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TERMS OF REFERENCE

Job title:	Team of 2 National Consultants to support development of a project proposal for the Adaptation Fund addressing extreme climate-induced water-related events in Moldova
Duty station:	Chisinau, Moldova
Contract type:	Individual Contract (IC)
Expected duration of the assignment:	November 2019 – May 2020, 60 in total workdays (30 workdays per consultant)
Starting date:	November 2019

BACKGROUND/OVERVIEW:

Republic of Moldova (Moldova) is a small-sized landlocked country in Eastern Europe, exposed to different natural hazards, including floods, droughts and severe storms. In line with climate scenarios, in Moldova the average temperature is expected to increase with 2-3° C, resulting in more acute weather patterns and increased the frequency and magnitude of floods and drought.

Climate change and water resources

Water resources in the Moldova are sensitive to climate change with regards to their quantity and quality. Various emission scenarios and climate models provide different projected values for future water quantity and quality in Moldova, however, they indicate the sign that expected changes will be negative in any case. The natural water regime of the big and small rivers will change by increasing in the instability of annual flow and magnitude of spring and flash floods.

In addition, climate modeling shows that drought will become longer and more severe. The major expected effects of the climate change on the Moldova's waters are i) decline of the average annual rainfall by 6.8% for the 2040-69 period and decline of summer and autumn precipitation by 19.3% and 16%, respectively; thus, the frequency and severity of drought, with the probability of catastrophic drought (less than 50% of mean rainfall) will increase from one event within nine years to one event within two years; ii) reduce of available water resources by two-thirds by the 2080s; iii) increase and severity of floods. The impacts of climate change are expected to intensify as changes in temperature and precipitation affect economic activity, social sphere and natural ecosystems. The socio-economic costs of climate related natural disasters such as droughts, floods are significant, and both their intensity and frequency are expected to further increase as a result of climate change.

Floods on big rivers

The two big rivers as Prut and Dniester flooding in 2008 and 2010 caused the greatest damage. The 2008 floods on Prut and Dniester Rivers incurred USD 120 million in losses while the 2010 floods - USD 41.92 million which are estimated to have had an adverse economic impact on GDP of about 0.15 percent. In 2008 about 40 villages were flooded, 500 houses were completely or partially under water, and 150 of them were almost completely destroyed. About 8000 people were left homeless. 10,500 hectares of agricultural land

were flooded. A third of the entire crop was lost. The damage was assessed as $ 120 million; of them, 20% accounted for infrastructure, 15% - for farmland, and 65% - for real estate, houses, cottages, shops, camps and recreation centers, entertainment zones, sanatoriums, etc. In the 2010 the damage affected nearly 13,000 people, destroying critical infrastructure, washing away crops and livestock, damaging homes, and causing displacement. The 2010 floods highlight the importance of reducing disaster risks in RM, particularly as predictions indicate the country faces a greater likelihood of extreme temperature and precipitation patterns due to climate variability. The existing flood forecasting and early warning system in Moldova is another limiting factor for an effective flood risk management, which require strengthening at the technical, legislative and institutional levels.

Flash floods

Heavy rains result in frequent floods, to which over 40 percent of the country's settlements are exposed. On smaller rivers, heavy rains can form a flood within 2-3 hours, and location and magnitude of flood cannot be precisely determined. Flash floods are rather common in Moldova due to topographic and climatic conditions, and almost annually heavy rains result in local floods when the lands and settlements are inundated. The situation is aggravated by the fact that often, the reservoirs on the rivers are overflowing, and since many reservoir's dams are old and being in bad technical conditions, they often collapse what results in numerous materials and even human losses downstream. The flash floods occurring within small river basins provoke average annual damage estimated at the level of $5 million. Despite these facts, the system for early detection and warning of flash (rapid) floods was not established in Moldova.

Flood defense infrastructure

Flood is seen as one of the major risks given that almost half of all Moldovan localities are situated in the flood-prone areas and additionally, around 45,000 ha (or 2% of agricultural lands) have a history of being waterlogged. During last decades the risk of floods has increased due to outdated and weak flood protection system mainly inherited from Soviet times. Generally, flood defense infrastructure in Moldova consists of dams and dykes on the Dniester and Prut Rivers, and on smaller rivers. These still provide protection against floods, but their technical condition is a matter of great concern. Currently, there exists no reliable information on number of dams, situated on the Moldova's small rivers. There exists no precise information on technical conditions of the flood control infrastructure, including reservoirs' dams and dykes along rivers. According to various sources, in Moldova, number of dams varies from 4,000 to 6,000. Many of them were built without design documentation and do not have passports; for majority of old dams the design documentation was lost. There are also gaps in legislation addressing land relations, use of land of water bodies, commissioning of hydro-technical infrastructure, etc. Within last time, there were carried out several inventories of dams, but this process is still in progress, and available information is fragmentary and incomplete. According to rough estimates, around 20% of dams constructed on small rivers are either broken or do not operate properly.

Moldova has extensive systems of dykes. There are about 60 systems of dykes with a total length of about 1,240 km that protect about 90,000 ha of land. Despite the Prut and Dniester Rivers' dykes are generally maintained in good conditions, in some places they show undulating longitudinal profile (a particular problem is that crest level has been locally lowered by up to 1.5 m as a result of their paths and tracks created by people and farm machinery crossing the banks); deep ruts, grooves or channels, that locally have a depth of typically 0.5 m; damage to the integrity of the structure of the banks by burrowing animals; in some sectors the bank profile (including level and width) is not maintained what can result in subsidence of the bank; in some sectors there is a dyke damage caused by erosion.

Hydrological monitoring network

The exclusive role in monitoring of meteorological and hydrological parameters lies with the State Hydro-meteorological Service. There exists a network of meteorological stations and gauges both on the big rivers Dniester and Prut, and on smaller ones. This network was established in 60s of the last centuries, and currently, does not meet requirements for the integrated management of water resources, including monitoring of climate change impacts on water courses.

Currently, there exists 12 meteorological stations and 22 meteorological/agro-meteorological posts established in the Dniester river basin, and 6 stations and 10 posts in the Danube-Prut river basins. The network consists of both classical hydrological posts (were water level is measured by operators on a daily basis) and new water level monitoring stations equipped with automatic detectors and data loggers. Around 30 gauges are automatic ones. They were installed in the frameworks of several technical assistance projects mainly on the Dniester and Prut rivers, and very few - on smaller rivers. Currently, up to 50% of gauging stations are not in functioning due to different reasons (stolen, broken, no supplies and/ or poor maintenance). Thus, the hydrological data on smaller rivers and their tributaries are very limited.

Water dependent natural ecosystems

Currently, in Moldova, natural ecosystems are in very poor conditions. Forests cover only a small percentage of the country's territory, and they, with some exceptions, are unproductive and are semi-degraded. Remained wetlands are mainly found in the downstream of the Prut and Dniester Rivers. They are mainly small sized and not healthy being subject of anthropogenic and natural pressures and impacts. According to rough estimate, in Moldova, more than 75% of natural wetlands have been lost.

Small rivers are mainly straightened, deepened, and impounded; their floodplains are drained. Feeding water courses, where available, are often blocked by numerous dams. Large-scale changes of small rivers occurred in 50-70s of the last century in favor of agricultural activities on the drained floodplain lands. That time, the engineering paradigm for straightening and deepening the river channels was based on the requirement to let the flood wave pass as quickly as possible. As a result, natural river beds of many small rivers dramatically changed, and practically all-natural barriers - meanders, rapids, backwaters, islands, riverine vegetation were removed. Better part of small rivers was turned into channel-type watercourses being exposed to extremely strong hydro-morphological alterations. In relation to the small river water flows, around 50% of the reservoirs built on them have fixed overflow weirs what means that downstream flow will only occur when the reservoir is full, thus the ecological flow downstream usually cannot be maintained properly. Thus, hydrological engineering, including drainage, land conversion and other human activities have affected the rivers and floodplains and resulted in severe degradation of river and wetland ecosystems in Moldova. Eventually, this pressure will be accelerated under conditions of climate change.

In addition, other factors contributing to increase of risks of natural hazards are the constant changes in land-use practices triggering soil erosion and ultimately leading to siltation of rivers and reservoirs, coupled with insufficient knowledge and capacities on ecosystem-based and non-structural approaches to the climate resilient flood and drought risk reduction.

Thus, the ***project objective*** is to improve national and local resilience to extreme water-related events through promotion of sustainable integrated management of flood and drought risks. International expertise is required to support the project scoping, design the AF Concept and, consequently, develop the AF project Proposal based on thorough situation analysis and extensive stakeholder consultation. During the proposal preparation period, a number of studies and stakeholder consultations will be conducted with the view to further develop a fully formulated proposal. The final output of the international consultant's work will be the AF project Proposal addressing obtained feedback and ready for submission to the AF.

To support formulation of the Project Concept and Project Proposal, the UNDP Moldova has prepared a conceptual framework with indicative outcomes and activities listed below, but to be validated after the first in-country mission:

A. Strengthening of the early warning system for extreme water-related weather events at the national and local level and operational support capacity

- A1. Analysis and optimization of hydrological monitoring network towards the appropriate river basin water management and climate change paradigm.
- A2. Establishing of flash flood early detection and warning system

- A3. Improvement of understanding of local water governance institutions and their capacities for flood risk and drought management by better planning at the sub-basin level
- A4. Introduction of flood and hazards risks maps as an instrument for decision making under the climate change adaptation

B. Strengthening of the flood defense infrastructure

- B1. Inventory of dams and dykes in the central and south parts of Moldova to complete the Register of Hydro-technical Infrastructure
- B2. Dams and dykes safety surveys for identification of higher risks dams and its remediation.

C. Piloted and demonstrated ecosystems-based adaptation to climate change

- C1. Assessment of national potential to implement ecosystems-based climate change adaptation measures (national level)
- C2. Pilot projects for demonstration of ecosystems- based climate adaptation measures.

Against this background, UNDP is seeking a qualified candidate to assist developing of a full set of documentation according the AF formats and requirements.

OBJECTIVE OF THE ASSIGNMENT

The objective of this assignment is to develop under the leadership of an International Lead Consultant and a National Lead Consultant a Project Concept and detailed Project Proposal addressing extreme climate-induced water-related events in Moldova that would completely follow the AF requirements and reflect the draft conceptual framework developed by UNDP Moldova.

The main role/responsibilities of the team of national consultants is to provide technical backstopping for project design phase, including but not limited to national consultations with relevant stakeholders on the potential areas of the project proposal, research and analysis and gathering of the baseline information pertaining to hydrology, river flood control, hidro-technical engineering, ecosystem-based adaptation, and community-based resilience, exploration of complementarities with ongoing relevant initiatives in the area of water management, and others as deemed relevant.

OUTCOME OF THE ASSIGNMENT

The end result of the assignment will be a final version of the Project Concept and a developed in required details the AF Project Proposal addressing extreme climate-induced water-related events in Moldova submitted to the AF.

I. SCOPE OF WORK AND EXPECTED OUTPUT

In order to achieve the stated objectives, the Consultants will have individual as well as collective responsibilities as described below, but not limited to the following:

1. Consultant in hydro-engineering (CHE)

The Consultant will be responsible for dealing with following project's IDEAS, formulated as B1 and B2. Respectively the principal tasks and responsibilities are:

Studies, assessments and analysis:

a) To prepare an overview of the status national flood defense infrastructure and its management, including:

- Assess status of the inventories of hydrotechnical infrastructures (dams and dykes) and propose the follow up steps to complete inventories and analysis of the infrastructure;
- Overview of various project results and recommendations dealing with the flood defense infrastructures, flood risk and hazard assessment, dams safety, prioritization of etc.;

- Description of current technical, operational and managerial situation regarding dams and dykes safety conditions;
- Description and evaluation of current legal, institutional and managerial rules (procedures) as regards to safety control and safety operation of dams and dykes, safeguards responsibilities at national, regional, raional and local levels.

b) Identify principal gaps and obstacles for safeguarding of the existing flood defense infrastructures, including:

- legal aspects
- design and operational standards
- capacities of national and local authorities, as well as water users, to monitor, assess and evaluate the situation regarding safety of flood defense infrastructures;

c) Participate in the pre-selection of demonstration catchments, and conduct the assessment and description of hydro technical infrastructures with the high risks of failure, or other structural measures (bridges, dikes, flow obstacles, etc) and conduct pre-feasibility of their rehabilitation or liquidation (various options and modalities to be considered), which will include, but not limited:

- Description of infrastructure
- Identification of their risks and non-safeties
- Options to reduce the risks
- Preferred feasible solution
- Costs for alternatives

Contribution to the Proposals to the AF:

d) To contribute in formulation of detailed project Proposal to the AF (description of current situation, arguments to improve, alternatives and assessment of preferable options, technical interventions and institutional capacity building required, timeframe and costs for implementation) in regard to:

- safety of the flood defense infrastructures
- assessment of safety from the perspective of their technical and operational and managerial status
- selection and description of several structural projects for rehabilitation and risk reduction

e) To assist the project preparation team by participation in the meetings, discussions, brainstorming, field visits and other project drafting methods to be applied.

2. Consultant in non-structural, ecosystem-based adaptation measures (CES)

The Consultant will be responsible for dealing with following project's IDEAS, formulated as C1 and C2. Respectively the principal tasks and responsibilities are:

Studies, assessments and analysis:

a) To prepare an overview of the national experience in application of non-structural green and ecosystem-based adaptation measures to the climate change impacts in Moldova:

- Review national policy framework (strategies, plans, policies) regarding application of non-structural and ecosystem-based adaptation measures
- Analyze the national legislation to identify the legal provisions relevant to developing ecosystem-based approach for climate change adaptation

- Identify the principal obstacles and gaps to promote and apply ecosystem-based approach in Moldova, including legal, institutional, capacity, attitude of local population and authorities, land-use issues etc.
- Overview of results and recommendations of the successfully implemented national and international projects addressing ecosystem based and non-structural adaptation measures. Evaluate affordability of several options and scenarios for use of natural ecosystems for climate change adoption measures in the conditions of Moldova like:

  ✓afforestation,

  ✓wetland restoration,

  ✓river renaturalization, etc.

b) **Participate in the pre-selection of pilot catchments, and conduct the assessment and description of** non-structural and ecosystem-based adaptations measures within the demonstration catchments with higher potential including, but not limited:

- Description of site
- Identification of flood risk and drought risk reduction potential of the site
- Options to develop ecosystem-based project, including willingness of local stakeholders
- Preferred feasible solution
- Costs.

Contribution to the Proposals to the AF:

c) To contribute in formulation of detailed project Proposal to the AF (description of current situation, arguments to improve, alternatives and assessment of preferable options, technical interventions and institutional capacity building required, timeframe and costs for implementation) in regard to:

- nationwide assessment of ecosystem-based approach to mitigate extreme weather climate change events;
- selection and description of several projects for piloting of the ecosystem-based measures.

d) To assist the project preparation team by participation in the meetings, discussions, brainstorming, field visits and other project drafting methods to be applied.

II. Deliverables and Timeframe

All documentation related to the assignment will be in Romanian and English.

No.	Deliverables	Tentative timeframe/deadline	Responsible team members
	Consultant in hydro-engineering (CHE)		
1	Report on the national flood events and flood defense infrastructure status and its management, including gaps and obstacles for safe guarding of the existing flood defense infrastructures developed and approved by UNDP Moldova (report)	November 2019-December 2020 (up to 8 working days)	***CHE***
2	Inventory and description of hydro technical infrastructures within the selected demonstration catchments with the high risks of failure (dams, dikes) or increasing the risk of floods (bridges, obstacles, etc.) and pre-feasibility of their rehabilitation or liquidation carried-out (report)	May 2020 (up to 8 working days)	***CHE***

	Consultant in non-structural, ecosystem-based adaptation measures (CES)		
3	Report on the existing national experience in application of non-structural and green and ecosystem-based adaptation measures to the climate change impacts in Moldova developed and approved by UNDP Moldova (report)	November 2019-December 2019 (up to 8 working days)	***CES***
4	Inventory and description of potential projects to apply non-structural and ecosystem-based adaptations measures with higher potential of flood risk reduction within the selected demonstration catchments (report)	May 2020 (up to6 working days)	***CES***
5	Contribution to project proposal formulation (description of current situation, arguments to improve, alternatives and assessment of preferable options, technical interventions and institutional capacity building required, timeframe and costs for implementation) provided in a timely manner and of quality.	November 2019-May 2020 (up to 8 working days)	***CHE, CES***
6	Support in organising relevant meetings provided in a pro-active manner and participation in the meetings, discussions, brainstorming, field visits and other project drafting events ensured	November 2019-May 2020 (up to 6 working days)	***CHE, CES***

This is a part-time consultancy. The timeframe for the work of consultant is planned for November 2019 – May 2020.

Management Arrangements: The consultant will work under the guidance of UNDP Moldova Programme Specialist/Cluster Lead.

Financial arrangements: Payments will be disbursed in several instalments, upon submission and approval of deliverables, and certification by UNDP Moldova Programme Specialist/Cluster Lead that the services have been satisfactorily performed.

III. Qualifications and skills required for the team of experts:

1. Consultant in hydro-engineering (CHE)

I. Academic Qualifications:

- University degree in hydro-engineering, environmental engineering and related fields.
- Additional trainings in the domain of disaster (flood) risk reduction (on top of relevant professional experience), will be considered a strong advantage.

II. Experience and knowledge:

- At least 10 years of progressive experience in the hydro-engineering at the national or international level.
- At least 5 years of experience in project design, implementation and management with development assistance projects.
- Demonstrated knowledge of country's flood defense infrastructure and relevant policies and regulations.
- Previous experience in similar assignments is a strong advantage.
- Fluency in English, Romanian and Russian orally and in writing.

2. Consultant in non-structural, ecosystem-based adaptation measures (CES)

III. Academic Qualifications:

- University degree in forestry, environment and related sciences.

- Additional trainings in the domain of forestry (on top of relevant professional experience), will be considered a strong advantage.

IV. Experience and knowledge:

- At least 8 years of experience in the forestry planning and management sector.
- At least 5 years of experience in project design, implementation and management with development assistance projects.
- Demonstrated knowledge of ecosystem-based adaptation measures, including afforestation without restoration.
- Previous experience in similar assignments is a strong advantage.
- Fluency in English, Romanian and Russian orally and in writing.

IV. Documents to be included when submitting the proposals:

Interested individual consultants must submit the following documents/information to demonstrate their qualifications:

1. Proposal:
   - Providing a brief information on each of the above qualifications, item by item
   - A brief methodology on how they will approach and conduct the work
2. Financial proposal (in USD), specifying a fee per day and total requested amount including all related costs, e.g. fees, per diems, travel costs, phone calls etc.;
3. Duly filled in and signed Personal History Form (P11) and at least 3 names for a reference check.