

<b>Country</b>	<b>Sudan</b>
<b>Request ID#</b>	<b>2019000057</b>
<b>Title</b>	<b>Developing Methodology and Capacity for Monitoring Climate Change and its Impacts on Agriculture in Sudan through Earth Observations</b>
<b>NDE</b>	National council for Environment Huyam Ahmed Abdalla Ahmed Position: Environmental Inspector hoyamahmed66@gmail.com. Address: - MekNimir Avenue, Khartoum, Sudan
<b>Proponent</b>	Ministry of Agriculture and Forests Contact Person: Nora Abdelraheim Khojali Position: Earth Observation Expert. Email: <a href="mailto:norakhan_2000@yahoo.com">norakhan_2000@yahoo.com</a> . <a href="tel:0024912621683">Telephone: 00249 12621683</a> Address: Osman Degna Street – Khartoum- Sudan

#### **Summary of the CTCN technical assistance**

*The summary should provide a brief description of the problem (barrier to climate technology deployment) and how the technical assistance will address it (summary of outputs and activities). Please also briefly indicate national actors involved and the anticipated timeline. Please note this summary will be used for public communication purposes so it is important that it is well written. (maximum 1250 characters including spaces)*

The increase in global temperature will affect all the Sudan key sectors. Vulnerable sectors to rises in temperature are particularly rainfed agriculture, aquaculture, natural ecology systems and biodiversity, water resources, and energy (production and consumption). This ultimately increases the vulnerability of certain communities, such as poor farmers, pastoralists and generally communities that rely on rainfed agriculture. For the Agriculture sector, the climate impacts point to the connection between climate change and agricultural productivity. It shows that four climate stressors – temperature increase, rainfall variability, droughts, and floods – affect the agricultural sector and ultimately reduce its productivity. This predominantly affects poor farmers, poor people, senior citizens, children, and women<sup>1</sup>

This technical assistance targets to enhance the resilience of the Agriculture sector to these climate change adverse impacts. It will contribute to enhancing the Sudan national agricultural monitoring system through the integration of earth observation and geospatial technology and capacity development. This work will include the following main activities.

- Activity 1. Development of implementation planning and communication documents
- Activity 2. Identifying and mapping areas that are particularly vulnerable to changes in climate
- Activity 3. Baseline assessment and mapping of land health
- Activity 4. Interactive decision dashboard integrating climate variables with soil and land health

These activities will aim to identify areas that are particularly vulnerable to changes in climate and/or management is to develop a set of biophysical indicators or proxies for indicators that can be readily

<sup>1</sup> IFPRI working paper, *Climate Change and Agriculture in the Sudan*, Sept 2018

measured and monitored over time. This assistance will include development of methodologies and user-friendly dashboards that will help in assessment of soil and land health, mapping of climate vulnerable hotspots, biomass predictive models that can be applied in yield prediction and agricultural water use.

**Agreement:**

*(If possible, please use electronic signatures in Microsoft Word file format)*

**National Designated Entity to the UNFCCC  
Technology Mechanism**

Name: Huyam Ahmed Abdalla Ahmed

Title: Environmental Inspector

Date: 12 /Jul/2020

Signature:



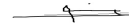
**Proponent** (signature of the Proponent is optional)

Name: Nora Abdelraheim Khojali

Title: Earth Observation Expert.

Date: 27/09/2020

Signature:



**UNFCCC Climate Technology Centre and Network (CTCN)**

Name: Rose Mwebaza

Title: CTCN Director

Date: 28/09/2020  
Date: .....

Signature: .....



## **1. Background and context**

*Please provide a brief description of the background and context for the CTCN Response Plan. Please include national and sectoral information using recognized and publicly available sources. (maximum 2500 characters including spaces).*

Agriculture is the most important sector of Sudan's economy and it is crucial for meeting the country's food security. It is the main livelihood source for more than 70 per cent of the population and about 80 percent of the labour force is employed in agriculture and its related activities. In addition, agriculture contributes to about 30-35 per cent to the GDP and generates around 90 per cent of non-oil export earnings. According to Sudan's NAPA (2007), Sudan NDC and its First National Communication to the UNFCCC (2003), agriculture has been identified as one of the three highest priority sectors most vulnerable to climate change. For example, crop production is predicted to decline substantially with adverse impacts on both local incomes and food security.

Climate change is emerging as one of the greatest long-term challenges facing society. Developing satellite systems that measure and monitor climate change, help mitigate its consequences, and reduce the uncertainties. The GEO Global Agricultural Monitoring initiative was initially launched by the Group of Twenty (G20) Agriculture Ministers in June 2011, in Paris. The initiative forms part of the G20 Action Plan on Food Price Volatility, which also includes the Agricultural Market Information System (AMIS, <http://www.amis-outlook.org>), another inter-institutional initiative with a Secretariat hosted by the UN Food and Agriculture Organization (FAO). The G20 Ministerial Declaration states that GEOGLAM "will strengthen global agricultural monitoring by improving the use of remote sensing tools for crop production projections and weather forecasting". This outlines the importance of developing Earth observation systems. Sudan has not however had the opportunity to fully develop these systems mainly due to technology and financial barriers.

EO-based monitoring systems could play a significant role in improving existing agricultural statistics and crop production assessments. However, Sudan, like other developing countries, is yet to fully take advantage of the EO-based monitoring systems. Referring to the Priorities in agriculture sector as outlined in Sudan NDC, the technical assistance will support technology transfer mechanism for using Earth Observation in monitoring the climate change variables and their contributions in the agricultural management that will lead to strengthen the agricultural Monitoring systems and raise the resilience of the vulnerable communities especially in the traditional rain fed sector.

This work will include the following main activities.

Activity 1. Development of implementation planning and communication documents

Activity 2. Identifying and mapping areas that are particularly vulnerable to changes in climate

Activity 3. Baseline assessment and mapping of land health

Activity 4. Interactive decision dashboard integrating climate variables with soil and land health

These activities will aim to identify areas that are particularly vulnerable to changes in climate and/or management is to develop a set of biophysical indicators or proxies for indicators that can be readily measured and monitored over time. Recent advances in hierarchical sampling methods using the Land Degradation Surveillance Framework (LDSF) coupled with earth observation data analytics and novel statistical approaches have opened for assessments and mapping of soil, vegetation, land use and various ecosystem metrics at landscape scale. Building on these advances and the vast libraries of soil, vegetation and remote sensing data collected by and hosted at World Agroforestry (ICRAF), spatial assessments of soil constraints and land degradation can be conducted at the selected spatial scales for Sudan.

The proposed methods provide consistent protocols and analytical procedures that vastly improve our understanding of how various processes interact at different scales, which is one of the primary limitations of current assessments of the impacts of climate change on agricultural systems, and

ecosystems in general. Baseline mapping at fine spatial resolution (30m) will be conducted for.

- Soil condition (soil carbon, pH, and other soil functional properties)
- Land degradation risk factors such as soil erosion and root-depth restrictions
- Climate resilience (proxies), such as.
  - Number of days with precipitation
  - Rainfall aggressiveness
  - Mean annual precipitation
  - Annual temperature ranges and trends
- Cropland phenology and biomass/yields (where data is available to train predictive models)
- Agricultural water use
- Vegetation cover dynamics and trends

Finally, interactive tools and a dashboard will be developed through a structured stakeholder engagement co-design process using the Stakeholder Approach to Risk-Informed Decision Making (SHARED) methodology. This dashboard will provide stakeholders in Sudan with a user-friendly way of interacting with the various spatial assessments and maps outlined above, providing up-to-date evidence that can be applied at various levels of decision making. To begin with, the NDE/proponent will select a pilot area/region. The underlying analysis and decision dashboard will be scaled to the entire country with other sources of funding.

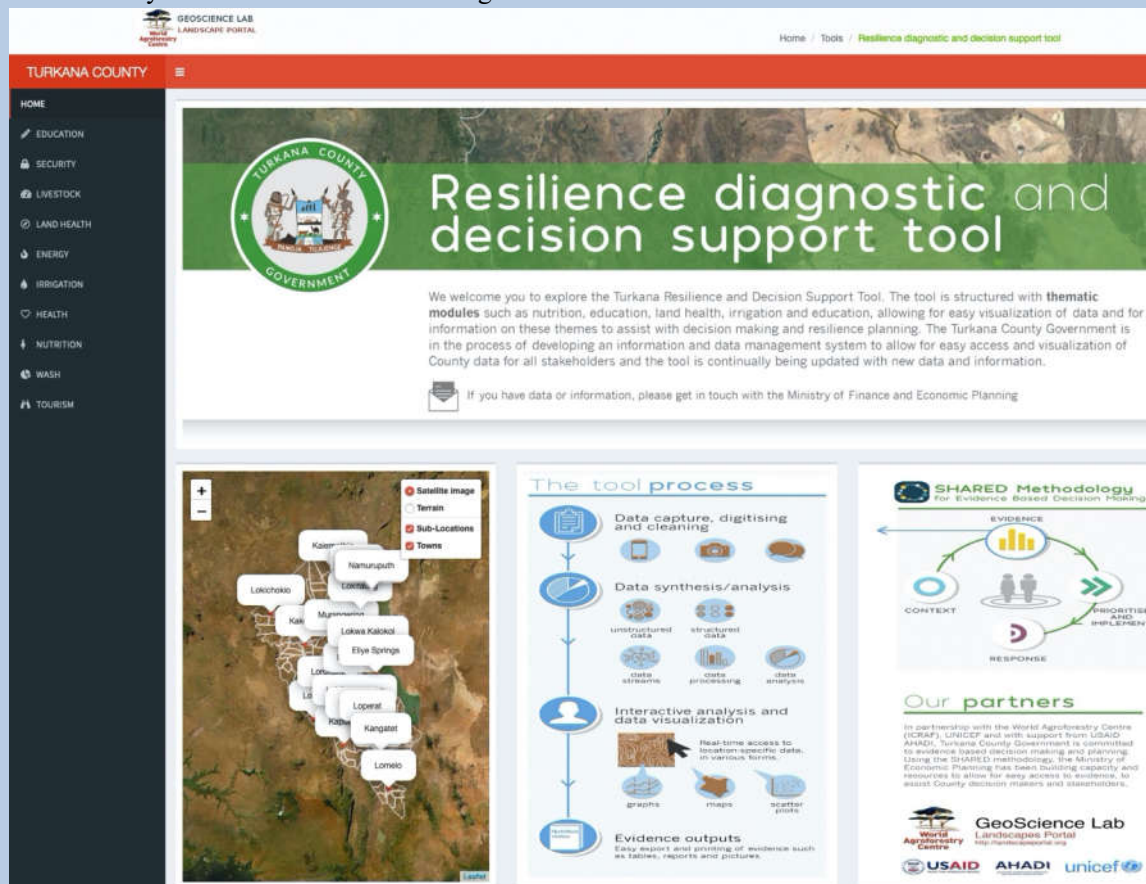


Figure 1. Example dashboard: The Resilience Diagnostic and Decision Support Tool for Turkana County in Kenya. This dashboard can be accessed and explored here: <http://landscapeportal.org/sharedApp/>.

## **2. Problem statement**

*Founded on the national and sectoral context as detailed in the section above, please include a brief problem statement clarifying the main problems and barriers for climate change mitigation and/or adaptation in terms of climate technologies that the CTCN Response Plan will address and overcome. (maximum 1250 characters including spaces).*

Agriculture is a key sector in Sudan. The sector contributes up to a third of the country GDP which constitutes 80 percent of non-oil exports and is a source of livelihood for about 65 percent of the population. The sector is critical to ensure food security for the growing population which is expected to double by 2050. The economic performance of the Sudan, particularly agriculture; depends on weather conditions, especially rainfall the major climatic variable. However, climate change impacts are being experienced in the country, in the last forty years; summer rainfall pattern across the country has been decreasing by 15 to 20 percent, while temperatures have recorded an increasing trend. These climate changes are having a profound impact on the sector and thus necessary action needs to be put in place to build the sector resilience to climate change.

The Republic of Sudan prioritized development goals, such as poverty alleviation, food security, services, GDP increase and natural resource management in its 25-year strategy. The country has also developed sectoral priorities for adaptation and mitigation in its NDC, TNA and NAP. Among the prioritized strategies is the used of earth observation systems for agricultural monitoring. That is the basis for this technical assistance request.

In Sudan, the Barriers to the Transfer and Diffusion of Climate Technologies in Agriculture sector and the overall adaptation technologies is more obvious in Systematic observation and seasonal forecasting, early warning systems, crop insurance, drought-resistant crops, crop management, land management, improved water use and availability, including rainwater harvesting. The barriers to adoption of adaptation technologies in the agriculture sector in general includes.

- i. Limitation of financing due to the National macroeconomic conditions; High cost of capital and interest rates, High inflation rate and high price fluctuations; high cost of operational running cost.
- ii. Human and institution development; Ineffective coordination between governmental agencies.
- iii. Research and technological capacity, the digital gap between the developed and developing countries. Insufficient specialized expertise in technology, practice, or organizational system.

This technical assistance will thus aim to contribute to enhancing the technological capacity in adoption of earth observation systems by building the capacity of the local expertise and demonstration of this technology application in the Agriculture sector.

*(Guidance: Please note that multiple activities lead to one Output, and multiple Outputs lead to one Outcome. There can be several Outputs, but only one Outcome description capturing the CTCN technical assistance. Deliverables are the products or services to be delivered to the NDE/Proponent/CTCN based on the Activities and the Outputs.)*

**Objective:** Please provide a one sentence description of the Objective of the technical assistance. The objective of the CTCN technical assistance reflects what the assistance aims to produce and impact.

**Outcome:** (Guidance: The Outcome articulates changes in the institutional and behavioural capacities for climate technology development or deployment. Activities and Outputs contribute to the Outcome, but the Outcome is not within the direct control of the CTCN activities). (maximum 400 characters including spaces)

[illegible]



Climate change has large potential impacts on agricultural production in general and smallholder agriculture. However, many of these potential impacts are still not well understood due to the enormous complexity of climate and ecosystem changes. Hence adaptation strategies are also generally not well defined. There is a need for better spatial targeting of management options that can reduce the vulnerability of the agricultural sector in Sudan to climate uncertainty and shocks. The Geographical areas selected for this project implementation will include White Nile, North Kordofan, South Kordofan, Gezira, Blue Nile and Sennar. A preliminary survey of the existing gridded datasets and their resolutions, available for Sudan that could be useful in this technical assistance. This preliminary survey will inform where to put effort in terms of data collection. The exercise will be desktop based and will make use satellite data from various platform including NASA satellite data, Copernicus, GEO. Other Data source: Rainfall dataset obtained from; a) Global Precipitation Mission (GPM) for rainfall data from year 2015 onward with a resolution of 10Km sq. b) TRMM -NASA for rainfall data before 2015 with a resolution of 25km sq. Temperature dataset obtained for MODIS from year 2000 to date. Analysis methodology to include timeseries computation for the above data

**Activity 2.1: Preliminary analysis/survey of available gridded datasets and Climate data collection; (rainfall and temperature datasets)**

## Activity 2.2: Database design

**Activity 2.3: Spatial datasets and associated analysis** for rainfall/precipitation and temperature trends, including:

- Number of days with precipitation
- Rainfall aggressiveness
- Mean annual precipitation
- Annual temperature ranges and trends

**2.4 Hotspot and vulnerability assessment**, including spatial assessments of extreme rainfall events and their frequency over the period 1998 to 2020.

**2.5 Development of a module to provide forecasting of extreme climate events (10-day forecasts) – to be integrated into decision dashboard (part of deliverable 2.6).**

## 2.6 Development of an Integration of hotspot and vulnerability assessments and maps into interactive decision dashboard.

### Deliverable 1:

- I. A report on climate hotspot mapping and vulnerability assessment. Detailing rainfall timeseries indicating rain days/month; annual rainfall distribution and intensity as well as temperature timeseries
- II. Module to provide forecasting of extreme climate events (10-day forecasts)

[illegible]



**4. Resources required and itemized budget:**

*A detailed activity-based budget for the CTCN assistance will be finalized by the CTCN and Implementer (to be attached as separate excel).*

Activities and Outputs	Input: Human Resources (Title, role, estimated number of days)	Input: Travel (Purpose, national vs. international, number of days)	Inputs: Meetings/events (Meeting title, number of participants, number of days)	Input: Equipment/Material (Item, purpose, buy/rent, quantity)	Estimated cost	
					Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan	
					Minimum	Maximum

<b>Output 1: Development of implementation planning and communication documents</b>						34,050
Activity 1.1: Formulation of i) Detailed work plan, ii) Monitoring and evaluation plan, iii) CTCN Impact Description, iv) Closure and Data Collection report.	Please allocate 1-3 working days for each of the mandatory reports under Activity 1.1.					
<b>Output 2: Identifying and mapping areas that are particularly vulnerable to changes in climate;</b>						78,650
<b>Activity 2.1: Climate data collation</b>						
<b>Activity 2.2: Database design</b>						
<b>Activity 2.3: Spatial datasets and associated analysis</b> for rainfall/precipitation and temperature trends, including: a. Number of days with precipitation b. Rainfall aggressiveness c. Mean annual precipitation d. Annual temperature ranges and trends						
<b>Output 3: Baseline assessment and mapping of land health</b>						110,250
<b>Activity 3.1:</b> identification of Set of biophysical indicators or proxies for indicators that can be readily measured and monitored over time based on the Land Degradation Surveillance Framework (LDSF). 3.4 Analysis and maps of vegetation cover dynamics and trends at moderate spatial						

resolution for 2001 to 2020.						
3.5 Integration of vegetation dynamics analysis module into interactive decision dashboard.						
<b>Activity 3.2:</b> Development of consistent protocols and analytical procedures for assessment of land degradation status and trends						
<b>Output 4; Interactive decision dashboard integrating climate variables with soil and land health</b>						126,500
<b>Activity 4.1:</b> Development of a user-friendly decision dashboard where stakeholders can interact with both climate and soil/land health maps and analysis results.						
<b>Estimated range of costing for the entire Response Plan</b>						334,000

## 5. Profile and experience of experts

Based on the required Human Resources identified in section 4 (Resources required and itemized budget) please provide a description of the required profile of all involved experts for the implementation of the CTCN Response Plan.

Experts required	Brief description of required profile
Please use the same titles for all experts as applied in section 4.	Please provide a short description of expertise and experience needed (education, sectors of expertise, years of experience, country experience, language requirements, etc.).
International expert and team	Senior Geo informatic scientist; A relevant Master's degree and at least 10 years' experience in conducting vulnerability assessments with a focus in Agriculture sector, including at least 5 years in developing country contexts;

leader	experience in Sudan desirable; Proven experience in incorporating climate change in vulnerability assessments
Mid-level Data Scientist	Senior platform developer scientist; A master's degree and 5 years' experience in vulnerability assessments
Mid-level Expert- SHARED; Stakeholder Engagement Specialist	A master's degree in a relevant social science, At least 5 years' experience in facilitation of Stakeholder Engagement through the SHARED approach, knowledge, and experience in
Mid-level Expert (RESEARCHER)	Relevant master's degree in Agriculture or related field, experience in modeling of agricultural water use, land, and soil health assessment

## 6. Intended contribution to impact over time

*Please provide a brief description of the intended contribution to impact over time of the outcome and outputs provided by this technical assistance on resilience to climate change and/or carbon abatement. To the extent possible, please quantify the intended impact contribution, for example by indicated estimated number of people potentially impacted over time, GDP contribution of the focus sector, carbon emissions by the focus sector, etc. This intended contribution to impact is what will happen if the objective (as articulated in section 3) is met. Please ensure relevant complementarity with text in sections 7 to 12. (maximum 1250 characters including spaces)*

- Enhance adaption capacity for Sudan particularly in the Agriculture sector
- Additional climate resilience benefits of improved soil quality, sustainable land management; improved water retention, reduced soil erosion, and inclusion of perennials that are better able to withstand climatic challenges.
- This TA will contribute to build the country's resilience to climate change. Enhancing the adaptation capacity of the Agriculture sector, which is the largest source of livelihood for the country, will help advance several sustainable development goals. Thus, in the long run this TA is expected to advance the SDGs primarily 1,2, 13, 15 and 17 but also significantly in 3,6,7,8 and 10.

## 7. Relevance to NDCs and other national priorities

*Please identify relevance and contribution from the technical assistance to the Nationally Intended Contributions (NDC) and other relevant national prioritized efforts (TNAs, TAPs, NAPs, NAMAs, etc.). (maximum 2500 characters including spaces)*

**Sudan's NDCs** is based on the Sudan's strategy to integrate climate mitigation and adaptation into its national sustainable development process to achieve low-carbon and resilience development objectives. NDC pg. 13; mentioned in one of the its points as intended the contributions Climate-proofing of some of existing developmental project to increase their resilience for current and future climatic changes, GIS&RS, are tools that help and contribute in climate –proofing process, through the availability of geographic and meteorological information's, therefore it return in Crops diversification as intended contributions.

**Sudan's NAP** endorsed by Ministerial council aims to integrate climate risks into all national development planning processes and reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience. Chapter 5 page 47, outlines need for enabling Environments, Technical capacity with new technology such as Earth Observation and its applications and tools will support the quality of resources management and strengthening the vertical and horizontal governmental hierarchies coordination (decision-making) within federal and states ministries, also helps in creating vulnerability hotspot mapping, climate proofing: especial focus needed on development of the national climate scenarios, enhancement of systems observation networks, training in methods and tools for vulnerability hotspot mapping and climate proofing. This can be useful tool for policymakers to prioritize areas in which to invest in adaptation, conduct further research, and/or carry out other efforts to reduce exposure and sensitivity to climate variability and change

**Technology Needs Assessment (TNA);** mitigation strategies focus on Agricultural and Forestry and Other Land Use (AFOLU) Sector. The strategies aim to address the degradation in soil and declining in agricultural productivity in most of the cultivable lands, Soil erosion, loss of soil fertility, flooding and loss of biodiversity are increasing in both irrigated and rain fed areas. strategies include using of the remote sensing for monitoring land degradation and collecting data by GIS to create geo data base which supports precision farming technique and provide

appropriate intervention in specific time with specific appropriate measures to increase agriculture productivity in cultivated land in economic and environmental means. Additionally, space technology and GIS& RS can help in estimating GHGs emissions associated with this sector.

For adaptation strategies in the agriculture sector, the TNA, refers to priorities that will support technology transfer mechanism. This includes new technology of using Earth Observation in monitoring the climate change variables and their contributions in the agricultural management that will led to strength the Food Security Monitoring and raise the resilience of the venerable communities especially in the traditional rain fed sector. Also, it will contribute in stability of crop production (food) through monitoring the trend of the agro-meteorological variables within the agricultural season.

#### **8. Linkages to relevant parallel on-going activities:**

*Please identify relevant previous and ongoing public and private sector initiatives, projects or programmes that the CTCN assistance will specifically build on and contribute to. To the extent possible, please add practical and operational details on the linkages between existing activities and the CTCN assistance. (maximum 2500 characters including spaces)*

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#### **9. Anticipated follow up activities after this technical assistance is completed:**

*Please describe the expected future use of the outputs and deliveries produced by this technical assistance, after the CTCN implementation is completed, towards contributing to the anticipated impacts over time articulated in section 6. For example, what organizations or stakeholders will use the outputs of the technical assistance after it is completed, for what purpose, at what scale and scope the outputs and deliveries will be applied, when and what will be the next steps undertaken, etc. (maximum 2500 characters including spaces)*

#### **10. Gender and co-benefits:**

Imbedded in design of the activities:	<p><i>A gender mainstreaming analysis is mandatory to include for all technical assistances. A gender expert will be assigned to carry out an assessment and evaluation regarding gender mainstreaming during the implementation of the TA.</i></p> <p>Women are more vulnerable to climate change than men, therefore any initiative designed to build resilience and mitigate climate change safeguards women. In Africa and Kenya in particular, women are more involved in agricultural activities and depend on the sector for their livelihood. As this TA aims to make a contribution towards improved productivity and more sustainable agricultural systems in general, this will ensure advancement of gender equality and other co-benefits to include but not limited to, poverty alleviation, improved nutrition and food security, good health and wellbeing among others</p>
Gender and co-benefits intended as result of the activities:	<p><i>Please describe all gender aspects, women's equality and other co-benefits expected because of the CTCN technical assistance.</i></p>



### 11. Main in-country stakeholders in implementation of the technical assistance activities:

Using the table below, please list and describe the role of in-country stakeholders, participants and beneficiaries who will be involved in or directly consulted during implementation of the assistance.

In country stakeholder	Role in implementation of the technical assistance
National Designated Entity	Facilitate /coordinate the TA implementation, between request proponent and implementor.
Request proponent Ministry of Agriculture and Forests	Share knowledge of country work relevant to this TA and Execute the operational products. Work closely with the TA implementor to ensure country ownership of the process and TA products
NDC-Partnership	Provide input mainly on activity 2 of this technical assistance
Research Centers, UN Agencies, NGOs, Private Sector	Contribute to TA development and products operationalizing
Add lines as needed	

### 12. SDG Contributions:

Instructions: Please complete the grey section below for a **maximum of three SDGs** that will be advanced through this TA. A complete list of SDGs and their targets is available here:

<https://sustainabledevelopment.un.org/partnership/register/>.

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs)
1	End poverty in all its forms everywhere	Agriculture is a key source of livelihood for Sudan. TA will thus contribute towards ending poverty as most households especially the poor ones are highly depended on Agriculture.
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	This TA aims to enhance the resilience of Agriculture sector to ensure enhance productivity hence achieve food security and sustainable agriculture
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	
5	Achieve gender equality and empower all women and girls	
6	Ensure availability and sustainable management of water and sanitation for all	
7	Ensure access to affordable, reliable, sustainable, and modern energy for all (consider adding targets for 7)	
	7.1 - By 2030, ensure universal access to affordable, reliable, and modern energy services	
	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix	
	7.3 - By 2030, double the global rate of improvement in energy efficiency	
	7.a - By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	
8	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all	
9	Build resilient infrastructure, promote inclusive and sustainable	

	industrialization and foster innovation	
10	Reduce inequality within and among countries	
11	Make cities and human settlements inclusive, safe, resilient, and sustainable	
12	Ensure sustainable consumption and production patterns	
13	Take urgent action to combat climate change and its impacts	All TAs should indicate relevance to Goal 13 and at least one target below (13.1 to 13.b).
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	Climate change is among key factors adversely impacting the Agriculture sector in Sudan. This TA will thus aim to enhance the sectors resilience to climate change.
	13.2 - Integrate climate change measures into national policies, strategies, and planning	
	13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	
	13.a - Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	
	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	
14	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development	
15	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels	
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	

### 13. Classification of technical assistance:

Please indicate primary type of technical assistance. Optional: If desired, indicate secondary type of technical assistance.

Please tick off the relevant boxes below	Primary	Secondary
<input type="checkbox"/> 1. Decision-making tools and/or information provision	X	<input type="checkbox"/>
<input type="checkbox"/> 2. Sectoral roadmaps and strategies	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 3. Recommendations for law, policy, and regulations	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 4. Financing facilitation	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 5. Private sector engagement and market creation	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 6. Research and development of technologies	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 7. Feasibility of technology options	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 8. Piloting and deployment of technologies in local conditions	X	<input type="checkbox"/>
<input type="checkbox"/> 9. Technology identification and prioritization	<input type="checkbox"/>	<input type="checkbox"/>

Please note that all CTCN technical assistance contributes to strengthening the capacity of in country actors.

### 14. Monitoring and Evaluation process

Upon contracting of the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance. The

*monitoring and evaluation plan must include specific, measurable, achievable, relevant, and time-bound indicators that will be used to monitor and evaluate the timeliness and appropriateness of the implementation. The CTCN Technology Manager responsible for the technical assistance will monitor the timeliness and appropriateness of the Response Plan implementation. Upon completion of all activities and outputs, evaluation forms will be completed by the (i) NDE about overall satisfaction level with the technical assistance service provided; (ii) the Lead Implementer about the knowledge and learning gained through delivery of technical assistance; and (iii) the CTCN Director about timeliness and appropriateness of the delivery of the activities and outputs.*