

Monitoring & Evaluation (M&E) Plan and Impact Statement Template

Objective of the M&E Plan and Impact Statement:

- The M&E Plan and Impact Statement must be designed based on the Technical Assistance Response Plan and must enable the Implementer to complete the Closure Report at the end of the assistance.

Process for filling in the template:

- The Implementer must identify relevant quantitative and qualitative indicators as specified in the Closure Report. A sub-set of indicators to monitor and assess must be chosen among these.
 - The Implementer may also identify other specific, measurable, achievable, relevant, and time-bound indicators suitable to monitor Activities, Outputs and anticipated Outcomes from the technical assistance and add to the M&E Plan and Impact Statement.
 - During implementation of the TA or FTA, the Implementer must collect all relevant data as described in the Monitoring & Evaluation Plan. Aggregated data on selected indicators as well as an updated version of the Impact Statement will be presented in the Closure Report at the end of the assistance.
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Basic Information	
Title of response plan	SOIL EROSION VALUATION USING ADVANCED LABORATORY MEASUREMENT METHODS TO SUPPORT CLIMATE RESILIENT AGRICULTURE AND FOOD SECURITY
Technical assistance reference number	CONTRACT NO. 3000099560 Request ID# 2022000003
Country/ countries	SUDAN
NDE focal point and organization	Huyam Ahmed Abdalla Higher Council for Environment and Natural Resources CTCN focal point Khartoum- Sudan Mek Nimir Street E. hoyamahmed66@gmail.com -Phone:00249129030174 WhatsApp: 00249908273803
Sector(s) addressed	AGRICULTURE & FOOD SECURITY, CLIMATE CHANGE
Technologies supported	Evaluate soil erosion using advanced atomic absorption to support climate resilient agriculture and food security in Sudan

Implementation period and total duration	18 months - April 11, 2022 - Dec 11, 2023
Total budget for implementation	250,030.00 USD
Designer of the response plan	RCMRD
Implementer of response plan	RCMRD

(A) Outputs and Activities as described in the Response Plan	(B) Indicator	(C) Expected results	(D) Method and frequency for data collection	(F) Comments
Output 1: TA coordination mechanism established	<ul style="list-style-type: none"> Number of Stakeholders in a working group Number of consultative meetings conducted with the working group Multi-stakeholder inception workshop Report 	<ul style="list-style-type: none"> Stakeholders in a working group, Consultative meetings conducted with the working group, Multi-stakeholder inception workshop Report 	<ul style="list-style-type: none"> Project report Meeting minutes Workshop report 	<ul style="list-style-type: none"> Full participation and cooperation of stakeholders Successful physical and online meetings with partners Full participation and cooperation of stakeholders The communication channels for online meetings are anticipated to be a challenge for Sudan NRDG based on previous experience
Activities:				
1.1 Map relevant stakeholders and establish a stakeholder working group, 1.2 Organize consultative meetings with the working group, 1.3 Organize a multi-stakeholder inception workshop				
Output 2: Site selection and data collection	<ul style="list-style-type: none"> Report on areas of eroded soil that are particularly vulnerable to climate change Report on baseline data, field data collection protocols, mapped soil and project scope Soil mapping methodology 	<ul style="list-style-type: none"> Technical report Field report technical report Field protocol & soil mapping methodology 	<ul style="list-style-type: none"> Field report Field report Technical exchange and co-development meetings 	<ul style="list-style-type: none"> Co-development of methodology to identify degraded areas. Target beneficiaries will undertake data collection and laboratory tests for the samples Co-development of methodology to identify degraded areas

Activities: 2.1 Identification of the sites and logistics. 2.2 Identifying areas of eroded soil that are particularly vulnerable to climate change 2.3 Developing Earth observation techniques for soil mapping				
Output 3: Soil erosion assessment	<ul style="list-style-type: none"> • Russle model - RUSLE modelling approach • Digital Soil Mapping methodology • Soil erosion mapping framework 	<ul style="list-style-type: none"> • Functional RUSLE model • Digital maps • Applicable Framework on soil erosion mapping 	<ul style="list-style-type: none"> • RUSLE modelling approach • Digital Soil Mapping report • Soil erosion mapping report 	<ul style="list-style-type: none"> • Co-development of the RUSLE model, digital soil mapping and soil erosion framework
Activities: 3.1 Develop - Russle model - RUSLE modelling approach will be used to determine the spatial extent of soil erosion risk, quantify the annual soil loss rates, and delineate the priority areas for climate-smart and sustainable soil management. 3.2 Digital Soil Mapping techniques - Digital Soil Mapping techniques will be applied to create spatially explicit digital maps of soil functional properties, such as NPK, SOC and pH to assess the impact of soil erosion. 3.3 Develop soil erosion mapping framework- (Proposed RUSLE-GEE framework)				
Output 4: Monitor the evolution of the erosion overtime and plan actions	<ul style="list-style-type: none"> • Criteria and indicators to monitor the evolution overtime • Methodology for Soil erosion modelling • Number of policy briefs on Criteria and indicators and guidance to develop local soil erosion modelling • Report on adaptation measures to address soil degradation and development of strategic action plan • Consultative and validation workshop report • Framework for UAV and remote sensing technologies in agriculture 	<ul style="list-style-type: none"> • Evolution criteria and indicators • Soil erosion modelling methodology • Policy briefs • Strategic action plan to address soil degradation • Workshop report • Drone mapping framework 	<ul style="list-style-type: none"> • Criteria and indicators report • Soil erosion modelling report • Policy briefs • Report on adaptation measures • Validation workshop report • Framework for UAV and remote sensing technologies report 	<ul style="list-style-type: none"> • Collaboration and co-development amongst the technical working groups
Activities: 4.1 Develop criteria and indicators to monitor the evolution overtime 4.2 Develop guidance for Soil erosion modelling 4.3 Production of policy briefs on Criteria and indicators and Guidance to develop local soil erosion modelling 4.4 Identify adaptation measures to address soil degradation and development of strategic action plan 4.5 Consultative and validation workshops to present the action plan, the indicators, the policy briefs, the guidance 4.6 Development of a framework for UAV and remote sensing technologies in agriculture				
Output 5: Train stakeholders and disseminate information about the results of the TA (Training on UAV and remote sensing technologies)	<ul style="list-style-type: none"> • Number of participants identified • Training Materials • Number of people trained on UAV and remote sensing technologies • Gender Analysis report • Anticipated number of direct and indirect beneficiaries as a result of the TA 	<ul style="list-style-type: none"> • Training on application of Remote sensing/drone in soil mapping • Gender analysis report • List of beneficiaries disaggregated into sex and adaptation and mitigation 	<ul style="list-style-type: none"> • Training reports and materials 	<ul style="list-style-type: none"> • Co-development of the training curriculum and materials • Collaboration and integration of gender inclusion • Participants will utilize the acquired skills

Activities

- 5.1 Identification of training participants and development of training materials & Gender Analysis
- 5.2 Gender Analysis
- 5.3 Facilitation of a 5-day training on UAV and remote sensing technologies

Note: The information in the table below will be used by the CTCN for public communication of the achieved and expected results of the Technical Assistance through the CTCN website www.ctc-n.org and other communication channels. See for example: https://www.ctc-n.org/sites/www.ctc-n.org/files/benin_a_ag_forestry.final_.pdf

Impact Statement	
Challenge	<p>Physical infrastructure Although NRGD, the institution responsible from soil conservation and land reclamation, has a Central Soil Laboratory for soil, plant, and fertilizers, it is not well-equipped with tools and systems for assessing degree of soil erosions, plant and fertilizers, some instruments are inoperative (Spectro photometer and Flame photo meter), others require replacement to cope with modern ones. The laboratory was equipped with atomic absorption instrument, but it was not functioning due to the lack of accessories (computer, printers etc..) and lack of software to operate the tool for soil and plant analysis. There was no fully equipped remote sensing laboratory (limited global positioning system, have no drones, maps printer, computer etc. for soil survey).</p> <p>Technical Expertise Technical expertise insufficient specialized expertise in the field of soil properties measures. No national biophysical soil health indicators o Low institutional capacities to address climate change adaptations needs in relation to sustainable soil management; inadequate monitoring framework to support climate resilient livelihoods regarding soil, o Low levels of climate impacts information and communications, low levels of awareness on systematic observation and seasonal forecasting for soil conservation, early warning systems; and lack of skills/knowhow in areas of vulnerability monitoring and mapping.</p> <p>Financial constraints Financial constrains due to the Sudan circumstances; High cost of capital and interest rates, High inflation rate and high price fluctuations; high cost of operational cost. o Ineffective coordination between governmental organizations and lack of synergies may increase the cost of implementation.</p>
CTCN assistance	<p>The Technical Assistance will determine the spatial extent of soil erosion hazard, quantify the annual soil loss rates, and delineate the priority areas for climate-smart and sustainable land management (CS-SLM). Additionally, the Project will assess the impact of the on-going soil erosion on the overall soil health and fertility status of the area and provide its conclusions. It seeks to evaluate the soil erosion using advanced atomic absorption to support climate resilient agriculture and food security in Sudan. This method is expected to provide a basis over which new or different methods of development of soil- and climate-based systems can be compared and objectively evaluated. Earth Observation based monitoring systems complement the qualitative and quantitative analysis of micronutrients in the soil, enhancing the overall understanding of erosion. EO-based monitoring systems could play a significant role in improving soil information system and crop production assessments by validating soil analysis assessments identified through field soil surveys within a targeted area.</p>

<p>Anticipated impact</p>	<p>The technical assistance will contribute to enhanced the technological capacities by filling information gaps, provide physical and human capacities and demonstration of these technologies’ application.</p> <p>The technical assistance will support technology transfer mechanism for using atomic absorption and EO tools including drones in monitoring the climate change variables on soil and their impacts on the agricultural productivity, that will lead to strengthen the soil monitoring systems and raise the resilience of the venerability of the sector and ecosystem (Core indicator 2)</p>
<p>Anticipated co-benefits from the TA</p>	<p>All activities will be designed to be gender-sensitive and benefit for all. Ministry of Agriculture and Natural Resources, usually create opportunities for discussion and learning, for both</p>
<p>Gender aspects of the TA</p>	<p>For this proposed action the gender mainstreaming will be planned to facilitate integration of gender equality in the design, planning and execution of activities. Gender equality is also recognized as an integral part of the stakeholder engagement and capacity building process, essential for achieving social justice, and for ensuring equitable and sustainable human development for all, reports will be gender-disaggregated data and monitoring progress towards gender equality.</p> <p>Technical staff will participate equitably in decision-making related to climate technology implementation and use, so both they will be benefit equitably from technical assistance and project-related training</p>
<p>Anticipated contribution to NDC</p>	<p>Following the implementation of this TA, it is planned that the country will start implementing some of the actions that will be identified in the plan of actions defined to increase the resilience of the country. This is expected to assist in the integration of climate mitigation and adaptation into Sudan’s national sustainable development process to achieve low-carbon and resilience development objectives.</p>
<p>The narrative story</p>	<p>The Sudanese Natural Resources General Directorate of Ministry of Agriculture and Natural Resources (NRGD) with the support from Climate Technology Centre and Network (CTCN) seeks to evaluate the soil erosion using advanced atomic absorption to support climate resilient agriculture and food security in Sudan. This method is expected to provide a basis over which new or different methods of development of soil- and climate-based systems can be compared and objectively evaluated. Earth Observation based monitoring systems complement the qualitative and quantitative analysis of micronutrients in the soil, enhancing the overall understanding of erosion. EO-based monitoring systems could play a significant role in improving soil information system and crop production assessments by validating soil analysis assessments identified through field soil surveys within a targeted area. The technical assistance shall contribute to enhance technological capacities by filling information gaps, providing physical and human capacities and demonstration of application Earth Observation technologies. Besides, this technical assistance will support technology transfer mechanism in using atomic absorption and Earth Observation tools including the use of UAVs in monitoring the climate change variables on soil and their impacts on</p>

	agricultural productivity, thereby strengthening soil monitoring systems and raising the resilience of the vulnerability of the agricultural sector
Contribution to SDGs	<p><i>To the extent possible, please describe contribution to approximately 3 SDGs, including SDG13, with a few sentences for each SDGs concerned.</i></p> <p><u>Goal: 2</u> SDG: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture</p> <ul style="list-style-type: none"> • Direct contribution from CTCN TA: Direct contribution from CTCN TA <p><u>Goal: 6</u> SDG: Ensure availability and sustainable management of water and sanitation for all</p> <ul style="list-style-type: none"> • Direct contribution from CTCN TA: Sudan is facing a strong erosion problem. Erosion is directly connected to water. <p><u>Goal: 13</u> SDG: Take urgent action to combat climate change and its impacts.</p> <p>13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries</p> <ul style="list-style-type: none"> • Direct contribution from CTCN TA: The mapping of Sudanese soils will help defining a plan of actions to increase the resilience of the country to erosion. <p>13.2 - Integrate climate change measures into national policies, strategies, and planning</p> <ul style="list-style-type: none"> • Direct contribution from CTCN TA: Frameworks, policy briefs, guidance on soil mapping will be delivered. <p>13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.</p> <ul style="list-style-type: none"> • Direct contribution from CTCN TA: Governmental institutions will be trained to soil mapping and will be able to comment the deliverables before their final approval. <p>13.b - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth, and local and marginalized communities.</p> <ul style="list-style-type: none"> • Direct contribution from CTCN TA: Mapping the soils will enable Sudan to make a better planning and a better use of its resources.