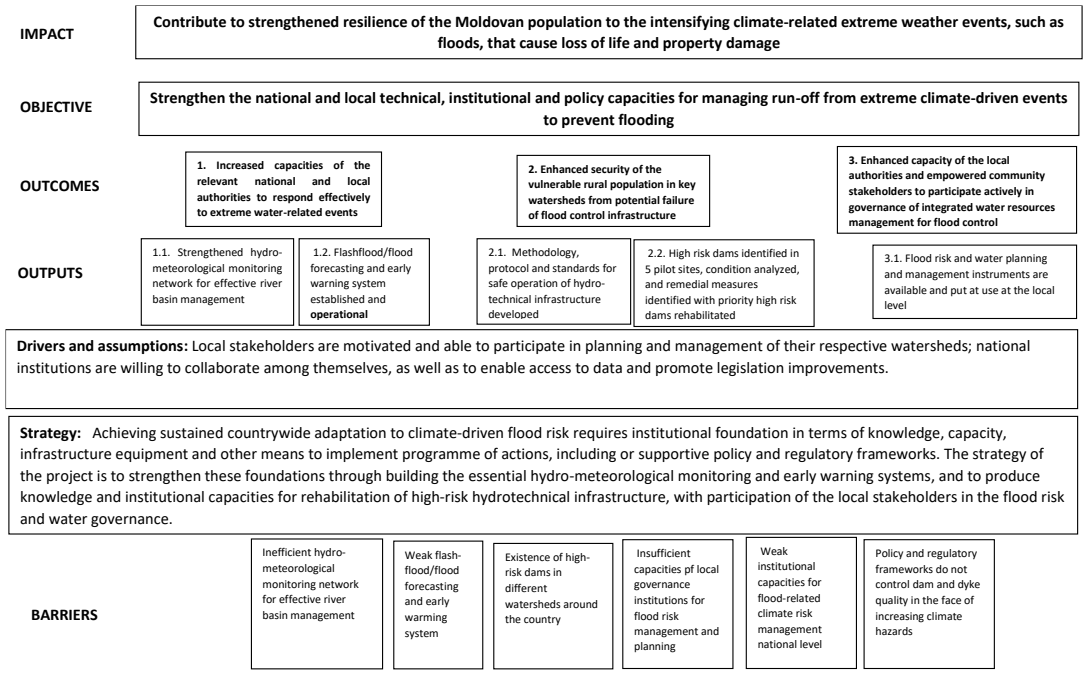


Figure 1. Theory of Change

4.1. Impact

Contribute to strengthened resilience of Moldovan population to the intensifying climate-related extreme weather events, such as floods, that causes loss of life and property damage.

4.2. Outcome

Outcome 1. Increased capacities of the relevant national and local authorities to respond effectively to extreme water-related events

Within Outcome 1, national and local authorities' capacities will be strengthened to be able to respond to extreme hydrological events, considering the typology of the pilot catchments and of Moldova. Thus, the observation network in the pilot catchments will be enhanced with additional monitoring stations, and subsequently, flood forecasting early warning systems will be designed, implemented and tested, using both the information from the upgraded monitoring network and from additional remote sensing sources.

Outcome 2. Enhanced security of the vulnerable rural population in key watersheds from potential failure of flood control infrastructure

The climate-driven vulnerability of rural inhabitants is largely dependent on the integrity and functionality of the dams and dykes along watercourses in Moldovan watersheds. Years of poor maintenance, coupled with illegal construction have resulted in infrastructure that cannot be trusted to withstand the volumes of water from the more intense rainfall resulting from climate change.

The Government of Moldova recognizes the potential for flood risk due to dam and dyke failures, however, it does not have a complete picture of hydro-infrastructure integrity and functionality, particularly in the central and southern portions of the country, nor is it able to differentiate between legal and illegal constructions at this stage.

The project will carry out analysis of all dams and dykes in each of the five pilot sites, identifying infrastructure at high risk of failure, and defining remedial measures. Costs of infrastructure renovation or removal will be calculated and, where cost-effective, the measures will be executed using project and partner funding, more specifically LPAs co-financing. The lessons learned from these site-specific experiences will be systematized, codified and fed into the design of the future investment program, as well as to policy makers. This evidence-based approach will ensure a cost-efficient and effective design and implementation of the future national-scale investment program.

As a result, the Outcome 2 will provide information, knowledge and institutional capacities for a new nation-wide approach in hydro-technical infrastructure safety management and planning which shall lead to enhanced security of the rural population to the potential failures of flood control infrastructure.

Outcome 3. Enhanced capacity of the local authorities and empowered community stakeholders to participate actively in governance of integrated water resources management for flood control

The provisions of the Water Law (No. 272 of December 23, 2011) delegated important elements of water resources management to sub-basin committees, of which there are currently 16 in Moldova. The sub-committees are a new governance structure for watersheds and as such have little experience in strategic planning and development of flood and drought management plans. Awareness of climate change impacts on hydrological regimes is poor. While the intention of empowering local stakeholders to plan and manage water resources is evidenced in the Water Law, their capacities and experience are weak. Participatory governance is a relatively new policy in government circles,

and its operationalization is poorly understood and implemented. This represents a substantial risk for any future country-wide flood risk investment program.

To reduce this risk, the project proposed here will build local institutional capacities and empower community stakeholders to participate in decision-making over water governance issues by implementing participatory watershed management plans focusing on flood risk reduction in the 5 pilot sites, taking into consideration the gender and inclusiveness issues.

4.3. Outputs

Output 1.1 Strengthened hydro-meteorological monitoring network for effective river basin management

The observational capacities of the State Hydro-Meteorological Service of Moldova (SHS) in the catchments within the pilot areas will be strengthened. Three meteorological stations and five hydrological stations will be acquired, deployed and included into the existing monitoring network. The main objective of this network upgrade will be to provide the necessary information for the operation of early warning systems, with the acquisition of precipitation and water level data, necessary to be able to predict the possibility of water-related disaster events. The data collected will help also in gaining a better understanding of the run-off processes in the pilot areas.

Output 1.2 Flashflood/flood forecasting and early warning system established and operational

A Flashflood/flood forecasting Early warning system (FFEWS) will be designed and implemented in the pilot areas considering the different processes and the existing flood risk. In order to implement this system, the information from the monitoring stations acquired in Output 1.1 will be combined with meteorological forecasting data and flood hazard models (hydrological and hydraulic) as implemented in the Output 2.2 to be able to forecast the possibility of hazardous flood events. The system design will be structured to seamlessly integrate into the broader national multi-hazard early warning system. As we develop the system, we will incorporate a central principle from the "Early Warnings for All" initiative. Throughout the design phase, community involvement will be a priority to ensure that the most vulnerable receive prompt notifications. The SHS plays a pivotal role in identifying potential threats and monitoring, being an integral part of the World Meteorological Organization. This organization regards national meteorological services as essential to the establishment of the EWS. On its part, UNDP will leverage regional experiences and share the project's outcomes on a regional scale, establishing its position as a leading organization for the EWS4All initiative in the area.

Output 2.1 Methodology, protocol and standards for safe operation of hydro-technical infrastructure developed

Any gaps in legislation supporting the safe operation of hydro-infrastructure in Moldova will be assessed and support will be provided to put in place relevant methodologies, protocols and standards.

Output 2.2 High risk dams identified in 5 pilot sites, condition analyzed, and remedial measures identified with priority high risk dams rehabilitated

This Output relates to the generation of knowledge and experience (lessons and capacities) from on-the-ground activities in 5 selected pilot sites. These products will be essential to the development and implementation of a cost-effective future investment program at national scale but also to adoption of a new approach for management and planning of flood control infrastructures.

This output – like the others mentioned above - represents the future investment program in miniature in the sense that it carries out the tasks and activities at pilot level that will be analyzed and applied in the design and implementation of the country-wide investment program further on by the Ministry of Environment. The project focuses on understanding the hydrological and hydraulic characteristics of each site/watershed; builds capacities to model the hydrological and hydraulic systems, survey and assess hydro-infrastructure; identifies and rehabilitates priority infrastructure at risk, and trains local engineers and water users in dam maintenance, operations and safety.

Output 3.1. Flood risk and water resources planning, and management instruments are available and put at use at the local level

A sub-basin initiative group for the purpose of this project will be formed and composed of local authorities, farmer organizations, academia, women and vulnerable groups, local GIES representatives and other experts. The initiative group will benefit from awareness raising training regarding climate change and its projected impacts on their sub-basin and will be assisted to analyze the status and dynamics of water resources and land use. The analysis of the integrity of hydro-infrastructure will be studied and the implications for flood and flashflood risk discussed. Risk reduction measures will be identified, costed and prioritized, taking into consideration the gender and inclusiveness issues. The sub-basin initiative will formulate short and long-term plans to reduce risk of sub-basin floods and flashfloods for local communities. While the plans will identify the flood hazard areas, vulnerable assets, and the population at risk, these will describe the monitoring system in place to track weather conditions, river level and will explain the process for issuing flood warnings to the public authorities and the population. The plans development process is also an opportunity to reinforce the importance of having in place clear instructions for reaching out of vulnerable population in case of hazards, and will be an opportunity to conduct trainings for local population with participation of the GIES on understanding the warnings and the which are the appropriate actions that should be taken by these to protect themselves and their property. These plans will be disseminated throughout the pilot areas, communities, project's sub-basins and validated in stakeholder workshops. The plans will be submitted for budgetary consideration at local and national levels as appropriate.

To jumpstart implementation of these participatory plans, the project will provide small grant financing to local authorities and/or civil society organizations to carry out tasks and activities encompassed in the flood and flashflood risk plans. By providing this financing, recipient organizations will strengthen their ownership of the plans and outcomes, an essential factor for their sustainability. Small grants may finance activities like reforestation, wetland restoration, soil conservation, agroforestry demonstrations, etc. Each organization's experience will be analyzed, and lessons identified for dissemination throughout the pilot areas and sub-basins.

At the same time, in anticipation of the national flood risk reduction investment program with support from the IFIs, the project will ensure dissemination of technical and other information as well as peer-to-peer exchange of experience and evidence-based best practice and lessons learned between the pilot sub-basins. Sub-basin management plans will be disseminated to the interested

NGOs and academic institutions. Women organizations working in the target areas (ex .WISDOM) showed their interest to support project activities on the local level with the vulnerable population. Lessons from the execution of small grants initiatives will also be disseminate through the network. The above-mentioned documents will include also gender and inclusiveness aspects.

4.4. Inputs / Activities

Activities under Output 1.

1.1.1 Identification of sites and installation of hydrological monitoring stations with proper capacity building for their operation

1.2.1 High resolution fluvial flood and flash-flood hazard assessment and mapping in pilot areas/sub-basins

1.2.2 High resolution fluvial and flash-flood risk assessment and mapping in pilot areas/sub-basin

1.2.3 Study of climate radar capacities and options with the purpose to incorporate them into the Flash Flood Detection System

1.2.4 Identification of institutional responsibility to maintain Flash Flood Detection System and Alert/ Warning Center with the most suited institution

1.2.5 Elaboration of Instruction/ Guide addressing operation of the Alert/ Warning Center and providing training to the assigned staff

Activities under Output 2.

2.1.1. Methodology and protocol developed for assessment of safety conditions of hydro-technical infrastructure together with safety assessment norms and standards (including rules for survey, tools and devices needed for assessment

2.1.2 Draft legal framework revised/ strengthened and presentation to parliament through

the Ministry

2.2.1 Hydrological and hydraulic modelling to assist in dam safety assessment for flood scenarios, etc

2.2.2 Capacity building to carry out modelling

2.2.3 Identification of dams with highest risk of failure (considering their preliminary assessed technical conditions, risk of failure, affected territory, including population affected in case of dam failure)

2.2.4 Identification of dams constructed illegally and those non-compliant with legal provisions

2.2.5 Implement pilot dam safety survey and risk assessment, and training in dam safety assessment and reporting for local engineers

2.2.6 Cost-benefit analysis to select priority dams with highest risk of failure and potential damage for rehabilitation

2.2.7 Technical design of rehabilitation works for the selected dams; EIA (as needed), approvals

2.2.8 Formulate investment plans for each pilot area/Sub-basin

2.2.9 Implementation of selected dam rehabilitation, including hydrotechnical construction (minimum 1 per site)

2.2.10 Training for water users in dam operation and maintenance under normal and flood conditions; site visits, peer-to-peer

Activities under Output 3.

3.1.1 Local governance institutions trained in flashflood and flood risk management

3.1.2 Participatory preparation of sub-basins flood risk management plans and of flashfloods local management plans

3.1.3. Flood and flashflood risk management plans implemented through small grants to community partnerships

3.1.4 Lessons learned from pilot experience systematized and disseminated to other pilot sub-basin and main stakeholders, as well as to policy makers

4.5 Indicators

Please see Appendix 1 for details regarding Indicators and Targets, Means of Verification and Risks and Assumptions.

5. Risk Management

Table 2: Risk Register

Tentative Risk Register (first basic risk assessment)			
Description of the risk[22] (concrete event, its cause and possible negative impact)	**Likelihood[23]**	**Possible impact[24]**	**Risk management measures planned (to reduce either likelihood or possible impact or both)**
Operational: key institutions fail to coordinate or collaborate in implementation of on-site activities	1-2	2	From the beginning of project development, the key institutions have been involved in the collaborative analysis, design and planning of this project. Institutional representatives will sit on the Project Steering Committee and field work will be carried out by inter-

[22] For reference, the ADA Risk Catalogue with standard risks that can arise in the context of projects and programmes is available online and can be consulted on a voluntary basis for the identification and description of risks (https://www.entwicklung.at/en/media-centre/downloads).
[23] Enter a value: (1) very unlikely, (2) unlikely, (3) likely, (4) very likely
[24] Enter a value: (1) insignificant, (2) significant, (3) major.
An ADA staff guidance on assessing likelihood and impact along a 1-4 scale and 1-3 scale respectively is available online (https://www.entwicklung.at/en/media-centre/downloads) and can be used by applicants on a voluntary basis.

			institutional teams to encourage collaboration and information sharing.
Operational: extreme rainfall events may damage infrastructure as it is being rehabilitated	1	3	Rehabilitation actions will be scheduled as much as possible to avoid overlap with expected rainfall; at the same time, scheduled rehabilitation work will be carried out in such a way that infrastructure is left in a vulnerable state for as little time as possible.
Social: there is a risk that vulnerable and marginalized groups, such as elderly, persons with disabilities, poor people and others will be excluded and that existing inequality and discrimination against vulnerable people in target communities will be perpetuated.	1-2	2	Communities and beneficiaries will be informed through the actions set out in the stakeholder engagement plan and gender action plan. A Grievance Redress Mechanism is available to receive and address complaints. Disclosure of information and providing for meaningful participation of stakeholders during the planning and implementation of site-specific activities including as part of site-specific E&S screenings and assessments. This will facilitate equitable access to project benefits and avoidance of elite capture and potential perpetuation of historical inequality.
Gender: the project may perpetuate existing discrimination against women from different social groups, potentially limiting participation in project interventions	1-2	1	During the development of the project, a Gender Analysis will be undertaken, and a Gender Action Plan will be prepared based on that analysis. The Plan will outline the management measures that will be undertaken to address this risk and leverage it for multiple benefits. Opportunities for improving the lives of women and girls will be identified in the Gender Analysis and built into the design of the project.
Environment: work on dams and ecosystem adaptation measures will take place in and near watercourses posing risk of impacts to natural features, flora and fauna that are subject to regulations and protection.	2-3	2	Site specific work on dams and to construct ecosystem adaptation measures will be subject to site specific Social and Environmental Screening, and where appropriate completion of an ESIA. The project will be required to secure all applicable permits include permits to construct within watercourses. Site-specific plans will be prepared to address potential direct impacts to aquatic and terrestrial fauna and flora including fish, birds, mammals, and herpetofauna including specification of construction windows to avoid disruption of breeding or denning activities.
Operational: Completion of Outstanding Work and Remedying of Defects	1	2	During the Defects Liability Period, the Contractor shall finish the work, if any, outstanding at the date of the Certificate of Substantial Completion, and shall execute all such work of repair, amendment, reconstruction, rectification and making good defects, imperfections, shrinkages or other faults as may be required of the Contractor in writing by the Engineer during the Defects Liability Period and within fourteen (14) days after its expiration, as a result of an inspection made by or on behalf of the Engineer prior to expiration of the Defects Liability Period.

Operational: Failure to identify within reasonable timeframe experts of the required level for the project	2	3	In case the Project could not successfully and within the reasonable time frame identify and hire Experts of the required level, the option of contracting the company will be used. For those changes the project team will approach the Project Board for approval.

6. Monitoring and Evaluation

6.1. Monitoring, steering and dissemination of information

The UNDP Moldova Energy, Environment and Climate Change Cluster (EECCC) will exercise the quality assurance and management oversight functions over the project implementation team who will be hired on a competitive basis. In accordance with UNDP's programming policies and procedures, the project will be monitored through the following monitoring and evaluation plans:

Table 3: Monitoring Plan

Monitoring Activity	Purpose	Frequency	Expected Action
Track results progress	Progress data, including sex-disaggregated data, against the results indicators in the RRF will be collected and analysed to assess the progress of the project in achieving the agreed outputs.	Twice per year, or in the frequency required for each indicator.	Slower than expected progress will be addressed by project management.
Monitor and Manage Risk	Identify specific risks that may threaten achievement of intended results. Identify and monitor risk management actions using a risk log. This includes monitoring measures and plans that may have been required as per UNDP's Social and Environmental Standards and the Gender Analysis. The project audit will be conducted in compliance with the UN internal policy on audit and as per the Third-party Cost-sharing Agreement between the Austrian Development Agency (ADA, the donor) and the United Nations Development Programme (UNDP) and submitted to ADA.	Quarterly	Risks are identified by project management and actions are taken to manage risk. The risk log is actively maintained to keep track of identified risks and actions taken.
Learn	Knowledge, good practices and lessons, including gender=related, will be captured regularly, as well as actively sourced from other projects and partners and integrated back into the project.	Annually	Relevant lessons are captured by the project team and used to inform management decisions.
Annual Project Quality	The quality of the project will be assessed against UNDP's quality standards, including gender equity and equality standards,	Annually	Areas of strength and weakness will be reviewed by project

Assurance	to identify project strengths and weaknesses and to inform management decision making to improve the project.		management and used to inform decisions to improve project performance.
Review and Make Course Corrections	Internal review of data and evidence from all monitoring actions to inform decision making.	Annually	Performance data, risks, lessons and quality will be discussed by the project board and used to make course corrections.
Semi-annual progress reports and final report	A progress report will be presented to the Project Board and key stakeholders, consisting of progress data showing the results achieved against pre-defined targets at the output level, the annual project quality rating summary, an updated risk log with mitigation measures, and any evaluation or review reports prepared over the period. Progress reports shall include a description of project progress against the Project's intervention logic (outcome, outputs and indicators as per the Logframe in Appendix 1), the activities carried out, as well as information about the total number of beneficiaries reached by the end of the respective reporting period per outcome. Furthermore, progress regarding the implementation of recommendations related to gender, environmental and social standards resulting from the donors' relevant appraisals shall be reported. The project final report shall include a description of the results achieved with reference to the project's impact, outcome(s) and expected outputs using the indicators included in the Results Framework and the impact of the activities carried out. UNDP shall refer to and enclose to the reports all deliverables and publications produced with funds of the Project.	Semi-annually, and at the end of the project (final report)	
Project Review (Project Board)	The project's governance mechanism (i.e., project board), which shall be gender balanced, will hold regular project reviews to assess the performance of the project and review the Multi-Year Work Plan to ensure realistic budgeting over the life of the project. In the project's final year, the Project Board shall hold an end-of project review to capture lessons	Annually	Any quality concerns or slower than expected progress should be discussed by the project board and management actions agreed to address the issues identified.

	learned and discuss opportunities for scaling up and to socialize project results and lessons learned with relevant audiences.		

6.2. Assessment and Evaluations

The status of implementation of this project will be assessed during meetings of the Project Board. The project will be subject to a Mid-term Evaluation by a group of national and international experts in the field. It will focus on the relevance, effectiveness, efficiency and sustainability of project implementation; will highlight issues requiring necessary decisions and actions; and will present lessons learned about project design, implementation and management. The findings from the mid-term evaluation will be incorporated as recommendations for enhanced implementation during the second half of the project's term. The Terminal Evaluation will be conducted three months before project closure.

7. Implementation

7.1. Preparation of implementation

With the allocation of resources for various expertise, the project will initiate implementation of all four activities concurrently.

Nevertheless, a Project Inception Workshop will be held in the first year of the project. The Inception Workshop is crucial to building ownership for the project results and to plan the first-year annual work plan. The Inception Workshop should address a number of key issues including:

- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO, project staff and project partners and stakeholders vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms.
- Based on the project results framework finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations.
- Plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures should be clarified, and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

7.2. Organizational structure, processes and management capacities

The project will be implemented following UNDP's direct implementation modality, due to the involvment of two or more government entities[25].

UNDP Country Office in Moldova (UNDP CO) will be the Implementing Partner. As such, it will bear the overall accountability for delivering the programme in accordance with its applicable regulations, rules, policies and procedures, as outlined in FRM_Financial Management and Implementation Modality_Direct Implementation Modality_1.docx (live.com) here .

The Implementing Partner is responsible and accountable for managing this project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of UNDP resources. UNDP is responsible for:

- Approving and signing the multiyear workplan;
- Approving and signing the combined delivery report at the end of the year; and,

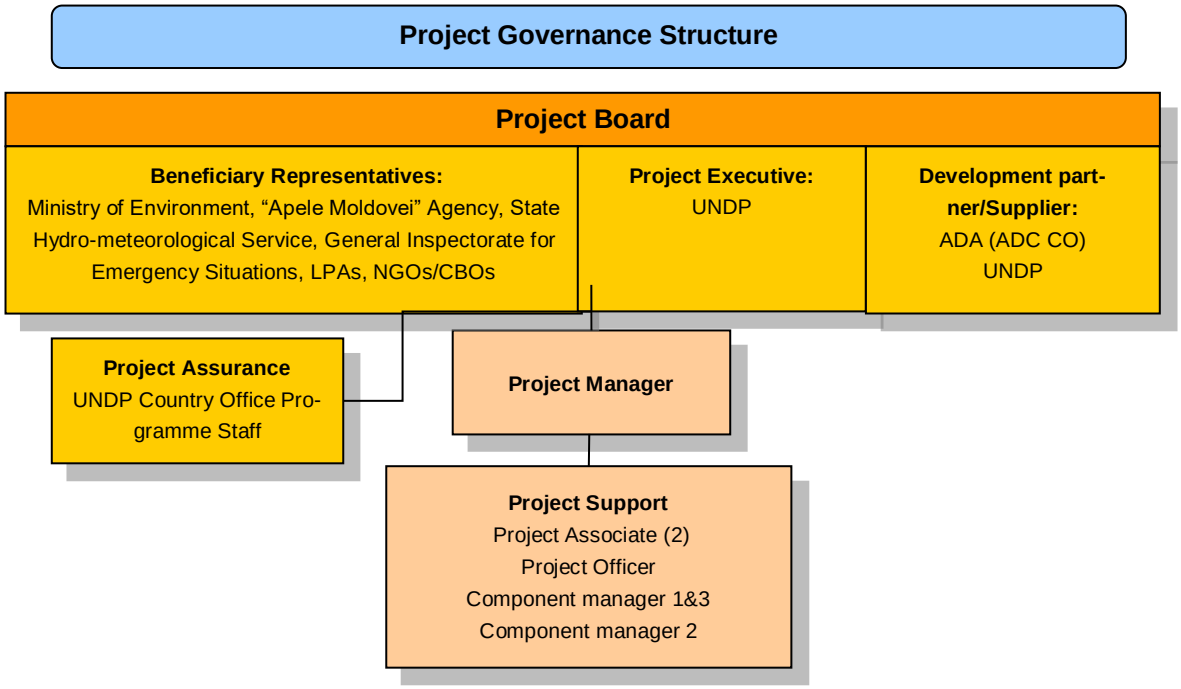


Figure 2. Project governance structure

The **Project Board** will provide overall guidance and quality assurance for the project, ensure adherence to the DIM guidelines and ensure compliance with UNDP policies and procedures. The Project Board is responsible for making decision by consensus. If a consensus cannot be reached within the Board, the final decision shall rest with the UNDP representative on the Project Board. It is required that as per internationally recognized professional standards and principles of sound governance, conflicts of interest affecting board members in performing their duties must be

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formally disclosed if not avoidable. Where a board member has a specific personal conflict of interest with a given matter before the board, he/she must recuse oneself from their participation in a decision. No board member can vote or deliberate on a question in which he/she has a direct personal or pecuniary interest not common to other members of the board.

The Project Board will include representation by the Ministry of Environment, LPAs representative, NGO representative, UNDP and the donor. The final composition of the Board will be decided during the Local Project Appraisal Committee.

The Project Board will meet one time annually at minimum.

The Project Board will be responsible for approving annual work plans, assessing progress, discussing lessons learned, and taking decisions on proposals and recommendations presented by any of its members. It shall discuss and decide upon specific Project implementation issues, ensuring optimal transformation of activities into outputs through appropriate monitoring and evaluation actions pertaining to the relevance, performance, and progress towards each outcome, facilitating cooperation between relevant partners and stakeholders (public and private), and ensuring continuous and effective communication and coordination between the Project and its beneficiaries. The Project Board will also provide a forum for sharing the key results of the Programme, as well as discussing changes or challenges in the sector and proposing solutions.

Specific Responsibilities of the Project Board:

- Provide overall guidance and direction to the Project, ensuring it remains within any specified constraints;
- Address issues as raised by the Project Manager;
- Provide guidance and agree on possible countermeasures/management actions to address specific risks;
- Agree on Project Manager's tolerances as required;
- Review the Project Progress Report and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to plans;
- Appraise the Project Annual Review Report, make recommendations for the next AWP;
- Provide ad-hoc direction and advice for exception situations when Project manager's tolerances (agreed operational deviations for time and budget) are exceeded;
- Assess and decide on Project changes through revisions.
- Decide on the selection criteria. Approve the list of communities and projects to be supported.

The composition of the Project Board will include the following roles:

Executive: The Executive represents ownership of the project and will chair the Project Board. For this project, which is under DIM Modality, the Executive is: *UNDP* represented by the Country Office management (RR/DRR).

Development partner/Supplier: The Development partner/Supplier represents the interests of the parties concerned which provide funding, strategic guidance and/or technical expertise to the project. The Development partner representative is UNDP RRs or DRR. Other funding partners can also join -ADA (ADC CO).

Beneficiary Representatives: The Beneficiary Representatives is an individual or group of individuals representing the interests of those who will ultimately benefit from the project. Their primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries. Often representatives from civil society, industry associations, community groups or other government entities benefiting from the project can fulfil this role. There can be multiple beneficiary representatives in a Project Board. For this project, the Beneficiaries of the project are the

Ministry of Environment, supported by the subordinated institutions such as the SHS and "Apele Moldovei" Agency, General Inspectorate for Emergency Situations, LPAs and NGOs.

Project Manager: The Project Manager (PM) is the senior most representative of the Project Management Unit (PMU) and is responsible for the overall management of the project on behalf of the Implementing Partner, including the mobilization of all project inputs, supervision over project staff, consultants and sub-contractors. The project manager typically presents key deliverables and documents to the Board for review and approval, including progress reports, annual work plans, adjustments to tolerance levels and risk logs.

A designated representative of the PMU is expected to attend all board meetings and present the required progress reports and other documentation needed to support board processes as a non-voting representative.

Project Assurance

UNDP has a distinct assurance role for all UNDP projects in carrying out objective and independent project oversight and monitoring functions. UNDP performs quality assurance and supports the Project Board and Project Management Unit by carrying out objective and independent project oversight and monitoring functions, including applying UNDP's social and environmental management system to ensure the SES are applied through the project cycle. The Project Board cannot delegate any of its quality assurance responsibilities to the project manager. Project assurance is totally independent of project execution.

A designated representative of UNDP playing the project assurance role is expected to attend all Project Board meetings and support board processes as a non-voting representative. It should be noted that while in certain cases UNDP's project assurance role across the project may encompass activities happening at several levels (e.g. global, regional), at least one UNDP representative playing that function must, as part of their duties, specifically attend board meetings and provide board members with the required documentation required to perform their duties.

The UNDP representative playing the main project assurance function is the assigned Programme Analyst of Energy, Environment and Climate Change Cluster.

Table 4. Activities to be carried out by external experts

Activity	Experts/Companies Implicated
1.1.1 Identification of sites and installation of hydrological monitoring stations with proper capacity building for their operation	International Consultant for hydrological monitoring specifications National Consultant for identification of sites International Consultant for Training in O&M
1.2.1 High resolution fluvial flood and flash-flood hazard assessment and mapping in pilot areas/sub-basins	International consultant for modelling scoping National Firm for data collection for modelling exercise International Consultant for hydrological modelling International Consultant for hydraulic modelling

1.2.2 High resolution fluvial and flash-flood risk assessment and mapping in pilot areas/sub-basin	National firm for socio-economic survey National consultants for data collection International Consultant for Advice in Risk Assessments National firm for risk modelling implementation
1.2.3 Study of climate radar capacities and options with the purpose to incorporate them into the Flash Flood Detection System	International Consultant for Radar-FFDS capacity assessment International Consultant for provision of data processing and visualisation procedures International Consultant for training in Radar data and processing
1.2.4 Identification of institutional responsibility to maintain Flash Flood Detection System and Alert/ Warning Center with the most suited institution	International Consultant for Institutional Assessment
1.2.5 Elaboration of Instruction/ Guide addressing operation of the Alert/ Warning Center and providing training to the assigned staff	International Consultant for SOP and training
2.1.1. Methodology and protocol developed for assessment of safety conditions of hydro-technical infrastructure together with safety assessment norms and standards (including rules for survey, tools and devices needed for assessment	International Consultant to develop methodology, standards and field protocol National Consultant to revise national experience and legislation National Team to pilot drafted dams and weirs safety assessment procedures (5 pilot areas) National Consultant for institutional and capacity assessment and further needs identification to implement dams and weirs Safety assessemnt National company for hydrotechnical infrastructure inventory
2.1.2 Draft legal framework revised/ strengthened and presented to parliament through the Ministry	International Consultant to draft the set of legal acts (Law of dam safety as example), instructions and rules National Consultant to assist legislation revision and drafting
2.2.1 Hydrological and hydraulic modelling to assist in dam safety assessment for flood scenarios, etc	National firm for data collection International Consultant for Dam breaching International Consultant for hydraulic modelling
2.2.2 Capacity building to carry out modelling	International Consultant for Dam Breaching and Hydraulic
2.2.3 Identification of dams with highest risk of failure (considering their	National expert on dam safety (following results of modelling and soicio-economic assessment of potentially affected territories)

preliminary assessed technical conditions, risk of failure, affected territory, including population affected in case of dam failure)	
2.2.4 Identification of dams constructed illegally and those non-compliant with legal provisions	National expert to investigate archives and other documentation per pilot area
2.2.5 Implement pilot dam safety survey and risk assessment, and training in dam safety assessment and reporting for local engineers	National company to implement pilot area dam safety survey
2.2.6 Cost-benefit analysis to select priority dams with highest risk of failure and potential damage for rehabilitation	National expert to pilot "dam demolition regulation" Legal expert to preparing the Regulation for approval
2.2.7 Technical design of rehabilitation works for the selected dams; EIA (as needed), approvals	National design company EIA expert international EIA expert national Hydrological expert for EIA Climate expert EIA
2.2.8 Formulate investment plans for each pilot area/Sub-basin	National expert to formulate investment plan for pilot area and extention to the sub-basin
2.2.9 Implementation of selected dam rehabilitation, including hydrotechnical construction (minimum 1 per site)	Contract with construction company for physical works National Consultant for health and safety social environmental plan implementation National Consultant for engineering supervision of construction National Consultant for coordination of construction and acceptance works
2.2.10 Training for water users in dam operation and maintenance under normal and flood conditions; site visits, peer-to-peer	National expert to implement training (5 days per pilot area)
3.1.1 Local governance institutions trained in flashfloods and flood risk management	International Consultant to develop flashflood and flood risk management framework at the local level National Consultant to assist and provide local specifics and needs
3.1.2 Participatory preparation of flashflood and flood risk management plans	National Team to prepare local flashflood and flood management plans (5 pilot areas)

3.1.3Flood and flash flood risk management plans implemented through small grants to community partnerships	National Consultant for assisting of local communities to prepare a specifications and workload to implement priority issues
3.1.4 Lessons learned from pilot experience systematized and disseminated to other sub-basin committees and main stakeholders, as well as to policy makers	National Consultant to supervise, evaluate the progress and identify the achievable results, gaps, difficulties and good examples

The project audit will be conducted in compliance with the UN internal policy on audit and as per the Third-party Cost-sharing Agreement between the Austrian Development Agency (ADA, the donor) and the United Nations Development Programme (UNDP).

7.3. Time schedule

The project is expected to be implemented during 48 months since approval. Please see Appendix 2, Time Schedule, for details.

7.4. Necessary means and costs

See Appendix 3a) and 3b).

Processing of personal data

During initiation and performance of grant agreements, for audit purposes and to fulfil its statutory mandate, ADA may process personal data of natural persons that are collected by ADA or transferred or disclosed to ADA by the grant applicants or third parties under their instruction, e.g., personal data of employees, legal representatives, agents or other partners of the grant applicants or such third parties.
By submitting this grant application, each grant applicant acknowledges:

- to have taken note of ADA's **Privacy Notice** https://www.entwicklung.at/en/media-centre/privacy-notice ('ADA Privacy Notice');
- to ensure that each direct or indirect **transfer or disclosure** of personal data to ADA during the initiation or performance of a grant agreement (or to prove the grant funds are used properly and for the agreed purposes) are **lawful** pursuant to applicable data protection law;
- to ensure that all persons, whose personal data are transferred or disclosed to ADA, were promptly and demonstrably **provided** the **ADA Privacy Notice**; and
- that if a grant agreement is concluded and in accordance with its terms, ADA **publishes**, in particular on the ADA website, information about the supported measure as well as reports created during implementation of the measure.

Appendices:

Appendix No. 1) Logframe Matrix
Appendix No. 2) Time schedule
Appendix No. 3a) Summary project budget (project budget relevant for reallocations)
Appendix No. 3b) Detailed project budget (project budget relevant for accounting)
Appendix No. 4) Environmental and Social Impact Assessment and Management Plan (Environmental, Gender and Social Standards (EGSS) checklist)
Appendix No. 5) Gender Assessment and Action Plan
Appendix No. 6) List of reference documents
Appendix No. 7) Relevant projects in Moldova (ongoing and recently finished)
Appendix No 8) Stakeholders Consulted
Zip folder-Support letters from stakeholders and partners