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TERMS OF REFERENCE

Job title:	**National Consultant in carbon assessment and monitoring**
Duty station:	Chisinau, Moldova
Reference to the project:	Clima-East: Sustainable management of pastures and community forests in Moldova's first National Park Orhei to demonstrate climate change mitigation and adaptation benefits and dividends for local communities.
Contract type:	Individual contract
Expected workload:	100 working days
Duration:	October 2013 – October 2016

Background:

Moldova is located in an insufficiently wet zone which results in a high frequency of droughts in the result of climate change which negatively affect its economy. According to climate projections for Moldova[1] the annual mean air temperature in Moldova will increase under all emission scenarios. The most affected sectors will be agriculture and forestry.

Researchers expect that even small changes in temperature and precipitation could greatly affect future forest growth and survival, especially at ecosystem margins and threshold areas such as Moldova's forests. The potential lack of summer precipitation with consequent droughts is the main constraint factor on forest growth and productivity.

Soil erosion and landslides are common features throughout the country, which impacts on soil quality and contribute to GHG emissions. About 877,644 ha of lands are affected by erosion in the country (of which 114,165 ha are heavily eroded). The Government of Moldova recognized the land degradation problems in the country and adopted a country wide Programme for conservation and increase the soil fertility, which states along with other activities mentioned in programme, that soil erosion problems could be solved through afforestation activities on lands affected by landslide and ravine formation and effective grassland restoration and management. The carbon accumulation in soil and vegetation will continue to decline in pastures and degraded lands in the result of climate change factors and unsustainable human activities if no active interventions and long term planning measures to be undertaken.

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[1] National Human Development Report 2009/2010: Climate Change in Moldova. Socio-Economic Impact and Policy Operations for Adaptation and Second National Report (UNDP 2009)

In this regard EU Commission under CLIMA EAST package provided a grant to Republic of Moldova to demonstrate a natural resource management model in the pastures and forests of Moldova which increases ecosystems' capacity to sequester carbon under pending climate risks, while at the same time retaining biodiversity and economic values. The CLIMA EAST pilot project targets the pastures and forest degraded lands located in the Orhei National Park area (33,792.09 ha) and its buffer zone. The project will develop innovative pasture and community forest management systems on the whole territory of the park, including rehabilitation of 500 ha of pastures and afforestation of 150 ha of eroded and non-productive lands. The project will help avert further deterioration of natural resources (biodiversity, land, forest), sequestrate the carbon and reduce the emission of greenhouse gases, improve local pasture and forestry resources, promote better understanding of problems related to climate change impacts and contribute to local/regional sustainable development. The project activity is expected to enhance the GHG removals by preventing soil erosion, by establishing a robust GHG monitoring system. The systematic collection of relevant climate-related data based on developed monitoring system will further help to identify how communities of grassland and forest species will be affected by climate change i.e., what physical and biological changes could take place as a result of changes in temperature, precipitation and aggravation of situation with extreme climate events. This observation and forecasting system will provide the foundation for planning appropriate response measures and integrating them into on-going pasture and forest management efforts.

Objective of the assignment:

The expected output for the assignment is to assist the Ministry of Environment of Moldova and Orhei National Park administration in developing a robust GHG monitoring system and facilitating the carbon stock measurements, forest and pasture monitoring on restored areas under the project in Orhei National Park region.

Scope of work and expected output:

The activity will consist in developing a robust GHG monitoring system in National Park Orhei area. Also the project will facilitate the carbon stock measurements, forest and pasture monitoring on restored areas (500 ha of pastures and 150 ha of afforested eroded and non-productive lands).

In order to achieve the aforementioned objective, the Consultant will have to achieve the following tasks:

1. Develop a computer based system (excel or access) for monitoring of the carbon dividends and ecological integrity of the ecosystem and consult it with the project management team.
   - Development the workplan and timeframe for monitoring of restored pastures and degraded lands.
   - Establishment the indicators:
     a) ecological integrity of the grassland ecosystem (richness and density of indicator species populations, such as indicator species (Festuca valesiaca, Bothriochloa ischaemum, Stipa capillata, Poa bulbosa, Poa angustifolia, Artemisia austriaca)).
     b) volume of biomass growth for forest ecosystems;
     c) carbon benefits
2. Utilize experience in GHG inventory and vulnerability assessment tools AR-AM0002 (version 03), where appropriate, or propose other methodology, for carbon monitoring and assessment of afforested degraded lands. The monitoring should be carried out before and after afforestation activities, in order to establish the baseline and progress by the end of project intervention. Following parameters should be monitored:

- Above-ground tree vegetation should be monitored by measuring the growth of individual trees in permanent sample plots at fixed intervals, keeping track of growth, ingrowth, and mortality and associated changes in carbon of individual trees.
- The changes in carbon stocks of dead wood should be measured taking into account the respective characteristics of standing and lying dead wood.
- The litter biomass can be measure in accordance of the approved methodology AR-AM0002 (version 03).
- Belowground biomass will not be measured, but the data will be collected from the local forestry inventory data and Good Practice Guidance on Land Use, Land Use Change and Forestry (IPCC 2003) and published literature.
- Lying dead wood and herbaceous vegetation will not be monitored.
- Soil carbon should be measured using temporary plots by taking soil samples to a depth of 30 cm. The soil sampling should cover both rich and poor strata and the sample size calculated ensures the quality assurance and cost effective measurement of changes in the soil carbon.

3. Monitoring activities on the restored pasture lands should be carried out before and after restoration activities, in order to establish the baseline and progress by the end of project intervention. Following parameters should be monitored:
- Soil carbon from pasture lands will be monitored using AR-AM0002 (version 03) methodology. The methodology will be agreed with the project management team before starting monitoring activities.
- Biomass of herbaceous vegetation of pasture lands will be measured using AR-AM0002 (version 03) methodology or other relevant tools tested at the national or regional level.
- The biodiversity monitoring on the restored pasture lands will be based on the biodiversity indicators, which will include the floral community richness and floral community dominance. The indicator species populations, will be determined in the baseline. A monitoring table for biodiversity issues is provided (Table 1).
- Small sample plots will be selected at random (no more than 10 plots), however, ensuring a minimum distance between points of 250 meters for floral monitoring. For each plot, a control plot on an adjoining site will be monitored to establish baseline reference conditions.
- The floral community will be assessed using the permanent small plots of 5 m x 10 m where all individuals are assigned to species and recorded.

Table 1: Indicators and procedures for biodiversity monitoring

Indicator	Methodology/ Data sources	Frequency/ Dates of evaluations	Documentation
Floral species diversity in project sites relative to control sites	Field surveys of established monitoring plots	As per carbon monitoring schedule (late spring and fall)	Report to PMT
Avian species diversity in project sites relative to control sites	Field surveys of established point counts	As per carbon monitoring schedule (late spring)	Report to PMT
Floral community dominance index and native: exotic species ratio in project site and adjacent control sites	Field surveys of established monitoring plots	As per carbon monitoring schedule (late spring and fall)	Report to PMT

4. Based on the observations from monitoring activities provide recommendations for planning appropriate response measures and development of recommendations for project experience replication based on the monitoring results and present them to the project management team.

Deliverables and Timeframe:

1. System for monitoring of the carbon dividends and ecological integrity of the ecosystem in place **by 30 October 2013.**
2. The baseline established based on the results of a survey of the degraded lands before afforestation (soil carbon monitoring) **by 10 December 2013.**
3. The baseline established based on the results of a survey of the pastures before restoration **by 30 October 2014**.
4. Monitoring of pasture lands and afforested lands carried out after restoration activities **by 30 October, 2016**.
5. Recommendations for project experience replication based on the monitoring results developed **by 30 October, 2016**.

Management Arrangements:

Consultant will work under the overall guidance of the UNDP CLIMA EAST Project Manager, in coordination with the Ministry of Environment of Moldova, Agency "Moldsilva" and Local Public Authorities from Orhei National Park area. The Contractor will report to the UNDP CLIMA EAST Project Manager.

Financial arrangements:

Payment will be disbursed in four instalments upon submission and approval of the final documents as specified under 'Deliverables and Timeframe' section and certification by the Project Manager, and UNDP Portfolio Manager, that the services have been satisfactorily performed.

Qualifications and Experience

- Graduate degree in biology or related fields;
- At least 5 years of significant experience in carbon and biodiversity inventory, forestry or related issues in Moldova;
- Technical knowledge in the targeted focal area(s);
- Work experience with projects financed by international organizations will be an asset;
- Experience in working with local public authorities and local communities.

Competencies:

- Capacity for analytical studies;
- Ability to undertake field works are strongly required ;
- Ability to plan and organize his/her work, observing deadlines and achieving results.

Language requirements:

- Fluent in written and oral communication in Romanian;
- Knowledge of English or/and Russian will be a strong asset.